

PowerTech Plus 4.5L and 6.8L Diesel Engines Level 14 Electronic Fuel System With Denso HPCR

TECHNICAL MANUAL PowerTech Plus 4.5 L and 6.8 L Diesel Engines—Level 14 Electronic Fuel System with Denso HPCR

22FEB08 (ENGLISH)

For complete service information also see:

PowerTech Plus 4.5 L and 6.8 L Diesel Engines—Base Engine	CTM104
Alternators and Starter Motors.....	CTM77
OEM Engine Accessories	CTM67 (English Only)

John Deere Power Systems

LITHO IN U.S.A.

Introduction

Forward

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

This manual (CTM320) covers only Level 14 Electronic Fuel System with the Denso High Pressure Common Rail (HPCR). It is one of six volumes on 4.5 L and 6.8 L engines. The following companion manual covers the base engine and mechanical fuel system. Each manual covers repair, operation, and diagnostics.

- CTM104—Base Engine

Other manuals will be added in the future to provide additional information on electronic fuel systems as needed.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

 This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Use this component technical manual in conjunction with the machine technical manual. An application listing in Section 01, Group 001 identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in sections and groups for the various components requiring service instruction. At the beginning of each group are summaries of the upcoming group.

Before beginning repair on an engine, clean the engine.

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines are metric sized.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manual for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each block of material completely before performing service to check for differences in procedures or specifications. Follow only the procedures that apply to the engine model number you are working on. If only one procedure is given, that procedure applies to all the engines in the manual.

CALIFORNIA PROPOSITION 65 WARNING: Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

RG41183,00000EA -19-04AUG07-1/1

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Section 01

General

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Work In Ventilated Area

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area.



TS220 -UN-23AUG88

DX,AIR -19-17FEB99-1/1

Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



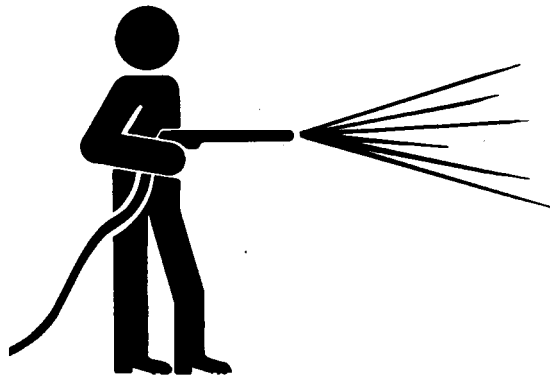
T81389 -UN-07DEC88

DX,ALERT -19-29SEP98-1/1

Work in Clean Area

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90-1/1

Dispose of Waste Properly

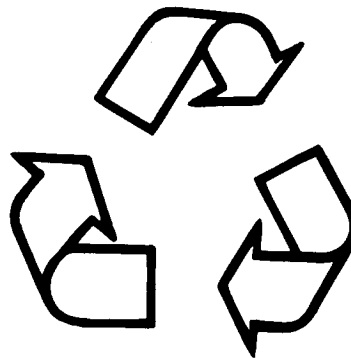
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



TS1133 -UN-26NOV90

DX,DRAIN -19-03MAR93-1/1

Avoid Harmful Asbestos Dust

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.



TS220 -UN-23AUG88

DX,DUST -19-15MAR91-1/1

Handle Fuel Safely—Avoid Fires

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.



TS202 -JUN-23AUG88

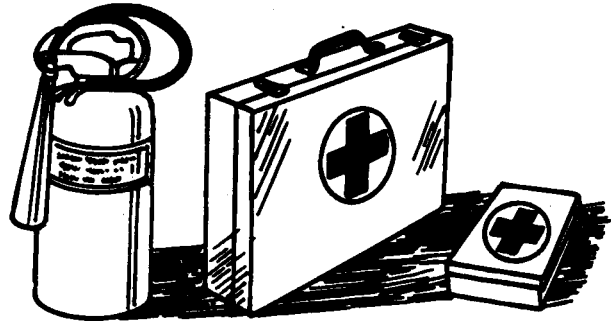
DX,FIRE1 -19-03MAR93-1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 -JUN-23AUG88

DX,FIRE2 -19-03MAR93-1/1

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.



TS1356 -JUN-18MAR92

DX,FIRE3 -19-16APR92-1/1

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4

Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 -UN-23AUG88

DX,FLAME -19-29SEP98-1/1

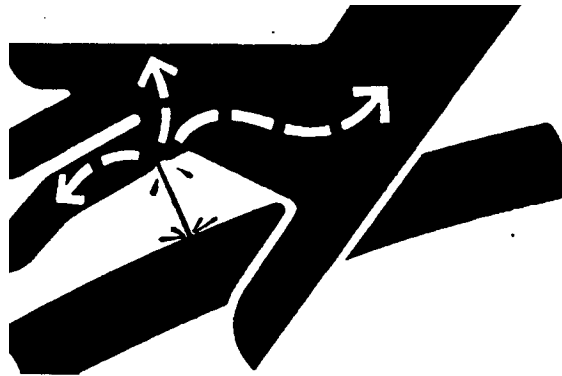
Avoid High-Pressure Fluids

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



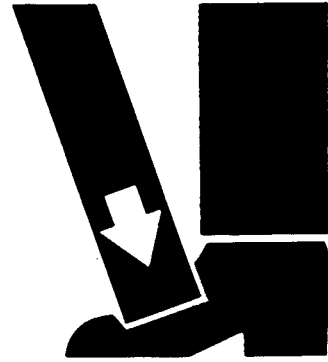
X9811 -UN-23AUG88

DX,FLUID -19-03MAR93-1/1

Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.

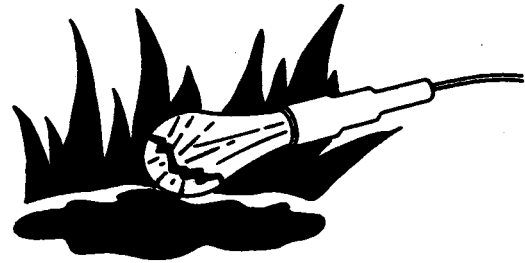


DX,LIFT -19-04JUN90-1/1

TS226 -JUN-23AUG88

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



DX,LIGHT -19-04JUN90-1/1

TS223 -JUN-23AUG88

Live With Safety

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



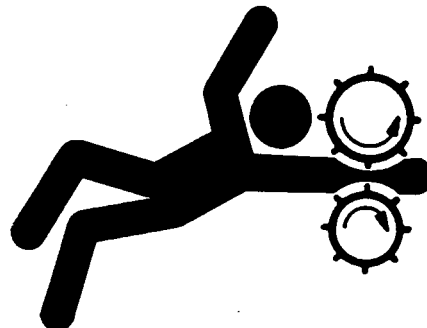
DX,LIVE -19-25SEP92-1/1

TS231 -19-07OCT88

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



DX,LOOSE -19-04JUN90-1/1

TS228 -JUN-23AUG88

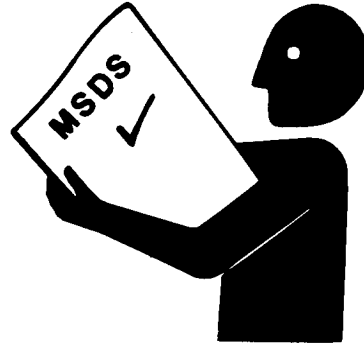
Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



TS1132 -UN-26NOV90

DX,MSDS,NA -19-03MAR93-1/1

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 -UN-23AUG88

DX,NOISE -19-03MAR93-1/1

Remove Paint Before Welding or Heating

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.



TS220 -JUN-23AUG88

DX,PAINT -19-24JUL02-1/1

Stay Clear of Rotating Drivelines

Entanglement in rotating driveline can cause serious injury or death.

Keep tractor master shield and driveline shields in place at all times. Make sure rotating shields turn freely.

Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before making adjustments, connections, or cleaning out PTO driven equipment.



TS1644 -JUN-22AUG95

DX,PTO -19-12SEP95-1/1

Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



TS281 -UN-23AUG88

DX,RCAP -19-04JUN90-1/1

Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.



TS201 -UN-23AUG88

DX,READ -19-03MAR93-1/1

Use Proper Tools

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



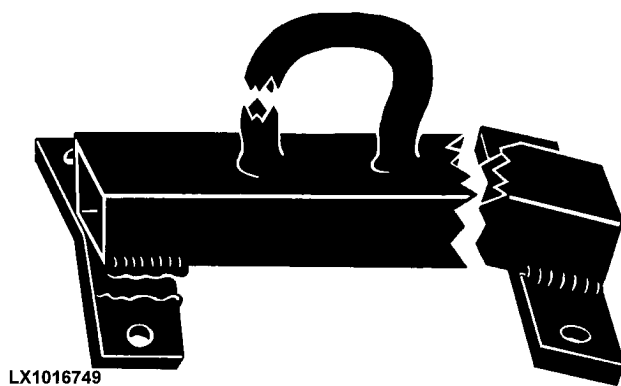
TS779 -JUN-08NOV89

DX,REPAIR -19-17FEB99-1/1

Construct Dealer-Made Tools Safely

Faulty or broken tools can result in serious injury. When constructing tools, use proper, quality materials, and good workmanship.

Do not weld tools unless you have the proper equipment and experience to perform the job.



LX1016749

LX1016749 -JUN-01JUL97

DX,SAFE,TOOLS -19-10OCT97-1/1

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



TS218 -UN-23AUG88

DX,SERV -19-17FEB99-1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

⚠ DANGER

⚠ WARNING

⚠ CAUTION

TS187 -19-30SEP88

DX,SIGNAL -19-03MAR93-1/1

Replace Safety Signs

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



TS201 -JUN-23AUG88

DX,SIGNS1 -19-04JUN90-1/1

Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



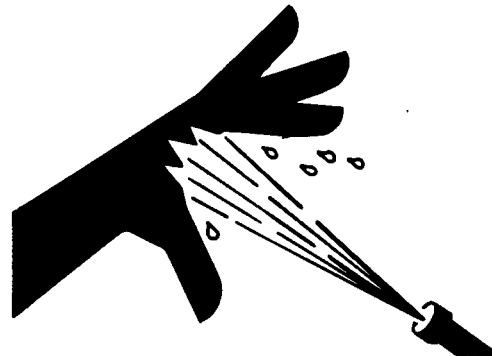
TS204 -JUN-23AUG88

DX,SPARKS -19-03MAR93-1/1

Protect Against High Pressure Spray

Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.

If an accident occurs, see a doctor immediately. Any high pressure spray injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



TS1343 -JUN-18MAR92

DX,SPRAY -19-16APR92-1/1

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.



TS953 -UN-15MAY90

DX,TORCH -19-10DEC04-1/1

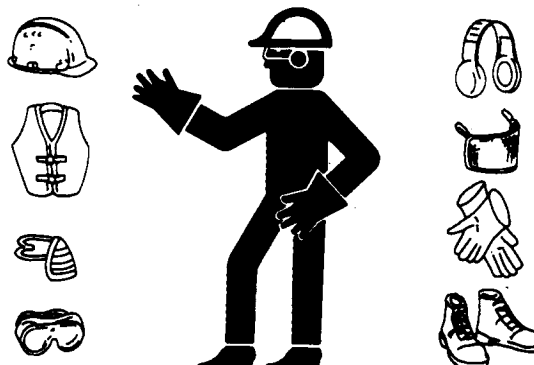
Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

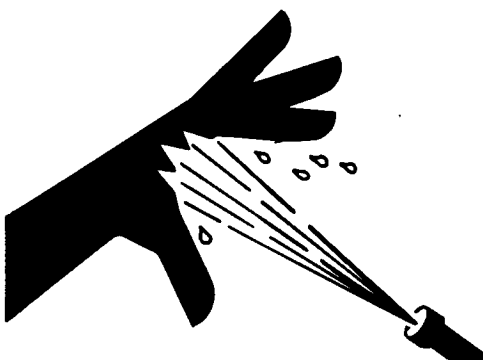


TS206 -UN-23AUG88

DX,WEAR -19-10SEP90-1/1

Wait Before Opening High-Pressure Fuel System

High-pressure fluid remaining in fuel lines can cause serious injury. Only technicians familiar with this type of system should perform repairs. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and nozzles on engines with High Pressure Common Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.



TS1343 -UN-18MAR92

DX,WW,HPCR2 -19-07JAN03-1/1

Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
 - Chemicals labeled '**Danger**': Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
 - Chemicals labeled '**Warning**': Less toxic. Generally require use of goggles, gloves, and skin protections.
 - Chemicals labeled '**Caution**': Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling spray or dusts.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.
- Store chemicals in a secure, locked area way from human or livestock food. Keep children away.
- Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.



A34471

TS220 –UN-23AUG88

A34471 –UN-11OCT88

Handling Batteries Safely



CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (—) battery clamp first and replace it last.



CAUTION: Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Using proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

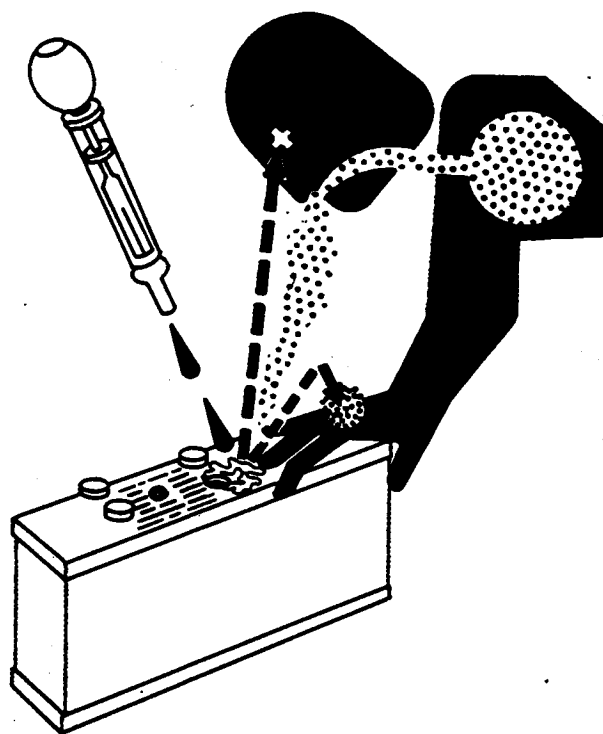
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 qt.).
3. Get medical attention immediately.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**



Explosion

TS204 -UN-23AUG88



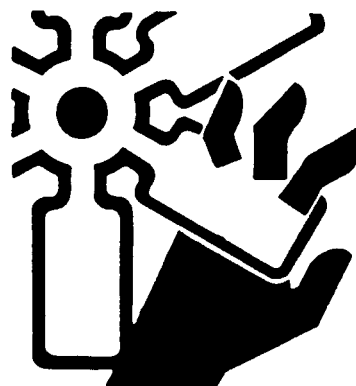
Acid

TS203 -UN-23AUG88

Install Fan Guards

Rotating cooling system fans can cause serious injury.

Keep fan guards in place at all times during engine operation. Wear close fitting clothes. Stop engine and be sure fan is stopped before making adjustments or connections, or cleaning near the front of the engine.



Rotating Fan

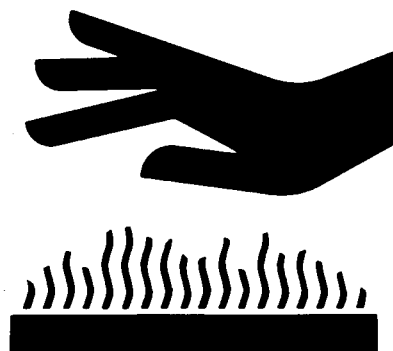
TS677 -JUN-21SEP89

OUO1083,00005FE -19-15OCT07-1/1

Avoid Hot Parts

Avoid skin contact with exhaust manifolds, turbochargers and mufflers. Keep flammable materials clear of the turbocharger.

External dry exhaust parts become very hot during operation. Turbochargers may reach temperatures as high as 500°C (932°F) under full load, and naturally aspired exhaust manifolds may reach 600°C (1112°F) under full load. This may ignite paper, cloth or wooden materials. Parts on engines that have been at full load and reduced to no load idle will maintain approximately 150°C (302°F).



Hot Surface

TS271 -JUN-23AUG88

OUO1083,00005FF -19-22DEC05-1/1

Engine Serial Number Plate Information

IMPORTANT: The engine serial number plate (A) can be easily destroyed. Before “hot tank” cleaning the block, remove the plate.

NOTE: Four-valve head engines have “16V” (for 16 valves total on 4 cylinder engine) or “24V” (for 24 valves total on 6 cylinder engine) printed on a plate located on the rocker arm cover.

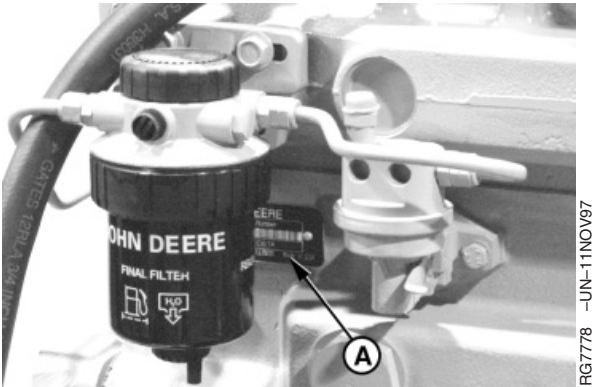
Engine Serial Number (B)

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, and a 6-digit sequential number. The following is an example:

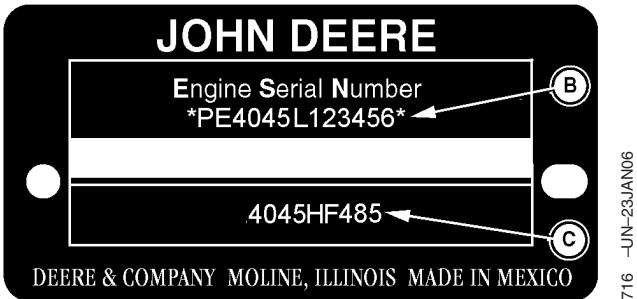
CD4045L123456	
CD	Engine Manufacturing Location
CD	Saran, France
T0	Dubuque, Iowa
PE	Torreon, Mexico
J0	Rosario, Argentina
4	Number of Cylinders
045	Displacement in Liters (4.5 Liters)
L	Emission Tier Level
B	Non-certified engine
C,E or F	Tier 1/Stage I emission certified engine
G, J or K	Tier 2/Stage II emission certified engine
L, M, N or P	Tier 3/Stage IIIA emission certified engine
123456	6-digit unique sequence number

Engine Model Designation (C)

The second line of information on the serial number plate identifies the engine/machine or OEM relationship. See ENGINE APPLICATION CHARTS later in this group.



Saran Serial Number Plate



Torreon Serial Number Plate

- A—Engine Serial Number Plate
- B—Engine Serial Number
- C—Engine Application Data
- D—Empty, Coefficient of Absorption or Saran internal factory identification

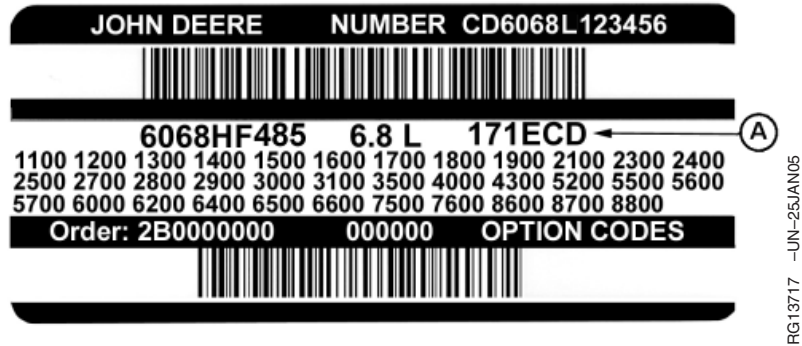
4045HF485

4	Number of Cylinders
045	Displacement in Liters (4.5 Liters)
H	Aspiration Code)
D	Naturally aspirated
T	Turbocharged, no aftercooling
A	Turbocharged and air-to-coolant aftercooled
H	Turbocharger and air-to-water aftercooled
S	Turbocharged and air-to sea water aftercooled
F	User Code
AT	Agritalia srl (Vittoria, Sicily, Italy)
BE	Bell Equipment Co. (Richards Bay, South Africa)
CQ	John Deere Brazil (Horizontina, Brazil)
DW	John Deere Davenport Works (Davenport, Iowa)
E	John Deere Ottumwa Works (Ottumwa, Iowa)
F	OEM (Original Equipment Manufacturers)
FF	Deere-Hitachi (Kernersville, North Carolina)
FG	Goldoni S.P.A. (Modena, Italy)
FM	Marine Engine
FS	OEM Engines - SDMO Application
FU	OEM Engine - Saran Power Unit for Gen-Set
H	John Deere Harvester Works (East Moline, Illinois)
KV	John Deere Commercial Worksite Products (Knoxville, Tennessee/Dubuque, Iowa)
L	John Deere Werke Mannheim (Germany)
LA	John Deere Werke Manheim (Germany) (Engines with Bosch VP44 Injection Pump)
LV	John Deere Commercial Product (Augusta, Georgia)
N	John Deere Des Moines Works (Des Moines, Iowa)
P	Industrias John Deere Mexico S.A. de C.V. (Saltillo/Monterrey, Mexico)
PY	Larson & Toubro Ltd. (Pune, India)
RW	John Deere Waterloo Tractor Works (Waterloo, Iowa)
T	John Deere Dubuque Works (Dubuque, Iowa)
T8	Cameco Industries (Thibodaux, Louisiana)
TJ	John Deere Forestry (formerly Timberjack) (Sweden/Finland/Canada/USA)
YC	John Deere Jialian Harvester Co. Limited (China)
Z	John Deere Werke Zweibrucken (Germany)
485	Application Code. In this example (485), "4" denotes 4-Valves per cylinder and "85" denotes Tier 3 (Stage IIIA) engines.

Coefficient of Absorption (D) — (Early Saran-Built Engines - Later Engines, Internal Factory Identification)

The second line of information on Saran serial number plate may also contain the coefficient of absorption value for smoke emissions or, for later engines, an internal factory identification number.

OEM Engine Option Code Label



OEM Engine Option Code Label

A—Engine Base Code

An option code label is secured to the top of the valve cover and identifies the factory installed options on each OEM engine to ensure correct parts acquisition.

Always provide option code information and engine base code when ordering repair parts. A listing of

option codes is given in parts catalogs and operator's manuals.

NOTE: Before "hot tank" cleaning, ensure that option codes are recorded elsewhere.

RG41183,00000ED -19-04AUG07-1/1

Information Relative to Emissions Regulations

Depending on the final destination, engines can meet the emissions regulations according to the US Environmental Protection Agency (EPA), California Air Resources Board (CARB) and for Europe, the Directive 97/68/EC relating the measures against the emissions of particles and gaseous pollutant from internal combustion engines. Such engines are called "CERTIFIED" and receive an emission label stuck on the engine.

The regulations prohibit tampering with the emission-related components listed below which would render that component inoperative or to make any adjustment on the engine beyond published specifications. It is also illegal to install a part or

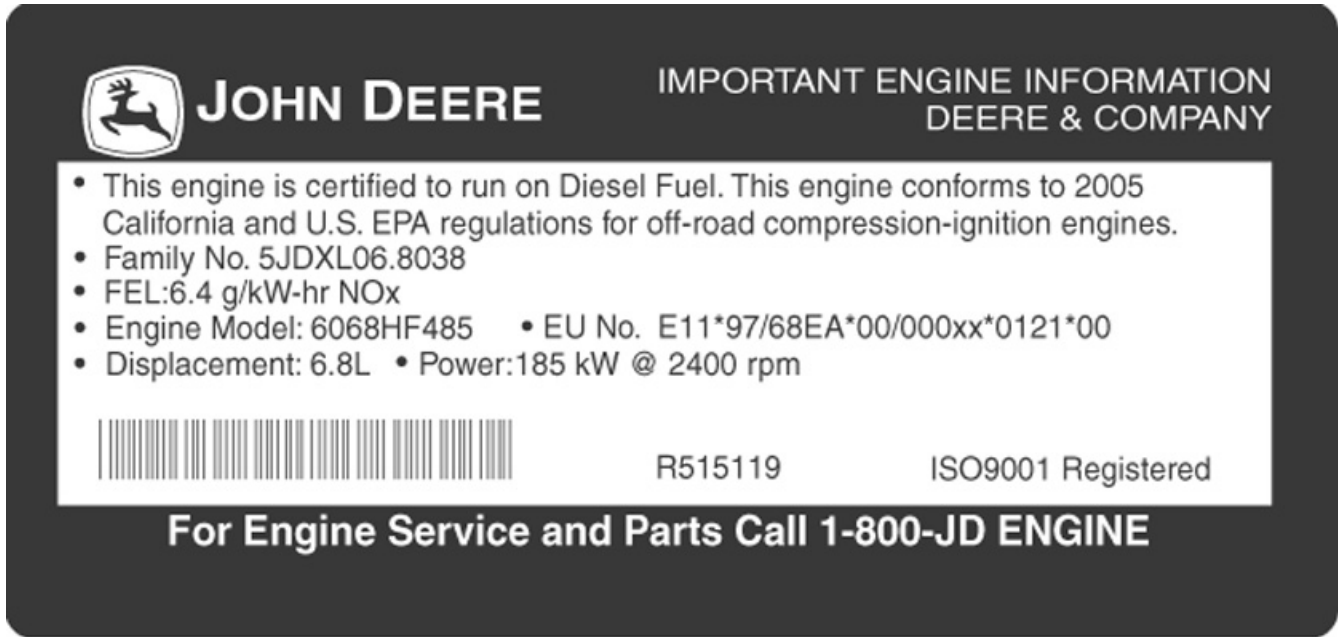
component where the principle effect of that component is to bypass, defeat, or render inoperative any engine component or device which would affect the engine's conformance to the emission regulations. **To summarize, it is illegal to do anything except return the engine to its original published specifications.**

List of emission-related components:

- Fuel injection system
- Intake manifold
- Turbocharger
- Charge air cooling system
- Piston

RG40854,0000007 -19-15OCT07-1/1

Emissions Control System Certification Label



6.8L Engine Emissions Label



CAUTION: Statutes providing severe penalties for tampering with emissions controls may apply at the user's location.

The emissions warranty described below applies only to those engines marketed by John Deere that have been certified by the United States Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB); and used in the United States and Canada in non-road mobile equipment. The presence of an emissions label like the one shown signifies that the engine has been certified with the EPA and/or CARB. The EPA and CARB warranties

only apply to new engines having the certification label affixed to the engine and sold as stated above in the geographic areas. The presence of an EU number in the third line of the label signifies that the engine has been certified with the European Union countries per Directive 97/68/EC. The emissions warranty does not apply to the EU countries.

NOTE: The hp/kW rating on the engine emissions certification label specifies the gross engine hp/kW, which is flywheel power without fan. In most applications this will not be the same rating as the advertised vehicle hp/kW rating.

DN22556,000005B -19-04AUG07-1/1

Engine Application Charts

JOHN DEERE AGRICULTURAL EQUIPMENT	
Machine Model	Engine Model
Tractor	
6230 Premium Tractor	CD4045HL480
6330 Premium Tractor	CD4045HL480
6430 Premium Tractor	CD4045HL480
6530 Premium Tractor	CD6068HL480
6630 Premium Tractor	CD6068HL480
6830 Premium Tractor	CD6068HL481
6930 Premium Tractor	CD6068HL481
7130 Tractor (North America)	PE6068HRW73
7230 Tractor (North America)	PE6068HRW73
7330 Tractor (North America)	PE6068HRW75
7430 Tractor (North America)	PE6068HRW77
7430 Premium Tractor	CD6068HL482
7530 Premium Tractor	CD6068HL482
7630 Tractor (North America)	PE6068HRW64
7730 Tractor	PE6068HRW64
7830 Tractor	PE6068HRW65
7930 Tractor	PE6068HRW65
Combine	
1550CWS Combine	CD6068HCQ81
9540WTS Combine	CD6068HZ480
9560STS Combine	PE6068HH058
9560STSE Combine	CD6068HZ482
9560WTS Combine	CD6068HZ480
9570STS Combine	PE6068HH061
T550 Combine	CD6068HZ482
W540 Combine	CD6068HZ480
W550 Combine	CD6068HZ482
Sprayer	
4730 - K2K Sprayer	PE6068HN053
4830 - K2 Sprayer	PE6068HN053

Continued on next page

RG40854,0000009 -19-04AUG07-1/2

Engine Identification

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JOHN DEERE CONSTRUCTION and FORESTRY EQUIPMENT	
Machine Model	Engine Model
Backhoe, Loader	
624K Loader	PE6068HDW67
644K Loader	PE6068HDW69
Excavator	
240DLC Excavator	PE6068HT061
270DLC Excavator	PE6068HT062
Skidder	
640H Skidder	PE6068HDW64
640H Skidder	PE6068HDW65
648H Skidder	PE6068HDW64
648H Skidder	PE6068HDW65
748H Skidder	PE6068HDW71
848H Skidder	PE6068HDW66
Harvester	
1070D Harvester	CD6068HTJ86
Forwarder	
810D Forwarder	CD4045HTJ85
1010D Forwarder	CD4045HTJ85
1110D Forwarder	CD6068HTJ85
1410D Forwarder	CD6068HTJ85
1410E Forwarder	CD6068HTJ87
Bundler	
1490E Bundler	CD6068HTJ87
Combi Machine	
1480E Combi Machine	CD6068HTJ87

JOHN DEERE OEM (Outside Equipment Manufacturers)	
Engine Model	Application
4045HF485	Industrial
6068HF485	Industrial
6068SFM75	Marine

RG40854,0000009 -19-04AUG07-2/2

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended. Renewable diesel is basically identical to petroleum diesel fuel that is created by Hydrotreating fats and oils. Renewable diesel that meets EN 590 or ASTM D975 is acceptable for use at all percentage mixture levels.

Required fuel properties

In all cases, the fuel shall meet the following properties:

Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).

Cold Filter Plugging Point (CFPP) should be at least 5°C (9°F) below the expected lowest temperature or **Cloud Point** below the expected lowest ambient temperature.

Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Sulfur content:

- Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.
- Use of diesel fuel with sulfur content less than 0.10% (1000 ppm) is **STRONGLY** recommended.
- Use of diesel fuel with sulfur content 0.10% (1000 ppm) to 0.50% (5000 ppm) may result in **REDUCED** oil and filter change intervals as shown in the table.
- **BEFORE** using diesel fuel with sulfur content greater than 0.50% (5000 ppm), contact your John Deere dealer.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

IMPORTANT: Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

DX,FUEL1 -19-05OCT07-1/1

Bio-Diesel Fuel

Biodiesel is a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis.

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 Accredited Producer (as certified by the National Biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website: <http://www.bq-9000.org>.

While 5% blends are preferred (B5), biodiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used in all John Deere engines. Biodiesel blends up to B20 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751 (US), EN 14214 (EU), or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

John Deere approved fuel conditioners containing detergent/dispersant additives are recommended when using lower biodiesel blends, but are required when using blends of B20 or greater.

John Deere engines can also operate on biodiesel blends above B20 (up to 100% biodiesel) ONLY if the biodiesel meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B20 may not fully comply with all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel. John Deere approved fuel conditioners containing detergent/dispersant additives are required.

The petroleum diesel portion of biodiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standards.

Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture. Biodiesel blends from B21 to B100 must be used within 45 days of the date of biodiesel manufacture.

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the above specifications.

Consult your John Deere dealer for approved biodiesel fuel conditioners to improve storage and performance with biodiesel fuels.

When using biodiesel fuel, the engine oil level must be checked daily. If oil becomes diluted with fuel, shorten oil change intervals. Refer to Diesel Engine Oil and Filter Service Intervals for more details regarding biodiesel and engine oil change intervals.

The following must be considered when using biodiesel blends up to B20:

- Cold weather flow degradation
- Stability and storage issues (moisture absorption, oxidation, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to biodiesel on used engines.)
- Possible fuel leakage through seals and hoses
- Possible reduction of service life of engine components

The following must also be considered when using biodiesel blends above B20.

- Possible coking and/or blocked injector nozzles, resulting in power loss and engine misfire if John Deere approved fuel conditioners containing detergent/dispersant additives are not used
- Possible crankcase oil dilution, requiring more frequent oil changes
- Possible corrosion of fuel injection equipment
- Possible lacquering and/or seizure of internal components
- Possible formation of sludge and sediments
- Possible thermal oxidation of fuel at elevated temperatures
- Possible elastomer seal and gasket material degradation (primarily an issue with older engines)

- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel systems and fuel handling equipment
- Possible reduction in water separator efficiency
- Potential high acid levels within fuel system
- Possible damage to paint if exposed to biodiesel

IMPORTANT: Raw pressed vegetable oils are **NOT** acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

DX,FUEL7 -19-04OCT07-2/2

Minimizing the Effect of Cold Weather on Diesel Engines

John Deere diesel engines are designed to operate effectively in cold weather.

However, for effective starting and cold weather operation, a little extra care is necessary. The information below outlines steps that can minimize the effect that cold weather may have on starting and operation of your engine. See your John Deere dealer for additional information and local availability of cold weather aids.

Use Winter Blend Diesel Fuel

When temperatures fall below -10°C (14°F), winter blend diesel fuel is best suited for cold weather operation. Winter blend diesel fuel has a lower cloud point and a lower pour point.

Cloud point is the temperature at which wax will begin to form in the fuel and this wax causes fuel filters to plug. **Pour point** is the lowest temperature at which movement of the fuel is observed.

NOTE: On an average, winter blend diesel fuel has a lower BTU (heat content) rating. Using winter blend diesel fuel may reduce power and fuel efficiency, but should not cause any other engine performance effects. Check the grade of fuel being used before troubleshooting for low power complaints in cold weather operation.

Air Intake Heater

An air intake heater is an available option to aid cold weather starting.

Ether

An ether port on the intake is available to aid cold weather starting.



CAUTION: Do not use ether when (1) starting with an engine equipped with glow plugs or (2) when starting with an air intake heater.

Coolant Heater

An engine block heater (coolant heater) is an available option to aid cold weather starting.

Seasonal Viscosity Oil and Proper Coolant Concentration

Use seasonal grade viscosity engine oil based on the expected air temperature range between oil changes and a proper concentration of low silicate antifreeze as recommended. (See DIESEL ENGINE OIL and ENGINE COOLANT requirements this section.)

Diesel Fuel Flow Additive

Use John Deere Premium Diesel Fuel Conditioner (winter formula) which contains anti-gel chemistry, or equivalent to treat Grade No.2-D fuel during the cold weather season. This generally extends operability about 10°C (18°F) below its Cloud Point. For operability at temperatures further below, winter grade fuel (a blend of No.2-D and No.1-D, or straight No.1-D fuel) is best suited for cold weather operation.

IMPORTANT: Treat fuel when outside temperature drops below 0°C (32°F). For best results, use with untreated fuel. Follow all recommended instructions on label.



CAUTION: Do not use ether when starting with an air intake heater.

Biodiesel

When running with BIODIESEL blends wax formation can generate at warmer temperatures. Begin to use John Deere Premium Biodiesel Conditioner (winter) at 5°C (40°F) to treat biodiesel fuels during the cold weather season. Below 0°C (32°F) John Deere requires the use of B5 or lower blends. Below -10°C (14°F) John Deere requires the use of winter blend diesel fuel.

Winterfronts

Use of fabric, cardboard, or solid winterfronts is not recommended with any John Deere engine. Their use can result in excessive engine coolant, oil, and charge air temperatures. This can lead to reduced engine life, loss of power and poor fuel economy. Winterfronts may also put abnormal stress on fan and fan drive components potentially causing premature failures.

If winterfronts are used, they should never totally close off the grill frontal area. Approximately 25% area in the center of the grill should remain open at all times. At no time should the air blockage device be applied directly to the radiator core.

Radiator Shutters

If equipped with a thermostatically controlled radiator shutter system, this system should be regulated in such a way that the shutters are completely open by the time the coolant reaches 93°C (200°F) to prevent excessive intake manifold temperatures. Manually controlled systems are not recommended.

If air-to-air aftercooling is used, the shutters must be completely open by the time the intake manifold air temperature reaches the maximum allowable temperature out of the charge air cooler.

For more information, see your John Deere dealer.

DX,FUEL10 -19-04OCT07-2/2

Handling and Storing Diesel Fuel



CAUTION: Handle fuel carefully. Do not fill the fuel tank when engine is running.

DO NOT smoke while you fill the fuel tank or service the fuel system.

Fill the fuel tank at the end of each day's operation to prevent water condensation and freezing during cold weather.

Keep all storage tanks as full as practicable to minimize condensation.

Ensure that all fuel tank caps and covers are installed properly to prevent moisture from entering.

Monitor water content of the fuel regularly.

When using bio-diesel fuel, the fuel filter may require more frequent replacement due to premature plugging.

Check engine oil level daily prior to starting engine. A rising oil level may indicate fuel dilution of the engine oil.

IMPORTANT: The fuel tank is vented through the filler cap. If a new filler cap is required, always replace it with an original vented cap.

When fuel is stored for an extended period or if there is a slow turnover of fuel, add a fuel conditioner to stabilize the fuel and prevent water condensation. Contact your fuel supplier for recommendations.

DX,FUEL4 -19-19DEC03-1/1

Lubricity of Diesel Fuel

Most diesel fuels manufactured in the United States, Canada, and the European Union have adequate lubricity to ensure proper operation and durability of fuel injection system components. However, diesel fuels manufactured in some areas of the world may lack the necessary lubricity.

IMPORTANT: Make sure the diesel fuel used in your machine demonstrates good lubricity characteristics.

Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

If fuel of low or unknown lubricity is used, add John Deere PREMIUM DIESEL FUEL CONDITIONER (or equivalent) at the specified concentration.

Lubricity of Biodiesel Fuel

Significant improvement in lubricity can occur with biodiesel blends up to B20. The gain in lubricity above a 20% blend is limited.

DX,FUEL5 -19-05OCT07-1/1

Testing Diesel Fuel

DIESELSCAN™ is a John Deere fuel analysis program that can be used to monitor the quality of your fuel. The DIESELSCAN analysis verifies fuel type, cleanliness, water content, suitability for cold weather operation, and whether the fuel meets specifications.

Check with your John Deere dealer for availability of DIESELSCAN kits.

DIESELSCAN is a trademark of Deere & Company

DX,FUEL6 -19-14NOV05-1/1

Diesel Engine Oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.

John Deere PLUS-50™ oil is preferred.

Oils meeting one of the following specifications are also recommended:

- ACEA Oil Sequence E7
- ACEA Oil Sequence E6

Extended service intervals may apply when John Deere PLUS-50™, ACEA E7, or ACEA E6 engine oils are used. Consult your John Deere dealer for more information.

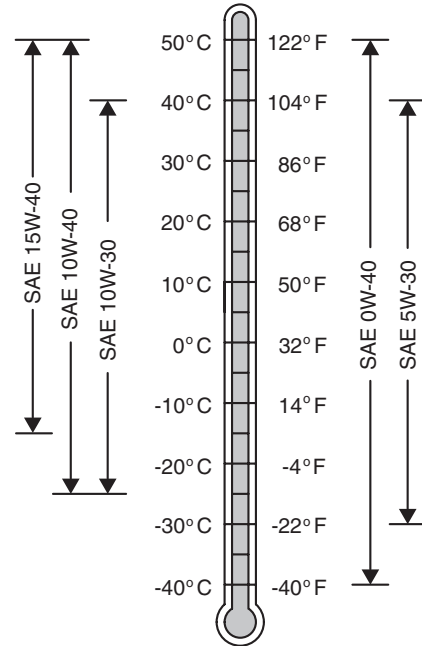
Other oils may be used if they meet one or more of the following:

- John Deere TORQ-GARD SUPREME™
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- ACEA Oil Sequence E5
- ACEA Oil Sequence E4

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

DO NOT use diesel fuel with sulfur content greater than 1.0% (10 000 ppm).



Oil Viscosities for Air Temperature Ranges

TS1691 -UN-18JUL07

PLUS-50 is a trademark of Deere & Company

TORQ-GARD SUPREME is a trademark of Deere & Company

DX,ENOIL11 -19-26JUL07-1/1

Diesel Engine Break-In Oil

New engines are filled at the factory with John Deere ENGINE BREAK-IN OIL. During the break-in period, add John Deere ENGINE BREAK-IN OIL as needed to maintain the specified oil level.

Change the oil and filter after the first 100 hours of operation of a new or rebuilt engine.

After engine overhaul, fill the engine with John Deere ENGINE BREAK-IN OIL.

If John Deere ENGINE BREAK-IN OIL is not available, use a diesel engine oil meeting one of the following during the first 100 hours of operation:

- API Service Classification CE
- API Service Classification CD
- API Service Classification CC
- ACEA Oil Sequence E2
- ACEA Oil Sequence E1

After the break-in period, use John Deere PLUS-50™ or other diesel engine oil as recommended in this manual.

IMPORTANT: Do not use PLUS-50 oil or engine oils meeting any of the following during the first 100 hours of operation of a new or rebuilt engine:

API CJ-4	ACEA E7
API CI-4 PLUS	ACEA E6
API CI-4	ACEA E5
API CH-4	ACEA E4
API CG-4	ACEA E3
API CF-4	
API CF-2	
API CF	

These oils will not allow the engine to break-in properly.

PLUS-50 is a trademark of Deere & Company.

DX,ENOIL4 -19-13SEP06-1/1

Oil Filters

Filtration of oils is critical to proper operation and lubrication.

Always change filters regularly as specified in this manual.

Use filters meeting John Deere performance specifications.

DX,FILT -19-18MAR96-1/1

Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

John Deere SD POLYUREA GREASE is preferred.

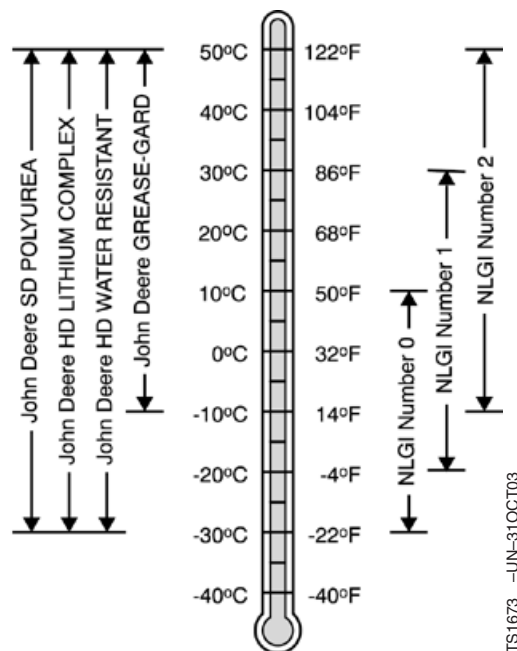
The following greases are also recommended

- John Deere HD LITHIUM COMPLEX GREASE
- John Deere HD WATER RESISTANT GREASE
- John Deere GREASE-GARD™

Other greases may be used if they meet the following:

NLGI Performance Classification GC-LB

IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.



GREASE-GARD is a trademark of Deere & Company

DX,GREA1 -19-07NOV03-1/1

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic oils.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

DX,ALTER -19-15JUN00-1/1

Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

DX,LUBST -19-18MAR96-1/1

Mixing of Lubricants

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements.

Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

Consult your John Deere dealer to obtain specific information and recommendations.

DX,LUBMIX -19-18MAR96-1/1

Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

John Deere COOL-GARD™ Prediluted Coolant is preferred for service.

John Deere COOL-GARD Prediluted Coolant is available in a concentration of either 50% ethylene glycol or 55% propylene glycol.

Additional recommended coolants

The following engine coolant is also recommended:

- John Deere COOL-GARD Coolant Concentrate in a 40% to 60% mixture of concentrate with quality water.

John Deere COOL-GARD coolants do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Other fully formulated coolants

Other fully formulated low silicate ethylene or propylene glycol base coolants for heavy-duty engines may be used if they meet one of the following specifications:

- ASTM D6210 prediluted (50%) coolant
- ASTM D6210 coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D6210 do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Coolants requiring supplemental coolant additives

Other low silicate ethylene glycol base coolants for heavy-duty engines may also be used if they meet one of the following specifications:

- ASTM D4985 ethylene glycol base prediluted (50%) coolant
- ASTM D4985 ethylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D4985 require an initial charge of supplemental coolant additives, formulated for protection of heavy duty diesel engines against corrosion and cylinder liner erosion and pitting. They also require periodic replenishment of additives during the drain interval.

Other coolants

It is possible that neither John Deere COOL-GARD nor coolants meeting one of the coolant standards listed above is available in the geographical area where service is performed. If these coolants are unavailable, use a coolant concentrate or prediluted coolant with a quality additive package that provides cylinder liner cavitation protection and protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40% to 60%) coolant
- ethylene glycol or propylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Water quality

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Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

IMPORTANT: Do not mix ethylene glycol and propylene glycol base coolants.

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

DX,COOL3 -19-27OCT05-2/2

Supplemental Coolant Additives

The concentration of coolant additives is gradually depleted during engine operation. For all recommended coolants, replenish additives between drain intervals by adding a supplemental coolant additive every 12 months or as determined necessary by coolant testing.

John Deere COOLANT CONDITIONER is recommended as a supplemental coolant additive in John Deere engines.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with John DeereCOOL-GARD™.

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

COOL-GARD is a trademark of Deere & Company

DX,COOL4 -19-07NOV03-1/1

Operating in Warm Temperature Climates

John Deere engines are designed to operate using glycol base engine coolants.

Always use a recommended glycol base engine coolant, even when operating in geographical areas where freeze protection is not required.

IMPORTANT: Water may be used as coolant *in emergency situations only*.

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation will occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended glycol base engine coolant as soon as possible.

DX,COOL6 -19-18MAR96-1/1

Additional Information About Diesel Engine Coolants and Supplemental Coolant Additives

Engine coolants are a combination of three chemical components: ethylene glycol or propylene glycol antifreeze, inhibiting coolant additives, and quality water.

Coolant specifications

Some products, including John Deere COOL-GARD™ Prediluted Coolant, are fully formulated coolants that contain all three components in their correct concentrations. Do not add an initial charge of supplemental coolant additives to these fully formulated products.

Coolants meeting ASTM D6210 do not require an initial charge of supplemental coolant additives.

Some coolant concentrates, including John Deere COOL-GARD Coolant Concentrate, contain both glycol antifreeze and inhibiting coolant additives. Mix these products with quality water, but do not add an initial charge of supplemental coolant additives.

Coolants meeting ASTM D4985 require an initial charge of supplemental coolant additives.

Replenish coolant additives

The concentration of coolant additives is gradually depleted during engine operation. Periodic replenishment of inhibitors is required, even when John Deere COOL-GARD or another fully formulated coolant is used. Follow the recommendations in this manual for the use of supplemental coolant additives.

Why use supplemental coolant additives?

Operating without proper coolant additives will result in increased corrosion, cylinder liner erosion and pitting, and other damage to the engine and cooling system. A

simple mixture of ethylene glycol or propylene glycol and water will not give adequate protection.

Use of supplemental coolant additives reduces corrosion, erosion, and pitting. These chemicals reduce the number of vapor bubbles in the coolant and help form a protective film on cylinder liner surfaces. This film acts as a barrier against the harmful effects of collapsing vapor bubbles.

Avoid automotive-type coolants

Never use automotive-type coolants (such as those meeting ASTM D3306). These coolants do not contain the correct additives to protect heavy-duty diesel engines. They often contain a high concentration of silicates and may damage the engine or cooling system.

Water quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate. All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total dissolved solids	<340 mg/L
Total hardness	<170 mg/L
pH	5.5 to 9.0

Freeze protection

The relative concentrations of glycol and water in the engine coolant determine its freeze protection limit.

Ethylene Glycol	Freeze Protection Limit
40%	-24°C (-12°F)
50%	-37°C (-34°F)
60%	-52°C (-62°F)
Propylene Glycol	Freeze Protection Limit
40%	-21°C (-6°F)
50%	-33°C (-27°F)
60%	-49°C (-56°F)

DO NOT use a coolant-water mixture greater than 60% ethylene glycol or 60% propylene glycol.

DX,COOL7 -19-19DEC03-2/2

Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F).

John Deere COOL-GARD is preferred for service.

If John Deere COOL-GARD is not available, use a low silicate ethylene glycol or propylene glycol base coolant concentrate in a 50% mixture of concentrate with quality water.

The coolant concentrate shall be of a quality that provides cavitation protection to cast iron and aluminum parts in the cooling system. John Deere COOL-GARD meets this requirement.

Freeze protection

A 50% mixture of ethylene glycol engine coolant in water provides freeze protection to -37°C (-34°F).

A 50% mixture of propylene glycol engine coolant in water provides freeze protection to -33°C (-27°F).

If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

Water quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

IMPORTANT: Do not mix ethylene glycol and propylene glycol base coolants.

DX,COOL8 -19-16NOV01-1/1

Testing Diesel Engine Coolant

Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant test strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective

method to check the freeze point and additive levels of your engine coolant.

Compare the results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere COOLANT CONDITIONER should be added.

COOLSCAN™ and COOLSCAN PLUS™

For a more thorough evaluation of your coolant, perform a COOLSCAN or COOLSCAN PLUS analysis, where available. See your John Deere dealer for information.

COOLSCAN is a trademark of Deere & Company
COOLSCAN PLUS is a trademark of Deere & Company

DX,COOL9 -19-19DEC03-1/1

Drain Intervals for Diesel Engine Coolant

Drain the factory fill engine coolant, flush the cooling system, and refill with new coolant after the first 3 years or 3000 hours of operation.

Subsequent drain intervals are determined by the coolant used for service. At each interval, drain the coolant, flush the cooling system, and refill with new coolant.

When John Deere COOL-GARD™ is used, the drain interval may be extended to 5 years or 5000 hours of

operation, provided that the coolant is tested annually AND additives are replenished, as needed, by adding a supplemental coolant additive.

If John Deere COOL-GARD is used but the coolant is not tested OR additives are not replenished by adding a supplemental coolant additive, the drain interval is 3 years or 3000 hours of operation

If COOL-GARD is not used, the drain interval is reduced to 2 years or 2000 hours of operation.

COOL-GARD is a trademark of Deere & Company

DX,COOL11 -19-19DEC03-1/1

Engine Oil and Filter Service Intervals

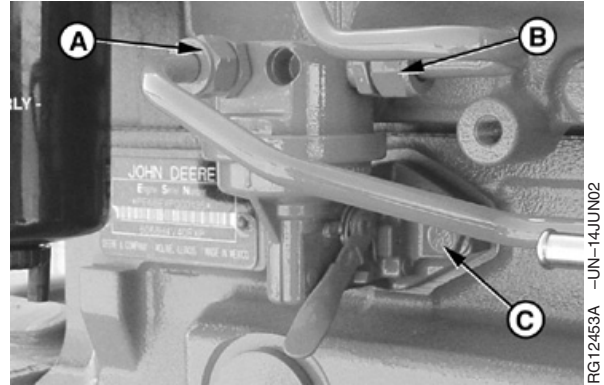
See applicable operator's manual for service intervals.

DM80898,000025E -19-15OCT07-1/1

Low Pressure Fuel System Type 1

Option Codes:

3701, 3702, 3713, 3715



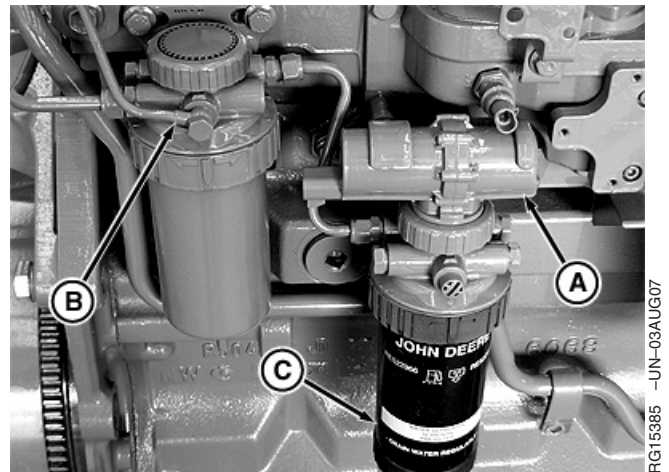
Low Pressure Fuel System Type 1

JB81757,0000081 -19-01FEB08-1/1

Low Pressure Fuel System Type 2

Option Codes:

3717, 3720



Low Pressure Fuel System Type 2

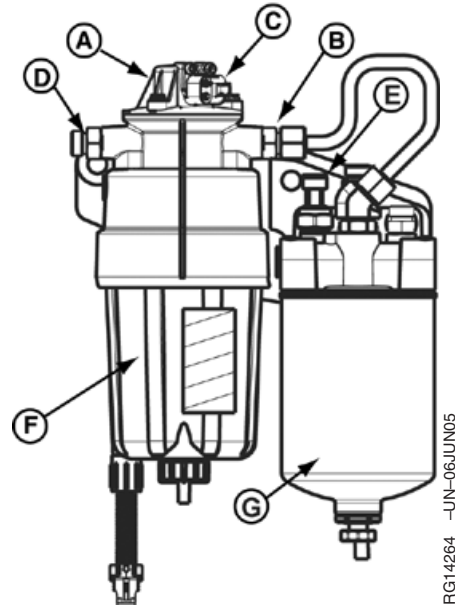
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Low Pressure Fuel System Type 3

Option Codes:

3503, 3504, 3510, 3511



Low Pressure Fuel System Type 3

RG14264 -UN-06JUN05

JB81757,0000083 -19-01FEB08-1/1

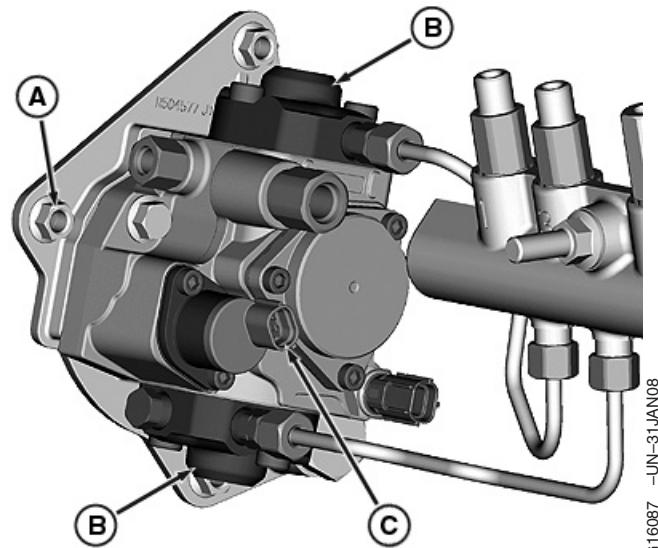
High Pressure Fuel System Type 1

Option Codes:

169D, 167D, 16C7

Identify your fuel system components.

- A—Lock Nut (3 used)
- B—Two Pumping Elements
- C—Suction Control Valve



High Pressure Fuel Pump Type 1

RG16087 -UN-31JAN08
PU00210,0000001 -19-01FEB08-1/1

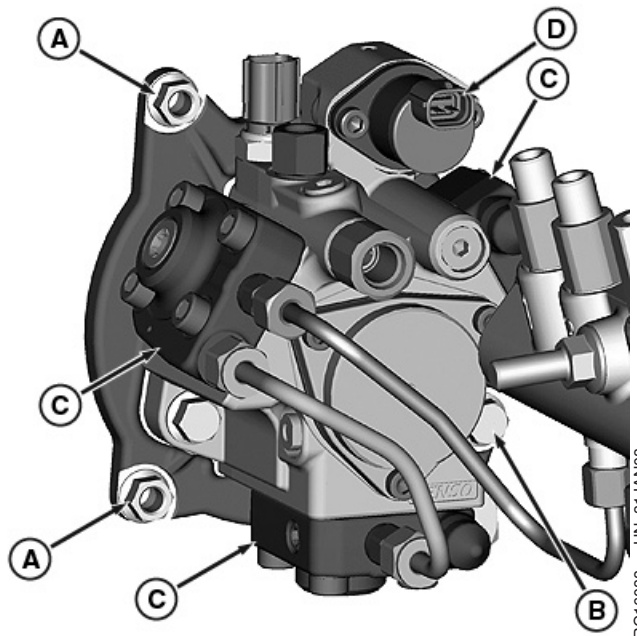
High Pressure Fuel System Type 2

Option Codes:

16R2, 16S4

Identify your fuel system components.

- A—Lock Nut (2 used)
- B—Allen Screw
- C—Three Pumping Elements
- D—Suction Control Valve



High Pressure Fuel Pump Type 2

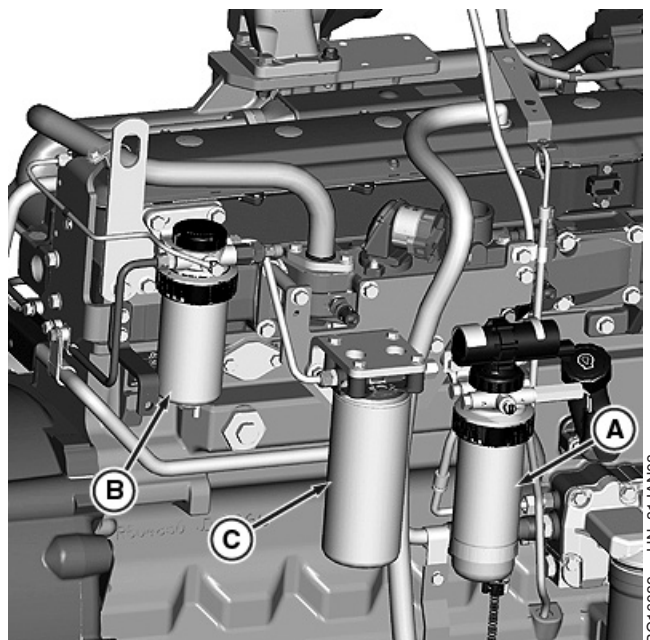
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Fuel Dosing System Type 1

Option Codes:

16P2

- A—Primary Fuel Filter
- B—Secondary Fuel Filter
- C—Doser Element



Fuel Dosing System

PU00210,0000C3C -19-11FEB08-1/1

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Section 02

Repair and Adjustments

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Fuel System - General Information

The Level 14 Engine Control Unit (ECU) is used to control the High Pressure Common Rail (HPCR) fuel system. The HPCR fuel system includes the high pressure fuel pump, high pressure common rail, and electronic injectors.

The electronic injectors can not be serviced. If any part of the component fails, the entire injector must be replaced.

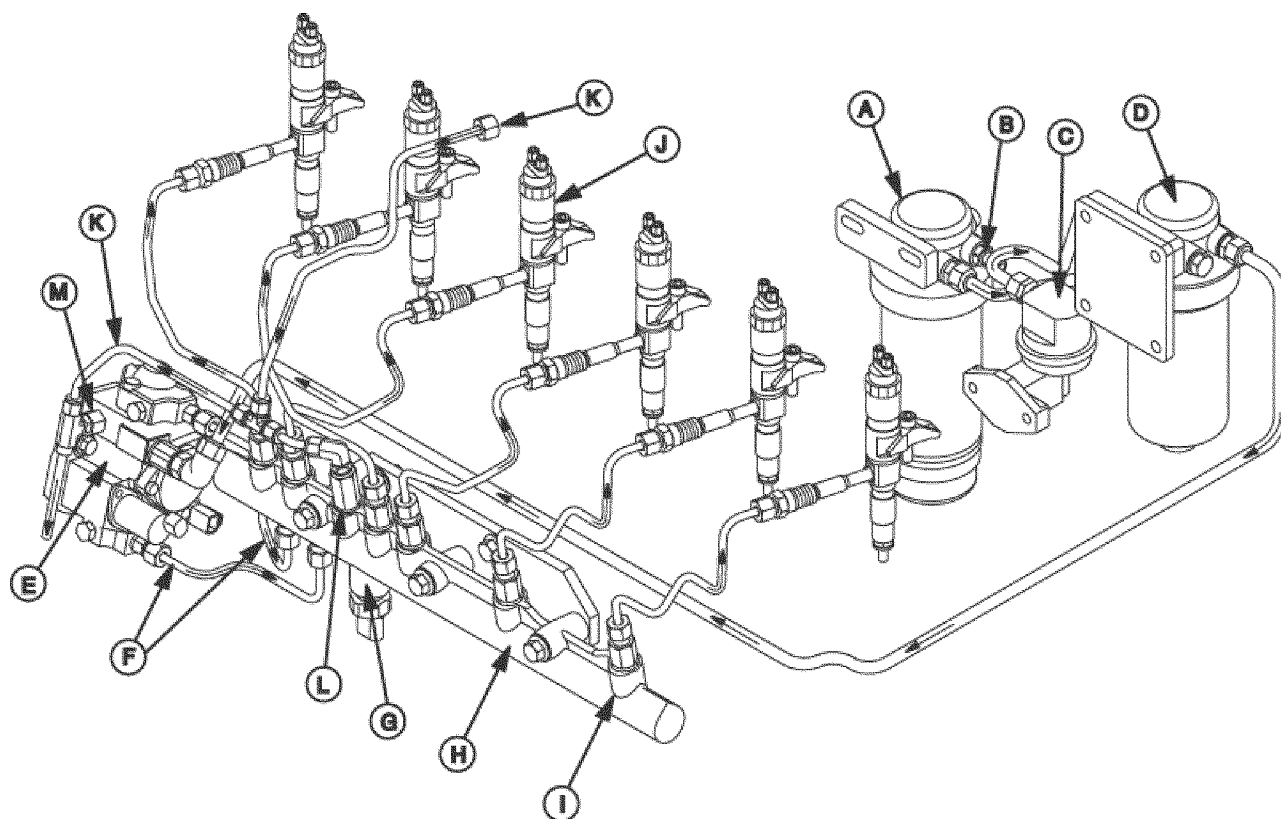
Electronic injectors cannot be tested for opening pressure, as they are controlled electronically.

When servicing injectors it is important to complete the injector calibration procedure. Each injector has a specific calibration and this information can be obtained by scanning the bar code on the service injector box and downloading the injector information from the John Deere Custom Performance™ web site. An alternative is to enter the injector serial number, part number, and QR code listed on the injector. If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.

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RG40854,000000E -19-04AUG07-1/1

Fuel System Components



Fuel System Components

A—Pre, or Primary Fuel Filter
 B—Fuel Inlet
 C—Fuel Transfer Pump
 (mechanical)

D—Final Fuel Filter
 E—High Pressure Fuel Pump
 F—Pressurized Fuel Lines
 G—Fuel Rail Pressure Sensor

H—High Pressure Common
 Rail (HPCR)
 I—Flow Damper
 J—Electronic Fuel Injector
 (EFI)

K—Fuel Leak-off Line
 L—Pressure Limiter
 M—Overflow Orifice

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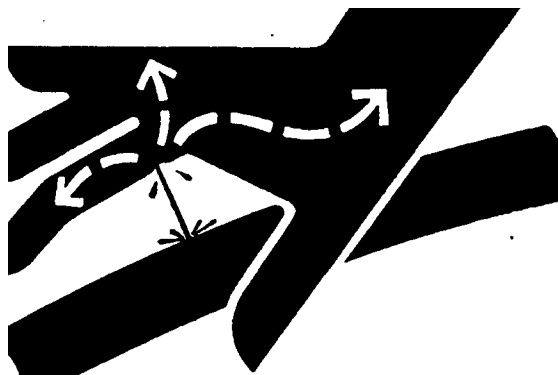
Relieve Fuel System Pressure



CAUTION: Escaping diesel fuel under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure to relieve pressure. Before applying pressure to the system, be sure ALL connections are tight and lines, pipes and hoses are not damaged. Keep hands and body away from pinholes and nozzles which eject fluid under pressure. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

Any time the fuel system has been opened up for service (lines disconnected or filters removed), it will be necessary to bleed air from the system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 in this manual.



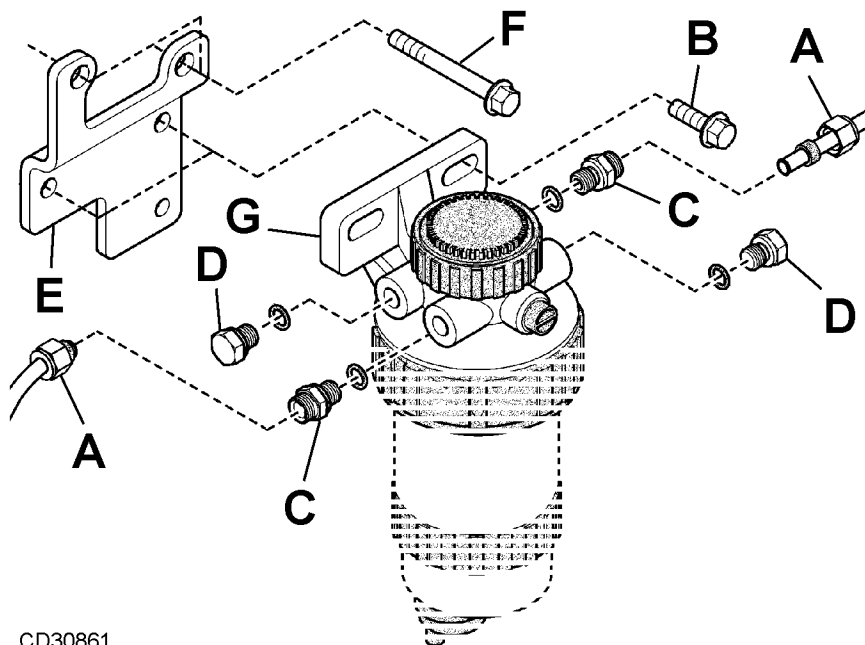
High Pressure Fluids

X9811 -UN-23AUG88

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RG40854,000000F -19-13SEP07-1/1

Remove and Install Fuel Filter Base



CD30861

Fuel Filter Mounting Base (primary and final)

CD30861 -UN-24AUG06

A—Fuel Lines

B—Cap Screws - Fuel Filter
Base to Engine

C—Fitting

D—Plug

E—Bracket

F—Cap Screw - Bracket to
Cylinder Head

G—Fuel Filter Base

NOTE: Fuel filter base can be removed with or without filter element installed.

1. Disconnect fuel lines (A).
2. Loosen cap screws (B) and remove fuel filter base (G).
3. Remove bracket (E) from cylinder head if needed.
4. Replace and reinstall parts as necessary. Tighten cap screws to specification.

Fuel filter base—Specification

Bracket-to-cylinder head cap screw—Torque.....	70 N•m (52 lb-ft)
Fuel filter base-to-bracket cap screw—Torque.....	50 N•m (37 lb-ft)

NOTE: Fuel lines may be connected to different inlet and outlet ports depending on application.

5. Install fittings (C) and plugs (D), or optional accessories like fuel pressure sensor or fuel heater, on filter base as required. Tighten to specification.

Specification

Fittings, plugs or accessories-to-fuel filter base—	
Torque.....	10 N•m (7 lb-ft)

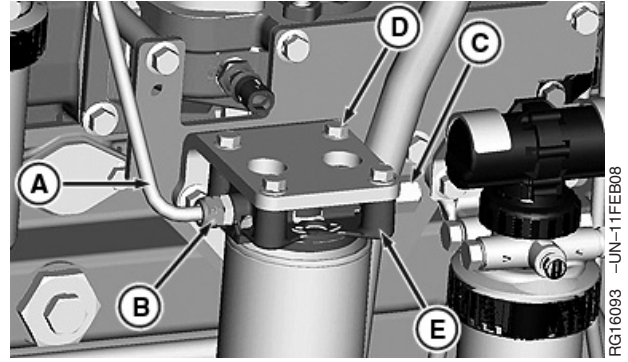
6. Install fuel lines then tighten tube nuts until seated on fitting shoulder.
7. If previously removed, install filter element then bleed fuel system.

Remove and Install Doser Header

Remove Doser Header

NOTE: Doser header can be removed with or without doser element.

1. Remove fuel line (A).
2. Remove fitting (B).
3. Remove fitting with O-ring (C).
4. Remove cap screws (D).
5. Remove doser header (E).



Doser Header Fittings

A—Fuel Line to Final Filter
B—Straight Fittings
C—ORFS Fitting
D—Cap Screw (4 used)
E—Doser Header

Continued on next page

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Install Doser Header

1. Install header and four cap screws.

IMPORTANT: Header must be installed with the “IN” port facing the front of the engine. Verify this is correct before proceeding.

2. Install ORFS fitting with o-ring (F) in the port labeled “IN” on the doser header. This will face the front of the engine.

Specification

O-ring face Seal Fitting—Torque 10 N.m (7.5 lb-ft)

3. Install cap (G) on ORFS fitting.

Specification

Cap—Torque 10 N.m (7.5 lb-ft)

4. Install straight fitting (H) with o-ring into the port labeled “OUT” on the doser header. This will face the rear of the engine.

Specification

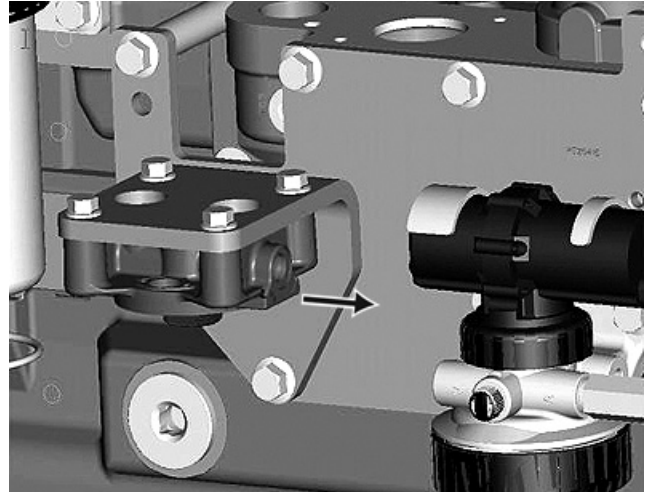
Straight Fitting—Torque 10 N.m (7.5 lb-ft)

5. Install fuel line on fitting in doser header. Tighten tube nuts until seated on fitting shoulder.

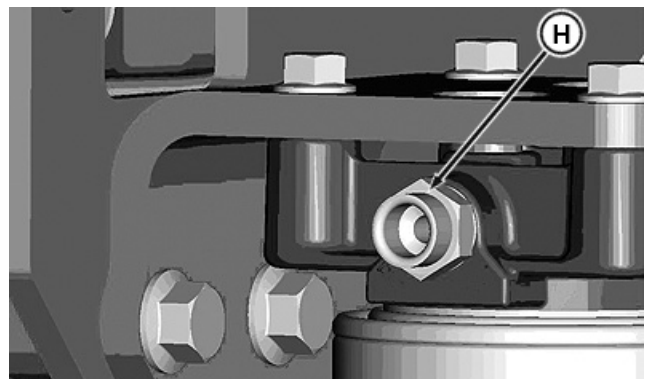
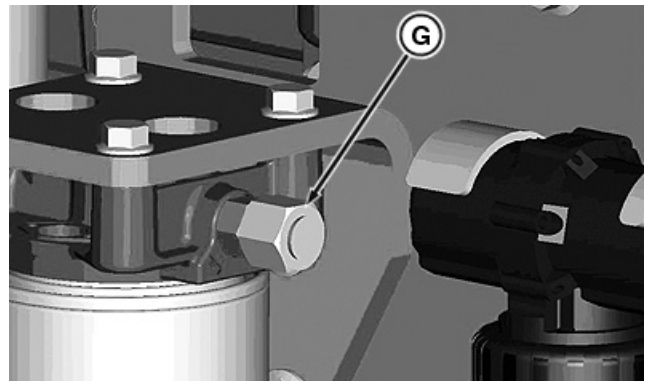
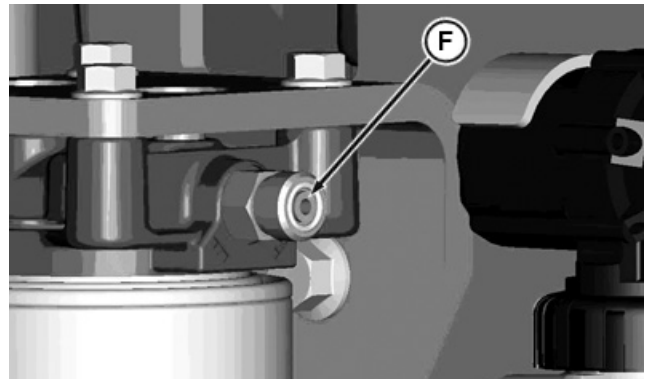
F—Fitting with O-ring

G—Cap

H—Straight Fitting



Header Orientation



PU00210,0000005 -19-18FEB08-2/2

Replace Fuel Filter Elements

NOTE: Refer to operator's manual for proper servicing and (hourly) replacement intervals.

1. Thoroughly clean fuel filter/water bowl assembly and surrounding area, if not previously done.
2. Disconnect water-in-fuel sensor (if equipped)
3. Loosen drain plugs (C) and drain into suitable container.

NOTE: Lifting up on retaining ring (A) as it is rotated helps to get it past raised locators.

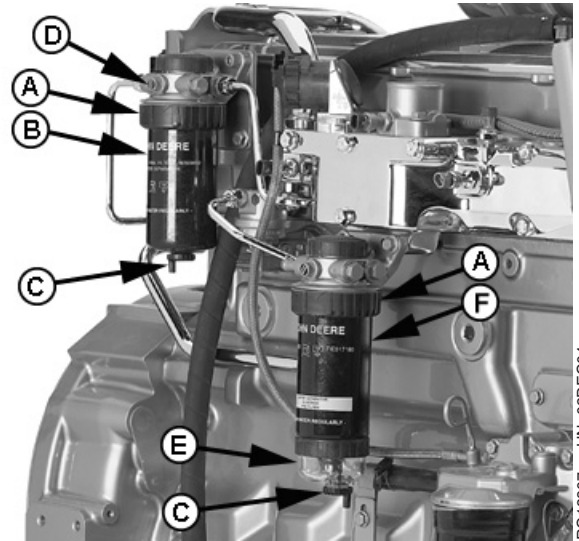
4. Firmly grasp the retaining ring (A) and rotate it clockwise 1/4 turn (when viewed from top). Remove retaining ring with filter element (B or F) and water separator bowl (E) (if equipped).
5. Inspect filter mounting base for cleanliness. Clean as required.

NOTE: Raised locators on fuel filter canisters must be indexed properly with slots in mounting base for correct installation.

6. Install new filter elements onto mounting bases. Be sure elements are properly indexed and firmly seated on bases. It may be necessary to rotate filters for correct alignment.

If equipped with water separator bowl (E), remove filter element from separator bowl. Drain and clean separator bowl. Dry with compressed air. Install bowl onto new element. Tighten securely.

7. Align keys on filter element with slots in filter base.
8. Install retaining ring onto mounting base making certain dust seal is in place on filter base. Hand tighten ring counterclockwise (about 1/3 turn) until it "snaps" into the detent. DO NOT overtighten retaining ring.



Replace Fuel Filter Elements

- A—Retaining Ring
- B—Final Fuel Filter
- C—Drain Plug
- D—Air Bleed Plug
- E—Water Separator Bowl
- F—Primary Fuel Filter

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RG13807 -UN-02DEC04

NOTE: The proper installation is indicated when a “click” is heard and a release of the retaining ring is felt.

A plug is provided with the new element for plugging the used element.

9. Bleed fuel system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 later in this manual. Tighten air bleed plug (D).
10. If applicable, connect water in fuel sensor connector.

RE38635,000013B -19-04OCT07-2/2

Replacing Fuel Filter and Dosing Elements (4045)

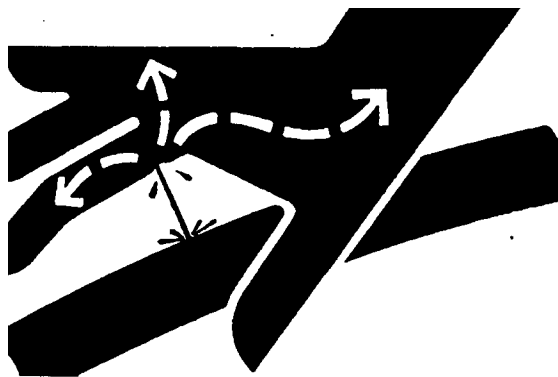
CAUTION: Before performing any maintenance to fuel system related components, be sure that machine is in the Key OFF position AND that the electric fuel transfer (lift) pump or battery is disconnected. Whenever the machine is in the Key ON position, power is applied to the electric fuel transfer (lift) pump.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

IMPORTANT: Replace fuel filter elements anytime audible alarm sounds and trouble codes indicate plugged fuel filters (low fuel pressure). If no alarm sounds during the 12 month service interval, replace elements at that time, or after 250 hours operation, whichever comes first.

Engines are equipped with dual fuel filters: a primary filter with water separator bowl, and a final filter. Both filters and the dosing element are replaced at the same 250-hour interval or every 12 months.



High-Pressure Fluids

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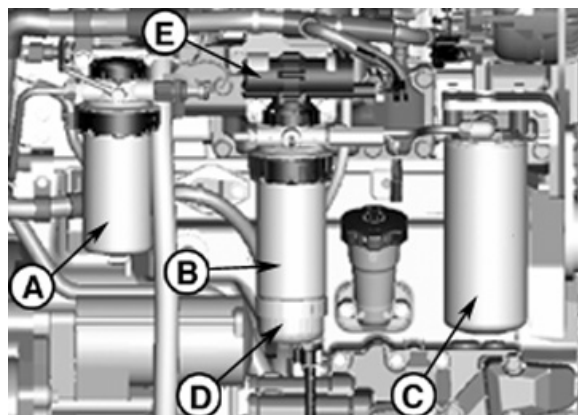
1. Close fuel shut-off valve, if equipped.
2. Thoroughly clean fuel filter assemblies and surrounding areas.
3. Disconnect water in fuel sensor (H) wiring from primary fuel filter (B).
4. Loosen drain plugs (I) and drain fuel into a suitable container.

NOTE: *Lifting up on retaining rings (G) as they are rotated helps to get them past raised locators.*

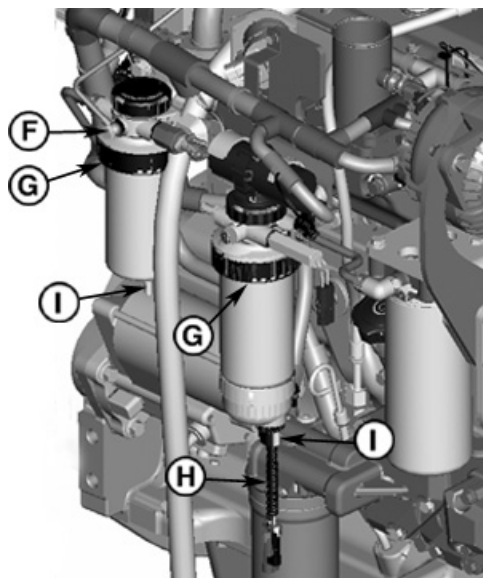
5. Firmly grasp the retaining rings (G) and rotate them clockwise 1/4 turn (when viewed from the top). Remove ring with final fuel filter element (A) and with primary fuel filter element (B).
6. Loosen ring and remove water separator bowl (D) with primary fuel filter element. Drain and clean bowl. Dry bowl with compressed air.
7. Inspect filter mounting base for cleanliness. Clean as required.

NOTE: *Raised locators on fuel filter canisters must be indexed properly with slots in mounting base for correct installation.*

8. Install new filter elements onto mounting bases. Be sure elements are properly indexed and firmly seated on bases. It may be necessary to rotate filters for correct alignment.
9. Align keys on filter element with slots in filter base.
10. Install retaining ring onto mounting base making certain dust seal is in place on filter base. Hand tighten ring counterclockwise (about 1/3 turn) until it "snaps" into the detent. DO NOT overtighten retaining ring.



RG15342 -UN-29JUN07



RG15405 -UN-29JUN07

- A—Final Fuel Filter Element
- B—Primary Fuel Filter Element
- C—Dosing Element
- D—Water Separator Bowl
- E—Electric Fuel Transfer (Lift) Pump
- F—Constant Air Bleed
- G—Retaining Ring
- H—Water in Fuel Sensor
- I—Drain Plug

NOTE: The proper installation is indicated when a "click" is heard and a release of the retaining ring is felt.

A plug is provided with the new element for plugging the used element.

11. Install water separator bowl on primary fuel filter and tighten ring.
12. Turn dosing element (C) using a suitable filter or strap wrench to remove. Discard dosing element.

NOTE: New dosing element canister should come around 3/4 full of lubricating additive. Be sure that when removing cap, that the canister is held right side up so as not to spill the fluid.

13. Remove cap from new dosing element canister.
14. Wipe the sealing surfaces of the header with a clean rag.
15. Install and tighten dosing element by hand until firmly against the header. Apply an extra 3/4 turn after gasket contact is made.
16. Reconnect water in fuel sensor wiring.
17. Open fuel shut-off valve, if equipped.

NOTE: The electric fuel transfer (lift) pump (E) and constant air bleed (F) enables the fuel system to self prime.

18. Key on for 30 seconds to prime fuel system, then start engine and check for possible leaks.

PU00210,0000C39 -19-29JAN08-3/3

Replacing Fuel Filter and Dosing Elements (6068)

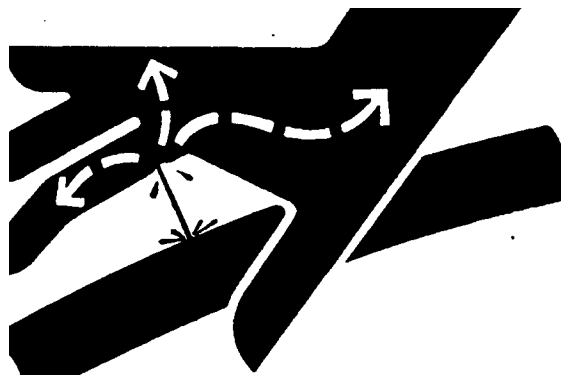
CAUTION: Before performing any maintenance to fuel system related components, be sure that machine is in the Key OFF position AND that the electric fuel transfer (lift) pump or battery is disconnected. Whenever the machine is in the Key ON position, power is applied to the electric fuel transfer (lift) pump.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

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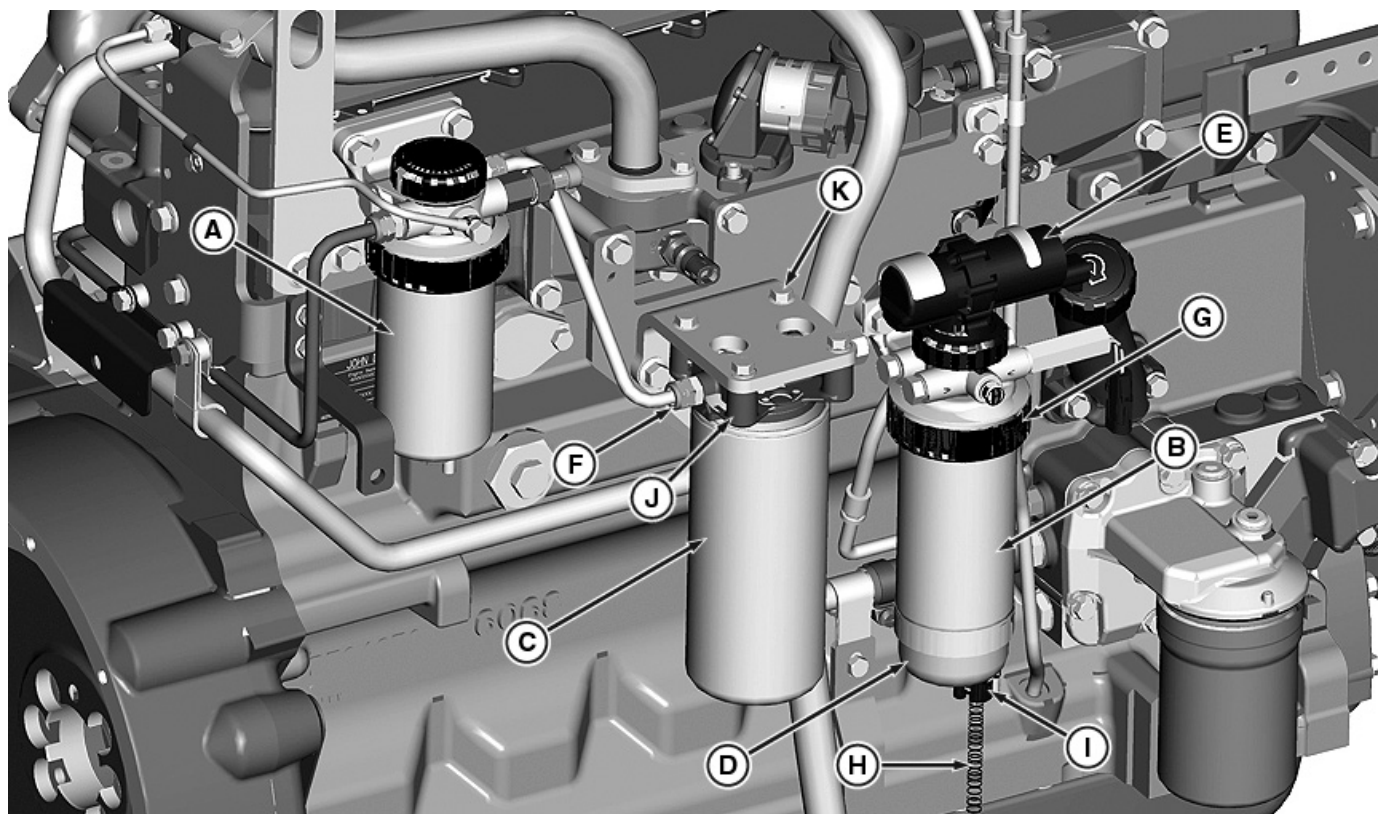
IMPORTANT: Replace fuel filter elements anytime audible alarm sounds and trouble codes indicate plugged fuel filters (low fuel pressure). If no alarm sounds during the 12 month service interval, replace elements at that time, or after 250 hours operation, whichever comes first.

Engines are equipped with dual fuel filters: a primary filter with water separator bowl, and a final filter. Both filters and the dosing element are replaced at the same 250-hour interval or every 12 months.



High-Pressure Fluids

X9811 -UN-23AUG88



RG16084 -UN-28/JAN08

A—Final Fuel Filter Element
B—Primary Fuel Filter Element
C—Dosing Element

D—Water Separator Bowl
E—Electric Fuel Transfer (Lift) Pump

F—Constant Air Bleed
G—Retaining Ring
H—Water in Fuel Sensor

I—Drain Plug
J—Doser Header
K—Cap Screw (4 used)

1. Close fuel shut-off valve, if equipped.
2. Thoroughly clean fuel filter assemblies and surrounding areas.
3. Disconnect water in fuel sensor (H) wiring from primary fuel filter (B).
4. Loosen drain plugs (I) and drain fuel into a suitable container.

NOTE: Lifting up on retaining rings (G) as they are rotated helps to get them past raised locators.

5. Firmly grasp the retaining rings (G) and rotate them clockwise 1/4 turn (when viewed from the top). Remove ring with final fuel filter element (A) and with primary fuel filter element (B).

6. Loosen ring and remove water separator bowl (D) with primary fuel filter element. Drain and clean bowl. Dry bowl with compressed air.
7. Inspect filter mounting base for cleanliness. Clean as required.

NOTE: Raised locators on fuel filter canisters must be indexed properly with slots in mounting base for correct installation.

8. Install new filter elements onto mounting bases. Be sure elements are properly indexed and firmly seated on bases. It may be necessary to rotate filters for correct alignment.
9. Align keys on filter element with slots in filter base.

Continued on next page

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10. Install retaining ring onto mounting base making certain dust seal is in place on filter base. Hand tighten ring counterclockwise (about 1/3 turn) until it "snaps" into the detent. DO NOT overtighten retaining ring.

NOTE: The proper installation is indicated when a "click" is heard and a release of the retaining ring is felt.

A plug is provided with the new element for plugging the used element.

11. Install water separator bowl on primary fuel filter and tighten ring.
12. Turn dosing element (C) using a suitable filter or strap wrench to remove. Discard dosing element.

NOTE: New dosing element canister should come around 3/4 full of lubricating additive. Be sure that when removing cap, that the canister is held right side up so as not to spill the fluid.

13. Remove cap from new dosing element canister.
14. Wipe the sealing surfaces of the header with a clean rag.
15. Install and tighten dosing element by hand until firmly against the header. Apply an extra 3/4 turn after gasket contact is made.
16. Install air bleed line (F).
17. Reconnect water in fuel sensor wiring.
18. Open fuel shut-off valve, if equipped.

NOTE: The electric fuel transfer (lift) pump (E) and constant air bleed (F) enables the fuel system to self prime.

19. Key on for 30 seconds to prime fuel system, then start engine and check for possible leaks.

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Replace Fuel Filter Elements - Racor Fuel Filter System

NOTE: Both primary and secondary filters must be replaced at the same time.

Remove and Install Primary Fuel Filter Element

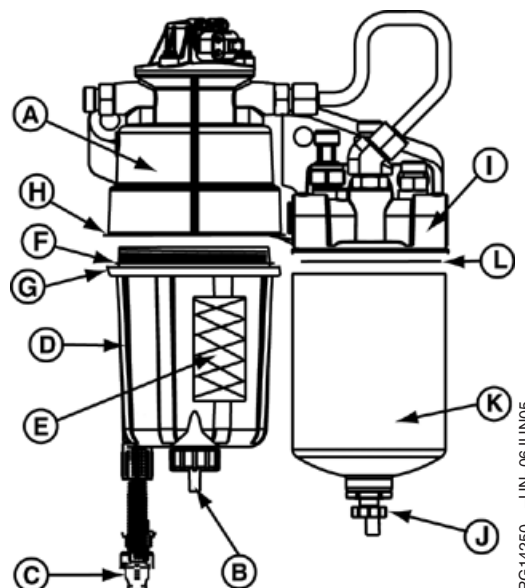
NOTE: For applications other than OEM, refer to operator's manual for proper servicing, hourly replacement intervals, and filter locations.

NOTE: Do not pre-fill filter with fuel. This may introduce debris into the fuel system.

1. Thoroughly clean filter header (A) and surrounding area to keep from getting dirt and debris into fuel system.
2. Connect a fuel drain line to filter drain valve (B) on bottom of filter and drain all fuel from the filter canister (D).
3. Disconnect water-in-fuel sensor connector (C).
4. Turn filter canister (D) counter-clockwise (CCW) to remove.
5. Once filter canister is removed, pull filter element (E) down to remove from filter header (A).
6. Inspect filter header and filter canister sealing surfaces. Clean as required.
7. Place new packing on filter canister.
8. Place thin film of fuel on filter packing.
9. Place filter element in canister with tangs on bottom going into canister.
10. Screw canister into filter header and turn clockwise (CW). Tighten until canister lip (G) just mates with header lip (H), then tighten to specification:

Specification

Primary Fuel Filter Canister to
Filter Header—Torque..... 14 N•m (120 lb-in)



Primary and Secondary Filter Parts Kit

- A—Primary Filter Header
- B—Primary Filter Canister Drain Valve
- C—Water In Fuel Sensor Connector
- D—Primary Filter Canister
- E—Primary Filter Element
- F—Primary Filter Packing
- G—Primary Filter Canister Lip
- H—Primary Filter Header Lip
- I—Secondary Fuel Filter Header
- J—Secondary Filter Drain Valve
- K—Secondary Fuel Filter
- L—Secondary Filter Packing

11. Connect water-in-fuel sensor connector.

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Remove and Install Secondary (Final) Fuel Filter

NOTE: For applications other than OEM, refer to operator's manual for proper servicing, hourly replacement intervals, and filter locations.

NOTE: Do not pre-fill filter with fuel. This may introduce debris into the fuel system.

NOTE: Filter replacement instructions are printed on the new filter.

1. Thoroughly clean filter header (I) and surrounding area to keep from getting dirt and debris into fuel system.
2. Connect a fuel drain line to filter drain valve (J) on bottom of filter and drain all fuel from the filter.
3. Turn filter (K) counter clockwise (CCW) to remove.
4. Inspect filter header sealing surface. Clean as required.
5. Install new filter fuel drain valve and tighten to specification.

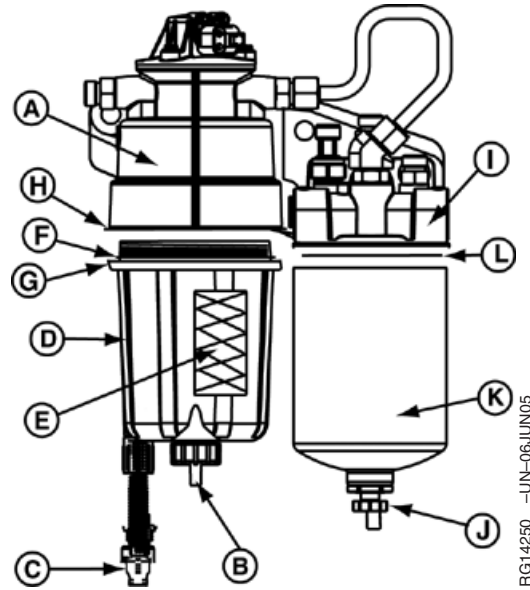
Specification

Secondary Fuel Filter Drain

Valve—Torque..... 3.4 - 4 N•m (30 - 35 lb-in)

6. Place new filter packing (L) on filter.
7. Place thin film of fuel on packing.
8. Screw fuel filter into fuel filter header, turning clockwise (CW). Tighten until fuel filter snugly mates with fuel filter header (I).
9. Turn filter 1/2 to 3/4 turn further (CW).

NOTE: To prime the fuel system before starting engine, turn ignition key to ON for 60 seconds.



Primary and Secondary Filter Parts Kit

- A—Primary Filter Header
- B—Primary Filter Canister Drain Valve
- C—Water In Fuel Sensor Connector
- D—Primary Filter Canister
- E—Primary Filter Element
- F—Primary Filter Packing
- G—Primary Filter Canister Lip
- H—Primary Filter Header Lip
- I—Secondary Fuel Filter Header
- J—Secondary Filter Drain Valve
- K—Secondary Fuel Filter
- L—Secondary Filter Packing

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Remove Fuel Transfer Pump

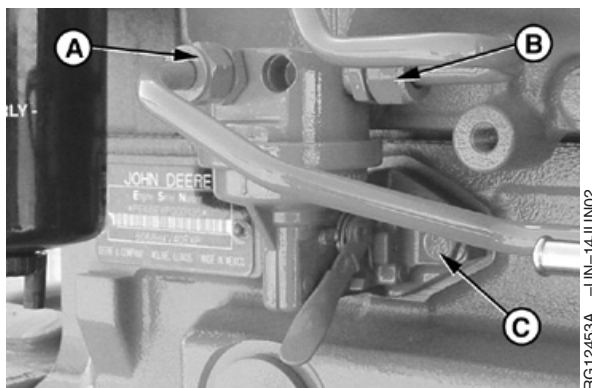
IMPORTANT: A backup wrench must always be used when disconnecting fittings or fuel lines from supply pump to avoid damage to fittings.

1. Disconnect fuel inlet line (A) and outlet line (B) and cap connections on fuel transfer pump and fuel lines to keep debris out of fuel system.
2. Remove cap screws (C) and remove fuel transfer pump assembly from cylinder block.

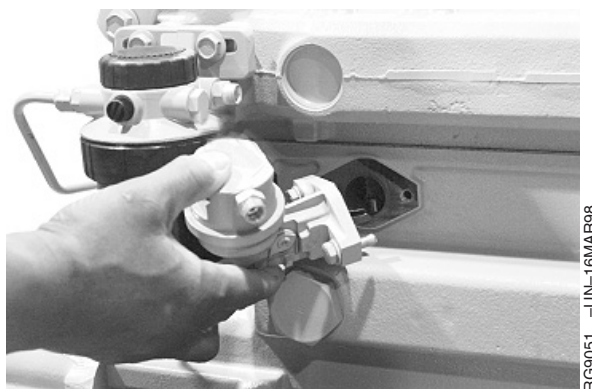
NOTE: The fuel transfer pump is driven by a push rod (D) that rides on an eccentric camshaft lobe. The cylinder head must be removed to remove this push rod.

3. Cover opening on cylinder block to prevent dirt from entering the engine.
4. Inspect face of pump lever for wear. If lever face is worn flat or concave, replace pump.

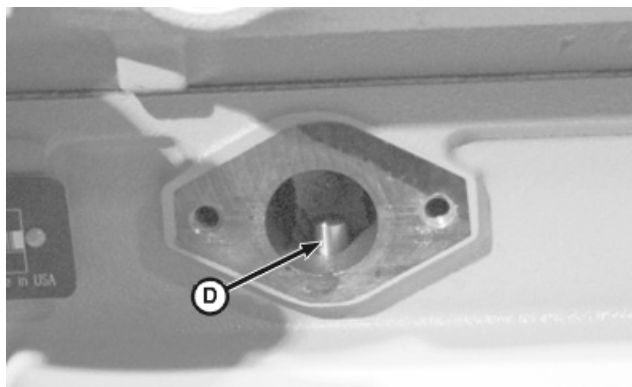
A—Transfer Pump Inlet from Pre-Filter
B—Transfer Pump Outlet to Final Fuel Filter
C—Cap Screws
D—Push Rod



Mechanical Fuel Transfer Pump Supply Lines



Remove Mechanical Fuel Transfer Pump



Mechanical Fuel Transfer Pump Push Rod

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Install Fuel Transfer Pump

IMPORTANT: Apply LOCTITE 242 to threads of supply pump mounting cap screws (C) and fuel line fittings when reinstalling supply pump. DO NOT allow sealant to get into fuel system.

1. Install the fuel transfer pump to cylinder block with pumping lever resting on top of push rod, using a new O-ring. Tighten cap screws (C) to specifications.

Specification

Fuel Transfer Pump Cap
Screws—Torque 30 N•m (22 lb-ft)

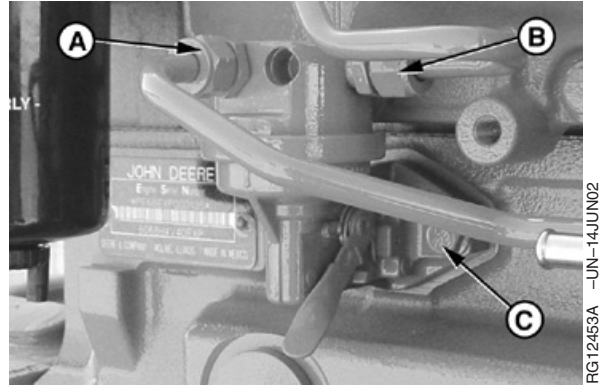
IMPORTANT: Always use a backup wrench when installing fittings and/or fuel lines onto supply pump to avoid damage to fittings.

2. Install fittings in inlet and outlet ports and tighten to specification.

Specification

O-Ring Face Seal (ORFS) Inlet
Port Fitting—Torque 8 N•m (6 lb-ft)
Fitting to Transfer Pump Outlet—
Torque 9 N•m (6.5 lb-ft)

3. Connect supply pump inlet line (A) and outlet line (B) and tighten tube nut until seated on fitting shoulder.
4. Bleed the fuel system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 of this manual.



Fuel Transfer Pump Lines

A—Fuel Transfer Pump Inlet from Pre-filter
B—Fuel Transfer Pump Outlet to Final Fuel Filter
C—Cap Screws

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Remove and Install Electronic Fuel Transfer Pump - Filter Mounted

NOTE: The electronic fuel transfer pump is an integral part of the primary fuel filter. When the transfer pump requires replacement, the filter element must be replaced as well.

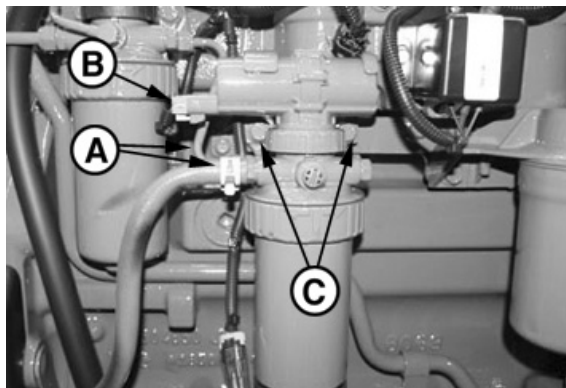
1. Disconnect inlet and outlet fuel lines (A).
2. Disconnect wiring harness (B).
3. Loosen and remove 2 cap screws securing filter assembly to cylinder head. Remove primary filter and fuel pump assembly.
4. Replace filter assembly in reverse order. Tighten cap screws to specification.

Specification

Fuel Filter Base to Filter Bracket

Cap Screws—Torque 50 N•m (37 lb-ft)

5. Bleed fuel system.



Primary Fuel Filter with Electronic Fuel Transfer Pump

A—Fuel Lines
B—Wiring Harness Connection
C—Filter Base Cap Screws

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Remove and Install Electronic Fuel Transfer Pump - Racor System

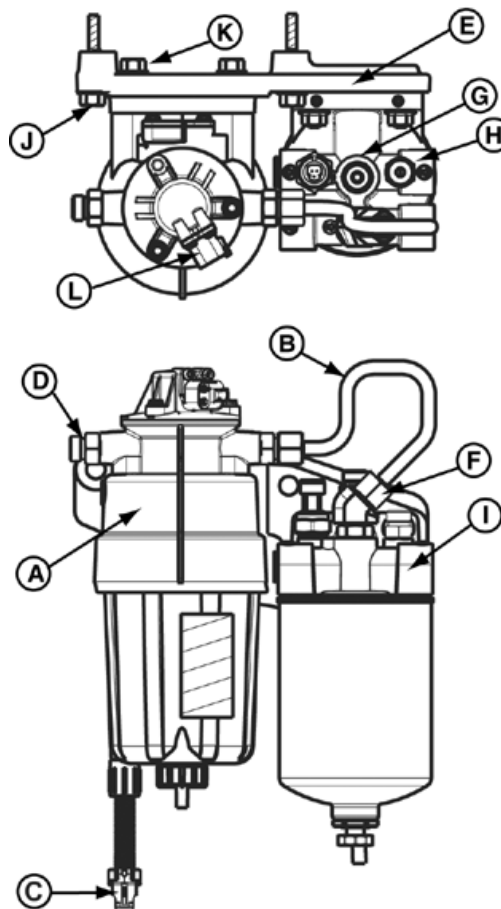
NOTE: For applications other than OEM, refer to vehicle manual for transfer pump information.

IMPORTANT: ALWAYS use a backup wrench when removing and/or installing fittings and/or fuel lines to avoid damage.

Remove Fuel Transfer Pump Assembly

1. Disconnect fuel lines from (B), (D), (F), (G) and (H). Cap connections on fuel lines to keep debris out of fuel system.
2. Disconnect fuel transfer pump connector (L).
3. Disconnect water in fuel sensor connector (C)
4. Remove filter assembly bracket cap screws (J) and remove filter assembly bracket (E) from engine.
5. Remove transfer pump header cap screws (K) from back of fuel filter assembly bracket. Remove transfer pump header (A) from fuel filter assembly bracket.

A—Primary Filter/Fuel Transfer Pump Header
 B—Primary Fuel Filter Outlet
 C—Water In Fuel Sensor Connector
 D—Primary Fuel Filter Inlet
 E—Filter Assembly Bracket
 F—Secondary Fuel Filter Inlet
 G—Air Bleed Valve
 H—Secondary Filter Outlet
 I—Secondary Filter Header
 J—Filter Assembly Bracket Cap Screws
 K—Fuel Transfer Pump Header Cap Screws
 L—Fuel Transfer Pump Connector



Filter Assembly

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Install Fuel Transfer Pump Assembly

IMPORTANT: ALWAYS use a backup wrench when removing and/or installing fittings and/or fuel lines to avoid damage.

1. Place transfer pump header (A) on fuel filter assembly bracket (E). Install fuel transfer pump header cap screws (K) and tighten to specification.

Specification

Fuel Transfer Pump Cap

Screws—Torque..... $35 \pm 7 \text{ N}\cdot\text{m}$ ($26 \pm 5 \text{ lb}\cdot\text{ft}$)

2. Install the fuel filter assembly bracket to cylinder block. Tighten filter assembly bracket cap screws (J) to specification.

Specification

Filter Assembly Bracket Cap

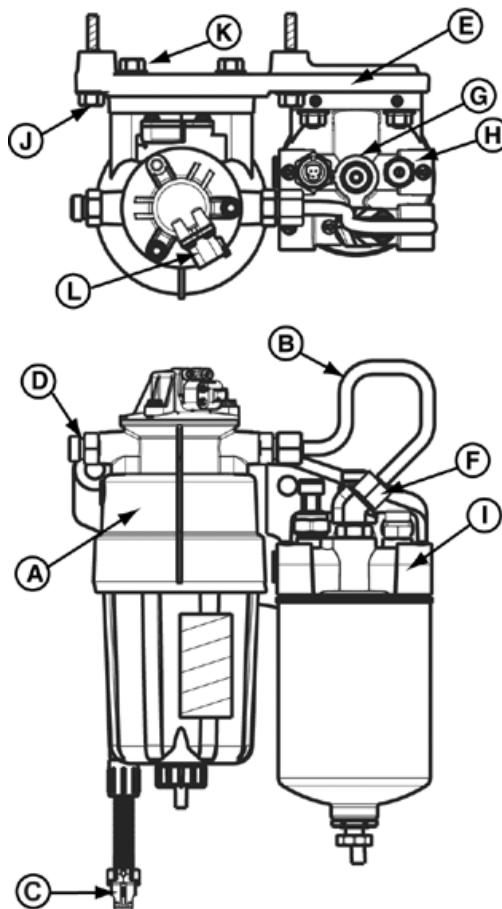
Screws—Torque..... $68 \pm 13 \text{ N}\cdot\text{m}$ ($50 \pm 10 \text{ lb}\cdot\text{ft}$)

3. Connect fuel lines to fuel transfer pump inlet (D), outlet (B), secondary filter inlet (F), air bleed valve (G), and secondary fuel outlet (H) and tighten to specification.

SpecificationFuel Line Fittings—Torque..... $20 \pm 4 \text{ N}\cdot\text{m}$ ($15 \pm 3 \text{ lb}\cdot\text{ft}$)

4. Reconnect fuel transfer pump connector (L) and water in fuel connector (C).

NOTE: Turn ignition key to ON for 60 seconds to prime the fuel system before starting engine.



Filter Assembly

- A—Primary Filter/Fuel Transfer Pump Header
- B—Primary Fuel Filter Inlet
- C—Water In Fuel Sensor Connector
- D—Primary Fuel Filter Outlet
- E—Filter Assembly Bracket
- F—Secondary Fuel Filter Inlet
- G—Air Bleed Valve
- H—Secondary Filter Outlet
- I—Secondary Filter Header
- J—Filter Assembly Bracket Cap Screws
- K—Fuel Transfer Pump Header Cap Screws
- L—Fuel Transfer Pump Connector

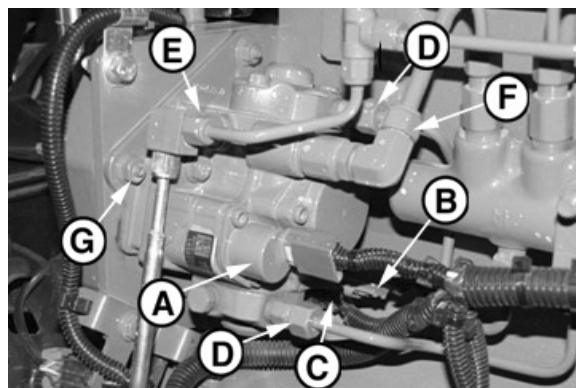
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Type 1 Remove and Install High Pressure Fuel Pump

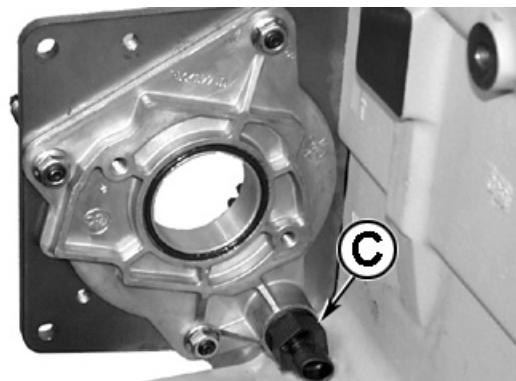
Remove High Pressure Fuel Pump

1. Disconnect wiring harness from suction control valve (A), fuel temperature sensor (B), and pump position (camshaft) sensor (C).
2. Loosen and disconnect high pressure fuel lines (D).
3. Loosen and disconnect duel leak off line.
4. Loosen and disconnect fuel supply line (F).
5. Loosen and remove 3 nuts (G) from adapter plate on engine front plate.
6. Carefully remove high pressure pump assembly from engine.

A—Suction Control Valve
 B—Fuel Temperature Sensor
 C—Pump Position (Camshaft) Sensor
 D—High Pressure Fuel Outlet
 E—Leak Off Line Connection
 F—Fuel Supply Inlet
 G—Adapter Plate Nuts -3-

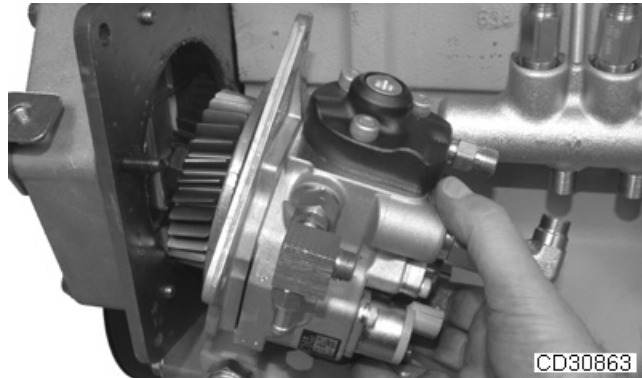


Remove High Pressure Fuel Pump



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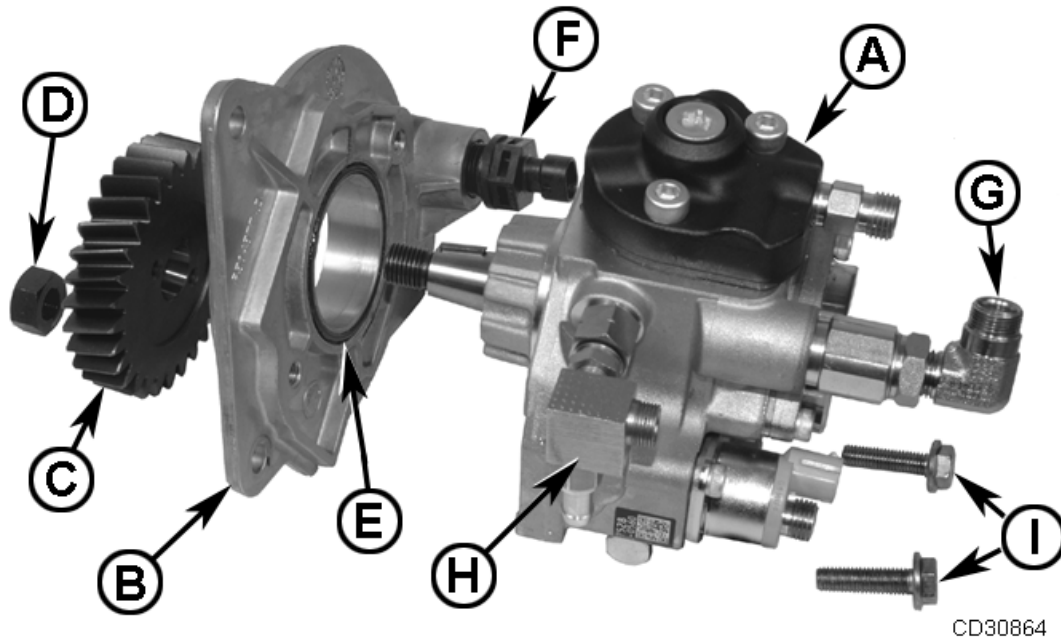
Camshaft Sensor (Shown with High Pressure Pump Removed)



Remove High Pressure Fuel Pump

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High pressure fuel pump exploded view

A—High pressure fuel pump
B—Adapter plate
C—Drive gear

D—Nut
E—O-ring
F—Pump position sensor

G—Fuel supply fitting
H—Fuel leak-off fitting

I—Cap screw (high pressure pump-to-adapter plate)

Disassemble and Reassemble High Pressure Fuel Pump

A) Disassembling

1. Remove gear (C) using JDG1560 tool. Use a vise with claws to block the gear when removing gear.
2. Remove the two cap screws (I) and separate high pressure pump (A) from adapter plate (B).
3. Replace parts as necessary.

B) Reassembling

1. Install high pressure pump (A) on adapter plate (B) with a new O-ring (E). Tighten the 2 cap screws (I) to specification.

Specification

High pressure pump to adapter plate—Torque 40 N•m (30 lb-ft)

2. Install gear (C) on pump shaft then tighten nut (D) to specification. Use a vise with claws to block the gear when tightening.

Specification

High pressure pump gear nut—
Torque..... 70 N•m (52 lb-ft)

3. Install pump position sensor (F) onto adapter plate then tighten to specification.

Specification

pump position sensor to
adapter plate—Torque..... 15 N•m (11 lb-ft)

4. Install fuel supply elbow fitting (G) on high pressure pump. Orient fitting to be in line with fuel line. Tighten fitting nut to specification.

Specification

Fuel supply elbow fitting
nut-to-high pressure pump—
Torque..... 20 N•m (15 lb-ft)

5. Install fuel leak-off fitting (H) on high pressure pump. Orient fitting vertical pointing down. Tighten fitting nut to specification.

Specification

Fuel leak-off fitting nut-to-high
pressure pump—Torque..... 15 N•m (11 lb-ft)

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Install High Pressure Fuel Pump

NOTE: Timing mark (D) should be visible, as shown, when engine is at number 1 cylinder top dead center.

1. Rotate engine to Top Dead Center (TDC) of number 1 cylinder and install JDG1571 Timing Pin in flywheel.
2. Remove plug (A) to access gear timing mark.
3. Replace O-rings (B & C) on adapter plate then install high pressure pump so that timing mark (D) can be seen through the timing gear cover opening as shown.
4. Install the 3 nuts (H) and tighten to specification.

Specification

Adapter plate to engine front plate—Torque..... 40 N•m (30 lb-ft)

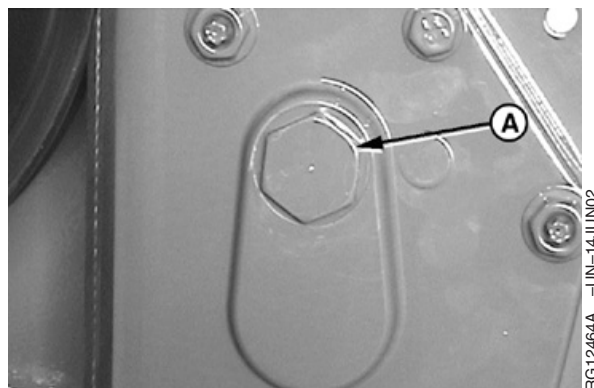
5. Install high pressure fuel lines (E) then tighten to specification.

Specification

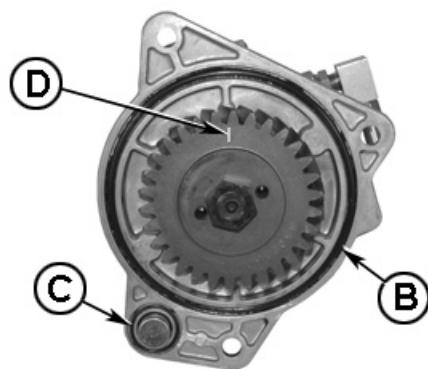
High pressure fuel line (both ends)—Torque..... 30 N•m (22 lb-ft)

6. Install leak-off line (F) then tighten tube nuts until seated on fitting shoulder.
7. Install fuel supply line (G) then tighten tube nut until seated on fitting shoulder.
8. Reconnect wiring harness to suction control valve (I), to fuel temperature sensor (J) and to camshaft sensor (K).

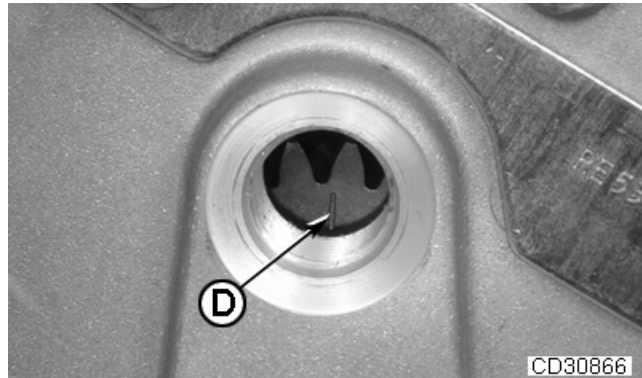
A—Plug to access gear timing mark
 B—O-ring (adapter plate-to-front plate)
 C—O-ring (camshaft sensor)
 D—High pressure pump gear timing mark
 E—High pressure fuel line
 F—Leak-off line
 G—Fuel supply line
 H—Adapter plate nut
 I—Suction control valve
 J—Fuel temperature sensor
 K—Camshaft sensor



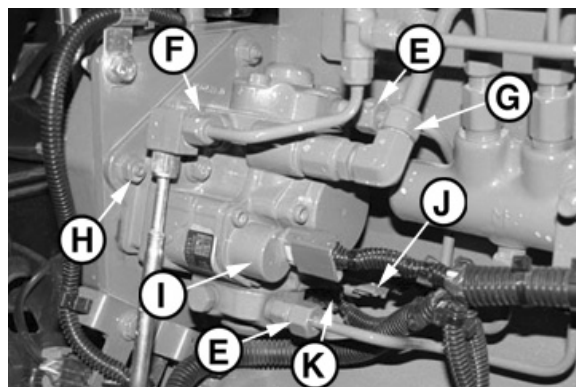
Plug to Access Gear Timing Mark



Install O-Rings on Adapter Plate



Gear Timing Mark



Install High Pressure Pump

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9. Reinstall plug (A). Tighten to specification.

Specification

Plug to access gear timing
mark—Torque..... 50 N•m (37 lb-ft)

10. Bleed fuel system.

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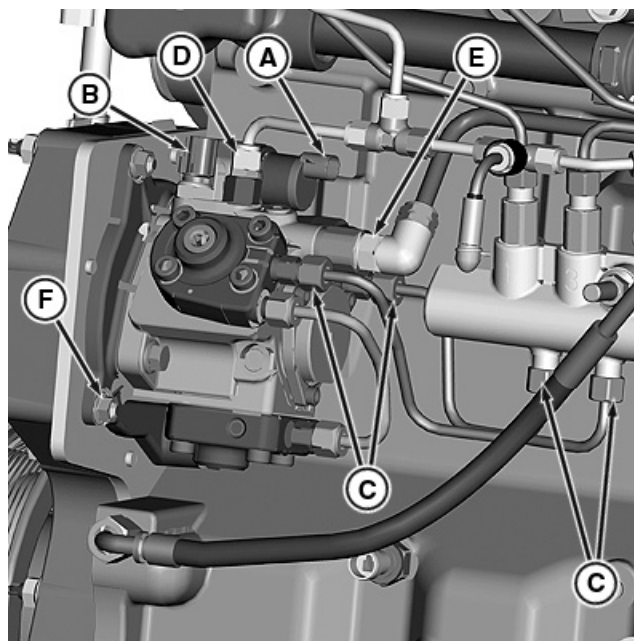
RE38635,000013F -19-29JAN08-4/4

Type 2 Remove and Install High Pressure Fuel Pump

Remove High Pressure Fuel Pump

1. Disconnect wiring harness from suction control valve (A) and fuel temperature sensor (B).
2. Remove high pressure fuel lines (C).
3. Remove fuel leak off line fitting (D).
4. Remove fuel supply line fitting (E).
5. Loosen and remove three nuts (F) from adapter plate on engine front plate.
6. Carefully remove high pressure pump assembly from engine.

A—Suction Control Valve
B—Fuel Temperature Sensor
C—High Pressure Fuel Lines
D—Leak Off Line Connection
E—Fuel Supply Inlet
F—Adapter Plate Nuts -3 used

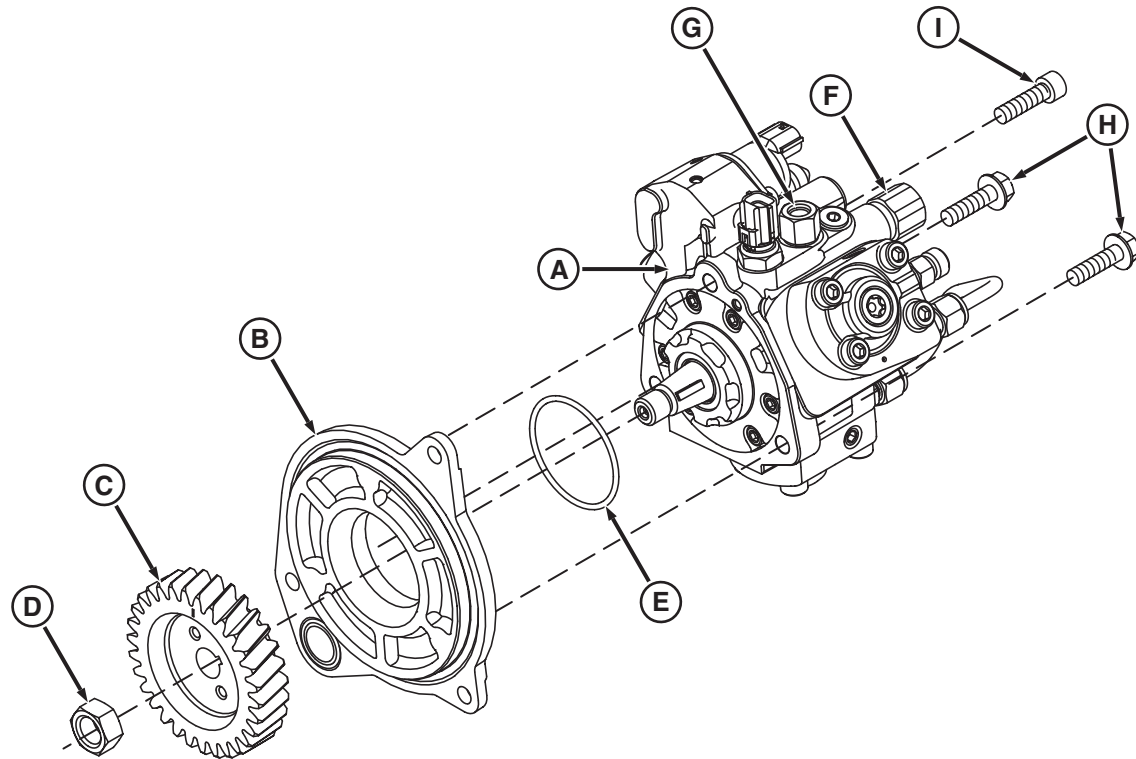


Remove High Pressure Fuel Pump

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High Pressure Fuel Pump Exploded View

A—High Pressure Fuel Pump
B—Adapter Plate
C—Drive Gear

D—Nut
E—O-ring
F—Fuel Supply Fitting

G—Fuel Leak-off Fitting
H—Cap Screw (High Pressure
Pump-to-Adapter Plate)

I—Allen Screw

Disassemble and Reassemble High Pressure Fuel Pump

A) Disassembling

1. Remove nut (D). Use a vise with claws to block the gear when removing gear.
2. Remove gear (C) using JDG1560 tool.
3. Remove the two cap screws (H) and one allen screw (I) and separate high pressure pump (A) from adapter plate (B).
4. Replace parts as necessary.

B) Reassembling

1. Install high pressure pump (A) on adapter plate (B) with a new O-ring (E). Tighten the two cap screws (H) and one allen screw (I) to specification.

Specification

High Pressure Pump to Adapter
Plate—Torque..... 35 N•m (26 lb.-force)

2. Install gear (C) on pump shaft then tighten nut (D) to specification. Use a vise with claws to block the gear when tightening.

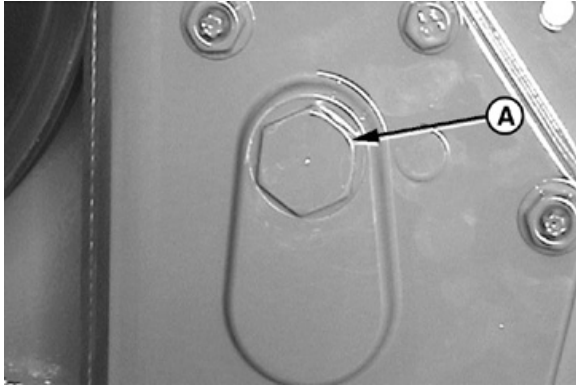
Specification

High Pressure Pump Gear
Nut—Torque 68 N•m (50 lb.-force)

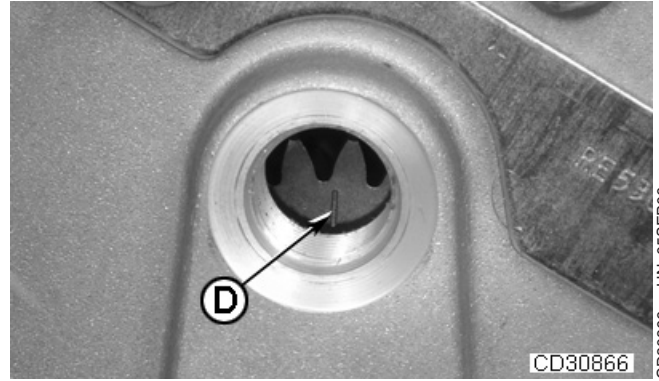
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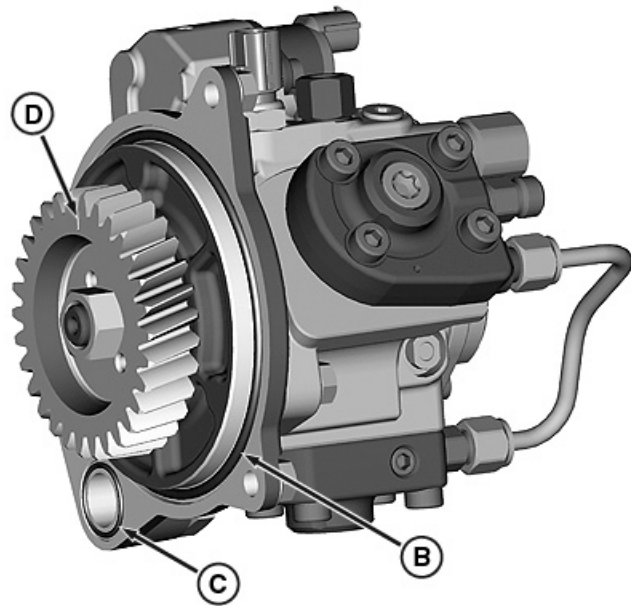
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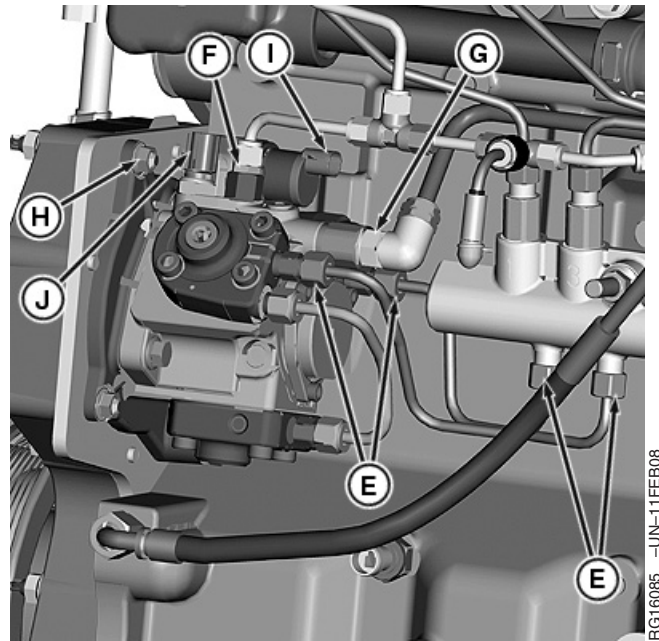
Plug to Access Gear Timing Mark



Gear Timing Mark



Install O-rings on Adapter Plate



Install High Pressure Pump

A—Plug to access Gear Timing Mark

B—O-ring (Adapter Plate-to-Front Plate)

C—O-ring (camshaft sensor)
D—High Pressure Pump Gear Timing Mark

E—High Pressure Fuel Line
F—Leak-off Line
G—Fuel Supply Line

H—Adapter Plate Nut
I—Suction Control Valve
J—Fuel Temperature Sensor

Install High Pressure Fuel Pump

NOTE: Timing mark (D) should be visible, as shown, when engine is at number 1 cylinder top dead center.

1. Rotate engine to Top Dead Center (TDC) of number 1 cylinder and install JDG1571 Timing Pin in flywheel.
2. Remove plug (A) to access gear timing mark.

3. Replace O-rings (B & C) on adapter plate then install high pressure pump so that timing mark (D) can be seen through the timing gear cover opening as shown.
4. Install the three nuts (H) and tighten to specification.

Specification

Adapter plate to engine front plate—Torque 35 N•m (26 lb.-force)

Continued on next page

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5. Install high pressure fuel lines (E) then tighten to specification.

Specification

High pressure fuel line (both ends)—Torque 27 N•m (20 lb.-force)

6. Install fuel supply elbow fitting (G) on high pressure pump. Orient fitting to be in line with fuel line. Tighten fitting nut to specification.

Specification

Fuel Supply Elbow Fitting
Nut-to-High Pressure Pump—
Torque..... 20 N•m (15 lb.-force)

7. Install fuel leak-off fitting (F) on high pressure pump. Orient fitting vertical pointing down. Tighten

fitting nut to specification.

Specification

Fuel Leak-off Fitting—Torque..... 18 N•m (13 lb.-force)
Leak-off Nut—Torque 6 N.m (4.5 lb.-force)

8. Reconnect wiring harness to suction control valve (I) and to fuel temperature sensor (J).

9. Reinstall plug (A). Tighten to specification.

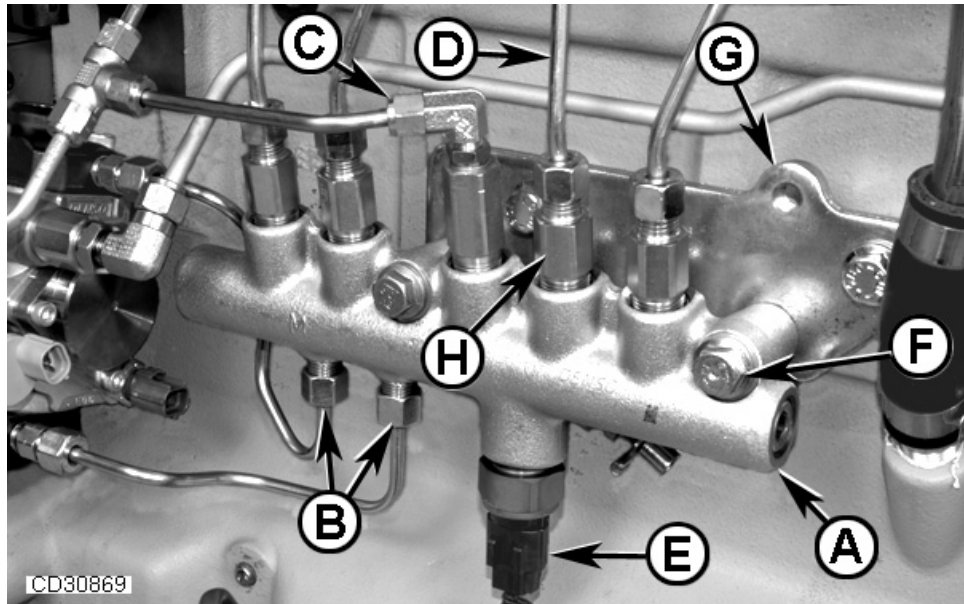
Specification

Plug to access gear timing
mark—Torque 50 N•m (37 lb.-force)

10. Bleed fuel system. See Bleed the Fuel System in Section 4, Group 150.

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Remove and Install High Pressure Common Rail



Remove High Pressure Common Rail (HPCR)

A—High Pressure Common Rail (HPCR)	C—Leak-off line	E—Pressure sensor	G—Bracket
B—Pump-to-rail high pressure line	D—High pressure delivery line	F—Cap screw	H—Flow damper

Remove High Pressure Common Rail

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

1. Disconnect pressure sensor wiring harness.
2. Disconnect leak-off line (C) from elbow fitting.
3. Remove pump-to-rail high pressure lines (B)
4. Remove high pressure delivery lines (D) from rail. Do not remove flow damper (H).
5. Loosen cap screw (F), then remove the high pressure common rail (A) from engine.

Install High Pressure Common Rail

1. Install bracket (G) on engine (if previously removed). Install high pressure common rail on bracket then tighten cap screw to specification.

Specification

High pressure common rail bracket to engine—Torque	70 N•m (52 lb-ft)
High pressure common rail to bracket—Torque	70 N•m (52 lb-ft)

2. Install 90 degree elbow fitting (if required) into common rail leak off port at 45 degrees toward front left hand side of engine. Tighten to specification.

Specification

90 degree Elbow Fitting to Common Rail—Torque	15 N•m (12 lb-ft)

3. Install high pressure delivery lines (D). Tighten to specification.

Specification

High pressure delivery lines to rail—Torque	30 N•m (22 lb-ft)

4. Install pump-to-rail high pressure lines (B). Tighten to specification.

Continued on next page

RE38635,0000148 -19-04AUG07-1/2

Specification

Pump-to-rail high pressure
lines—Torque..... 30 N•m (22 lb-ft)

6. Connect wiring harness to pressure sensor (E).
7. Bleed fuel system.

5. Connect leak-off line (C) to elbow fitting. Tighten
tube nut until seated on fitting shoulder.

RE38635,0000148 -19-04AUG07-2/2

Remove and Install Flow Dampers

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

Remove Flow Dampers

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

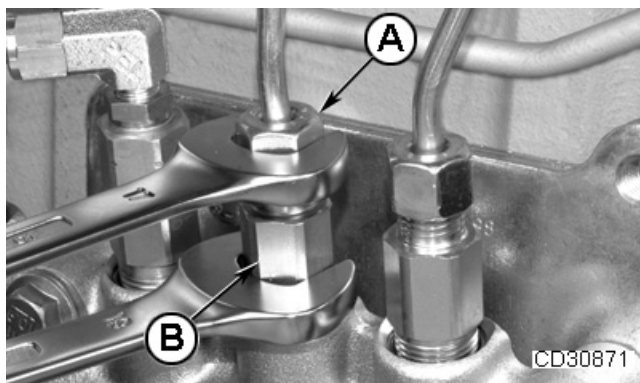
1. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the faulty flow damper.
2. Using a backup wrench on flow damper, loosen fuel line fitting (A).

IMPORTANT: Do NOT bend or force lines out of the way.

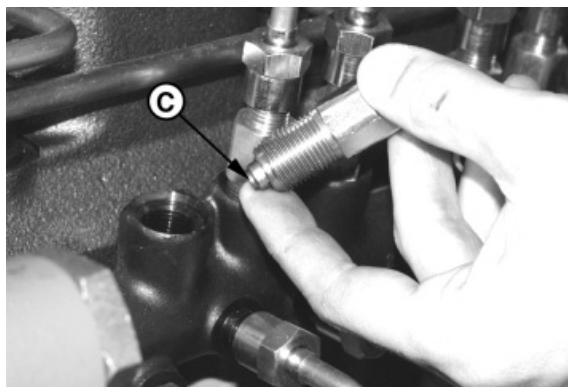
3. Loosen fuel line fitting on injector inlet connector. The line does not need to be removed.
4. Remove flow damper (B) keeping internal components (C) together.

IMPORTANT: Make sure magnet is clean before using.

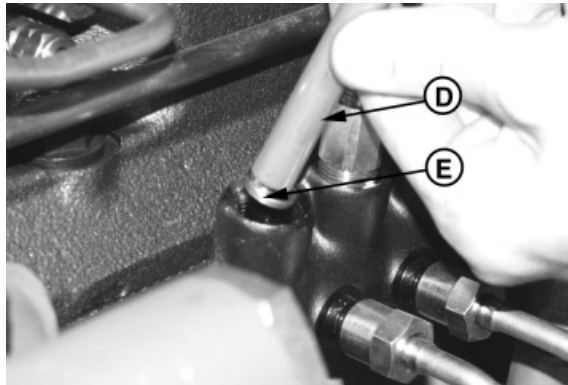
5. Remove orifice plate (E) from inside flow damper bore using a clean magnet (D).
6. Replace complete flow damper as an assembly.



Remove flow damper



Flow Damper Internal Components



Removing Orifice Plate

- A—Fuel line fitting
- B—Flow damper
- C—Internal Components
- D—Magnet
- E—Orifice Plate

Continued on next page

RG41183,00000D4 -19-22JAN07-1/2

Install Flow Dampers

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

1. Insert new orifice plate (A) inside bore on high pressure common rail.
2. Holding spring (C) and piston (B) inside flow damper body (D), install new flow damper on high pressure common rail. Tighten flow damper to specification.

Specification

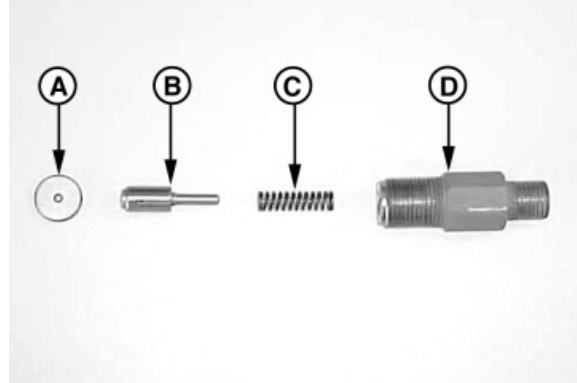
Flow damper—Torque..... 176 N•m (130 lb-ft)

3. Using a backup wrench, connect high pressure injection line to flow damper and to injector inlet connector. Tighten to specification.

Specification

High pressure injection line at both ends—Torque..... 30 N•m (22 lb-ft)

4. Bleed fuel system.



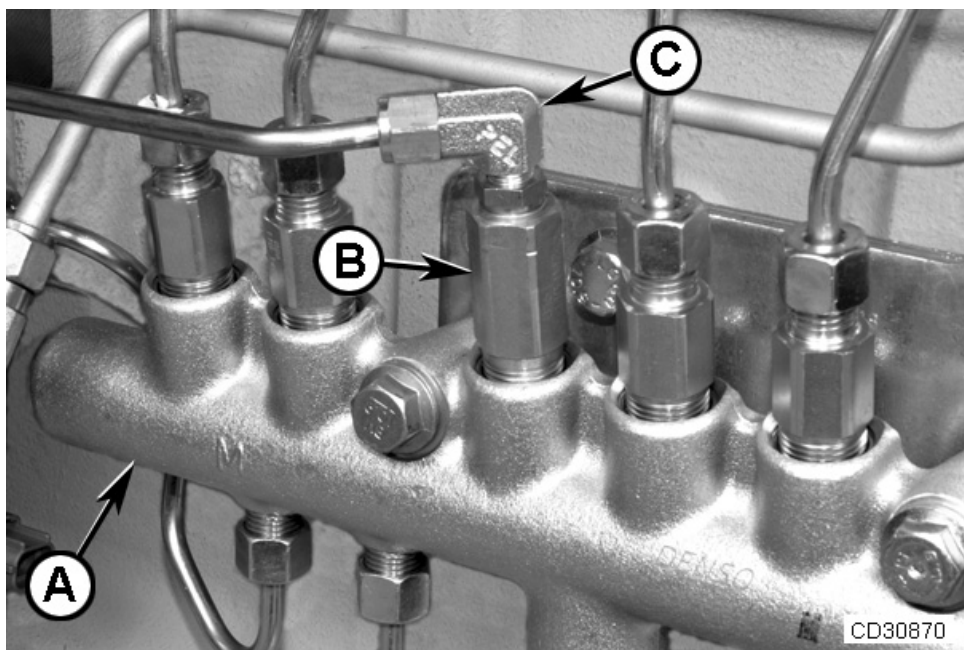
RG11845A -UN-31AUG01

Flow Damper Exploded View

A—Orifice Plate
B—Piston
C—Spring
D—Flow Damper Body

RG41183,00000D4 -19-22JAN07-2/2

Remove and Install Pressure Limiter



Remove/Install Fuel Pressure Limiter

A—High Pressure Common Rail (HPCR)

B—Fuel pressure limiter

C—Leak-off Line Fitting

Remove Pressure Limiter

CAUTION: Wait a minimum of 15 minutes after engine is stopped before disconnecting any high pressure fuel lines.

IMPORTANT: Perform the following steps in a clean environment. Avoid debris to enter the fuel system thus would cause injector failure.

1. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
2. Disconnect leak-off line then remove fitting (C) from pressure limiter (B) using a backup wrench on the pressure limiter.

IMPORTANT: Clean magnet prior to removing pressure limiter.

IMPORTANT: DO NOT remove and replace pressure limiter. A leak may result. A new pressure limiter should be installed

3. Remove and discard pressure limiter. The pressure limiter comes as an assembly. Due to the torque during installation, the crimp on the end of the assembly can come loose. When removing the pressure limiter check to see if the entire assembly is together. If not, use a clean magnet to remove the loose components from the bore. Make sure the ball valve does not fall into the rail.

Continued on next page

RE38635,000013C -19-04AUG07-1/2

Install Pressure Limiter

IMPORTANT: When replacing pressure limiter, **DO NOT** use sealant or any Loctite. The seal is metal to metal.

IMPORTANT: **DO NOT** remove and replace pressure limiter. A leak may result. A new pressure limiter should be installed

1. Install new pressure limiter (B) into common rail (A). Tighten to specification.

Specification

Pressure Limiter—Torque 176 N•m (130 lb-ft)

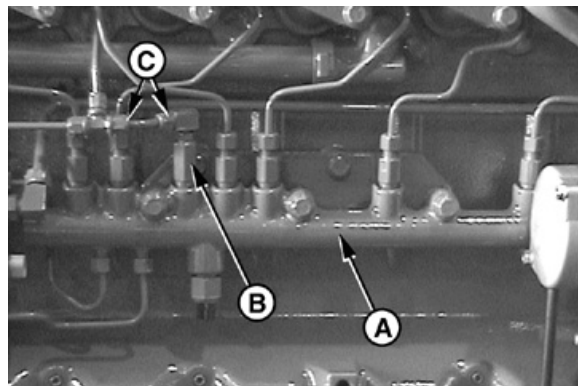
2. Install leak-off line fitting (C) to pressure limiter using a backup wrench. Orient fitting to be in line with leak-off line then tighten nut to specification.

Specification

High Pressure Common Rail

Leak-off Line Fitting—Torque..... 6 N•m (11 lb-ft)

3. Connect leak-off line then tighten tube nuts until seated on fitting shoulder.
4. Bleed fuel system.

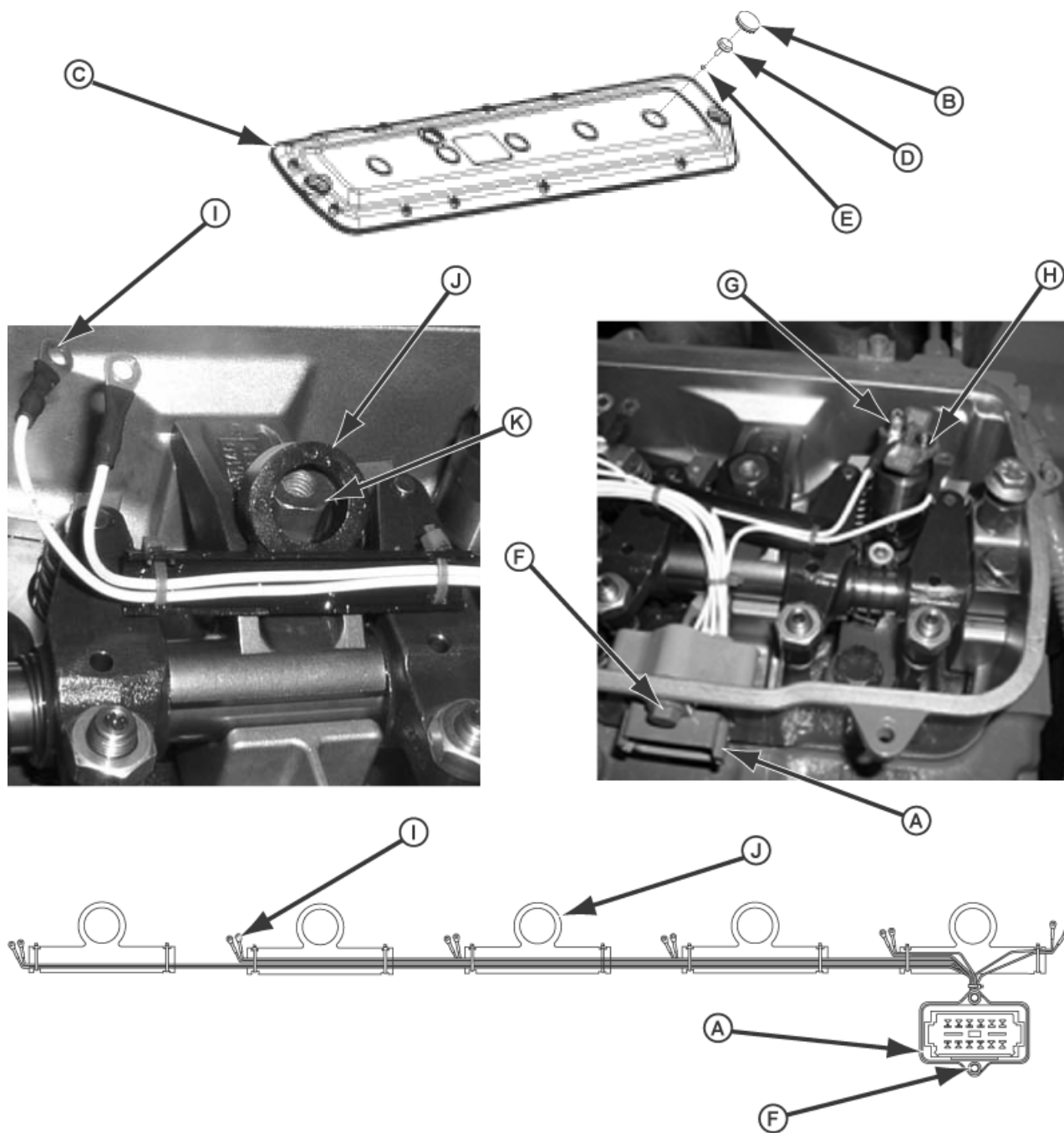


High Pressure Common Rail (HPCR)

RG12459B -UN-18JUN02

RE38635,000013C -19-04AUG07-2/2

Remove and Install Fuel Injection Wire Harness Assembly



Fuel injection Wire Harness Assembly

A—Fuel Injector Wire Harness Assembly Connector
B—Cap (Rocker-Arm Cover)
C—Rocker Arm Cover

D—Cap screw (Rocker Arm Cover)
E—O Ring
F—Cap screw (Fuel Injector Wire Harness Assembly Connector)

G—Nut (EI Terminal)
H—EI Terminal
I—Wire Eyelets

J—Wire Assembly Stiffeners
K—Nut

RG15215 -JUN-06FEB07

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DB92450,000005C -19-04OCT07-1/4

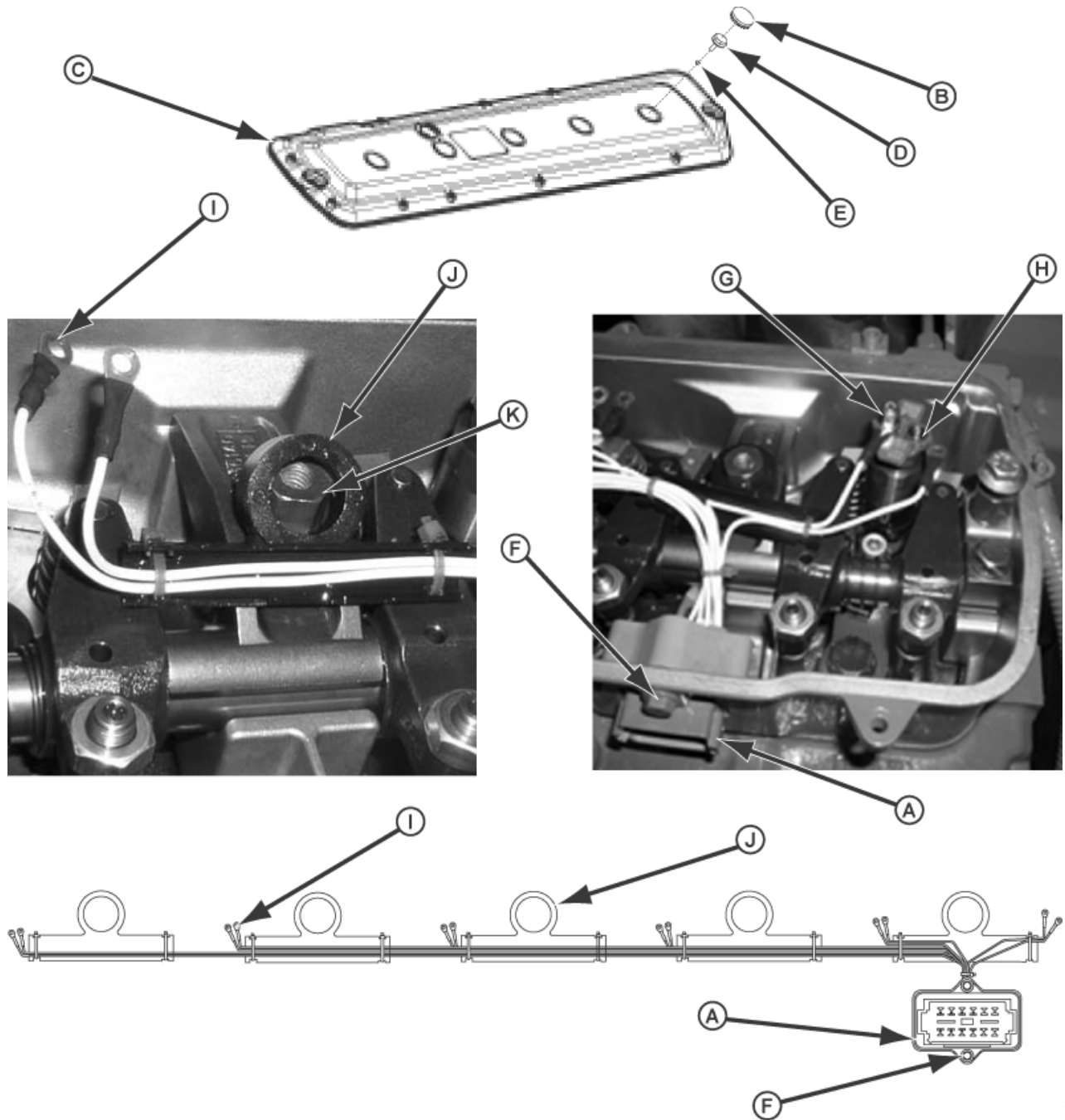
Removal Procedures

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 6 (4.5L Engine)* or *COMPONENT LOCATION DIAGRAM 12 (6.8L Engine)* in Section 03, Group 140 of this manual.

1. Separate engine harness fuel injector connector from fuel injector wire harness assembly connector (A).
2. Using flat-bladed tool, pry off and retain 7 each rocker-arm cover caps (B) from rocker arm cover (C).
3. Remove and retain cap screws (D).
4. Remove and discard O-ring seals (E), one from each cap screw.
5. Carefully remove rocker arm cover, and lay aside upside down, so as not to damage or disturb rocker arm cover gasket.
6. Remove and retain cap screws (F) from fuel injector wire harness assembly connector.
7. Push fuel injector wire harness assembly connector into rocker arm compartment.
8. Remove and retain nuts (G) from EI terminals (H), 2 each, from each EI.
9. Lift wire eyelets (I) off EI terminals.
10. Lift eyes of wire assembly stiffeners (J) off Nuts (K).
11. Remove and discard fuel injector wire harness assembly.

Continued on next page

DB92450,000005C -19-04OCT07-2/4



Fuel injection Wire Harness Assembly

A—Fuel Injector Wire Harness
Assembly Connector
B—Cap (Rocker-Arm Cover)
C—Rocker Arm Cover

D—Cap screw (Rocker Arm
Cover)
E—O Ring
F—Cap screw (Fuel Injector
Wire Harness Assembly
Connector)

G—Nut (EI Terminal)
H—EI Terminal
I—Wire Eyelets

J—Wire Assembly Stiffeners
K—Nut

RG15215 -JUN-06FEB07

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DB92450,000005C -19-04OCT07-3/4

Installation Procedures

1. Install eyes of wire assembly stiffeners (J) onto Nuts (K).
2. Install wire eyelets (I) onto EI terminals (H).
3. Install nuts (G) onto terminals, 2 each, for each EI. Torque nuts to specification.

SpecificationInjector Terminal Nut—Torque $2.2 \pm 0.2 \text{ N}\cdot\text{m}$ ($19.5 \pm 2.0 \text{ lb}\cdot\text{in.}$)

4. From inside rocker arm compartment, push fuel injector wire harness assembly connector (A) into connector space in side of rocker arm compartment.
5. Screw two each cap screws (F) into fuel injector wire harness assembly connector. Torque cap screws to specification.

SpecificationConnector Cap screw—Torque $10 \text{ N}\cdot\text{m}$ (7.5 lb-ft.)

6. Carefully replace rocker arm cover (C) onto rocker arm compartment. If gasket is damaged, first replace it, then install rocker arm cover.
7. Install new O-rings (E), one for each cap screw (D).
8. Attach rocker arm cover to rocker arm compartment. Torque cap screws to specification.

Specification

Rocker Arm Cover Cap

Screws—Torque $10 \text{ N}\cdot\text{m}$ (7.5 lb-ft)

9. Snap caps (B) into place on rocker arm cover.
10. Connect engine harness fuel injector connector to fuel injector wire harness assembly connector.

DB92450,000005C -19-04OCT07-4/4

Remove Electronic Injectors (EIs)

NOTE: Injectors have an identification tag (A) containing the injector serial number and the performance data used to program the ECU at the factory. Injectors and engine cylinders are matched in the ECU database. If a new injector is installed or injector is swapped with another one, the ECU must be updated with the new information using Service ADVISOR. See ELECTRONIC INJECTOR CALIBRATION in Section 04, Group 160 later in this manual.

IMPORTANT: Perform the following steps in a clean environment. Avoid debris to enter the fuel system thus would cause injector failure.

NOTE: Injector can be removed with the rocker arm shaft carrier (B) installed or removed.

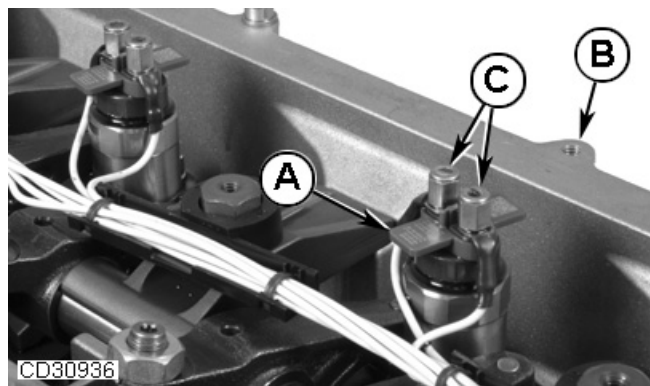
1. Remove rocker arm cover with vent tube.

NOTE: Rocker arm cover gasket is reusable if no visible damage is detected. Do not store cover resting on gasket surface.

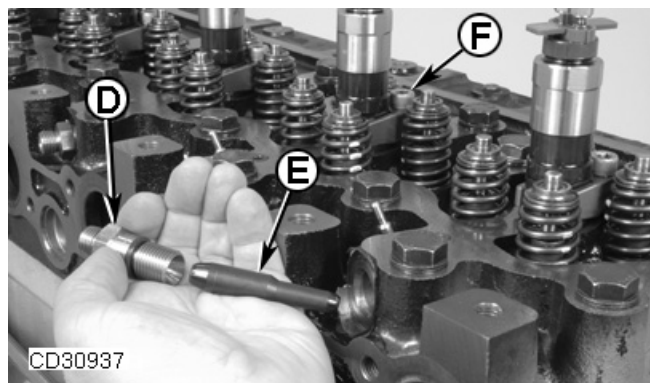
2. Disconnect High Pressure Common Rail (HPCR) delivery line of the electronic injector to be removed.
3. Remove wires from injector studs (C).
4. Loosen side feed tube fitting (D) and remove side feed tube (E).
5. Remove injector hold down clamp screw (F).
6. Using injector removal tool JDG1652A (G), remove injector along with hold down clamp.

IMPORTANT: When removing the injector, hold at the base and rotate counterclockwise. Do not twist the top of the injector, which may result in solenoid damage.

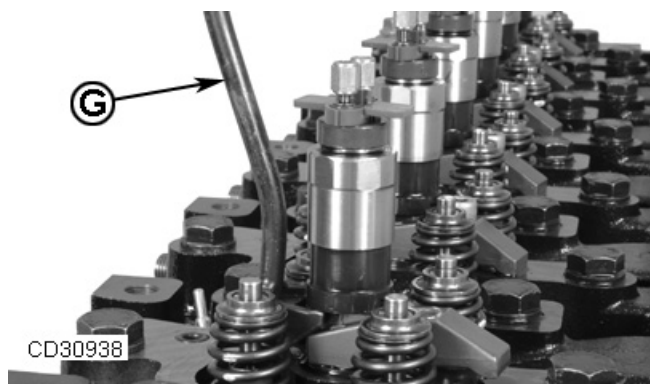
7. Immediately cover all openings in cylinder head and injector.



Remove injector wire



Remove side feed tube



Remove injector using JDG1652A tool (carrier removed)

- A—Injector identification tag
- B—Rocker arm shaft carrier
- C—Injector studs
- D—Side feed tube fitting
- E—Side feed tube
- F—Injector hold down clamp screw
- G—JDG1652A Injector removal tool

NOTE: Electronic injector cannot be serviced nor tested for opening pressure as it is controlled electronically. If any component of the injector fails, the entire injector must be replaced.

CD03523,0000198 -19-04OCT07-2/2

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Clean Electronic Injector (EI) Bore

1. Clean light deposits out of electronic injector bore using an electric drill and D17030BR Thread Cleaning brush.
2. Work brush up and down several times to clean bore.

RG40854,0000118 -19-22JAN07-1/1

Clean Electronic Injector (EI) Orifice

Electronic injector orifice cannot be cleaned. If orifice is plugged, replace electronic injector.

RG40854,0000117 -19-22JAN07-1/1

Clean Electronic Injector (EI) Body

IMPORTANT: Never use a steel brush to clean electronic injectors. Steel brush may damage electronic injectors.

1. Clean new or used electronic injectors by washing in diesel fuel.
2. If necessary, use a brass wire brush to remove carbon deposits.

RG40854,0000116 -19-22JAN07-1/1

Inspect Electronic Injector (EI) Body

1. Inspect electronic injector body to see that it is not scratched or scored.
2. If electronic injector is scratched or scored, replace electronic injector.

RG40854,0000115 -19-22JAN07-1/1

Install Electronic Injectors (EIs)

NOTE: When servicing injectors it is important to complete the injector calibration procedure using Service ADVISOR. Each injector has a specific calibration and this information can be obtained by scanning the bar code on the service injector box and downloading the injector information from the John Deere Custom Performance™ web site. An alternative for obtaining the fuel calibration data from Custom Performance is to use the part number and injector serial number stamped on the injector. ECU can also be directly loaded with the 30 digits code of the identification tag (A).

If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.

NOTE: Write down the injector part number and serial number for future reference.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

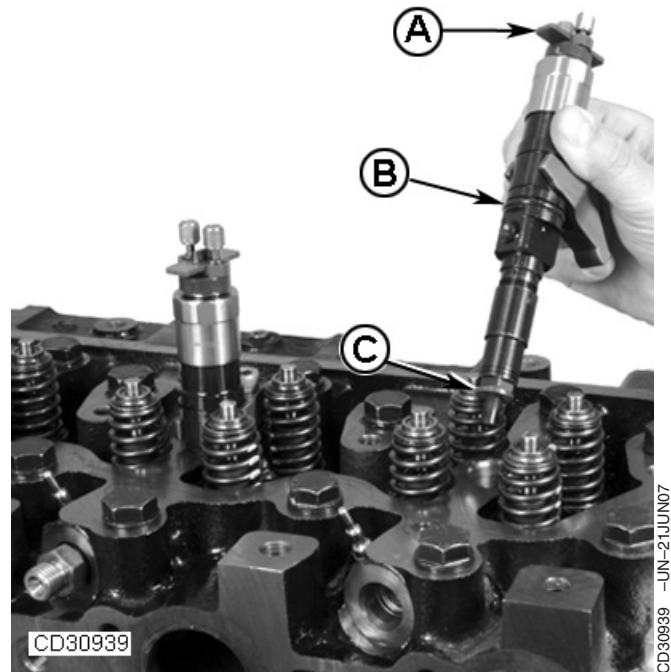
1. If injector is re-installed, replace O-ring (B) and combustion sealing washer (C).

IMPORTANT: Do not get oils in high pressure fuel passage or sealing surfaces.

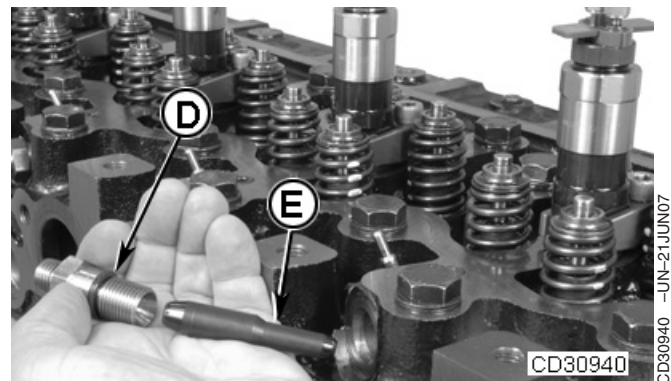
2. Lubricate O-ring with petroleum grease.
3. Carefully insert injector, with hold down clamp, into bore until it 'pops' into place.

IMPORTANT: When installing injector, do not twist the top of the injector. This will cause the injector calibration to be changed.

4. Lubricate side feed tube fitting O-ring (D) with petroleum grease.



Install injector



Install side feed tube

- A—Identification tag
- B—Injector body O-ring
- C—Combustion sealing washer
- D—Side feed tube fitting O-ring
- E—Side feed tube

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CD03523,0000199 -19-15FEB08-1/4

5. Install side feed tube (E) with the small end toward injector.

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CD03523,0000199 -19-15FEB08-2/4

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6. Hand tighten hold down clamp screw (F).
7. Torque side feed tube fitting (D) to specification.

Specification

First Torque - Side Feed Tube
Fitting—Torque..... 5 N•m (3.7 lb-ft)

8. Torque hold down clamp screw (F) to specification.

Specification

Injector Hold Down Clamp
Screw—Torque..... 47 N•m (35 lb-ft)

9. Torque side feed tube fitting to specification.

Specification

Second Torque - Side Feed Tube
Fitting—Torque..... 35 N•m (25.8 lb-ft)

10. Connect High Pressure Common Rail (HPCR) delivery line(s) to side feed tube fitting and HPCR. Torque to specification.

Specification

HPCR Delivery Line Fitting—
Torque 27 N•m (19.9 lb-ft)

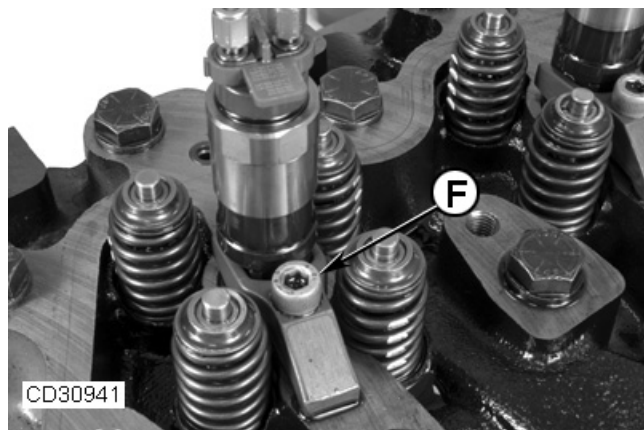
IMPORTANT: Do NOT use red or blue LOCTITE® on solenoid studs. Bonding strength is too high for small studs, making future removal impossible without twisting off stud.

11. Apply LOCTITE® 222 Small Thread Locker (PM38653) to injector studs.
12. Install injector wiring and retaining nuts (G) to injector studs and tighten to specification.

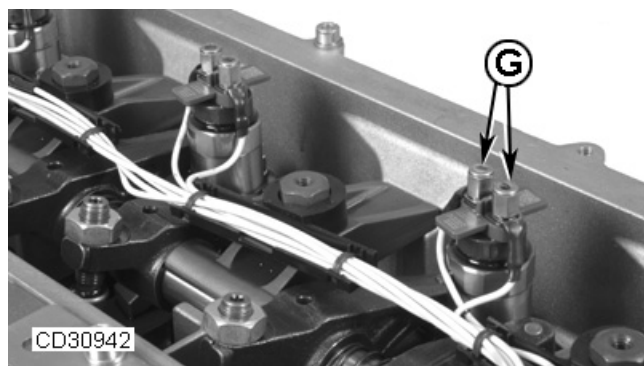
Specification

Injector Solenoid Wire Retaining
Nut—Torque 2 N•m (1.5 lb-ft) (18 lb-in.)

13. Calibrate the ECU for proper electronic injector fueling. See ELECTRONIC INJECTOR CALIBRATION in Section 04, Group 160 later in this manual.



Hold down clamp screw



Connect injector wiring

F—Hold down clamp screw
G—Injector stud nut

14. Install rocker arm cover with vent tube. See INSTALL ROCKER ARM COVER in Section 02, Group 021 of Base Engine Manual.

CD03523,0000199 -19-15FEB08-4/4

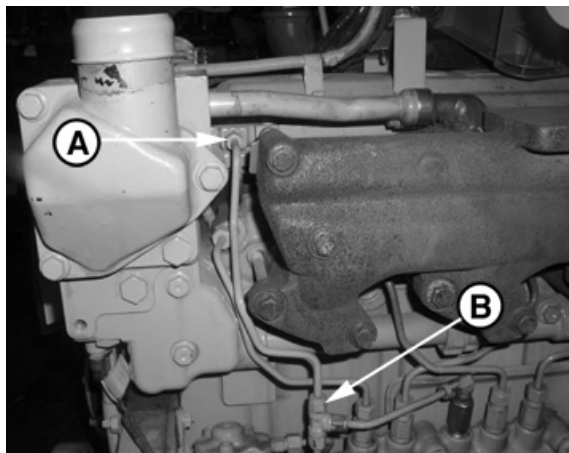
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Remove and Install Leak-off and Pump Overflow Lines

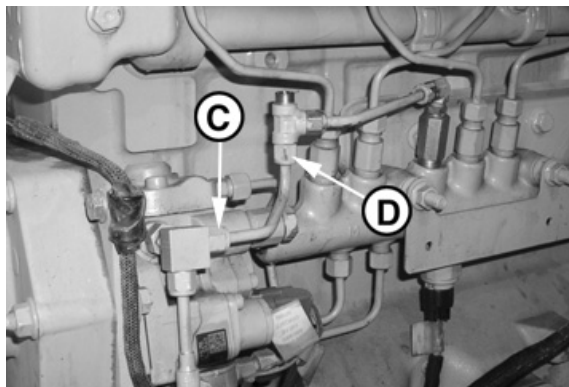
Remove Leak-off Lines

1. Loosen return line fitting (A) at top front of cylinder head.
2. Loosen fitting (B) at top of tee fitting. Set fuel line aside.
3. Loosen fitting (C) at overflow elbow fitting on fuel pump housing.
4. Loosen fitting (D) at bottom of tee fitting. Set fuel line aside.
5. Loosen fitting (E) at high pressure common rail flow limiter. Remove line with tee fitting attached and set aside.

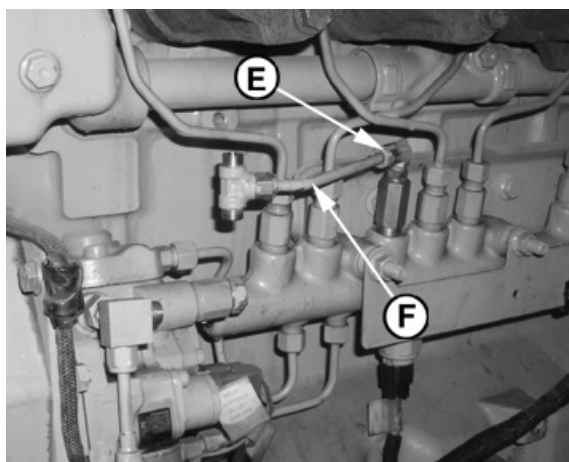
A—Fitting - Front of Cylinder Head
 B—Fitting - Top of Tee Fitting
 C—Fitting - Overflow Elbow Fitting on Pump Housing
 D—Fitting - Bottom of Tee Fitting
 E—Fitting - Flow Limiter
 F—Return Line - High Pressure Common Rail Flow Limiter



Remove Leak-off Line - Cylinder Head to Tee Fitting



Remove Leak-off Line - Tee Fitting to Overflow Elbow Fitting



Remove Leak-off Line - Flow Limiter to Tee Fitting

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RE38635,0000055 -19-04AUG07-1/3

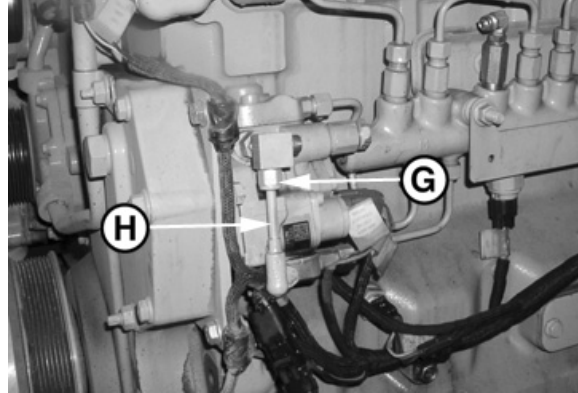
Remove Fuel Pump Overflow Line and Fitting

1. Loosen fitting (G) at bottom of elbow fitting. Set return fuel line (H) aside.

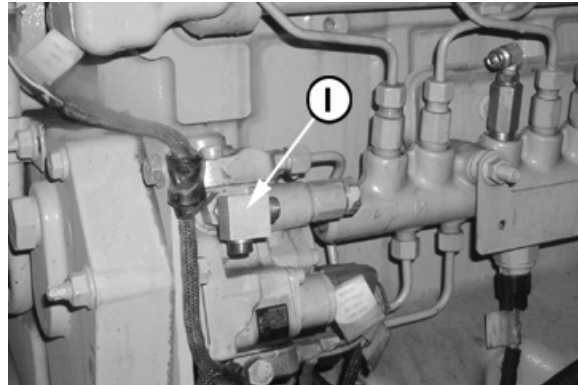
IMPORTANT: After removing elbow fitting from pump, cap or otherwise block hole in housing to prevent debris from entering pump housing.

2. Loosen and remove elbow fitting (I) from fuel pump housing.

G—Fitting - Fuel Return and Pump Overflow Line
H—Fuel Line - Return to Tank an Pump Overflow
I—Elbow Fitting



Fuel Pump Overflow and Return to Tank Line



Overflow and Return to Tank Elbow Fitting

RG15301 -UN-06JUN07
RG15302 -UN-06JUN07
RE38635,0000055 -19-04AUG07-2/3

Installation of Leak-off Lines

IMPORTANT: Before reassembly of fuel return lines to engine, replace O-rings (A) on each fitting, to prevent leaks.

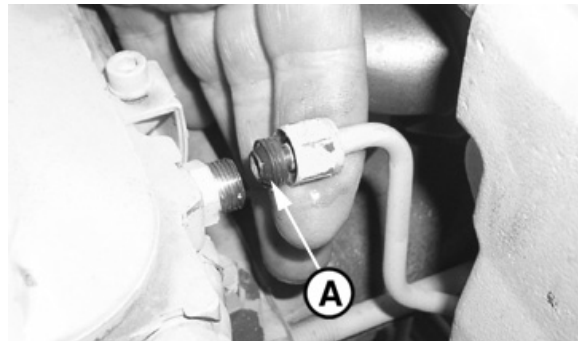
Assemble fuel leak-off lines to engine in reverse order of removal. Torque fittings and the elbow fitting to fuel pump housing to specification.

Specification

Elbow Fitting to Pump Housing—
Torque 20 N•m (15 lb-ft)

Specification

Fuel Line Fittings—Torque 14 N•m (11 lb-ft)



Fuel Line O-ring

A—O-ring

RG15303 -UN-06JUN07
RE38635,0000055 -19-04AUG07-3/3

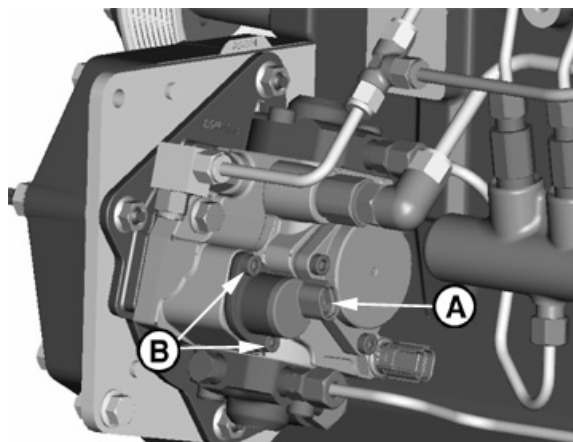
Remove and Install Suction Control Valve

IMPORTANT: Please note that the graphics show two different high pressure pump options. In each case, the lower graphic shows a pump (Model HP4) similar to that used on Tier 3/Stage III A PowerTech Plus™ 9.0L engines. The HP4 pump used on Tier 3/Stage III A PowerTech Plus 4.5 and 6.8L engines has components which are compatible with jet fuel, and the suction control valve is in a different location on the pump.

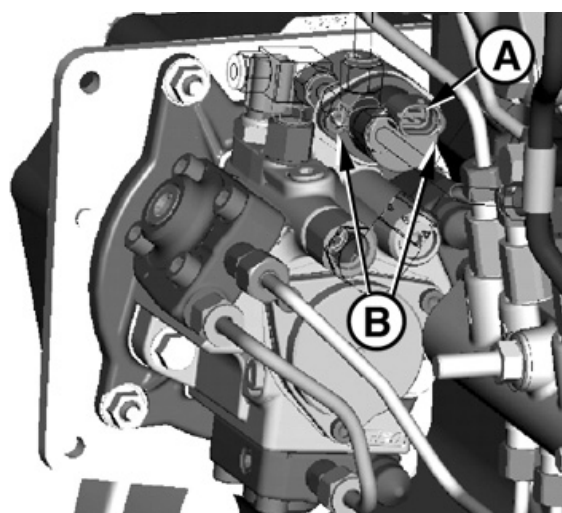
IMPORTANT: Avoid contamination to the fuel high pressure pump or the suction control valve while removing and replacing. Failure to maintain a high level of cleanliness will cause further damage to the pump and other fuel system components.

IMPORTANT: The high pressure fuel pump doesn't necessarily have to be removed from the engine to change the suction control valve. However, if the engine compartment is heavily contaminated, it is recommended that the pump be removed completely, cleaned, and have the service work completed off the engine. Cleanliness is very important. Once the suction control valve is replaced, install pump back to engine and reassemble fuel system.

1. Thoroughly clean suction control valve area - solenoid connector, suction control valve mounting area, and surrounding pump and engine surfaces with an engine cleaner and degreaser. **Be certain the suction control valve area is clean and free from dirt/debris/dust.** If practical, remove paint from the suction control valve joint area between the suction control valve and pump housing.



Remove Suction Control Valve Assembly



Remove Suction Control Valve (SCV) Assembly - Jet Fuel Capable HP4 Pump

A—Suction Control Valve Wire Connector
B—Suction Control Valve Retaining Bolts

2. Disconnect the suction control valve wire connector (A). **Avoid damaging the connector and plastic cover. DO NOT twist the connector.**
3. Loosen 2 suction control valve retaining bolts (B) with a 5 mm Allen hex tool. **Do not completely remove bolts. Beware of paint chips and other possible contamination sources. If necessary, clean the joint area again.**
4. With the 2 retaining bolts loose but not removed, remove the suction control valve from the pump body by hand, pulling straight out from pump. **DO NOT twist the valve or pry with any tool.**

IMPORTANT: Install a properly sized cap plug in the valve opening in the pump body to protect the pump from contamination.

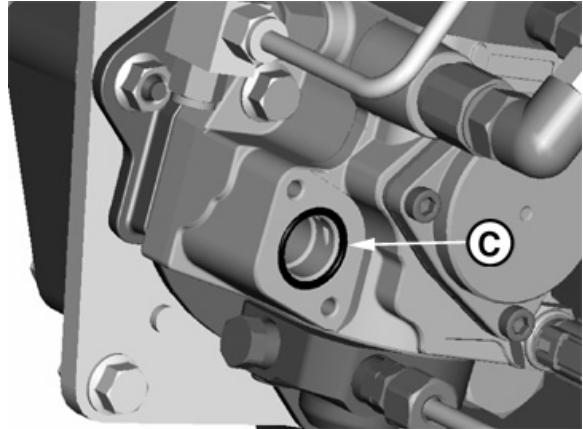
5. With the suction control valve separated from the pump, remove and discard the 2 retaining bolts.

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RE38635,0000065 -19-04AUG07-2/8

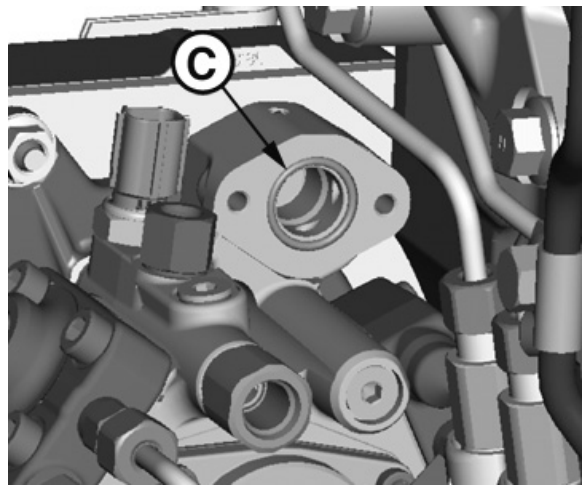
6. Check valve mounting surface on pump housing. Remove any residual gasket material from valve mounting surface. Exercise caution to not damage mounting surface. If o-ring (C) is stuck to pump housing surface rather than the suction control valve, remove o-ring.
7. Ensure the o-ring groove in pump housing is clean and free from debris.

C—O-Ring



RG15102 -UN-01SEP06

Suction Control Valve-to-Pump Housing O-Ring



RG15250 -UN-20MAR07

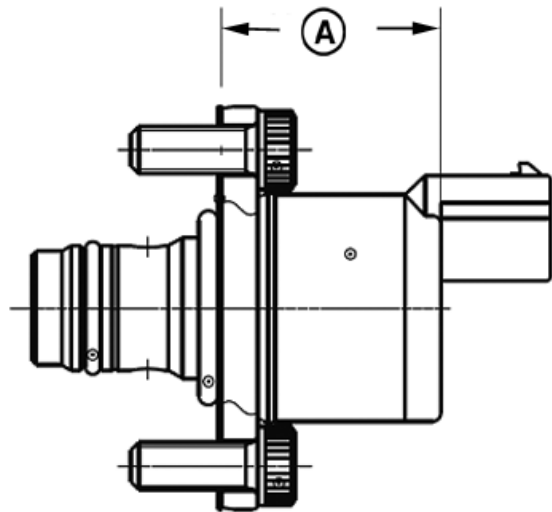
SCV to Pump Housing O-ring - HP4 Pump

RE38635,0000065 -19-04AUG07-3/8

NOTE: If the length of the new valve is not 27.6 mm, it is the incorrect valve for the 4.5L & 6.8L pump.

8. Verify the overall reference length of the valve to be 27.6 mm (1.09 in.)

A—27.6 mm (1.09 in.)



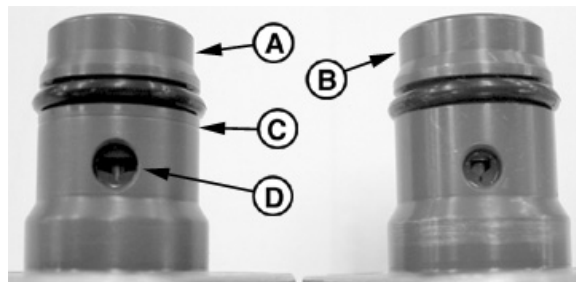
RG15103 -UN-01SEP06

Reference Length of Valve

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RE38635,0000065 -19-04AUG07-4/8

9. In addition to checking length of the valve, a visual check can be made to determine if the correct valve is in the kit. As shown, the PowerTech Plus 9.0L valve (A) has a groove (C) on the valve body. The PowerTech Plus 4.5L and 6.8L valve (B) has none. Additionally, the valve for the 9.0L has a different port geometry (D) than the valve for the 4.5L and 6.8L.

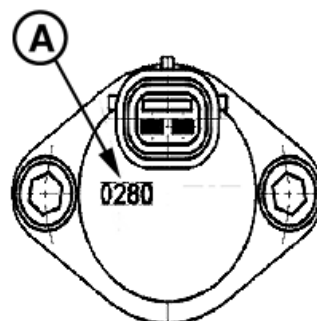


RG15156 -UN-13NOV06

- A—9L Valve
B—4.5L/6.8L Valve
C—Groove on Valve Body
D—Port Geometry

RE38635,0000065 -19-04AUG07-5/8

10. An identification number (A) is also located on the control valve housing.



Identification Mark - HP4 Pump

RG15251 -UN-20MAR07

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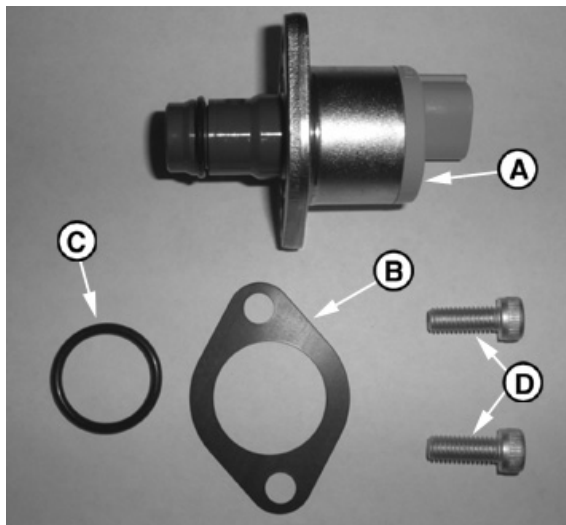
RE38635,0000065 -19-04AUG07-6/8

IMPORTANT: DO NOT handle replacement valve parts with dirty hands or gloves.

IMPORTANT: DO NOT allow engine coolant or brake fluid to contact o-rings.

11. Confirm replacement parts in kit, as shown.
12. Lubricate large and small o-rings with a small amount of diesel fuel. **Use just enough fuel to coat entire o-ring surfaces.**
13. Install large o-ring into groove in pump housing.

A—Suction Control Valve
B—Gasket
C—O-Ring (Valve to Pump Mounting Surface)
D—Valve Retaining Cap Screws -2-



4.5L/6.8L Suction Control Kit

RG14877 -UN-16MAY06

02
090
51

Continued on next page

RE38635,0000065 -19-04AUG07-7/8

14. Install the new suction control valve assembly into the pump body by hand until suction control valve flange nearly contacts pump housing. The flange may not contact because of the o-ring. **When installing valve, DO NOT twist the valve. Damage to o-rings will occur. Push valve straight into pump housing same as when valve was removed. The electrical connector (A) should be on the top side, facing rear of engine, as shown (A).**

15. Install new retainer bolts (B) through valve flange and into pump housing. Tighten both bolts evenly, then tighten to specification.

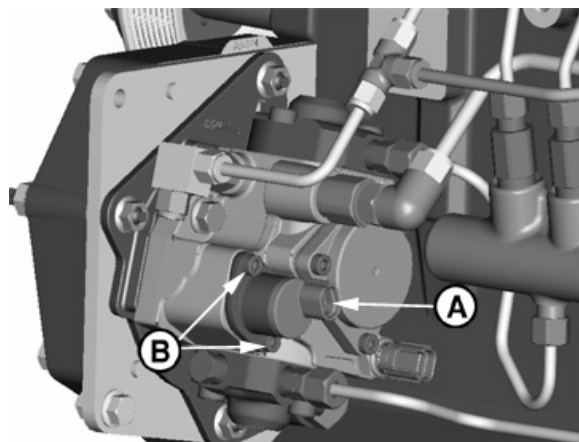
Specification

Suction Control Valve to Pump

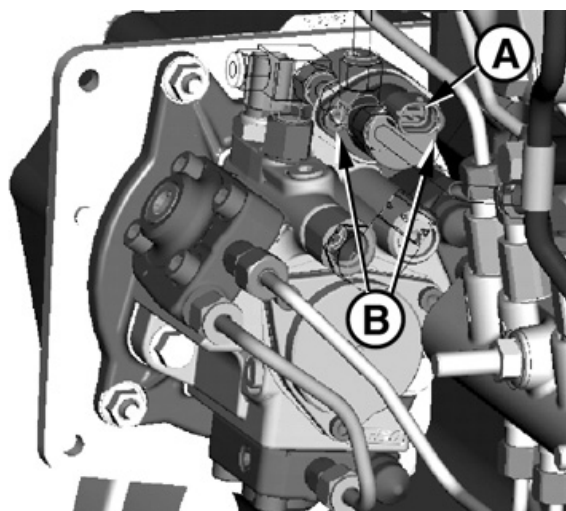
Housing—Torque..... 9 N•m (7 lb-ft)

IMPORTANT: DO NOT use any tool to connect wire harness. Damage to connector will occur. BE CERTAIN the electrical connector is in proper orientation. The electrical connector should be positioned on the top side, facing rear of engine. If the suction control valve is installed incorrectly, the valve will not function correctly

16. Connect suction control valve wire harness to electrical connector (A).
17. Connect negative (—) battery cable.
18. Start engine and perform computer diagnostics.
19. Check suction control valve - pump joint for fuel leaks. **Check for leaks on underside of suction control valve joint by hand and visually, using a small mirror.**
20. Perform the identical diagnostic procedure, as when troubleshooting, to verify proper operation of the replacement suction control valve and to prove the problem is solved.



Install Suction Control Valve Assembly



Install SCV Assembly - Jet Fuel Capable HP4 Pump

A—Suction Control Valve Wire Connector
B—Suction Control Valve Retaining Bolts

Remove and Install Exhaust Gas Recirculation (EGR) Valve

1. Disconnect wiring lead and remove two attaching screws (A). Place JDG10194 EGR removal tool at the base of the EGR valve and install tool forcing screws into the intake manifold. Carefully remove the valve without binding by alternately turning the two forcing screws until the valve lands are past the intake manifold port.
2. Remove gasket and clean mating surfaces. Vacuum debris and loose carbon deposits from intake housing.
3. Replace EGR O-rings (B) each time valve is removed.
4. Inspect valve lands (C) for wear and damage. Remove carbon deposits and debris.
5. Lubricate O-ring cavity in the manifold, with clean engine oil. Carefully install EGR valve and new gasket with the motor pointing away from the engine.

NOTE: Use your hand to tap into place to start screws if needed.

6. Tighten attaching screws (A) to initial specifications.

Specification

EGR Valve - Initial—Torque..... 5 N•m (4 lb-ft)

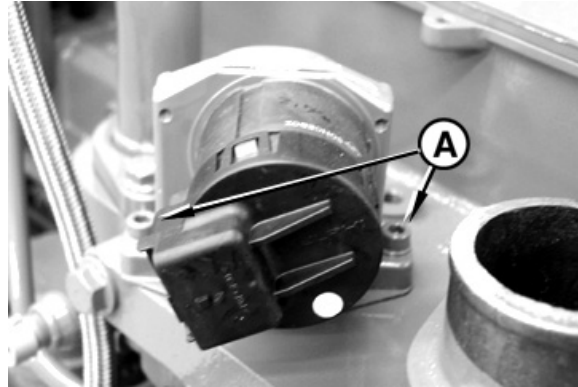
7. Tighten EGR attaching screws (A) to final specifications. Connect wiring lead.

Specification

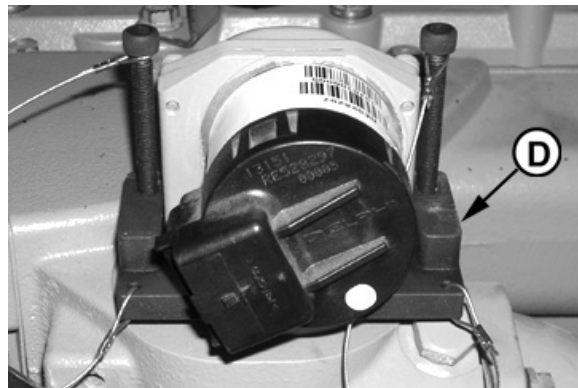
EGR Valve - Final—Torque 15 N•m (11 lb-ft)

IMPORTANT: If installing a new EGR valve, recalibrate using Service Advisor™, see EXHAUST GAS RECIRCULATION VALVE CALIBRATION under the Interactive Test tab - RETEST.

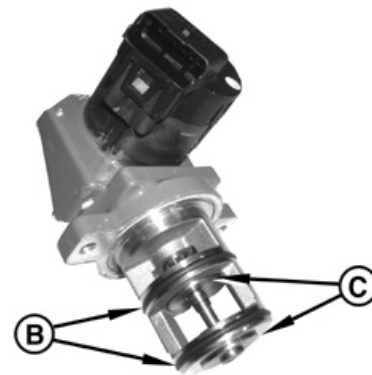
If reusing the EGR valve, recalibrate using Service Advisor™, see HARNESS DIAGNOSTIC MODE TEST under the interactive test tab - RETEST.



EGR Valve



JDG10194 EGR Removal Tool

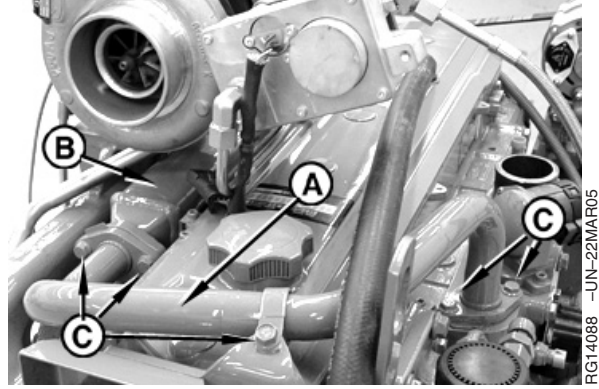


Inspect EGR Valve

- A—Attaching Screws
- B—O-Rings
- C—EGR Valve Lands
- D—JDG10194 EGR Removal Tool with Screws

Remove and Install EGR Exhaust Tube

1. Remove EGR exhaust tube and P-clamp attaching cap screws (C) and gaskets.
2. Inspect exhaust tube for damage or leaks and clean mating surfaces.
3. Install exhaust tube by placing in position. Use new gaskets and ensure all mating surfaces are flush. Hand tighten all cap screws to assure alignment. Tighten cap screws to specifications.

*EGR Exhaust Tube*

A—EGR Exhaust Tube
 B—EGR Cooler
 C—EGR Exhaust Tube Cap Screws

Specification

EGR Exhaust Tube Cap	
Screws—Torque	35 N•m (25 lb-ft)
Exhaust Tube P-Clamp Cap	
Screw—Torque	25 N•m (18 lb-ft)

RG19661,0000041 —19-04AUG07-1/1

Remove and Install EGR Coolant Inlet Tube

1. Remove coolant tube-to-EGR cooler cap screw.
2. Remove P-clamps at the rear and side of the engine.
3. Loosen EGR coolant inlet tube hose clamp located at the oil cooler and remove coolant tube.
4. Inspect coolant tube and mating surfaces for defects and nicks which may cause leaks.
5. Install tube in EGR Cooler and tighten to specifications.

Specification

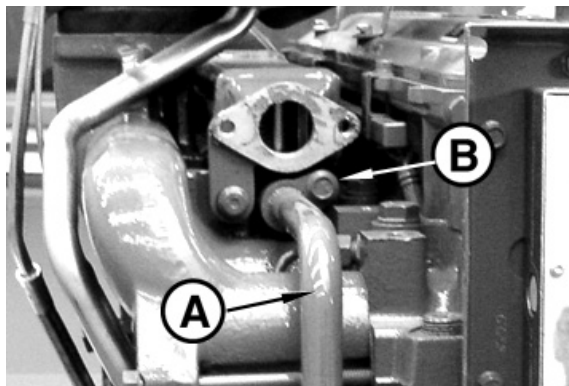
EGR Coolant Inlet Tube Cap
Screw—Torque..... 35 N•m (25 lb-ft)

6. Insert coolant tube in hose and secure hose clamp.
7. Tighten P-clamp cap screws to specifications.

Specification

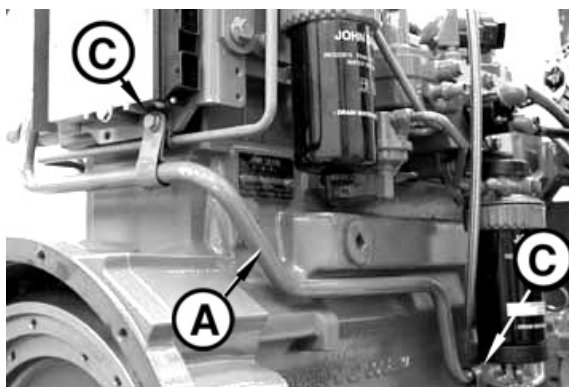
Coolant Tube P-Clamp Cap
Screws—Torque..... 25 N•m (18 lb-ft)

A—EGR Inlet Coolant Tube
B—Cap Screw
C—P-Clamps
D—Hose Clamp



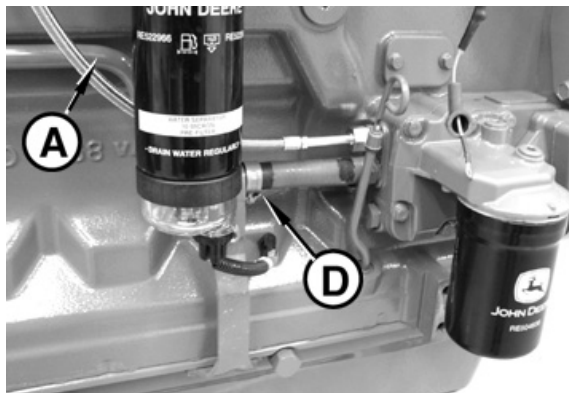
Coolant Tube Cap Screw

RG14087 -UN-23MAR05



Coolant Tube Clamps

RG14090 -UN-23MAR05



Coolant Tube Hose Connection

RG14098 -UN-23MAR05

RG19661,0000042 -19-13SEP07-1/1

Remove and Install Exhaust Gas Recirculation (EGR) Cooler

1.

Remove the EGR exhaust tube. See REMOVE AND INSTALL EGR EXHAUST TUBE earlier in this Group.

2. Remove the EGR coolant inlet tube. See REMOVE AND INSTALL EGR COOLANT INLET TUBE earlier in this Group.

3. Loosen EGR cooler rear support bushing cap screw (B).

4. Remove front EGR cooler cap screws (C).

5. Remove rear support bushing. Carefully remove the EGR cooler (A) and coolant outlet tube (D) as an assembly by sliding to the rear of the engine. If required, coolant outlet tube can be removed from the EGR cooler.

6. Inspect EGR cooler for damage and leaks.

7. Install coolant outlet tube to EGR cooler, if removed. Tighten cap screw to specifications.

Specification

EGR Cooler Outlet Tube Cap
Screw—Torque..... 35 N•m (25 lb-ft)

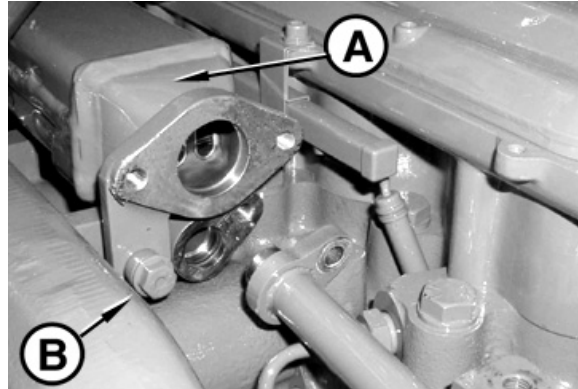
8. Install EGR cooler and outlet tube by carefully sliding the assembly forward and inserting the coolant tube into the thermostat housing (E).

9. Align the back of the EGR cooler and install the rear support bushing with cap screw and tighten to specifications.

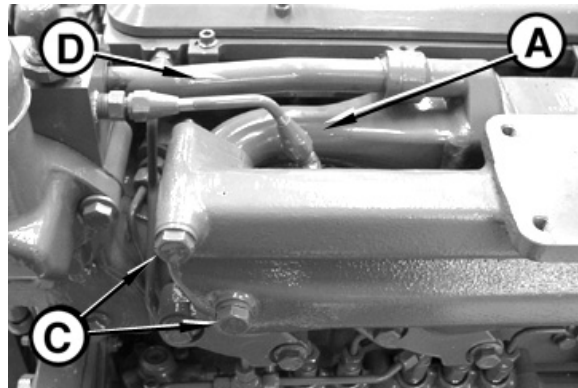
Specification

Rear Support Bushing Cap
Screw—Torque..... 35 N•m (25 lb-ft)

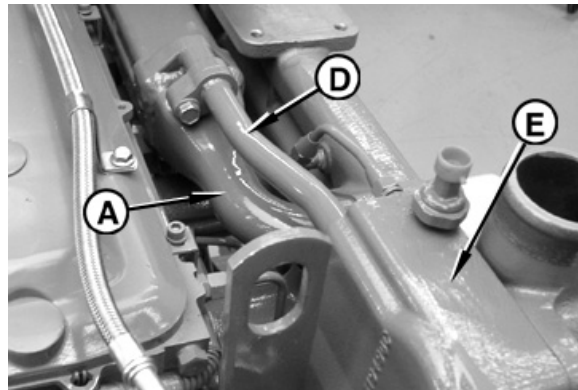
A—EGR Cooler
B—Rear Support Bushing
C—Front Cap Screws
D—EGR Coolant Outlet Tube
E—Thermostat Housing



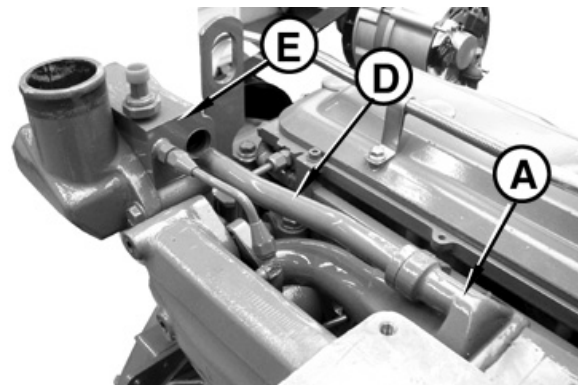
EGR Cooler Rear Support Bushing Cap Screw



EGR Cooler Front Cap Screws



EGR Coolant Outlet Tube



EGR Coolant Outlet Tube

Continued on next page

RG19661,000003F -19-03OCT07-1/2

10. Install and tighten EGR cooler front attaching cap screws to specifications.

Specification

EGR Cooler Cap Screws—
Torque 35 N•m (25 lb-ft)

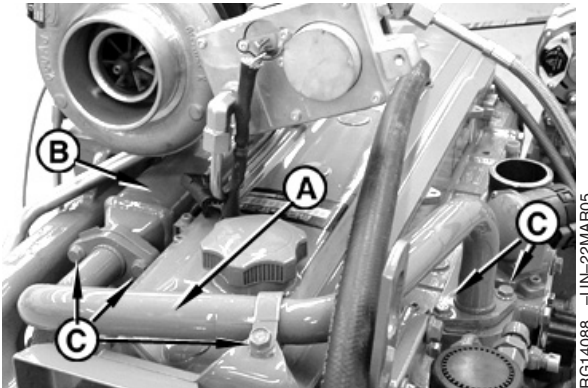
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RG19661,000003F -19-03OCT07-2/2

Remove and Install Exhaust Gas Recirculation (EGR) Tubing

Remove and Install EGR Exhaust Tube

1. Remove EGR exhaust tube and P-clamp attaching cap screws (C) and gaskets.
2. Install exhaust tube by placing in position. Use new gaskets and ensure all mating surfaces are flush. Hand-tighten all cap screws to assure alignment. Tighten cap screws to specifications.



EGR Exhaust Tube

Specification

EGR Exhaust Tube Cap Screw—
Torque 35 N•m (25 lb-ft)

A—EGR Exhaust Tube
B—EGR Cooler
C—EGR Exhaust Tube Cap Screws

Specification

Exhaust Tube P-Clamp Cap
Screw—Torque..... 25 N•m (18 lb-ft)

Remove and Install EGR Coolant Inlet Tube

Continued on next page

DB92450,000001B -19-04AUG07-1/2

1. Remove coolant tube-to-EGR cooler cap screw (B).
2. Remove P-clamps (C) at the rear and side of the engine.
3. Loosen EGR coolant inlet tube (A) hose clamp located at the oil cooler and remove coolant tube.
4. Install tube in EGR Cooler and tighten to specifications.

Specification

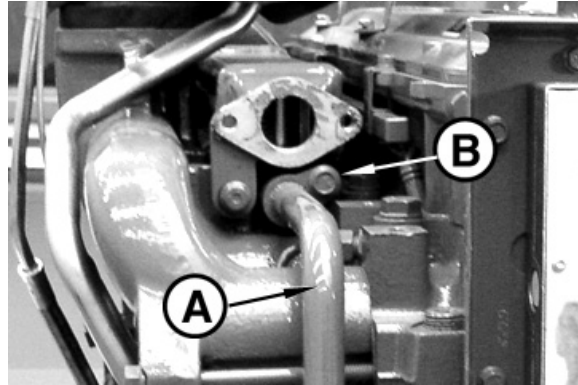
EGR Coolant Inlet Tube Cap
Screw—Torque..... 35 N•m (25 lb-ft)

5. Insert coolant tube in hose and secure hose clamp (D).
6. Tighten P-clamp cap screws to specifications.

Specification

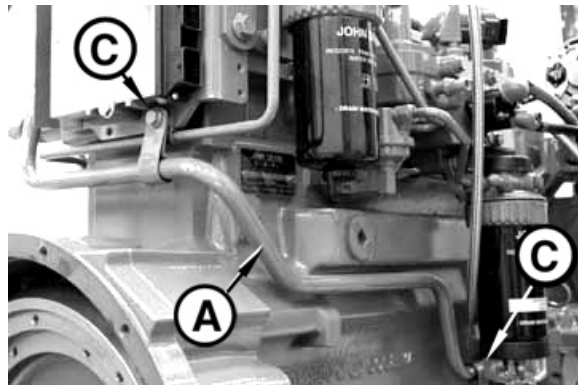
EGR Cooler Outlet Tube Cap
Screw—Torque..... 25 N•m (18 lb-ft)

A—EGR Inlet Coolant Tube
B—Cap Screw
C—P-Clamps
D—Hose Clamp



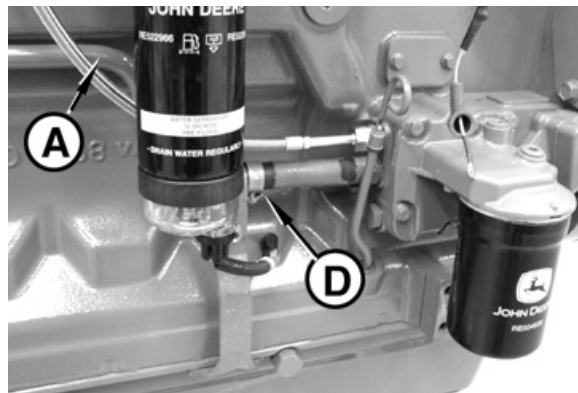
Coolant Tube Cap Screw

RG14087 -UN-23MAR05



Coolant Tube Clamps

RG14090 -UN-23MAR05



Coolant Tube Hose Connection

RG14098 -UN-23MAR05

DB92450,000001B -19-04AUG07-2/2

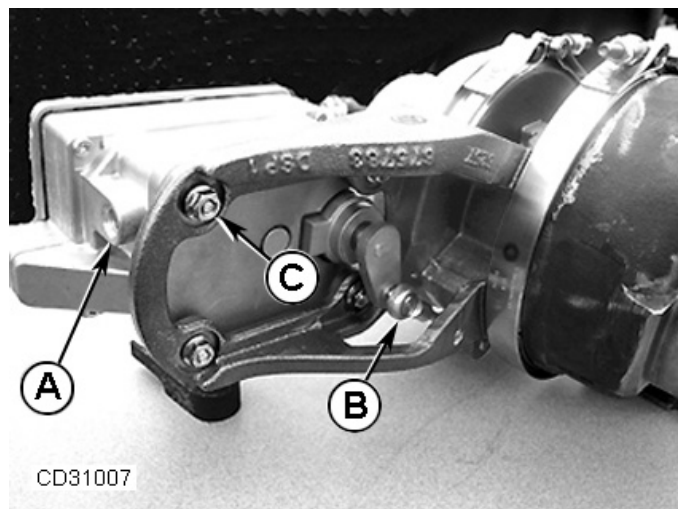
Remove and Install Variable Geometry Turbocharger Actuator (4 Cylinder Engine - If Equipped)



Actuator Linkage (Earlier design)



Actuator Linkage (Later design)



Loosen Actuator Nuts

A—Turbocharger Actuator

B—Linkage

C—Nut

NOTE: Actuator linkage on earlier engines has a splined ball-joint design while later engines feature a threaded ball-joint design.

Remove Turbocharger Actuator

IMPORTANT: Disconnect the battery cables before performing any work. Insure power supply is in the “off” position when performing work on the turbocharger actuator or damage to the ECU/Actuator communication can

result. When an actuator is connected to power, it will perform a baseline learn to record the fully open and closed positions. If this baseline learn is incorrect, the actuator will not perform correctly.

1. Disconnect actuator wiring harness.
2. Disconnect actuator coolant supply line and coolant return line.

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RG19661,000022A -19-15FEB08-1/7

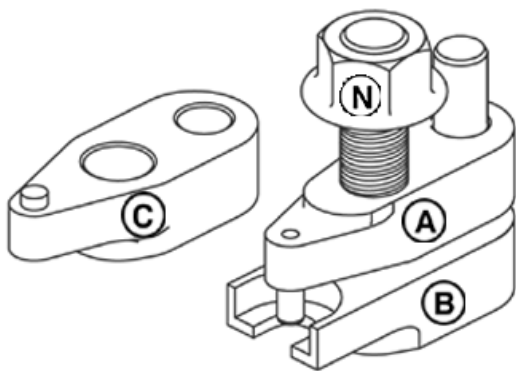
IMPORTANT: Actuator link must be removed from the turbocharger linkage end. **DO NOT** attempt to remove the linkage at the actuator or separate the actuator by turning the threaded shaft.

NOTE: In some vehicle applications or turbocharger orientation, it may be necessary to remove the

turbocharger/actuator assembly from the engine. For clarity in this instruction, the turbocharger has been removed.

3. To provide additional access to the link, loosen the four nuts attaching the actuator to the turbocharger frame.

RG19661,000022A -19-15FEB08-2/7



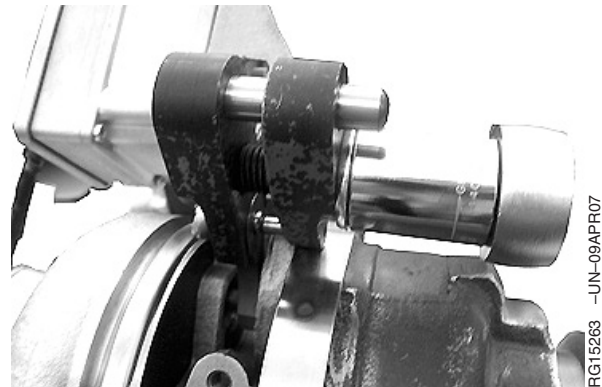
JDG10395 VGT Link Tool

Removal Procedure (Earlier Design)

1. Remove "C" clip from the turbocharger end of the actuator linkage.
2. Position the notched base piece (B) of JDG10395 linkage tool around the end of the turbocharger actuating arm.
3. Install JDG10395 driver (A) on JDG10395 base and tighten tool nut to press the splined ball-joint link out of the turbocharger linkage arm.
4. Remove actuator mounting nuts and actuator.



Position JDG10395 VGT Tool Base on Actuator Arm



Remove Actuator Link

A—Long-Pin Driver
B—Base
C—Short-Pin Driver (use for limited access)
N—Nut

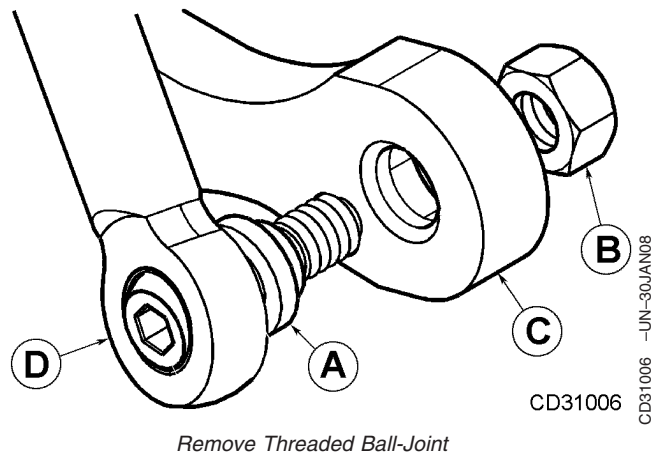
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RG19661,000022A -19-15FEB08-3/7

Removal Procedure (Later Design)

1. Loosen the threaded ball joint (A) using an Allen wrench.
2. Remove nut (B), then actuator linkage (D) from turbocharger arm (C).
3. Remove actuator mounting nuts and actuator.

A—Threaded Ball-Joint
 B—Nut
 C—Turbocharger Arm
 D—Actuator Linkage



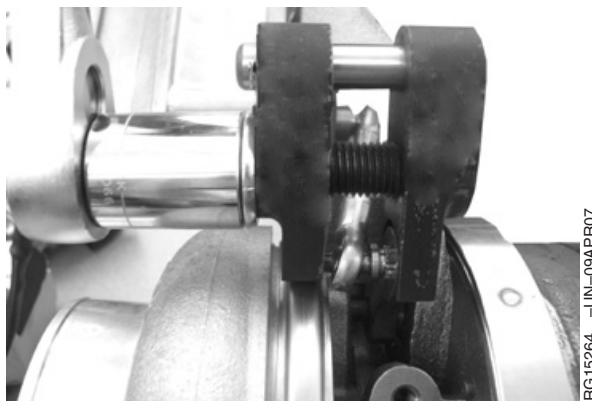
RG19661,000022A -19-15FEB08-4/7

Installation Procedure (Earlier Design)

1. Install actuator on turbocharger bracket but do not tighten actuator mounting nuts.
2. Position the base piece (B) of JDG10395 linkage tool behind the turbocharger actuating arm.
3. Align the splined ball-joint link in the turbocharger actuating arm and install the JDG10395 short pin drive tool (C) on the base guide pin.

Slowly tighten tool nut until the "C" clip groove in the splined ball joint link has come through the actuating arm.

4. Install "C" clip on actuator linkage.



Install Actuator Linkage

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RG19661,000022A -19-15FEB08-5/7

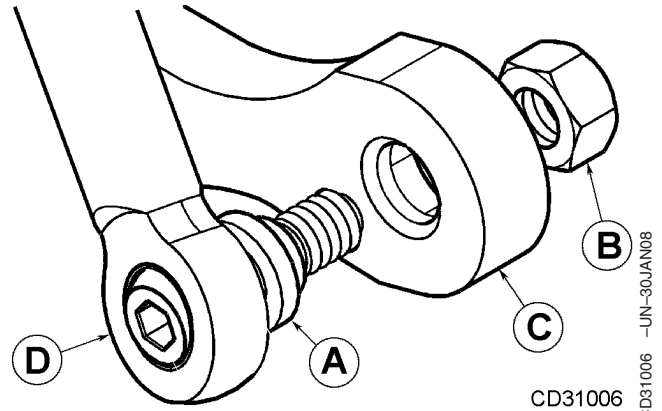
Installation Procedure (Later Design)

1. Install actuator on turbocharger bracket but do not tighten actuator mounting nuts.
2. Install the nut (B) in the turbocharger arm cavity (C).
3. Install the threaded ball-joint (A) in turbocharger arm then tighten to specifications.

Specification

Threaded Ball-Joint—Torque 8.5 N•m (75 lb-in.)

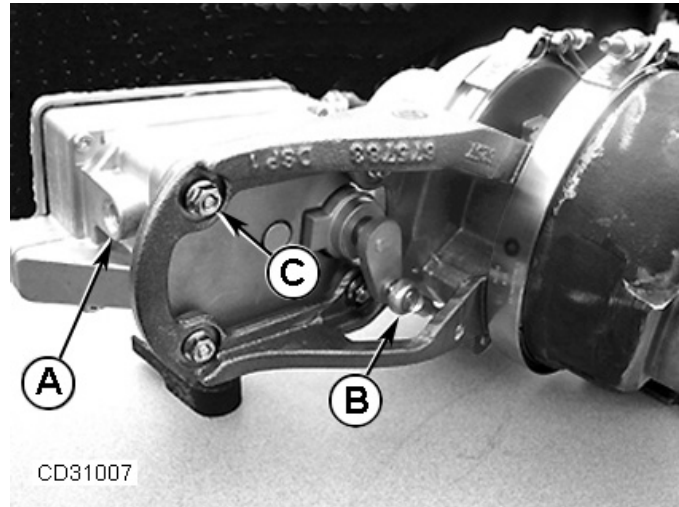
A—Threaded Ball-Joint
B—Nut
C—Turbocharger Arm
D—Actuator Linkage



Install Threaded Ball-Joint

Continued on next page

RG19661,000022A -19-15FEB08-6/7



Tighten Actuator Nuts

A—Turbocharger Actuator

B—Linkage

C—Nut

Final Actuator Installation

1. Tighten actuator mounting nuts to specifications.

Specification

Actuator Mounting Nuts—
Torque..... 13.5 N•m (10 lb-ft)

IMPORTANT: Be constantly aware of any binding in the linkage. Linkage should travel freely at all times and return immediately to original position when manually tested.

The linkage is adjusted by the manufacturer then endpoints are crimped in place. **DO NOT** attempt to adjust the length of the linkage

2. Check linkage orientation for free travel and to be sure there is no binding. The linkage should travel freely through its entire range of travel and return to the original position when tested manually.
3. Connect actuator coolant supply and return line fittings. Secure nuts on both fittings, and using a

second wrench, tighten to specification.

Specification

Actuator Coolant Line Fittings—
Torque..... 24 N•m (18 lb-ft)

4. Connect engine harness to VGT actuator to turn on power.



CAUTION: When power to the actuator is “on”, **BE CERTAIN** to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates very quickly and fingers can be pinched.

5. Reference Service Advisor, Interactive Test Tab, to run TURBO LEARN VALUE RESET TEST for actuator and linkage. This test allows the actuator and linkage to check travel stops when running the learn cycle.
6. Conduct a diagnostic check of the harness and actuator. Reference CTM320 for specific procedures.

Remove and Install Variable Geometry Turbocharger Actuator (6 Cylinder Engine - If Equipped)

IMPORTANT: Disconnect the battery cables before performing any work. Insure power supply is in the "off" position when performing work on the turbocharger actuator or damage to the ECU/Actuator communication can result. When an actuator is connected to power, it will perform a baseline learn to record the fully open and closed positions. If this baseline learn is incorrect, the actuator will not perform correctly.

1. Disconnect actuator wiring harness (A).
2. Disconnect actuator coolant supply line (B) and coolant return line (C).

NOTE: Whenever disconnecting actuator linkage, ensure that the linkage does not bind or is forced out of position.

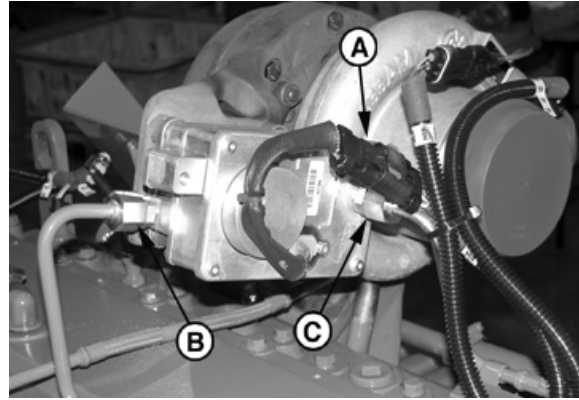
3. Disconnect actuator linkage arm (D) by loosening and removing allen screw.
4. Loosen and remove 4 hex nuts (E) securing actuator to bracket. Remove actuator assembly from turbocharger.

To install the actuator, reverse the steps shown above.

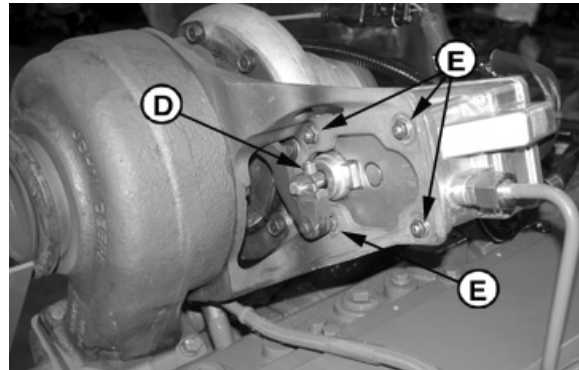
1. Position actuator to bracket and finger tighten 4 hex nuts.
2. Tighten nuts to specification

Specification

Actuator Mounting Nuts—Torque..... 13.5 N•m (10 lb-ft)



Actuator Coolant Lines and Wiring Harness



Actuator Linkage and Bracket Hardware

- A—Wiring Harness
B—Coolant Supply
C—Coolant Return
D—Actuator Linkage Allen Screw
E—Actuator -to-Bracket Hardware

Continued on next page

RG19661,0000044 -19-15FEB08-1/2

IMPORTANT: When installing actuator linkage, be certain there is free movement of the linkage, with no binding. The center joint of the linkage should be slightly loose when wiggled, with clearance between linkage arms on the pivot joint.

3. Position actuator linkage arm over actuator shaft and install stainless steel allen head screw to secure linkage to actuator shaft.
4. Carefully tighten allen screw to specification.

Specification

Linkage Arm to Actuator Shaft—
Torque Turn..... 7 N•m (5 lb-ft)

5. Connect actuator coolant supply and return lines to actuator. Secure nuts on both fittings, and using a second wrench, tighten to specification.

Specification

Actuator Coolant Line Fittings—
Torque 24 N•m (18 lb-ft)

6. Connect engine harness to VGT actuator to turn on power.

 **CAUTION:** When power to the actuator is “on”, **BE CERTAIN** to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates very quickly and fingers can be pinched.

7. Reference Service Advisor, Interactive Test Tab, to run TURBO LEARN VALUE RESET TEST for actuator and linkage. This test allows the actuator and linkage to check travel stops when running the learn cycle.
8. Conduct a diagnostic check of the harness and actuator. Reference CTM320 for specific procedures.

RG19661,0000044 -19-15FEB08-2/2

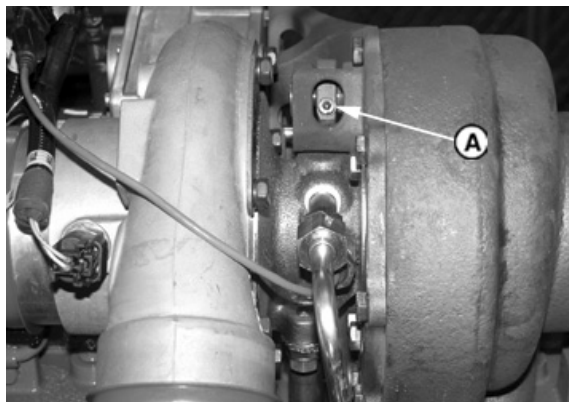
Remove and Install Turbocharger Actuator Linkage (6 Cylinder Engine)

Remove Turbocharger Actuator Linkage

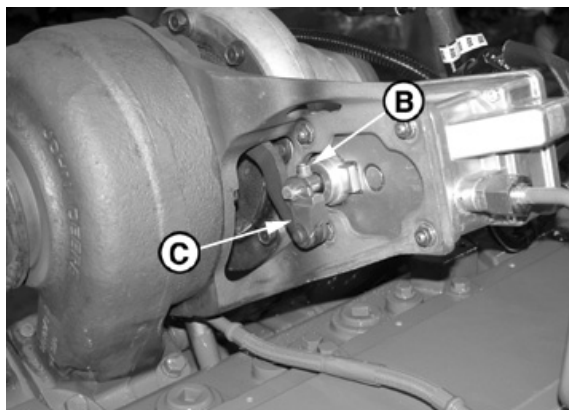
NOTE: Use caution when loosening or tightening linkage hardware. Stainless steel screws are brittle and break easily.

IMPORTANT: BE CERTAIN actuator wiring harness is disconnected before completing any repairs on linkage.

1. Position linkage arm so the inboard (turbocharger shaft) linkage set screw (A) is visible through bracket. Loosen and remove screw.
2. Lift actuator linkage off turbocharger shaft notch (linkage will not slide off end of shaft).
3. Position linkage on actuator shaft to access retainer screw (B). Loosen and remove screw.
4. Lift linkage assembly off notch in actuator shaft and set aside.



RG14194 -UN-27MAY05



RG14195 -UN-27MAY05

Actuator Linkage Screw - Outboard Position

A—Actuator Linkage to Shaft Screw - Inboard
B—Actuator Linkage to Shaft - Outboard
C—Actuator Linkage Arm

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RG19661,0000001 -19-15FEB08-1/4

Install Turbocharger Actuator Linkage

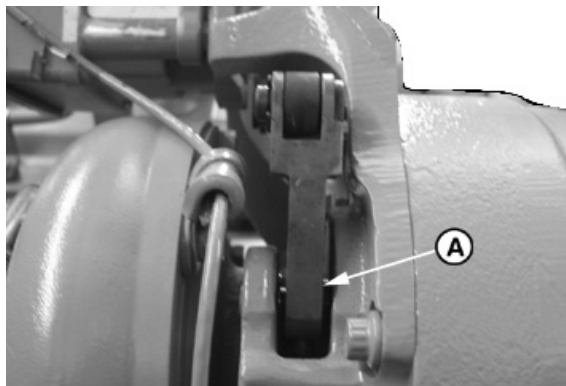
IMPORTANT: BE CERTAIN actuator wiring harness is disconnected before completing any repairs on linkage.

1. Insert linkage onto turbocharger pivot shaft flats (A).

NOTE: Use an open end wrench to exert slight pressure on linkage to align linkage with bolt hole in shaft. Additionally, use a wrench when tightening linkage hardware. Take care that the end link does not rotate on the shaft on an axis perpendicular to the axis of the shaft. This can cause binding of the linkage assembly.

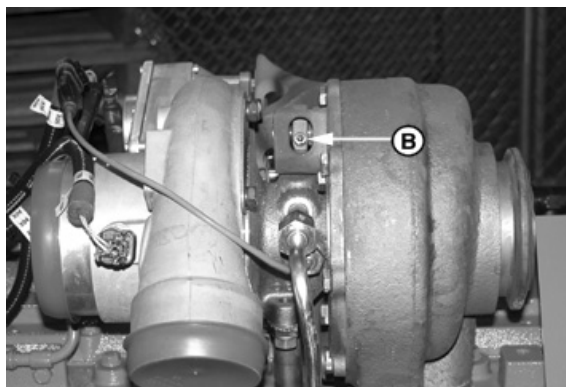
2. Install linkage (C) onto actuator shaft notch (D) and install M5 bolt through linkage and shaft finger tight (E).
3. Position linkage to notch on turbocharger shaft (B) and assemble linkage over shaft. Install M5 bolt to secure finger tight.

A—VGT Link - Turbocharger Shaft
 B—M5 Bolt - Turbocharger Shaft
 C—VGT Link - Actuator Shaft
 D—Actuator Pivot Shaft
 E—M5 Bolt - Actuator Shaft
 F—Center Pivot Joint



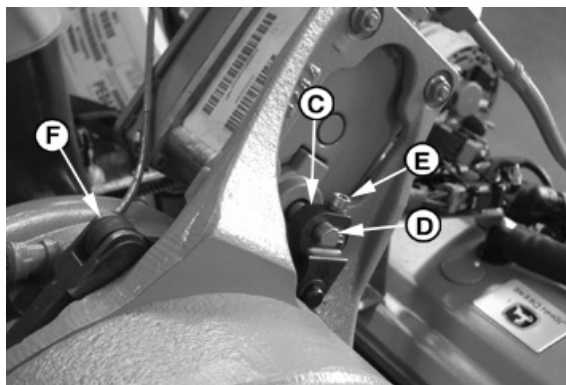
Install Link to Turbocharger Shaft

RG14210 -UN-28MAY05



M5 Bolt - Turbocharger Shaft

RG14209 -UN-28MAY05



Install Link - Actuator Shaft

RG14211 -UN-28MAY05

Continued on next page

RG19661,0000001 -19-15FEB08-2/4

IMPORTANT: DO NOT over tighten linkage hardware. Stainless steel screws are brittle and break easily.

4. Using an open end wrench to stabilize the links as the bolts are being tightened. Tighten the M5 bolt to specification.

Specification

M5 Linkage Screws -
Turbocharger & Actuator End—
Torque 7 N•m (5 lb-ft)



RG14520 -UN-30SEP05

Using Wrench to Support Linkage

Continued on next page

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5. Check linkage orientation for free travel (as shown) and to be sure there is no binding. The linkage should travel freely through its entire range of travel. Note example of proper linkage adjustment and how the linkage is perpendicular to the shaft.

IMPORTANT: Be constantly aware of any binding in the linkage. Use an open end wrench to align and secure the linkage as hardware is tightened (as shown). After bolts are tightened, linkage should travel freely at all times and return immediately to original position when manually tested. The center pivot joint should have some play when linkage shaft is wiggled. If binding of the linkage is noted, use a wrench to gently pry the end link into necessary position such that linkage moves freely throughout its full range and the binding condition is corrected.

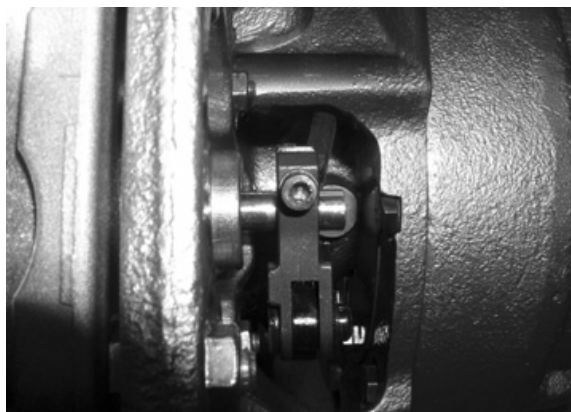
6. Verify again that the linkage moves freely and returns to original position when tested manually.
7. Connect engine harness to VGT actuator to turn on power.

CAUTION: When power to the actuator is “on”, **BE CERTAIN** to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates very quickly and fingers can be pinched.

8. Reference Service Advisor, Interactive Test Tab, to run TURBO LEARN VALUE RESET TEST for actuator and linkage. This test allows the actuator and linkage to check travel stops when running the learn cycle.
9. Conduct a diagnostic check of the harness and actuator. Reference CTM320 for specific procedures.



Check for Linkage Free Travel



Proper Linkage Adjustment

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Engine Control Unit (ECU) Maintenance

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT.

IMPORTANT: Do not pressure wash the Engine Control Unit (ECU).

IMPORTANT: Before welding on engines with ECU, remove ECU from Engine.

NOTE: For diagnosis and testing of the electronic engine control and sensors, refer to Group 160, TROUBLE CODE DIAGNOSTICS AND TESTS.

NOTE: The ECU is the system component LEAST likely to fail. Follow proper trouble shooting procedures and isolate the problem before replacing the ECU.

Normal operating conditions do not require any ECU maintenance. The ECU is not repairable. In the event that the ECU fails, it has to be replaced. Harness connectors to the ECU are repairable. See REPAIR CINCH FLEX BOX CONNECTOR later in this Group.

Precautions

- Before welding on application, remove ECU from application and disconnect all connectors from ECU

- Avoid high pressure spray onto ECU. Do not spray directly into connectors.
- Avoid locating ECU near high temperature areas. Cooling or shielding may have to be provided to keep the ECU within its operating temperature range.
- The ECU must have a ground connection to the engine block. Provide a grounding strap if necessary.
- Avoid high vibration areas.
- Orient the ECU so moisture will not collect on its chassis or into the harness connectors. Keep the vent plug free of dirt and moisture.
- Protect ECU from road splash, foreign debris, and high pressure impact.
- Mount the ECU so the harness exits the chassis in a downward direction.
- If possible, mount the ECU in a vertical orientation (connectors in a vertical plane) with vent plug pointing downwards.

For theory of operation on the ECU, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 later in this manual.

DM59778,0000026 -19-22JAN08-1/1

Remove and Install Engine Control Unit (ECU) for 4.5L Engine

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT.

IMPORTANT: Do not pressure wash the Engine Control Unit (ECU).

IMPORTANT: Before welding on engines with ECU, remove ECU from Engine.

NOTE: For diagnosis and testing of the electronic engine control and sensors, refer to Group 160, TROUBLE CODE DIAGNOSTICS AND TESTS.

NOTE: The ECU is the system component LEAST likely to fail. Follow proper trouble shooting procedures and isolate the problem before replacing the ECU.

For theory of operation on the ECU, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 later in this manual.

Replacing ECU

IMPORTANT: If an ECU is not programmed identically with the original (failed) ECU, misleading diagnostic messages, poor performance, or engine damage can occur.

The ECU is not repairable and must be replaced if found to be defective.

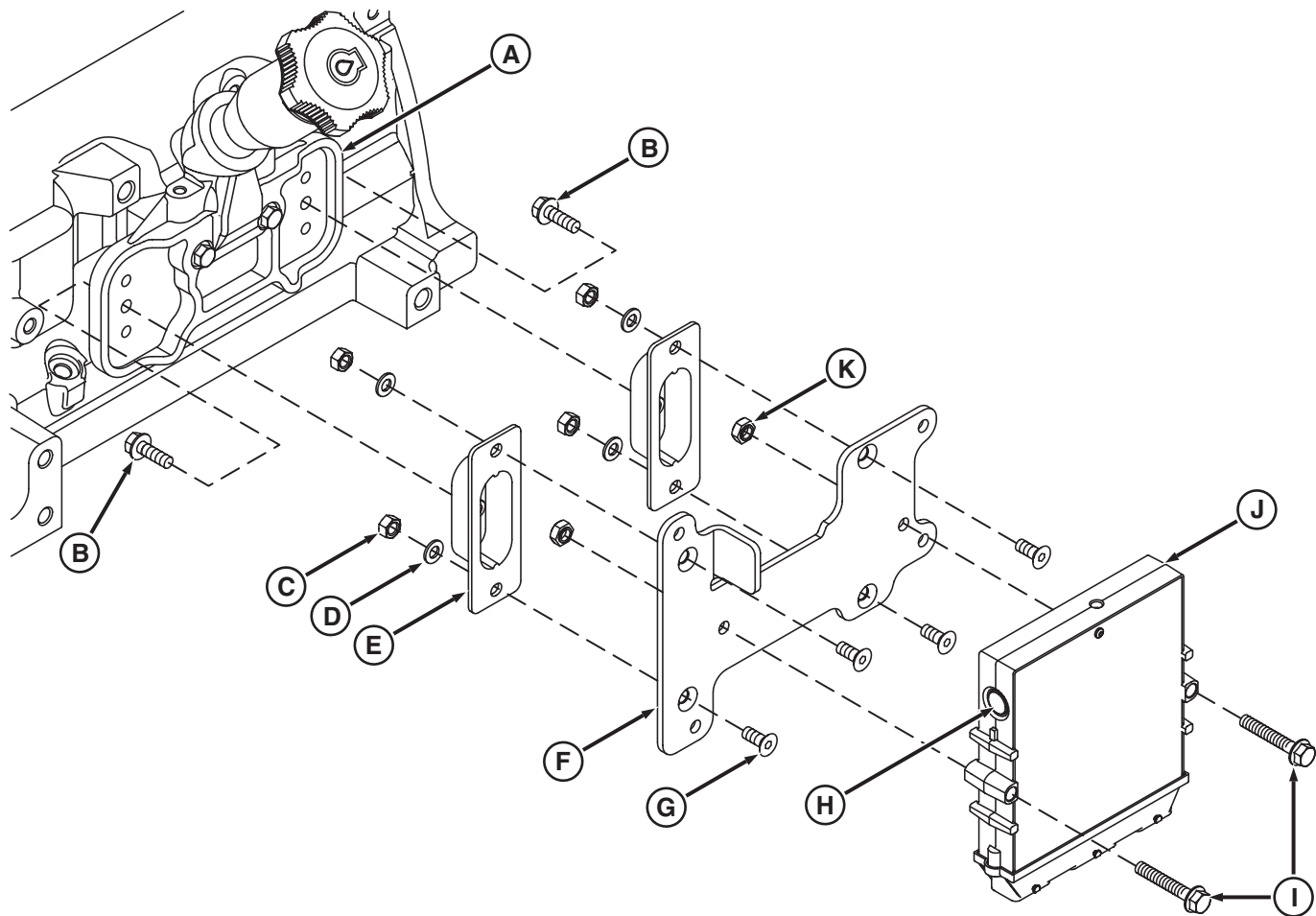
A new ECU has to be programmed for its specific application. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 04, group 160 later in this manual.

The connectors for the ECU are repairable. See REPAIR CINCH FLEX BOX CONNECTOR later in this Group.

Do not force connectors. Observe proper connector and polarity when reconnecting connectors. Make sure the connector is latched properly to its mating connector.

Continued on next page

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ECU Engine Mount

A—ECU Casting	D—Washer	G—Screw	J—ECU
B—Screw to Isolator	E—Isolator	H—Air Vent	K—Nut
C—Nut	F—ECU Mounting Bracket	I—Screw	

Mounting ECU

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAMS in Section 03, Group 140 of this manual.

Normal mounting location for the ECU is to the engine block. The mounting hardware supplied with the ECU provides a ground connection to the engine block. The ECU has to be grounded to the engine block for proper operation.

Mounting ECU to engine.

1. Ignition OFF. Disconnect all ECU connectors.
2. Attach isolators (E) to each leg of ECU casting (A) with screw (B). 2 Places.
3. Attach ECU mounting bracket (F) to isolators with Screw (G), Washer (D), and Nut (C). 4 Places.
4. Attach ECU (J) to ECU mounting bracket with screw (I) and nut (K). 2 Places. Note orientation of air vent (H).
5. Connect all ECU harness connectors to ECU.

Item	Measurement	Specification
ECU Casting-to-Oil Fill Location.	Torque	35 ±4 N•m (26 lb-ft)

Continued on next page

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Item	Measurement	Specification
Isolator-to-ECU Casting 2 Places.	Torque	35 ±4 N•m (26 lb-ft)
Item	Measurement	Specification
ECU Bracket-to-Isolators.	Torque	35 ±4 N•m (26 lb-ft)
Item	Measurement	Specification
ECU-to-ECU Bracket.	Torque	15 ±3 N•m (11 lb-ft)

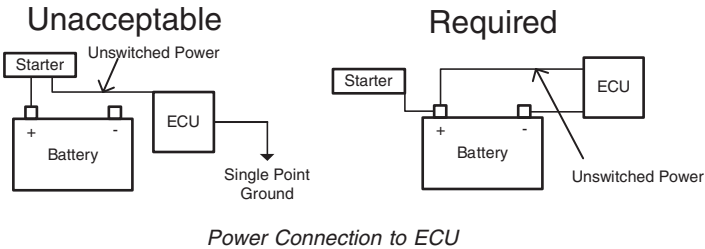
If the ECU is mounted in a different fashion, follow the requirements listed below.

- Avoid locations near high temperature areas. Cooling or shielding may have to be provided to keep the ECU within its operating temperature range.
- The ECU must have a ground connection to the engine block. Provide a grounding strap if necessary.
- Avoid high vibration areas.
- Orient the ECU so moisture will not collect on its chassis or into the harness connectors. Keep the vent plug free of dirt and moisture.

- Protect ECU from road splash, foreign debris, and high pressure impact.
- Mount the ECU so the harness exits the chassis in a downward direction.
- If possible, mount the ECU in a vertical orientation (connectors in a vertical plane) with air vent pointing downward.

Wiring practices for ECU.

DM59778,00000B0 -19-23JAN08-3/4



1. Power to the ECU is fused with a 20 Amp fuse.
2. Power and ground to the ECU should come directly from the battery. All operating current is drawn from unswitched battery power.
3. Switched power input to the ECU draws very little power. It used to signal the ECU that the application has been turned on. Loss of switched input power will cause the application to shutdown.

DM59778,00000B0 -19-23JAN08-4/4

Remove and Install Engine Control Unit (ECU) for 6.8L Engine

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT.

IMPORTANT: Do not pressure wash the Engine Control Unit (ECU).

IMPORTANT: Before welding on engines with ECU, remove ECU from Engine.

NOTE: For diagnosis and testing of the electronic engine control and sensors, refer to Group 160, TROUBLE CODE DIAGNOSTICS AND TESTS.

NOTE: The ECU is the system component LEAST likely to fail. Follow proper trouble shooting procedures and isolate the problem before replacing the ECU.

For theory of operation on the ECU, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 later in this manual.

Replacing ECU

IMPORTANT: If an ECU is not programmed identically with the original (failed) ECU, misleading diagnostic messages, poor performance, or engine damage can occur.

The ECU is not repairable and must be replaced if found to be defective.

A new ECU has to be programmed for its specific application. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 04, group 160 later in this manual.

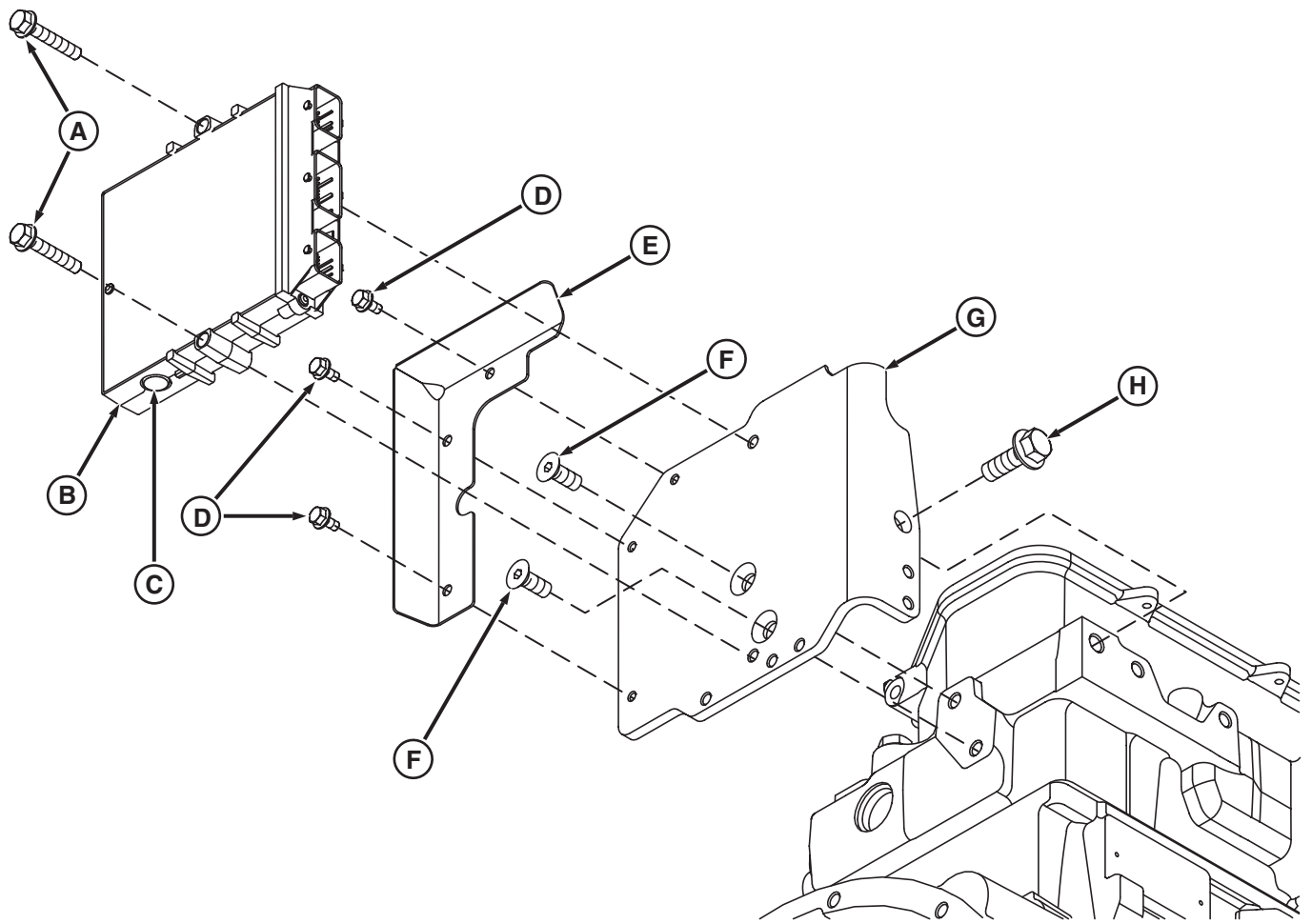
The connectors for the ECU are repairable. See REPAIR CINCH FLEX BOX CONNECTOR later in this Group.

Do not force connectors. Observe proper connector and polarity when reconnecting connectors. Make sure the connector is latched properly to its mating connector.

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RG16040 -UN-23JAN08

ECU to Rear of Engine Block

A—Cap Screw	C—Air Vent	E—ECU Rear Bracket	G—ECU Mounting Bracket
B—ECU	D—Cap Screw	F—Screw	H—Cap Screw

Mounting ECU

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAMS in Section 03, Group 140 of this manual.

Normal mounting location for the ECU is to the rear of the engine block. The mounting hardware supplied with the ECU provides a ground connection to the engine block. The ECU has to be grounded to the engine block for proper operation.

1. Ignition OFF. Disconnect all ECU connectors.
2. Position ECU (B) with Air Vent (C) pointing downwards
3. Secure ECU to mounting bracket (G) with two cap screws (A) and tighten to specification.
4. Connect all ECU harness connectors to ECU.

Item	Measurement	Specification
ECU Mounting Bracket-to-Rear of Engine. Two M10 Flat Head Screws.	Torque	40 ±4 N•m (30 lb-ft)

Continued on next page

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Item	Measurement	Specification
ECU Mounting Bracket and lift strap-to-Engine. M12 Cap Screw.	Torque	125 ±12 N•m (92 lb-ft)
Item	Measurement	Specification
ECU Rear Bracket-to-ECU Mounting Bracket. 3 M6 Cap Screws.	Torque	15 ±3 N•m (11 lb-ft)
Item	Measurement	Specification
ECU-to-ECU Mounting Bracket. Two M6 Cap Screws.	Torque	15 ±3 N•m (11 lb-ft)

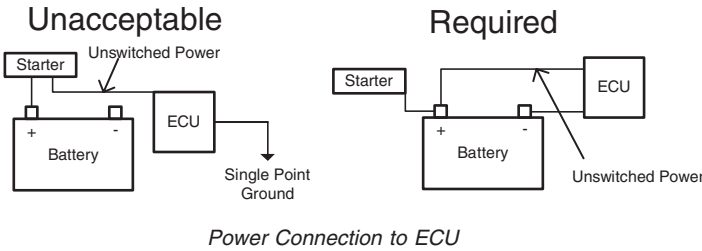
If the ECU is mounted in a different fashion, follow the requirements listed below.

- Avoid locations near high temperature areas. Cooling or shielding may have to be provided to keep the ECU within its operating temperature range.
- The ECU must have a ground connection to the engine block. Provide a grounding strap if necessary.
- Avoid high vibration areas.
- Orient the ECU so moisture will not collect on its chassis or into the harness connectors. Keep the vent plug free of dirt and moisture.

- Protect ECU from road splash, foreign debris, and high pressure impact.
- Mount the ECU so the harness exits the chassis in a downward direction.
- If possible, mount the ECU in a vertical orientation (connectors in a vertical plane) with air vent pointing downward.

Wiring practices for ECU.

DM59778,00000B5 -19-23JAN08-3/4



1. Power to the ECU is fused with a 20 Amp fuse.
2. Power and ground to the ECU should come directly from the battery. All operating current is drawn from unswitched battery power.
3. Switched power input to the ECU draws very little power. It is used to signal the ECU that the application has been turned on. Loss of switched input power will cause the application to shutdown.

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Remove and Install Engine Coolant Temperature (ECT) Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 3 (4.5L Engine) (C) or COMPONENT LOCATION DIAGRAM 9 (6.8L Engine) (C) in Section 03, Group 140 of this manual.

- 1. Disconnect ECT sensor wiring connector and remove sensor.
- 2. Coat sensor O-ring with TY6333 High Temperature Grease and install sensor in thermostat housing. Tighten to specifications.

Specification

Coolant Temperature Sensor (In Thermostat Cover)—Torque..... 10 N•m (7 lb-ft)

- 3. Install sensor wiring connector.

RG41183,00000D8 -19-04OCT07-1/1

Remove and Install Fuel Temperature Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 1 (4.5L Engine) (B) or COMPONENT LOCATION DIAGRAM 7 (6.8L Engine) (B) in Section 03, Group 140 of this manual.

- 1. Disconnect fuel temperature sensor wiring connector and remove sensor.
- 2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specification.
- 3. Reconnect sensor wiring connection.

Specification

Fuel Temperature Sensor—Torque 10 N•m (7 lb-ft)

RG41183,00000D9 -19-04OCT07-1/1

Remove and Install Exhaust Gas Recirculation (EGR) Exhaust Temperature Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 4 (4.5L Engine) (D)* or *COMPONENT LOCATION DIAGRAM 10 (6.8L Engine) (D)* in Section 03, Group 140 of this manual.

1. Disconnect EGR exhaust temperature sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

EGR Exhaust Sensor—Torque $60 \pm 12 \text{ N}\cdot\text{m}$ ($44 \pm 9 \text{ lb}\cdot\text{ft}$)

3. Install sensor wiring connector.

RG41183,00000DA -19-19OCT07-1/1

Charge Air Cooler Outlet Temperature Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 5 (4.5L Engine) (A)* or *COMPONENT LOCATION DIAGRAM 10 (6.8L Engine) (B)* in Section 03, Group 140 of this manual.

1. Disconnect charge air cooler outlet temperature sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

Charge Air Cooler Outlet Temperature Senso—Torque $10 \text{ N}\cdot\text{m}$ ($7 \text{ lb}\cdot\text{ft}$)

3. Install sensor wiring connector.

RG41183,00000DB -19-04OCT07-1/1

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Remove and Install Manifold Air Temperature (MAT) Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 4 (4.5L Engine) (A) or COMPONENT LOCATION DIAGRAM 10 (6.8L Engine) (A) in Section 03, Group 140 of this manual.

- 1. Disconnect Manifold air temperature sensor wiring connector and remove sensor.
- 2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

Manifold Air Sensor—Torque 10 N•m (7 lb-ft)

- 3. Install sensor wiring connector.

RG41183,00000DC -19-04OCT07-1/1

Remove and Install Oil Pressure Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 1 (4.5L Engine) (C) or COMPONENT LOCATION DIAGRAM 7 (6.8L Engine) (C) in Section 03, Group 140 of this manual.

- 1. Disconnect oil pressure sensor wiring connection and remove sensor.
- 2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specification.

Specification

Oil Pressure Sensor—Torque 10 N•m (7 lb-ft)

- 3. Reconnect oil pressure sensor wiring connection.

RG41183,00000DD -19-04OCT07-1/1

Remove and Install Fuel Rail Pressure Sensor

NOTE: For an expanded component location drawing, see **COMPONENT LOCATION DIAGRAM 2** (4.5L Engine) (C) or **COMPONENT LOCATION DIAGRAM 8** (6.8L Engine) (C) in Section 03, Group 140 of this manual.



CAUTION: Fuel in the high pressure common rail is under extremely high pressure. Relieve pressure before opening rail.

1. Before removing fuel rail pressure sensor, turn engine OFF and let sit for 5 minutes. This will relieve fuel pressure from the High Pressure Common Rail.

IMPORTANT: If any dirt, paint chips, or debris enters the fuel system, injector failure will occur!

2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the fuel rail pressure sensor.
3. Disconnect fuel rail pressure sensor wiring connection and remove sensor.

NOTE: Sensor should not be reused once it has been removed from the fuel rail.

IMPORTANT: Do not get any grease on tip of sensor.

4. Coat new sensor threads with TY6333 High Temperature Grease.
5. Verify that sensor is clean from all debris and install new sensor. Tighten to specification.

Specification

Fuel Rail Pressure Sensor—
Torque 100 N•m (742 lb-ft)

6. Reconnect sensor wiring connection.
7. Bleed the fuel system. See **BLEED THE FUEL SYSTEM** in Section 04, Group 150 later in this manual.

Remove and Install Fuel Transfer Pump Pressure Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 5 (4.5L Engine) (C)* or *COMPONENT LOCATION DIAGRAM 10(6.8L Engine) (C)* in Section 03, Group 140 of this manual.

IMPORTANT: If any dirt, paint chips, or debris enters the fuel system, injector failure will occur!

1. Disconnect fuel pressure sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

Fuel Pressure Sensor—Torque..... 10 N•m (7 lb-ft)

3. Install sensor wiring connector.

RG41183,00000DF -19-04AUG07-1/1

Remove and Install Manifold Air Pressure (MAP) Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 4 (4.5L Engine) (B)* or *COMPONENT LOCATION DIAGRAM 11 (6.8L Engine) (B)* in *Section 03, Group 140* of this manual.

1. Disconnect MAP sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

Manifold Absolute (MAP)
Sensor—Torque 10 N•m (7 lb-ft)

3. Install sensor wiring connector.

RG41183,00000E0 -19-04OCT07-1/1

Remove and Install Crank Position Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 3 (4.5L Engine) (D)* or *COMPONENT LOCATION DIAGRAM 9 (6.8L Engine) (D)* in *Section 03, Group 140* of this manual.

1. Disconnect crankshaft position sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specification.
3. Reconnect sensor wiring connection.

Specification

Crankshaft Position Sensor—
Torque 15 N•m (11 lb-ft)

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Remove and Install Pump Position Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 2 (4.5L Engine) (D) or COMPONENT LOCATION DIAGRAM 8 (6.8L Engine) (D) in Section 03, Group 140 of this manual.

- 1. Disconnect pump position sensor wiring connector and remove sensor.
- 2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specification.
- 3. Reconnect sensor wiring connection.

Specification

Pump Position Sensor—Torque..... 15 N•m (11 lb-ft)

RG41183,00000E6 -19-04OCT07-1/1

Remove and Install Turbo Speed Sensor

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 2 (4.5L Engine) (A) or COMPONENT LOCATION DIAGRAM 8 (6.8L Engine) (A) in Section 03, Group 140 of this manual.

- 1. Disconnect turbo speed pressure sensor wiring connector and remove sensor.
- 2. Install sensor. Tighten to specifications.

Specification

4.5L - Turbo Speed Sensor—
Torque 13.6 ± 0.6 N•m (10 ± 0.5 lb-ft)

Specification

6.8L - Turbo Speed Sensor—
Torque 12 ± 0.6 N•m (9 ± 0.4 lb-ft)

- 3. Install sensor wiring connector.

RG41183,00000E7 -19-04OCT07-1/1

Remove and Install Turbo Compressor Inlet Temperature Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 4 (4.5L Engine) (C)* or *COMPONENT LOCATION DIAGRAM 11 (6.8L Engine) (A)* in Section 03, Group 140 of this manual

1. Disconnect turbo compressor inlet temperature sensor wiring connector and remove sensor.
2. Coat new sensor O-ring with TY6333 High Temperature Grease and install sensor. Tighten to specifications.

Specification

Turbo Compressor Inlet Sensor—

Torque 10 N•m (7 lb-ft)

3. Install sensor wiring connector.

RG41183,00000C8 -19-04AUG07-1/1

Remove and Install Water in Fuel (WIF) Sensor

NOTE: For an expanded component location drawing, see *COMPONENT LOCATION DIAGRAM 5 (4.5L Engine) (D)* or *COMPONENT LOCATION DIAGRAM 10 (6.8L Engine) (E)* in Section 03, Group 140 of this manual.

1. Disconnect WIF sensor wiring connector and remove sensor.
2. Install sensor in fuel filter then hand tighten.
3. Install sensor wiring connector.

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Remove and Install Glow Plugs

NOTE: For an expanded component location drawing, see COMPONENT LOCATION DIAGRAM 2 (4.5L Engine) (B) or COMPONENT LOCATION DIAGRAM 8 (6.8L Engine) (B) in Section 03, Group 140 of this manual.

Removal of Glow Plugs

- 1. Disconnect glow plug wiring connector to glow plug(s).
- 2. Remove glow plug(s)

Installation of Glow Plugs

- 1. Install glow plug(s). Torque to specification.

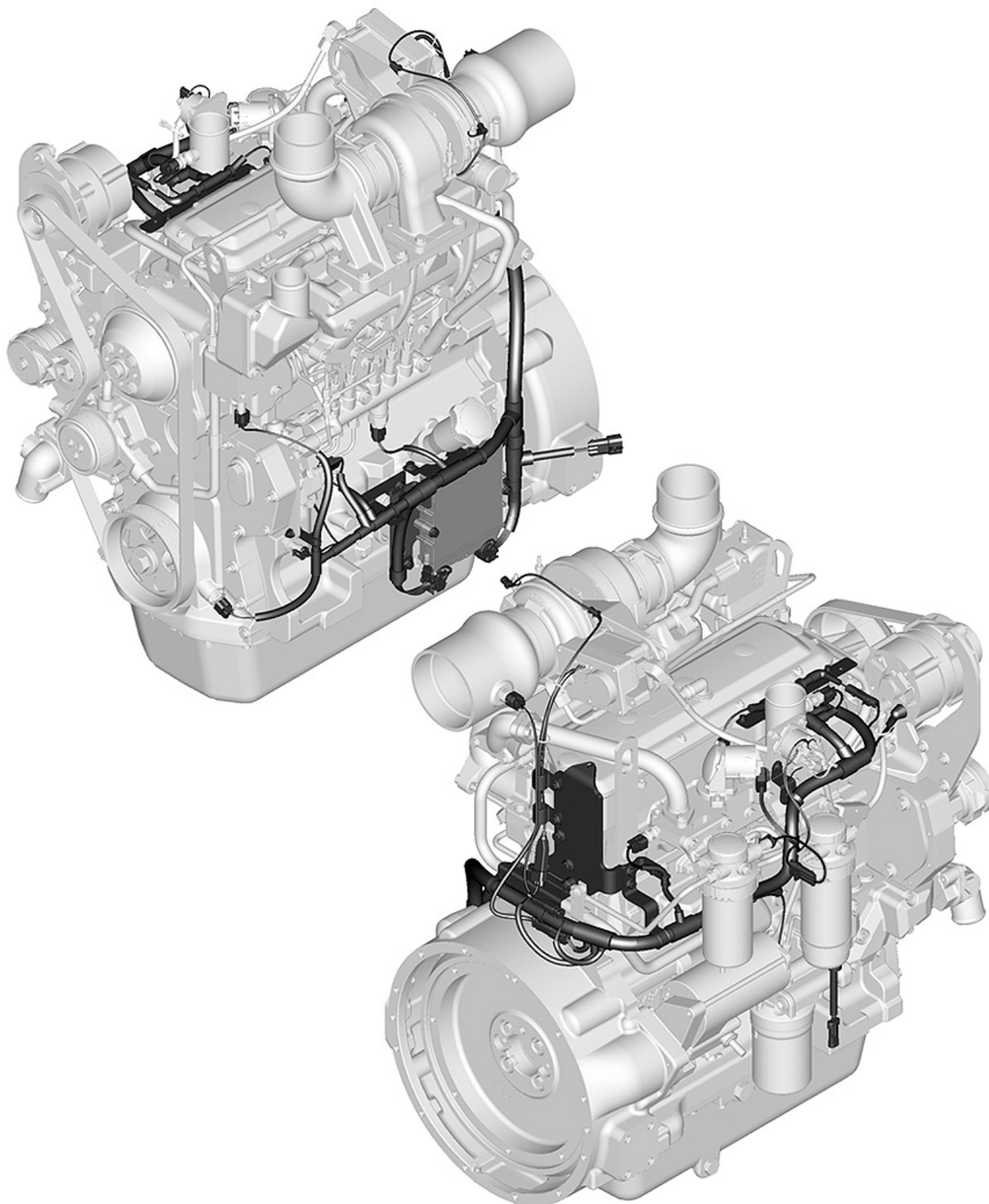
Specification

Glow Plug—Torque 15 N•m (11 lb-ft)

- 2. Connect glow plug wiring connector to glow plug(s).

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ECU Wiring Harness Routing for 4.5L Engine



Wire Harness Routing, 4.5L Engine

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Remove and Install Engine Wire Harness for 4.5L Engine

The Engine Wire Harness is made up of one main harness that connects to ECU connector J01 and J03. Other interconnect and jumper harnesses may exist depending on application.

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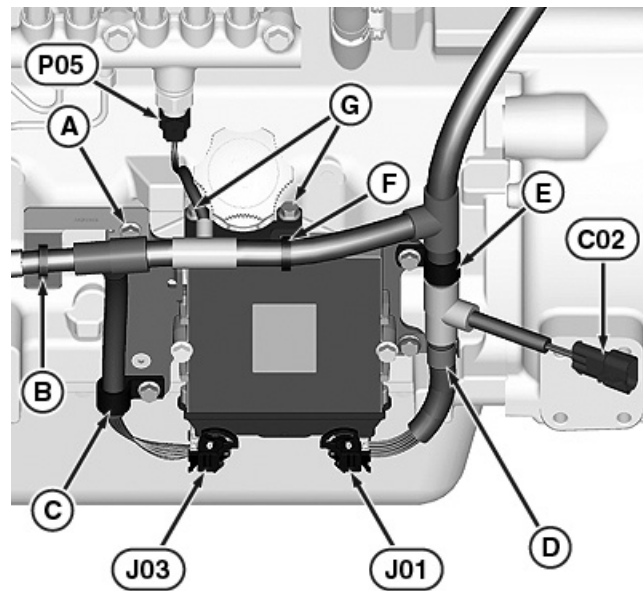
NOTE: See application manual for information on Control Panel Harness (J02).

NOTE: Disconnect cable from the negative battery terminal before removing or installing wire harness or any other major electrical components. Secure cable to prevent accidental shorts.

NOTE: For an overall view of the engine harness, see COMPONENT LOCATION DIAGRAMS 13 - 16 in Group 03, Section 140 later in this manual.

Remove Engine Wire Harness

1. Disconnect ECU Connectors J01 and J03.
2. Disconnect Connector C02 from C07.
3. Disconnect connector P05.
4. Remove harness clip (B) from harness bracket (A).
5. Remove harness clip (F) from harness bracket (G).
6. Remove harness clamps (C, D, and E) from ECU mounting bracket.



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Diagram 1- Wire Harness, ECU Connectors

- A —Harness Clamp
- B—Harness Clip
- C—Harness Clamp
- D—Harness Clamp
- E—Harness Clamp
- F—Harness Clip
- G—Harness Bracket
- C02—Auxiliary Power Connector
- J01—ECU Connector, Black Face
- J03—ECU Connector, Blue Face
- P05—Fuel Rail Pressure Sensor Connector

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7. Disconnect connectors P04, T04, T05, X01, and X02.
8. Remove harness clamp (H) from timing gear cover.

B—Harness Clip
H—Harness Clamp
P04—Engine Oil Pressure Sensor Connector
T04—Coolant Temperature Sensor Connector
T05—Fuel Temperature Sensor Connector
X01—Crank Position Sensor Connector
X02—Pump Position Sensor Connector

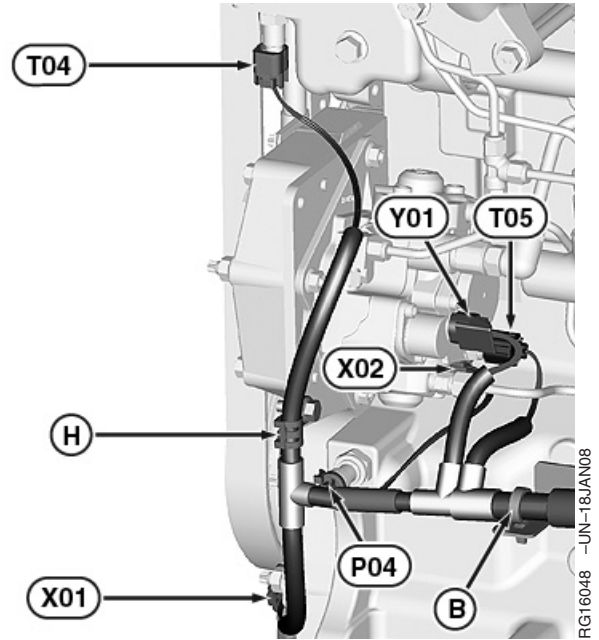


Diagram 2- Wire Harness, Left of ECU

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9. Disconnect connectors C23, if equipped, or T06.
10. Disconnect connectors T03, X04, and X05.
11. Remove two cable clamps (P) located near compressor inlet area.
12. Remove two harness clips (I) from bracket (J).
13. Remove two cable clamps (Q) from bracket attachment (N).
14. Remove two harness clamps (L, M) from bracket (K).

I—Harness Clip
 J—Harness Bracket
 K—Harness Bracket
 L—Harness Clamp
 M—Harness Clamp
 N—Bracket Attachment
 O—Tie Band
 P—Cable Clamp
 Q—Cable Clamp
 C23—Compressor Inlet Interconnect Connector
 T03—EGR Temperature Sensor Connector
 T06—Compressor Inlet Temperature Sensor Connector
 X04—VGT Actuator Connector
 X05—Turbo Speed Sensor Connector

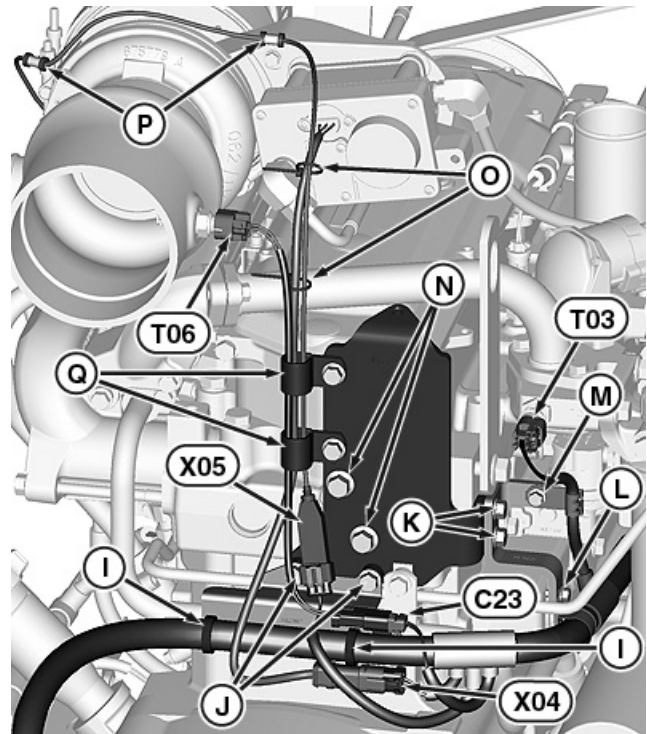


Diagram 3- ECU Harness, Rear of Cylinder Head

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15. Disconnect connector P03A if connected.
16. Disconnect connectors C01 and X03.
17. Disconnect terminals C03, C04, and C05 from glow plug relay (T).
18. Remove harness clip (R) from harness bracket (S).

R—Harness Clip
 S—Harness Bracket
 T—Glow Plug relay
 C01—Fuel Injector Connector
 C03—Glow Plug Relay Coil, Ground
 C04—Glow Plug Relay Coil, Drive
 C05—Glow Plug Relay, Diagnostic
 P03A—Fuel Pressure Sensor Interconnect
 X03—EGR Valve

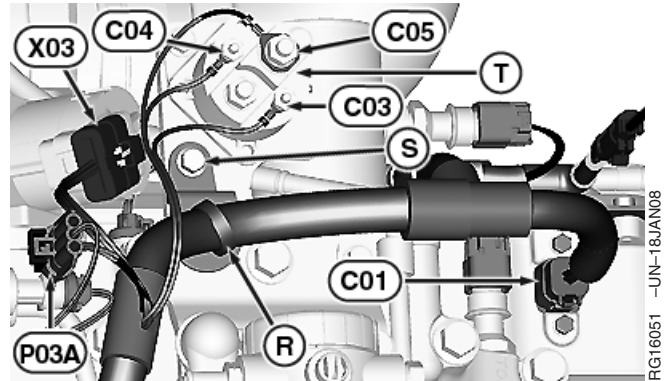


Diagram 4- Wire Harness, Area of Glow Plug Relay

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19. Disconnect connector D01.

K—Harness Bracket
 L—Harness Clamp
 D01—Water In Fuel Sensor Connector
 P03—Fuel Pressure Sensor Connector
 P03A—Fuel Pressure Sensor Interconnect

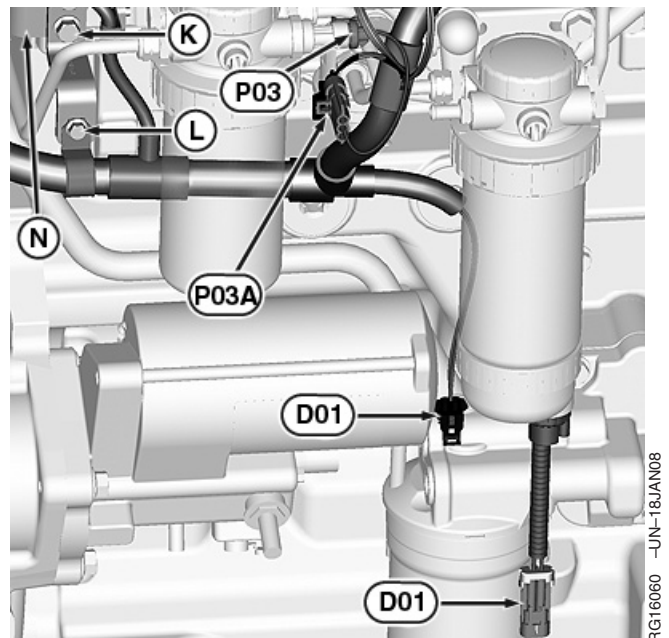


Diagram 5- Wire Harness, Fuel Filter

Continued on next page

DM59778,00000AE -19-26JAN08-6/9

20. Disconnect connectors C06, P01, T01, and T02.
21. Remove two harness clips (U) from harness bracket (V).
22. Carefully remove harness from engine.

Install Engine Wire Harness

NOTE: Disconnect cable from the negative battery terminal before installing wire harness or any other major electrical components. Secure cable to prevent accidental shorts.

NOTE: Refer to the previous diagrams for reference locations for the install procedure.

1. Place harness over engine. Refer to ECU WIRING HARNESS ROUTING FOR 4.5L ENGINE earlier in this section of the manual for proper harness placement.
2. Install two harness clips (U) to harness bracket (V) located near manifold. See diagram 6.

Specification

Harness Bracket-to-Engine Near
Manifold, 2 M6 Cap Screw.—

Torque 11 ±2 N•m (8 lb-ft)

3. Connect connectors C06, P01, T01, and T02 to their proper sensor as indicated in diagram 6.
4. Connect harness clip (R) to harness bracket (S) near glow plug relay (T). See diagram 4.

Specification

Harness Bracket-to-Glow Plug
Mounting Bracket, M6 Cap

Screw.—Torque..... 15 ±3 N•m (11 lb-ft)

5. Connect C03, C04, and C05 to glow plug relay (T).
Connect to proper terminals as shown in diagram 4.
6. If fuel pressure sensor is equipped, connect P03A to its jumper harness.
7. Connect C01 to fuel injector harness connector.

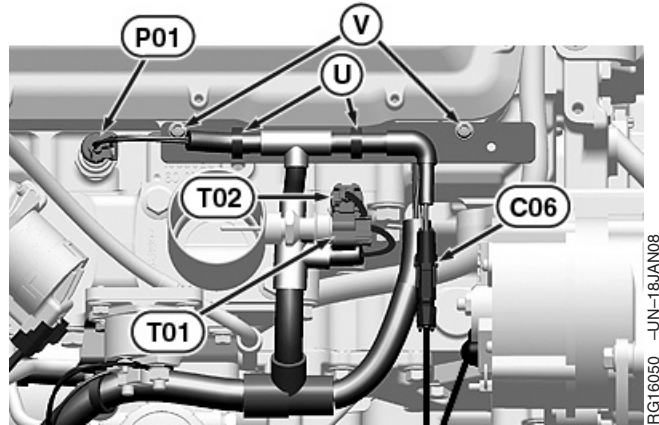


Diagram 6- Wire Harness, Area of Fresh Air Intake

U—Harness Clip
V—Harness Bracket
C01—Fuel Injector Connector
C06—Alternator Excitation
P01—Manifold Air Pressure Sensor Connector
T01—Charge Air Cooler Outlet Temperature
Sensor Connector
T02—Manifold Air Temperature Sensor Connector

8. Connect X03 (49) to EGR valve. Verify connector is inserted fully into EGR valve. Insert connector lock above latch in connector.

9. Connect D01 to fuel filter. See diagram 5.

10. Install 2 harness clamps (L, M) to harness bracket (K). Torque to specification. See diagram 3.

Specification

Harness Clamps-to-Harness

Bracket.—Torque..... 15 ±3 N•m (11 lb-ft)

Specification

.Harness Bracket-to-Attachment

Bracket, 2 M8 Cap Screws.—

Torque 25 ±5 N•m (18 lb-ft)

11. Connect connector T03 to EGR Temperature Sensor.

12. Connect 2 harness clips (I) to harness bracket (J) at rear of cylinder head. See diagram 3.

Specification

Harness Bracket-to-Attachment

Bracket, Two M8 Cap screws

with Spacers.—Torque 37 ±8 N•m (27 lb-ft)

13. Place 2 cable clamps (Q) around harnesses going to T06, X04, and X05 components and attach clamps to attachment plate (N).

14. Connect connector C23 to jumper harness if equipped, or connector T06 to compressor inlet temperature sensor.

15. Connect connectors X04 and X05.

16. Secure two tie bands around harnesses going to X04 and X05 components.

17. Place two cable clamps (L) around harness going to turbo speed sensor (X05) and attach clamps to compressor inlet.

18. Attach harness clip (F) to harness bracket (G) above ECU. See diagram 1.

Continued on next page

DM59778,00000AE -19-26JAN08-8/9

Specification

Harness Bracket above ECU,
Two M8 Cap screws.—Torque 37 ±8 N•m (27 lb-ft)

19. Attach three harness clamps (C, D, E) to ECU mounting bracket.

Specification

Harness Clamps-to-ECU
Mounting Bracket, Two M8 Cap
screws.—Torque..... 15 ±3 N•m (11 lb-ft)

20. Connect P05 to fuel rail pressure sensor.
21. Connect C02 to C07.
22. Connect J01 and J03 to ECU as shown in diagram 1.
Verify connectors are latched properly.
23. Attach harness clip (B) to harness bracket (A).

Specification

Harness Bracket near ECU
Mounting Bracket, M8 Cap
screw.—Torque 37 ±8 N•m (27 lb-ft)

24. Attach cable clamp (H) to back of timing gear cover.
See diagram 2.

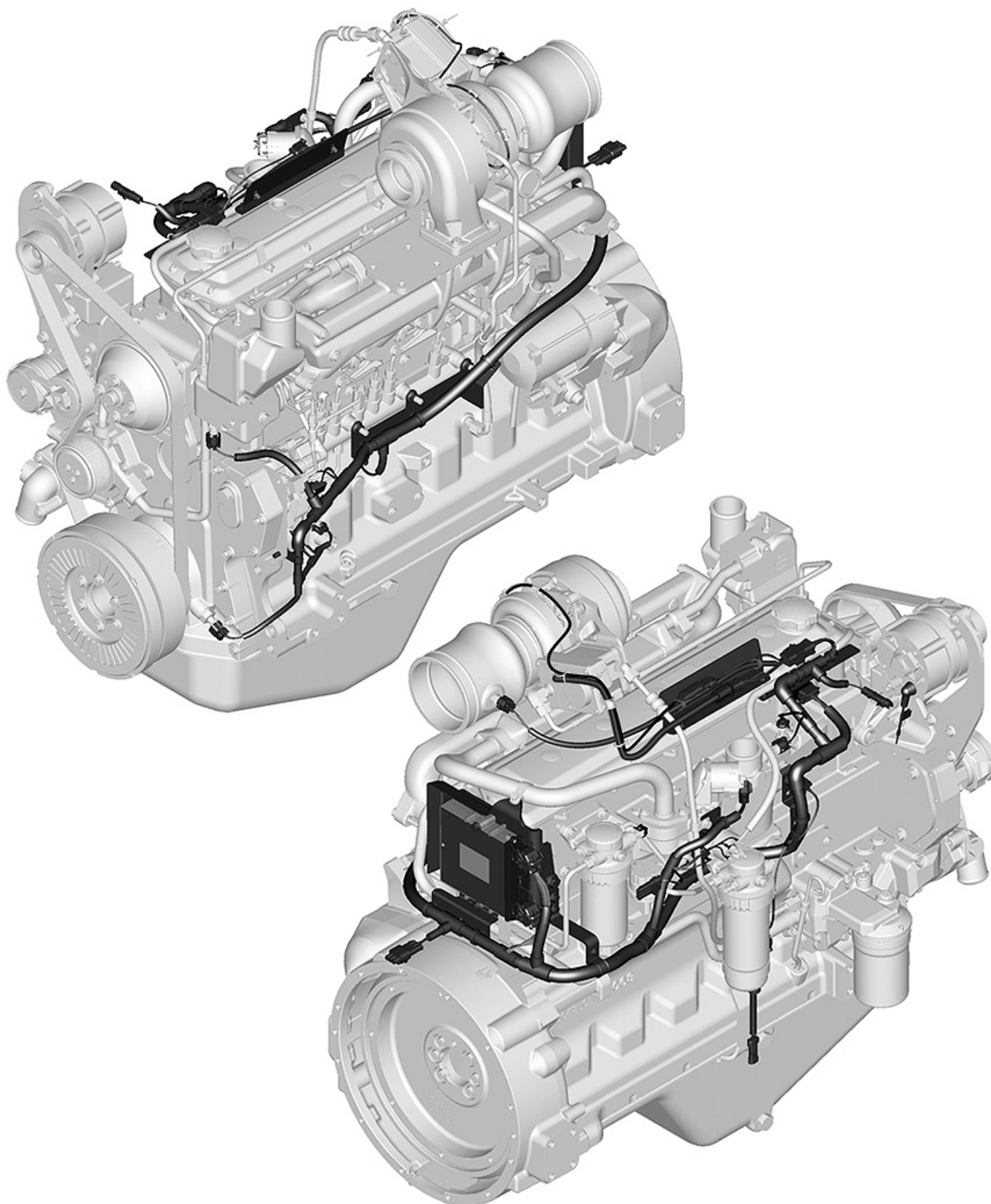
Specification

Harness Clamps-to-Timing Gear
Covert, M8 Cap screw.—Torque..... 37 ±8 N•m (27 lb-ft)

25. Connect connectors T04, T05, X01, X02, and Y01 to their associated components as shown in diagram 2.

DM59778,00000AE -19-26JAN08-9/9

ECU Wiring Harness Routing for 6.8L Engine



Wire Harness Routing, 6.8L Engine

DM59778,00000B3 -19-22JAN08-1/1

Remove and Install Engine Wire Harness for 6.8L Engine

The Engine Wire Harness is made up of one main harness that connects to ECU connector J01 and J03, Other interconnect and jumper harnesses may exist depending on application.

DM59778,00000B4 -19-28JAN08-1/8

NOTE: See application manual for information on Control Panel Harness (J02).

NOTE: Disconnect cable from the negative battery terminal before removing or installing wire harness or any other major electrical components. Secure cable to prevent accidental shorts.

NOTE: For an overall view of the engine harness, see COMPONENT LOCATION DIAGRAMS 17 - 19 in Group 03, Section 140 later in this manual.

Remove Engine Wire Harness

1. Disconnect Connectors J01 and J03 from ECU (E).
2. Disconnect Connector C02 from C07.
3. Remove two harness clips (B) from harness bracket (A).
4. Remove harness clamp (D) from harness bracket (C).

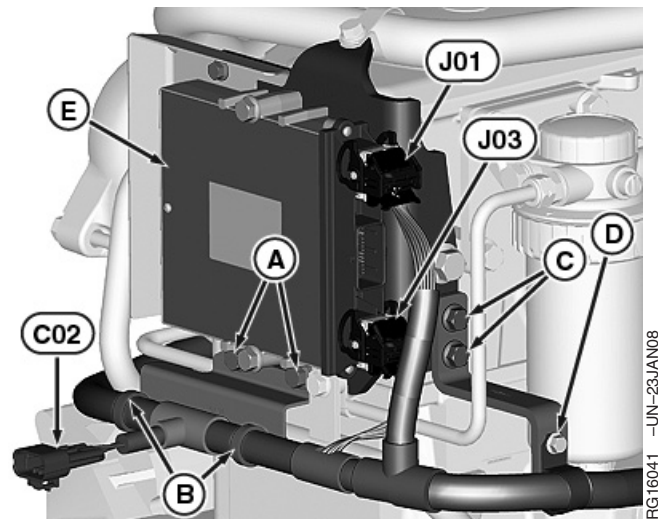


Diagram 1- Wire Harness, Rear of Cylinder Head

A—Harness Bracket
 B—Harness Clip
 C—Harness Bracket
 D—Harness Clamp
 E—ECU
 C02—Auxiliary Power Connector
 J01—ECU Connector Black Face
 J03—ECU Connector Blue Face

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5. Disconnect terminals C03, C04, and C05 from glow plug relay (H).
6. Disconnect P03A if connected.
7. Disconnect connectors T03 and X03.
8. Remove harness clip (F) from harness bracket (G).

F—Harness Clip
G—Harness Bracket
H—Glow Plug relay
C03—Glow Plug Relay Coil, Return
C04—Glow Plug Relay Coil, Drive
C05—Glow Plug Relay Diagnostic
P03—Low Pressure Fuel Sensor Connector
P03A—Low Pressure Fuel Sensor Interconnect
T03—EGR Temperature Sensor Connector
X03—EGR Valve

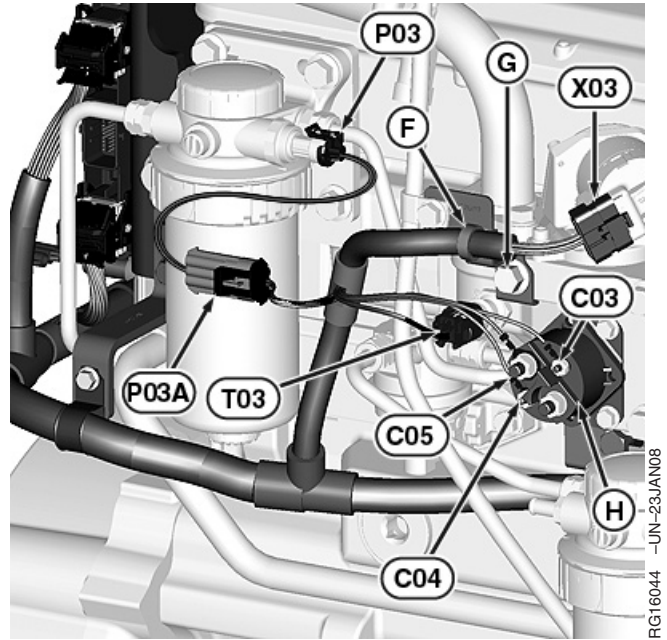


Diagram 2- Wire Harness, Area of Glow Plug Relay

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9. Disconnect connector D01 from primary fuel filter.
10. Disconnect connector T02 from manifold air temperature sensor.
11. Remove harness clip (J) from harness bracket (I).
12. Remove harness clip (K) from harness bracket (L).

I—Harness Bracket
 J—Harness Clip
 K—Harness Clip
 L—Harness Bracket
 D01—Water-in-Fuel Sensor Connector
 T02—Manifold Air Temperature Sensor Connector

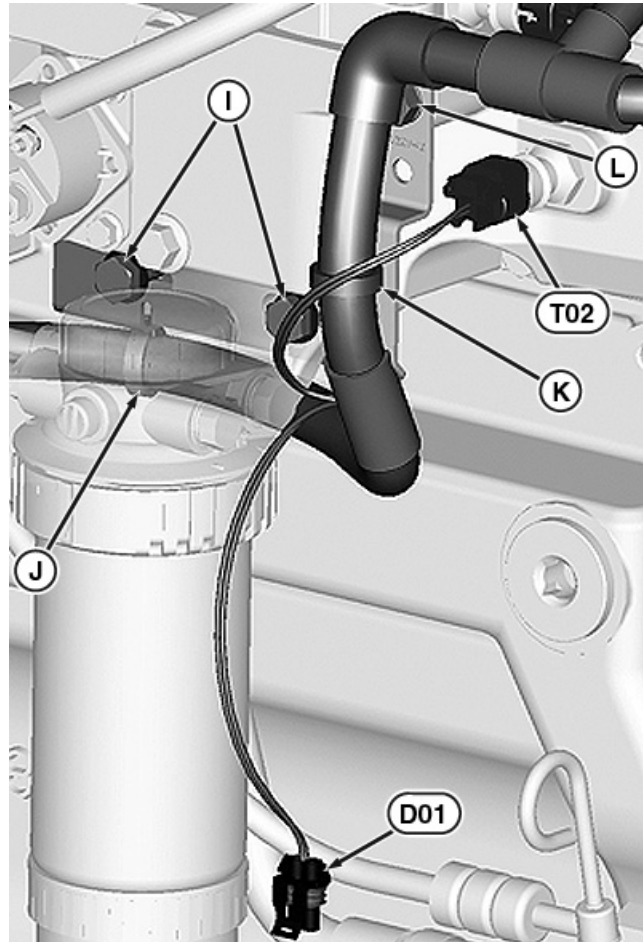


Diagram 3- Wire Harness Area of Primary Fuel Filter

DM59778,00000B4 -19-28JAN08-4/8

13. Disconnect connectors C01, C06, C23, P01, and T01.
14. Remove two harness clips (M) from harness bracket (N).

M—Harness Clip
 N—Harness Bracket
 C01—Fuel Injector Connector
 C06—Alternator Excitation Connector
 C23—Turbocharger Interconnect
 P01—Manifold Air Pressure Sensor Connector
 T01—Charge Air Cooler Outlet Sensor Connector

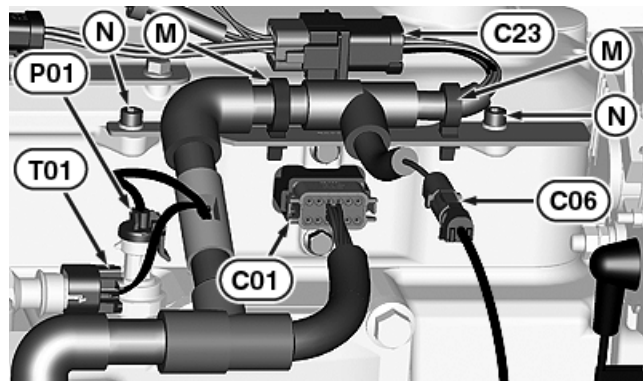


Diagram 4- Wire Harness, Area of Air Intake

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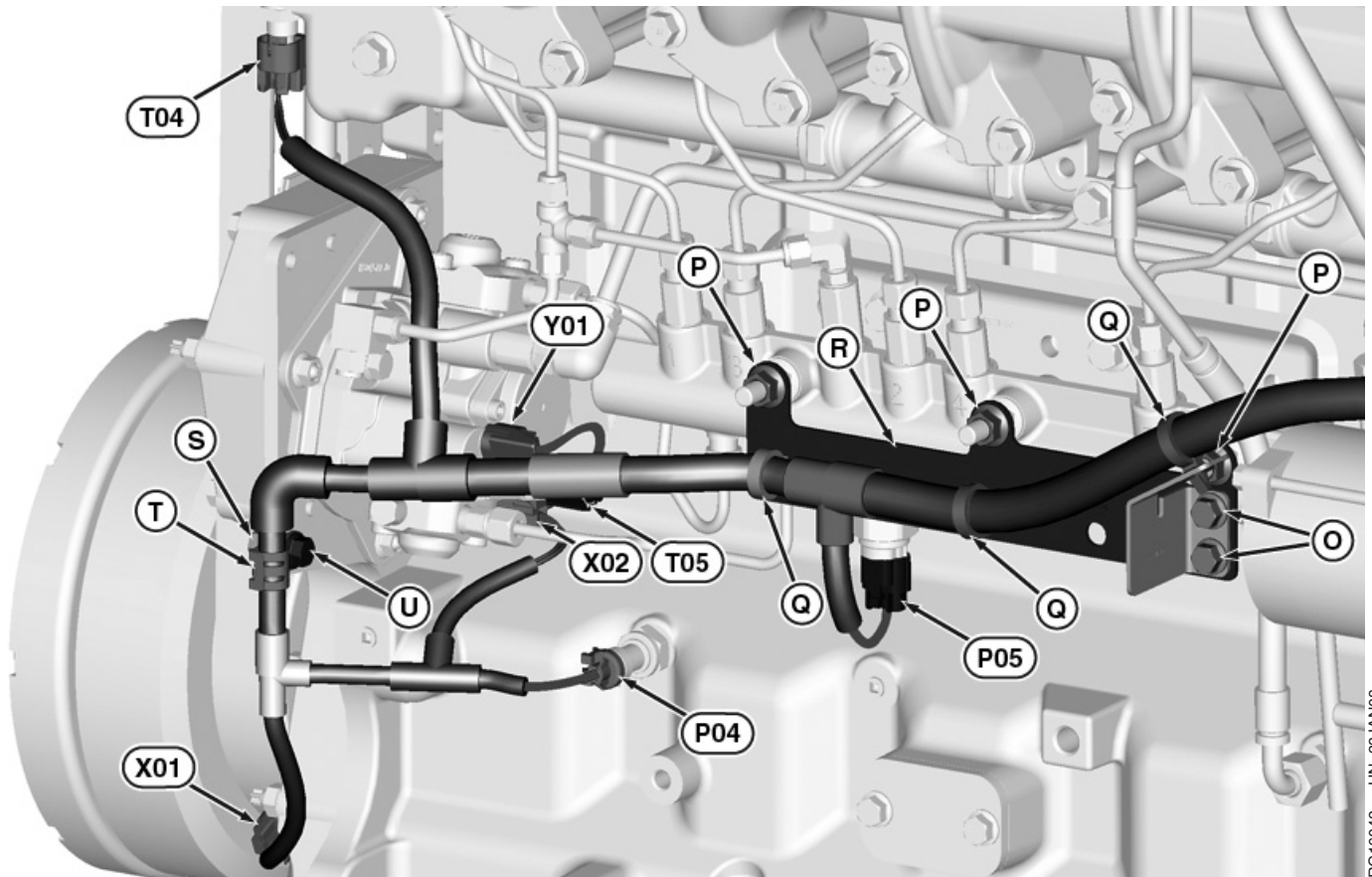


Diagram 5- Wire Harness, Left Side of Engine

O—Harness Bracket
P—Flange nut
Q—Harness Clip
R—Harness Bracket
S—Nut
T—Harness Clamp

U—Cap Screw
P04—Oil Pressure Sensor
Connector
P05—Fuel Rail Pressure
Connector

T04—Coolant Temperature
Sensor Connector
T05—Fuel Temperature Sensor
Connector
X01—Crank Position Sensor
Connector

X02—Pump Position Sensor
Connector
Y01—Suction Control Valve
Connector

15. Disconnect connectors P04, P05, T04, and T05.
16. Disconnect connectors X01, X02, and Y01.
17. Remove Nut (S) and Cap Screw (U) from cable clamp (T).
18. Remove three harness clips (Q) from harness brackets (O) and (R).
19. Carefully remove harness from engine.

Install Engine Wire Harness

NOTE: Disconnect cable from the negative battery terminal before installing wire harness or any

other major electrical components. Secure cable to prevent accidental shorts.

NOTE: Refer to the previous diagrams for reference locations for the install procedure.

1. Place harness over engine. Refer to ECU WIRING HARNESS ROUTING FOR 6.8L ENGINE earlier in this section of the manual for proper harness placement.
2. Connect three harness clips (Q) to harness brackets (O) and (R). See diagram 5.

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DM59778,00000B4 -19-28JAN08-6/8

Specification

Harness Bracket-to-Engine
Near Rail Pressure Area. Two
M8 Cap Screws.—Torque 37 ±8 N•m (28 lb-ft)

Specification

Harness Bracket-to-Engine
Near Rail Pressure Area. Three
M10 Flange Nuts.—Torque 50 ±10 N•m (37 lb-ft)

3. Attach cable clamp (T) to timing cover with cap screw (U) and nut (S).

Specification

Harness Clamp-to-Timing Gear
Cover. M8 Cap Screw and
Nut.—Torque 37 ±8 N•m (28 lb-ft)

4. Connect connectors P04, P05, T04, T05, X01, X02, and Y01 to their proper sensor as indicated in diagram 5.
5. Attach two harness clips (B) to harness bracket (A) below ECU (E). See diagram 1.
6. Attach harness clamp (D) to harness bracket (C) near ECU connectors. Torque to specification.

Specification

Harness Bracket Below ECU.
Two M8 Cap Screws.—Torque 37 ±8 N•m (28 lb-ft)

Specification

Harness Clamp-to-Harness
Bracket Near ECU Connectors.
M6 Cap Screw.—Torque 15 ±3 N•m (11 lb-ft)

Specification

Harness Bracket -to-Engine
Block Near ECU Connectors.
Two M8 Cap Screws.—Torque 25 ±5 N•m (18 lb-ft)

7. Connect C02 to C07.
8. Connect J01 and J03 to ECU.

9. Attach Harness Clip (F) to harness bracket (G) near glow plug relay. See diagram 2.

10. Attach Harness Clip (J) to harness bracket (M) behind primary fuel filter. See diagram 3.

Specification

Harness Bracket -to-Engine
Block Near Glow Plug Relay.
M19 Cap Screw.—Torque 73 ±14 N•m (54 lb-ft)

Specification

Harness Bracket -to-Manifold
behind fuel filter. 2 M10 Cap
Screws.—Torque 73 ±14 N•m (54 lb-ft)

11. Attach terminals C03, C04, and C05 to glow plug relay (H) as shown in diagram 2.
12. Connect P03A to interconnect harness if equipped, otherwise install dust cap.
13. Connect connectors T03 and X03 as shown in diagram 2.
14. Connect D01 to primary fuel filter and T02 to manifold air temperature sensor.
15. Attach 2 harness clips (M) to harness bracket (N) near air intake area. See diagram 4.

Specification

Harness Bracket Near Air
Intake Area. Two M6 Socket
Head Cap Screws and
Washers.—Torque 11 ±2 N•m (8 lb-ft)

16. Connect connector C01, C06, C23, P01, and T01 to their associated components as shown in diagram 4.

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DM59778,00000B4 -19-28JAN08-7/8

Turbocharger Interconnect

1. Connect two harness clips (E) to harness bracket (F) on rocker arm cover.

Specification

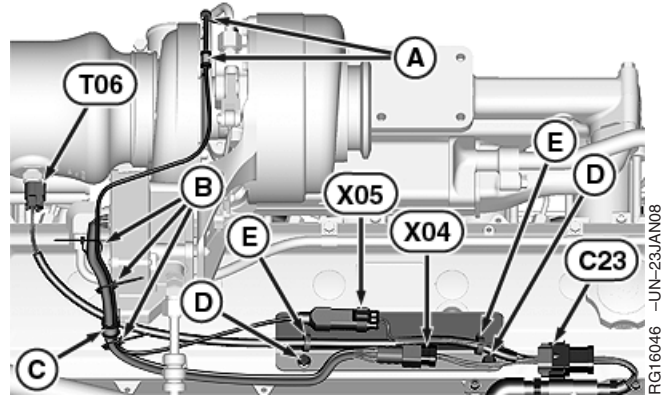
Harness Bracket -to-Rocker Arm
Cover. Two M6 Socket Head Cap
Screws and Washers.—Torque $7 \pm 1.5 \text{ N}\cdot\text{m}$ (5 lb-ft)

2. Attach cable clamp (C) to harness bracket (D) on VGT actuator.

Specification

Harness Bracket Near Air Intake
Area. Two M6 Socket Head Cap
Screws and Washers.—Torque $20 \pm 4 \text{ N}\cdot\text{m}$ (15 lb-ft)

3. Connect connectors C23, T06, X04, and X05 to their associated components.
4. Attach 3 cable ties (B) around harnesses from T06, X04 and X05 components.
5. Attach two cable clamps (A) around X05 sensor harness on turbocharger assembly.



Turbocharger Interconnect Harness

A—Harness Clamp
B—Cable Tie Wrap
C—Harness Clamp
D—Harness Bracket
E—Harness Clip
C23—Turbocharger Interconnect Connector
T06—Compressor Inlet Temperature Sensor Connector
X04—VGT Actuator Connector
X05—Turbo Speed Sensor Connector

DM59778,00000B4 -19-28JAN08-8/8

Connectors

Connectors provide electrical conductivity between two devices. Connectors typically consist of an outer shell, terminals, and perhaps a seal and locking device. Connectors come in many shapes and sizes, the differences being the number and type of terminals, voltage and current ratings, and environmental characteristics. Connectors join together as pairs, one called the receptacle and the other called the plug.

For a connector to function properly, the terminals have to be kept clean and free of any foreign debris. Over time, moisture, dirt, and other contaminants can cause the terminals of the connector to erode and not make a good electrical connection. It is important that the seals around the connector pairs are functional when reconnecting the connector.

Certain precautions are required when working with connectors.

- Do not pull on wires to disconnect a connector.
- Observe the locking mechanism of the connector when disconnecting and reconnecting a connector.
- Do not force connectors into each other when reconnecting.
- Look for bent terminals before reconnecting connectors.

- If corrosion exists on any terminals, replace the terminal.
- Make sure the connector is free of dirt or grease.
- Make sure the connector is dry of any moisture before reconnecting.
- Do not probe through the wire insulation or through the back of the connector to make measurements.
- Always use Terminal Probe kit, JT07328 when making measurements on a connector terminal.

NOTE: For connector and sensor locations, see *COMPONENT LOCATION* in Section 03, Group 140 later in this manual.

NOTE: For wiring diagrams of connectors and harnesses, see *ECU WIRING DIAGRAMS* in Section 06, Group 210 later in this manual.

IMPORTANT: Do not use items such as paper clips or wires for inserting into connector terminals when making measurements. Damage can occur to the connector or terminal.

IMPORTANT: If a connector is not being used, apply the proper dust cap to protect it from foreign debris.

DB92450,0000048 -19-15OCT07-1/1

Connector Repair

Exposure to extreme weather conditions, excessive vibration, and changing environments make it important to apply the proper techniques in repairing a connector to keep an application running properly. Problems can arise from broken wires, corroded or dirty terminals, and bent or broken terminals. Wear and tear on terminals can cause a poor electrical connection between the terminal pairs.

Connector repair typically requires extracting the terminal from the connector shell, inserting a wire seal, crimping a new terminal onto a wire, and inserting the terminal back into the connector shell. If a connector shell needs replaced, all the terminals have to be extracted and inserted into the new shell. Different style connectors require specific tools and procedures for that connector. While there are many styles of connectors, certain practices can be applied to all connectors.

Some general guideline lines to follow are:

- Before removing a terminal, first label or record where the wire attaches.
- Before crimping a new terminal to a wire, make sure the wire is long enough to fit into the connector without straining it. Do not try stretching the wire longer by pulling it through the harness. It may be necessary to splice a new wire to the existing wire.
 - Use a Heat Shrinkable Insulated Splice for splicing wires together. Recommended part is JDP PM05240 for wire gauges 10-12 and PM05220 for smaller wires.

- If a non heat shrinkable splice is used, apply heat shrink tubing over the splice to protect the wire from moisture and other contaminants.
- If applicable, apply the proper seal before crimping the wire onto the terminal.
- For a connector to function properly, the wire must be properly attached, or crimped, to the terminal.
 - Too loose of a crimp will allow the wire to pull out of the terminal and to tight of a crimp will cause the wire to break away from the terminal. A simple test is to gently pull on the wire to make sure it is securely crimped to the terminal.
 - On many terminals, the wire is crimped in two places, once around the insulation, and once around the bare metal. Visually inspect each crimp for proper alignment.
- When inserting a terminal into the connector housing, you should be able to feel it 'Lock' into place. Gently push and pull on the wire and make sure the terminal stays locked into the connector housing.
- Do not use excessive force when removing or inserting terminals into a connector housing.
- Make sure there is enough slack in the wires to account for vibration when the application is running.

NOTE: For information on inspecting connectors, see **TERMINAL TEST** in Section 04, Group 160 later in this manual.

NOTE: For repair procedures on specific manufacturers connectors, see the **Connector Repair** sections in this section of the manual.

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Welding

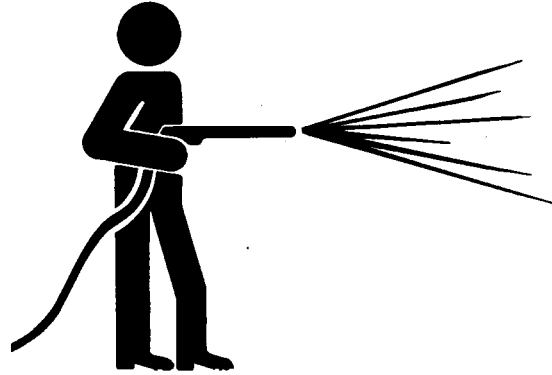
IMPORTANT: Before welding on engines with ECU, protect the ECU from high-current damage as follows:

1. Disconnect all connectors to ECU.
2. Disconnect connector to electronic injectors.
3. Remove ECU from applications chassis.
4. Connect welder ground close to welding point and away from ECU. Make sure the ECU is not in the ground path of the welder.

DM59778,0000024 -19-15OCT07-1/1

High Pressure Washing

IMPORTANT: Reduce pressure when directing pressurized water at electronic or electrical components and connectors as this may cause the components to malfunction. Always reduce pressure and spray at 45 degree angle. Avoid spraying directly into connectors.



Using High-Pressure Washer

T6642EJ -JUN-18OCT88

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Repair WEATHERPACK™ Connector

1. Disconnect WEATHERPACK™ connector. Remove the tie bands and tape.
2. Open the secondary lock on the back of the connector.
3. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
4. Insert JDG364 Extraction Tool¹ over terminal contact in connector body. Extraction tool needs to be fully seated to unlock terminal tangs from the connector body. When tool is seated, gently pull the wire from the back of the connector. If the wire(s) or terminal(s) are being repaired, go to step 5. If the wires and terminals are OK and only the connector is being replaced, go to step 9.
5. Using JDG145 Universal Electrical Pliers², cut off wire directly behind the terminal seal crimp. If any part of the seal is still on the wire, dispose of it.
6. Using JDG145 Universal Electrical Pliers², strip 6 mm (1/4 in.) insulation from end of wire.



TS0128 -UN-23AUG88

WEATHERPACK is a trademark of Packard Electric

¹ Included in JT07195B Electrical Repair Kit

² Included in JDG155 Electrical Repair Tool Kit

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DB92450,000004A -19-15OCT07-1/4

7. Select correct size of seal. Slide the seal over the wire insulation with the smaller diameter side facing the end of the wire. Small diameter side of seal should line up with the outer edge of the insulation.

IMPORTANT: The seal must fit snug over the cable insulation without a gap between the cable seal and the insulation.

NOTE: Cable seals are color coded for three sizes of wire:

- Green - 18—20 Gauge Wire
- Gray - 14—16 Gauge Wire
- Blue - 10—12 Gauge Wire



TS0136 -JUN-23AUG88

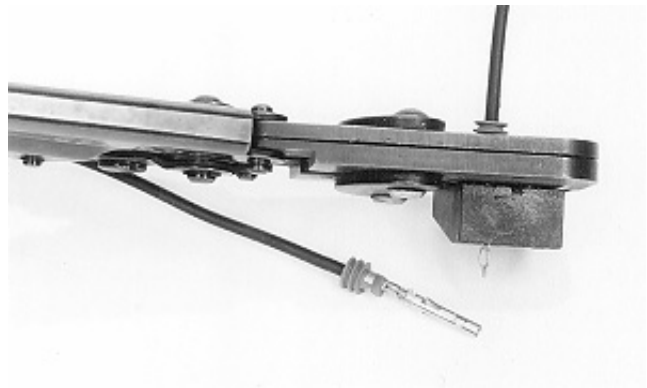
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DB92450,000004A -19-15OCT07-2/4

8. Select correct size terminal on wire and crimp in position with a W-type crimp using a JDG783 WEATHER PACK™ Crimping Tool.

NOTE: Terminals have numbered identification for two sizes of wire:

- #15 - 14—16 Gauge Wire
- #19 - 18—20 Gauge Wire



TS1623 -JUN-02NOV94

WEATHER PACK is a trademark of Packard Electric

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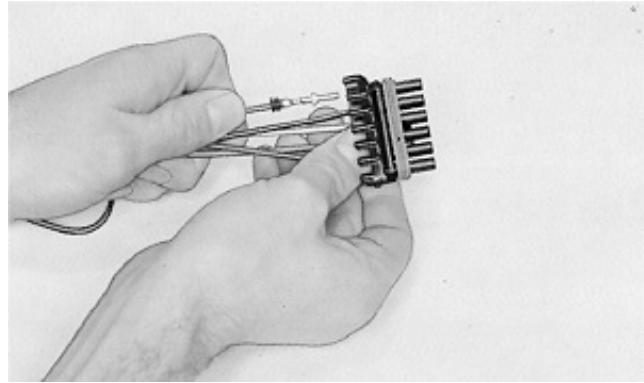
9. Insert terminal into connector. Terminal should click when it is fully seated. Make sure the wire is inserted into the correct connector cavity.

IMPORTANT: Terminal tangs must be carefully spread to ensure good seating on connector body. If terminal is being reused in a new connector, make sure tangs are spread.

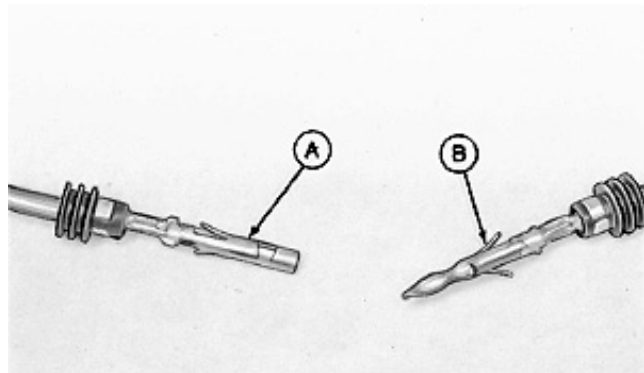
NOTE: Connector bodies are "keyed" for correct terminals. Be sure terminals are correctly aligned.

Correct terminal installation for sleeve (A) and pin (B) is illustrated.

10. Gently pull on wire to insure that the terminal is locked in position.
11. Repair or transfer remaining wires.
12. Close the secondary lock on the back of the connector.
13. Retape wires and add the required tie bands to the harness.



TS0130 -UN-23AUG88



TS0139 -UN-02DEC88

A—Sleeve
B—Pin

DB92450,000004A -19-15OCT07-4/4

Repair Cinch Flex Box Connector

Tools Required For Repair

- CINCH Crimper Tool JDG1727



RG14578 -UN-21NOV05

CINCH Crimper Tool

RG41183,00000E9 -19-15OCT07-1/17

- CINCH Terminal Remover Tool JDG 1725
- Wire Stripper JDG145
- Jeweler's screwdriver (or equivalent, narrow, flat-bladed tool)

RG14579 -UN-21NOV05



CINCH Terminal Remover Tool

RG41183,00000E9 -19-15OCT07-2/17

Secondary Lock Release Tool



RG15122 -UN-13JUN07

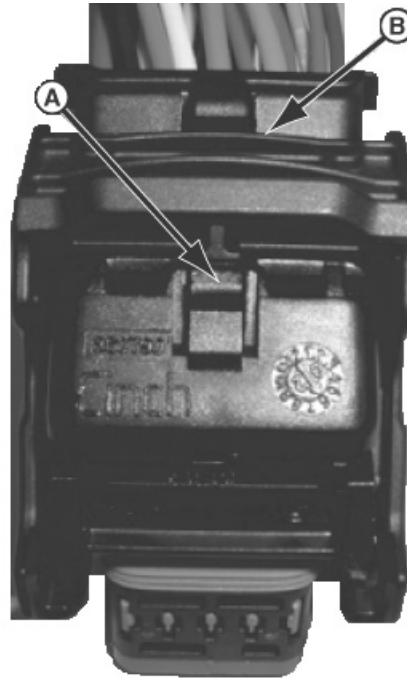
Secondary Lock Release Tool

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Repair CINCH Connector by Replacing Terminal (0.6 or 1.5 mm)

1. To unlock CINCH connector from ECU connector, press on tab (A), and push on connector lock (B) behind tab, allowing Lock rotation.



RG14580 -UN-21NOV05

Tab and Connector Lock

RG41183,00000E9 -19-15OCT07-4/17

2. Continue pushing on connector lock, until it has been rotated 90° clockwise (clicked into place).
3. Remove CINCH connector from ECU connector.



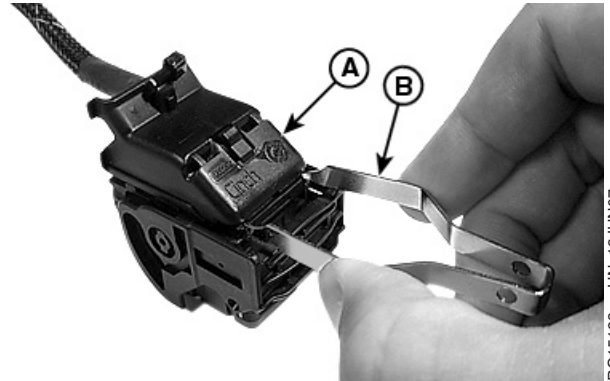
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Rotate lock 90 Degrees

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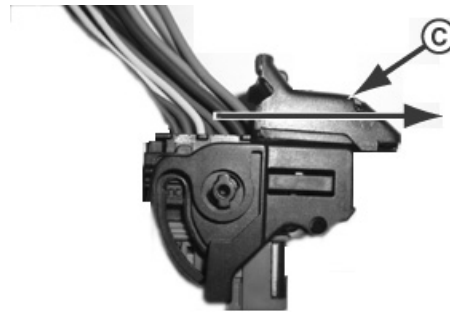
4. Unlock two tabs to release wire guard. Insert lock release tool (B) between tabs and connector body, or use small bladed jewelers screwdriver to spread tabs away from connector body. Being careful not to break tabs off connector body, spread tabs to release wire guard (A).



Unlock Tabs to Release Wire Guard

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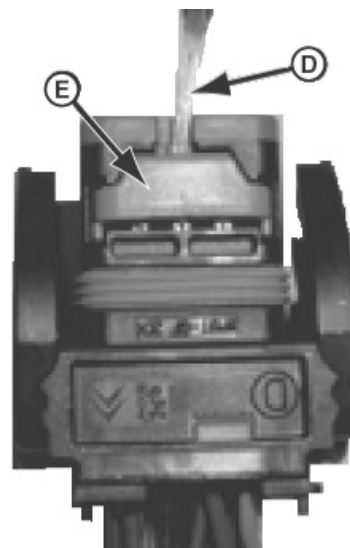
5. From wire side of connector, push on wire guard (C), and remove from connector.



Slide Guard Forward

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6. Insert thinly bladed tool (D) in the slot at the mating end of the connector and under the colored tab (E), as shown.



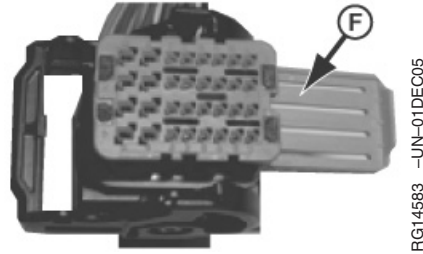
Insert Thin-Bladed Tool Under Tab

RG14582 -UN-21NOV05

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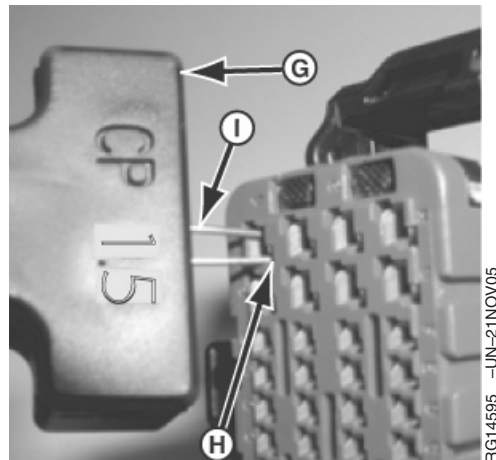
7. Gently pry tab out, and slide terminal retainer (F) out to the end of the connector body. Retainer does not detach from the connector body.



Slide Terminal Retainer Out

RG41183,00000E9 -19-15OCT07-9/17

8. Insert CINCH Terminal extraction tool (G), as shown, into offset holes (H) on either side of the terminal to be extracted, tool wire sizes 1.5 mm end for larger wire size, and 0.6 mm end for smaller wire size (I). Press in until tool surface meets with connector surface.

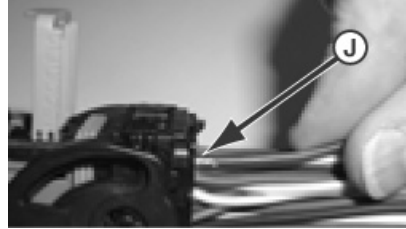


Insert Terminal Extraction Tool

Continued on next page

RG41183,00000E9 -19-15OCT07-10/17

9. With one hand, grasp connector, and with the other, grasp wire of terminal to be extracted (J), firmly pull on wire, until Terminal has been removed from connector.
10. Remove terminal extraction tool from connector. If wire was pulled out during step 8, or if wire was already broken off, leaving terminal inside the connector, do the following:
 - a. Insert a 0.813-0.643 mm (20-22 AWG) diameter, single-strand piece of stiff wire into mating-side (opposite wire-side) of connector.
 - b. Continue to push on terminal with wire, until terminal is completely ejected from connector, or until terminal is exposed at wire side of connector.
 - c. If terminal is only exposed, use long-nose pliers to pull it from the connector.
11. Cut back on insulated portion of wire, close to terminal-end of wire, but beyond any damage to either wire or insulation.

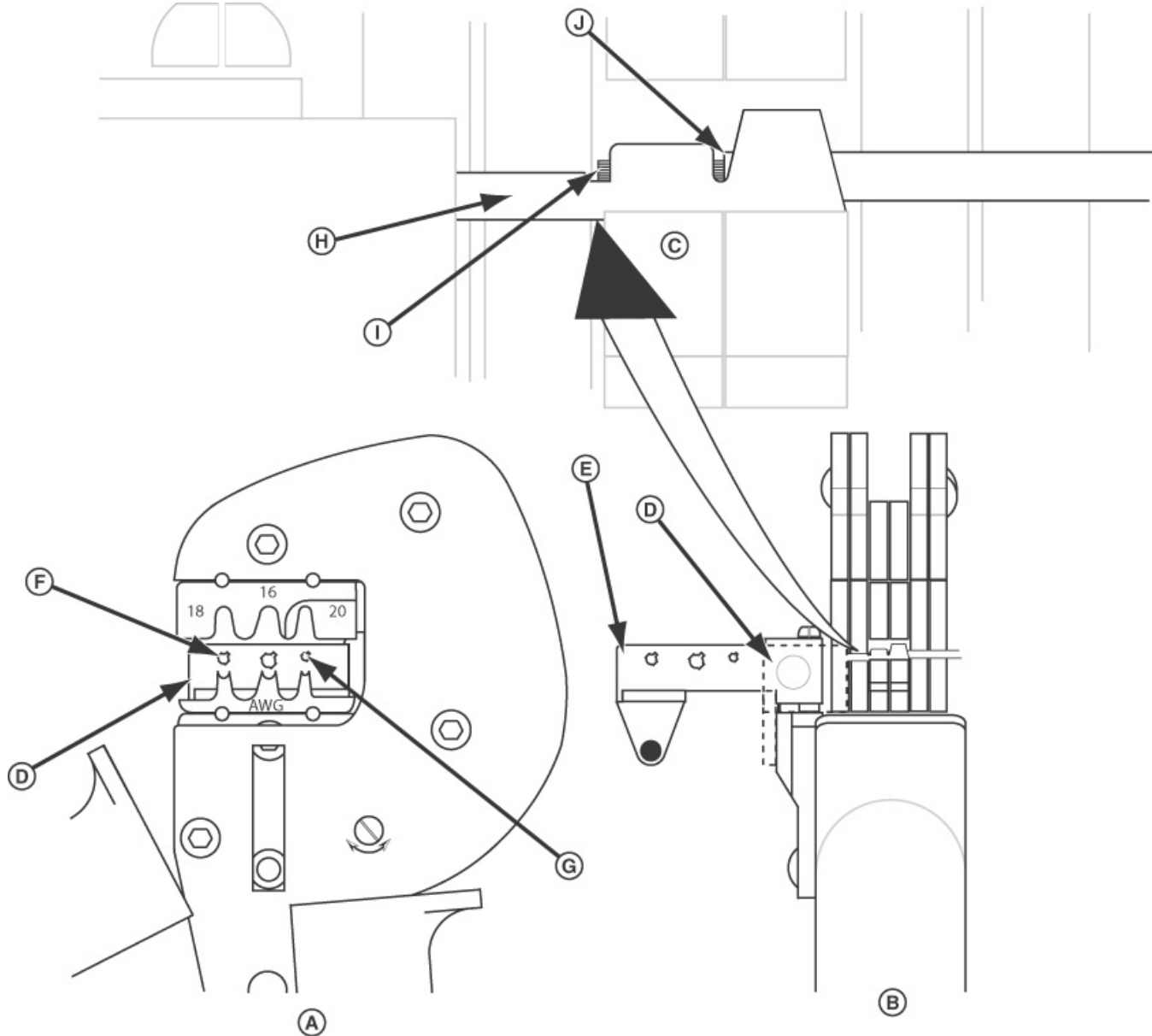


Remove Terminal and Wire

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Continued on next page

RG41183,00000E9 -19-15OCT07-11/17



CINCH Crimper Elements

A—Crimper Side View
 B—Crimper Front View
 C—Wire-in-Terminal Blowup
 D—Terminal Block (Closed)

E—Terminal Block (Open)
 F—1.5 mm Terminal Recess
 G—0.6 mm Terminal Recess

H—Terminal Seated in Block Recess
 I—Wire in Terminal (4.0 mm Insulation Stripped)

J—Wire in Terminal (insulation end)

NOTE: The above figure is intended to only illustrate crimper and wire-loading elements. Its callouts relate only to its own legend, and not to the callouts in the procedural steps.

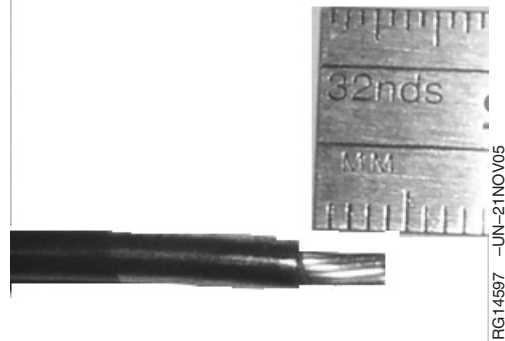
12.

RG14613 -UN-01DEC05

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RG41183,00000E9 -19-15OCT07-12/17

Using wire strippers, strip insulation from wire to expose approximately 4.0 mm (0.16 in.) length of wire, as shown.

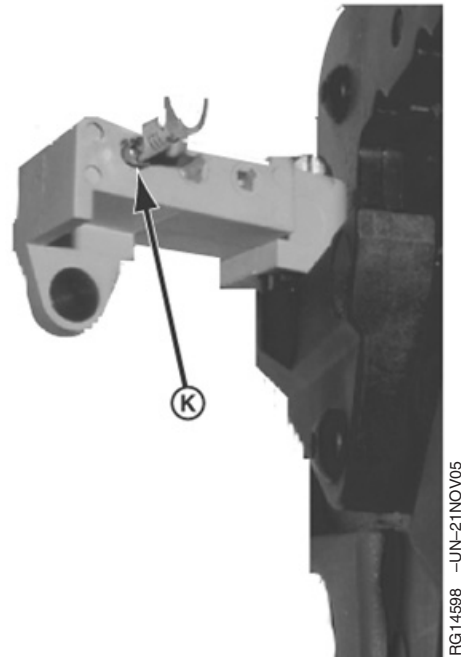


Strip 4.0 mm of Wire Insulation

RG41183,00000E9 -19-15OCT07-13/17

IMPORTANT: Use only JDG1727 Crimper. Use of another can result in an improper crimp. Attempting to insert an improperly crimped terminal can result in inability to fully seat, and to jam, the terminal inside the connector. This condition requires replacement of the entire connector.

13. Place female terminal in the matching recess (K) in crimper terminal block, as shown.



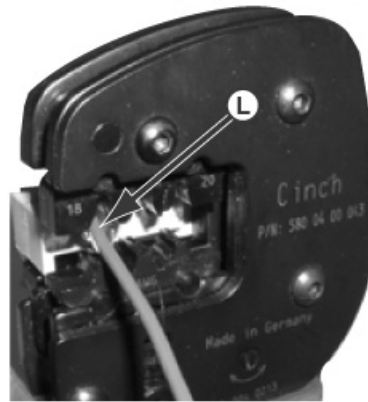
Terminal in Matching Recess of Crimper Terminal Block

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RG41183,00000E9 -19-15OCT07-14/17

14. Lay stripped end of wire onto end of terminal to be crimped, with insulation overlapping, as shown (L).

15. Squeeze crimper handles, until they automatically unlock. Remove wire and terminal from crimper.

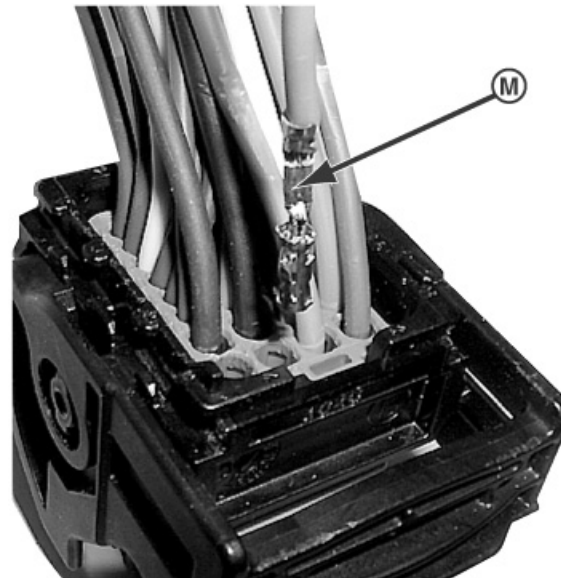


RG14588 -UN-01DEC05

Wire Onto Terminal in Crimping Pliers

RG41183,00000E9 -19-15OCT07-15/17

16. Fully insert terminal into connector (M), with crimped side of terminal facing away from the terminal retainer side of the connector and tabs on terminal aligned with offsets in connector, terminal hole, as shown.



RG14589 -UN-02DEC05

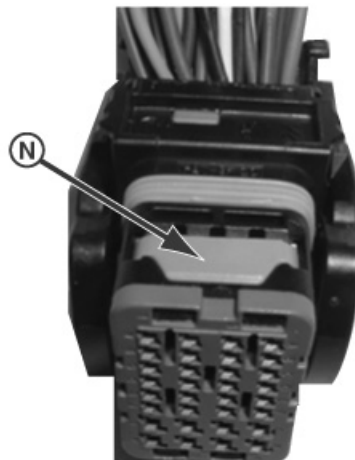
Correct Position For Terminal Insertion

Continued on next page

RG41183,00000E9 -19-15OCT07-16/17

NOTE: If retainer does not slide fully into position, terminal has not been completely seated. Check seating again. Do not force retainer. Retainer slides closed only when all connector terminals are fully seated

17. Close green terminal retainer, until its tab (N) is flush with connector surface.
18. Slide wire guard back onto connector, until it clicks into place.
19. Reconnect CINCH connector to ECU connector.
20. Push on lock toward wire side of connector, and continue rotating it 90 degrees, counter-clockwise, until it clicks into place, behind tab.



Push Tab Flush With Connector

RG14599 -UN-01DEC05

RG41183,00000E9 -19-15OCT07-17/17

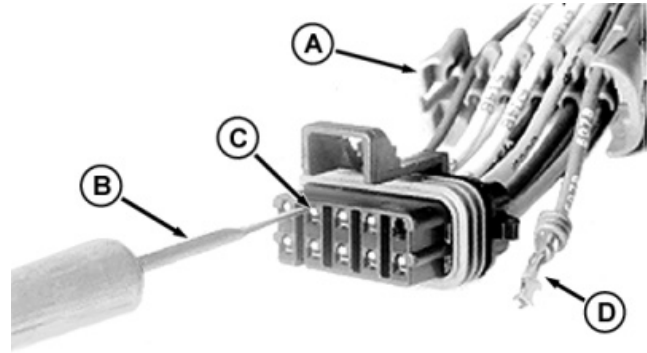
02
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Repair METRI-PACK Connectors(Push Type)

1. Disconnect the METRI-PACK connector. Remove the tie bands and tape.
2. Remove secondary lock (A).
3. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
4. Insert JDG776 or JDG777 Terminal Extraction Tool¹ (B) into connector cavity (C) pushing the terminal locking tab inward.

NOTE: Use JDG776 Extraction Tool with 56, 280, and 630 Series METRI-PACK terminals. Use JDG777 Extraction Tool with 150 Series METRI-PACK terminals.

5. Remove extraction tool and pull wire from the back of the connector.
6. Using JDG145 Universal Electrical Pliers², cut off wire directly behind the terminal.
7. Using JDG145 Universal Electrical Pliers² strip 6 mm (1/4 in.) insulation from end of wire.
8. Select the seal for the appropriate wire size (see note following). Slide the seal over the wire insulation with the smaller diameter side facing the end of the wire. Small diameter side of seal should line up with the outer edge of the insulation.



RW77137 -UN-08DEC98



TS0136 -UN-23AUG88

A—Connector Secondary Lock
 B—Extraction Tool
 C—Connector Body Socket
 D—Terminal

¹Included in JT07195B Electrical Repair Kit

²Included in JDG155 Electrical Repair Tool Kit

Continued on next page

DB92450,000004B -19-27JUL07-1/2

IMPORTANT: The seal must fit snug over the cable insulation, without a gap between the cable seal and the insulation.

NOTE: Cable seals are color coded for three sizes of wire:

- Green - 18—20 Gauge Wire
- Gray - 14—16 Gauge Wire
- Blue - 10—12 Gauge Wire

Crimp contact (A) on wire with a “W” type crimp using JDG865 Crimping Tool (B).

9. Crimp cable seal (C) on contact using JDG865 Crimping Tool (B).

10. Make sure locking tang (D) on the new terminal is in the outward position.

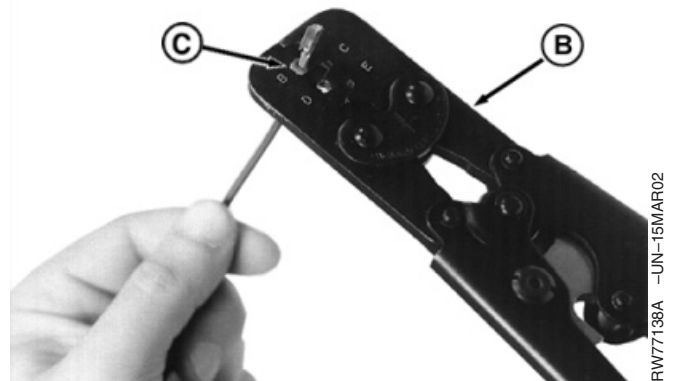
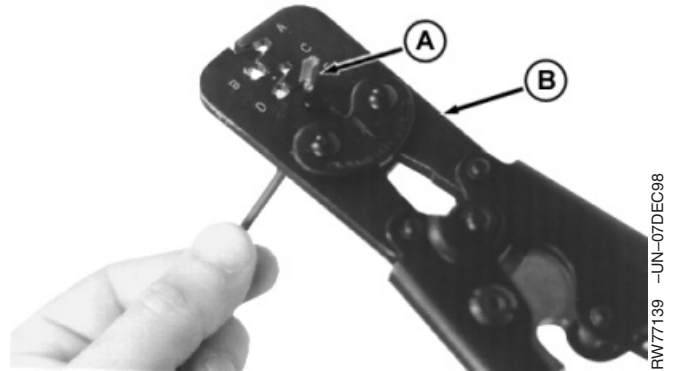
11. Push terminal into the correct connector cavity until terminal locks.

12. Gently pull on wire to verify terminal is locked into the connector.

13. Place the secondary lock back on the connector.

14. Retape the wires and add the required tie bands to the harness.

A—Contact
B—Tool
C—Cable Seal
D—Terminal Locking Tang



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RW77139 -UN-07DEC98

RW77138A -UN-15MAR02

RW77140A -UN-15MAR02

DB92450,000004B -19-27JUL07-2/2

Repair DT Series Deutsch Connectors

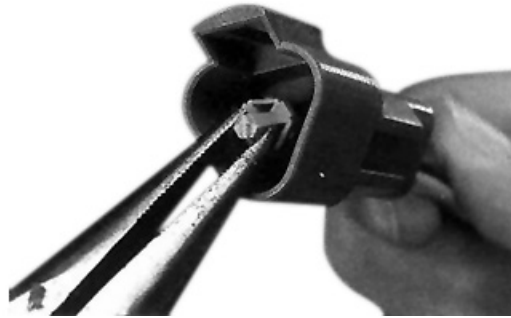
Steps to remove, crimp, and insert a new terminal.

1. Disconnect the Deutsch connector. Remove the tie bands and tape.
2. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.

Continued on next page

DM59778,000000A -19-15OCT07-1/10

3. Remove wedge using needle nose pliers or a hooked shaped wire. Pull wedge straight out. For connectors with a rectangular wedge (female terminals), use a jewelers screwdriver to remove the wedge from connector body.



DM59778.000000A -19-15OCT07-2/10

RG15073 -UN-26JUN07

4.

To remove the terminal, release the locking tab (A) from the terminal using a jewelers screwdriver. Gently, start to pull the wire from the connector.

A—Locking Tab



DM59778.000000A -19-15OCT07-3/10

RG15074 -UN-26JUN07

5. Hold the rear seal in place as the wire is pulled from the connector.

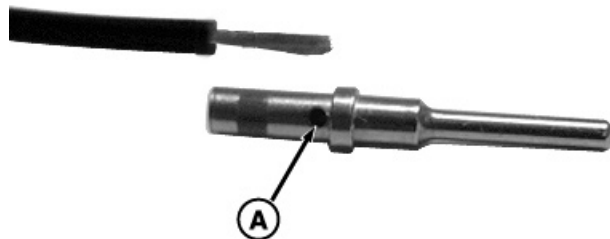


DM59778.000000A -19-15OCT07-4/10

RG15046 -UN-26JUN07

6. After terminal is removed from connector, cut wire directly behind terminal. Strip 6mm (1/4in) insulation from wire. Bare wire should be same length as the barrel on the terminal and should show through the inspection hole (A) when inserted into the terminal. Wire insulation should not protrude into the terminal.

A—Inspection Hole



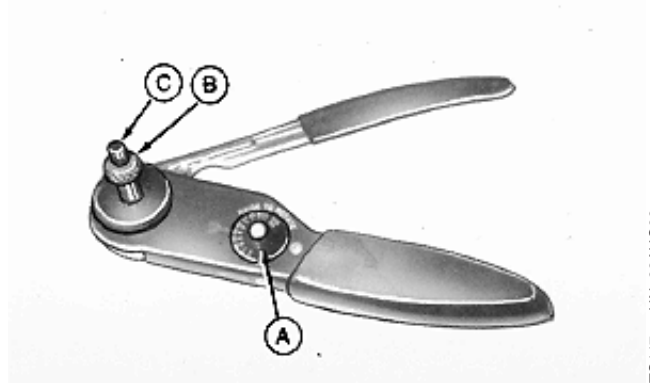
RG15070 -UN-26JUN07

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DM59778.000000A -19-15OCT07-5/10

7. Adjust selector (A) on JDG360 Crimping Tool¹ for correct wire size .
8. Loosen lock nut (B) and turn adjusting screw (C) in until screw stops.

A—Selector
B—Lock Nut
C—Adjusting Screw



TS117 —UN-23AUG88

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¹Included in JDG359 Deutsch Electrical Repair Kit

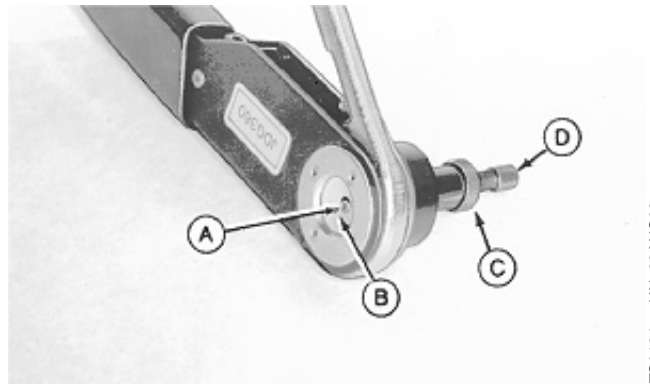
DM59778,000000A —19-15OCT07-6/10

9. Insert terminal (A) and turn adjusting screw (D) until terminal is flush with cover (B).

IMPORTANT: Select correct size terminal to fit connector body.

10. Tighten lock nut (C).

A—Terminal
B—Cover
C—Lock Nut
D—Adjusting Screw



TS0134 —UN-23AUG88

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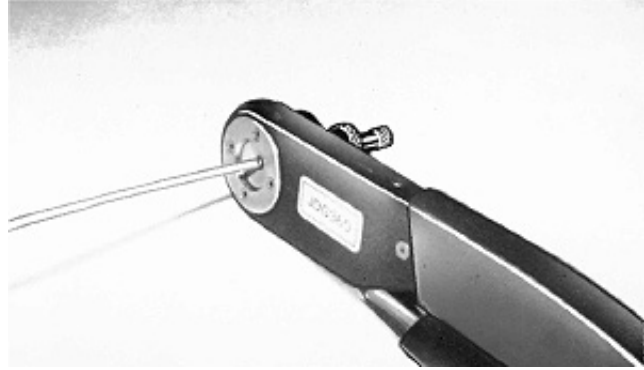
DM59778,000000A —19-15OCT07-7/10

11. Insert wire in terminal and crimp until handle contacts stop.

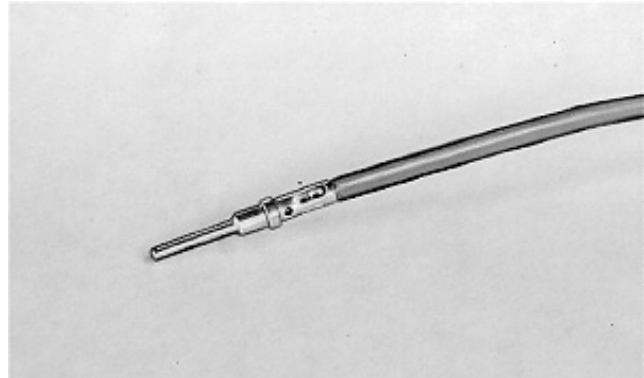
IMPORTANT: Terminal must remain centered between indenters while crimping. Once a crimp is started, it must be completed.

12. Release handle and remove terminal.

13. Inspect terminal to ensure all wires are in crimped barrel and insulation butts up to terminal. Wire should be visible through the inspection hole of the terminal.



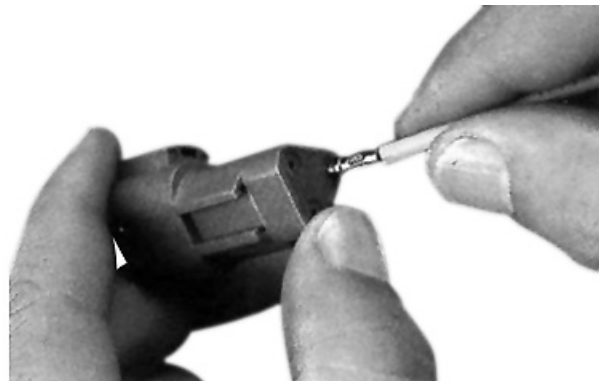
TS118 -UN-23AUG88



TS0135 -UN-23AUG88

DM59778.000000A -19-15OCT07-8/10

14. Hold connector with rear seal facing outward. Push terminal straight into connector cavity until positive stop is felt. Gently pull on wire to verify terminal is locked into the connector.

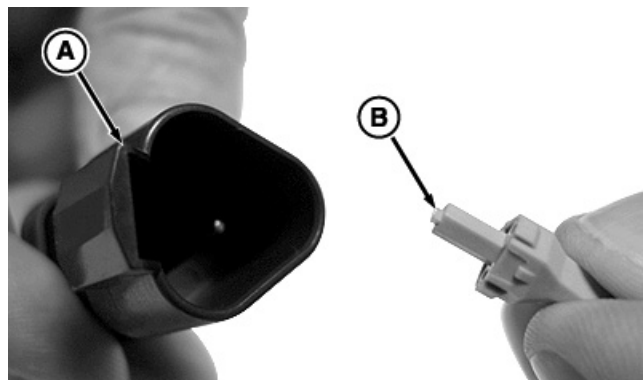


RG15071 -UN-26JUN07

DM59778.000000A -19-15OCT07-9/10

15. Insert wedge with arrow pointing towards exterior locking tab. The wedge will snap into place. Rectangular wedges snap into place in any orientation.
16. When all terminals have been replaced, tape wires and add the required tie bands to the harness.

A—Locking Tab
B—Location of Arrow



RG15072 -UN-26JUN07

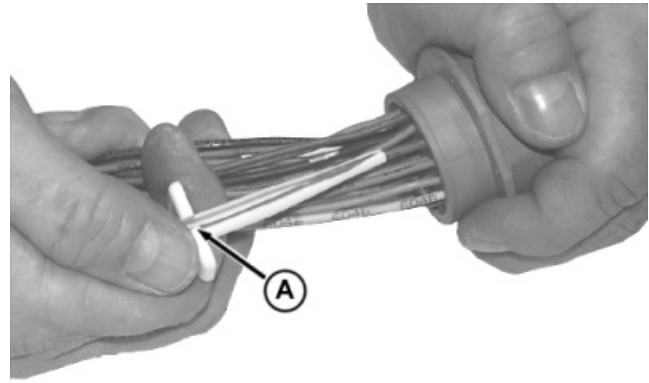
DM59778.000000A -19-15OCT07-10/10

Repair HD Series Deutsch Connectors

1. Disconnect the Deutsch connector. Remove the tie bands and tape.
2. Identify wire color/number to the connector cavity. Make sure each wire goes back to the correct cavity location.
3. Select correct size extractor tool for size of wire to be removed:
 - JDG361 Extractor Tool - 12—14 Gauge Wire¹
 - JDG362 Extractor Tool - 16—18 Gauge Wire¹
 - JDG363 Extractor Tool - 20 Gauge Wire²
 - JDG785 Extractor Tool - 6-8 Gauge Wire³
4. Insert the extractor tool (A) over the wire to be removed.
5. Slide extractor tool along wire until tool tip snaps onto wire.

IMPORTANT: DO NOT twist tool when inserting in connector.

6. Slide extractor tool connector body until tool is positioned over terminal contact.
7. Pull wire from connector body using extraction tool.



A—Extractor Tool

RW77142 -UN-07DEC98

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¹Included in JT07195B Electrical Repair Tool Kit and JDG359 DEUTSCH Electrical Repair Kit

²Included in JDG359 DEUTSCH Electrical Repair Kit

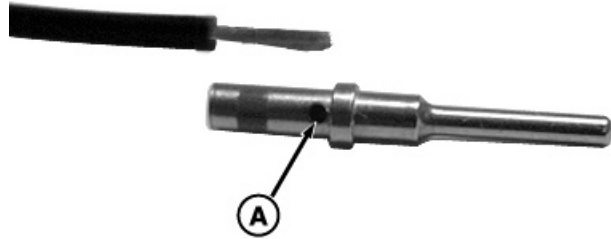
³Included in JT07195B Electrical Repair Tool Kit

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RG40854,00000CB -19-15OCT07-1/5

8. Using After terminal is removed from connector, cut wire directly behind terminal. using JDG145 Universal Electrical Pliers¹. Strip 6mm (1/4in) insulation from wire. Bare wire should be same length as the barrel on the terminal and should show through the inspection hole (A) when inserted into the terminal. Wire insulation should not protrude into the terminal.

A—Inspection Hole



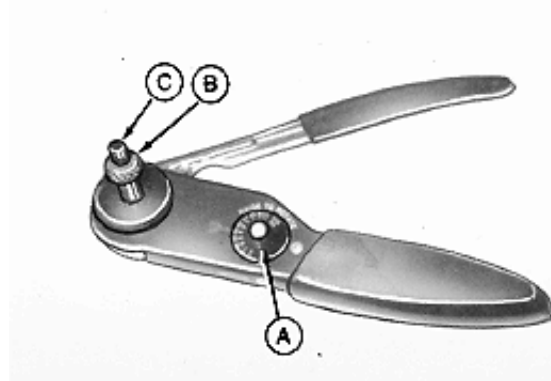
RG15070 -UN-26JUN07

¹Included in JDG155 Electrical Repair Tool Kit

RG40854,00000CB -19-15OCT07-2/5

9. Adjust selector (A) on JDG360 Crimping Tool¹ for correct wire size .
10. Loosen lock nut (B) and turn adjusting screw (C) in until screw stops.

A—Selector
B—Lock Nut
C—Adjusting Screw



TS117 -UN-23AUG88

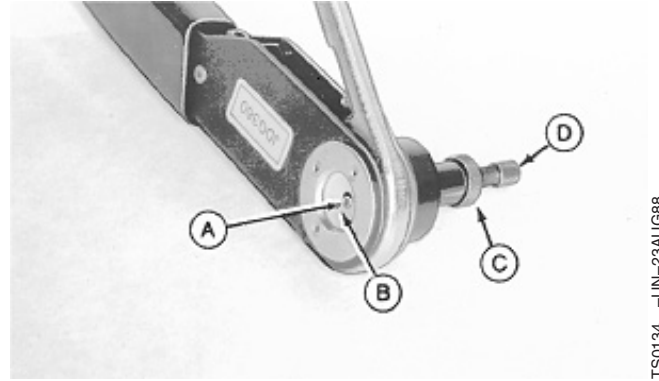
¹Included in JDG359 Deutsch Electrical Repair Kit

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RG40854,00000CB -19-15OCT07-3/5

- IMPORTANT: Select correct size terminal to fit connector body.**

- A—Terminal
B—Cover
C—Lock Nut
D—Adjusting Screw

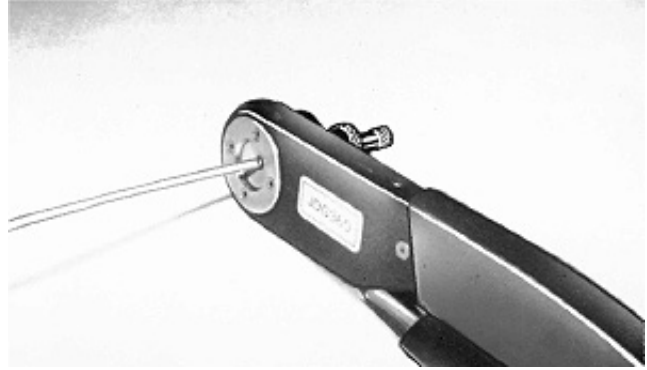


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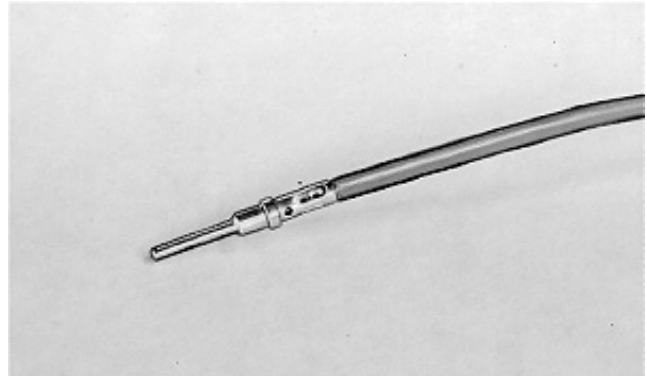
13. Insert wire in terminal and crimp until handle contacts stop.

IMPORTANT: Terminal must remain centered between indenters while crimping. Once a crimp is started, it must be completed.

14. Release handle and remove terminal.
15. Inspect terminal to ensure all wires are in crimped barrel and insulation butts up to terminal. Wire should be visible through the inspection hole of the terminal.
16. Push terminal straight into correct connector cavity until positive stop is felt.
17. Gently pull on wire to verify terminal is locked into the connector.
18. When all terminals have been replaced, tape wires and add the required tie bands to the harness.



TS118 -UN-23AUG88



TS0135 -UN-23AUG88



RW77141 -UN-07DEC98

RG40854,00000CB -19-15OCT07-5/5

Section 03

Theory Of Operation

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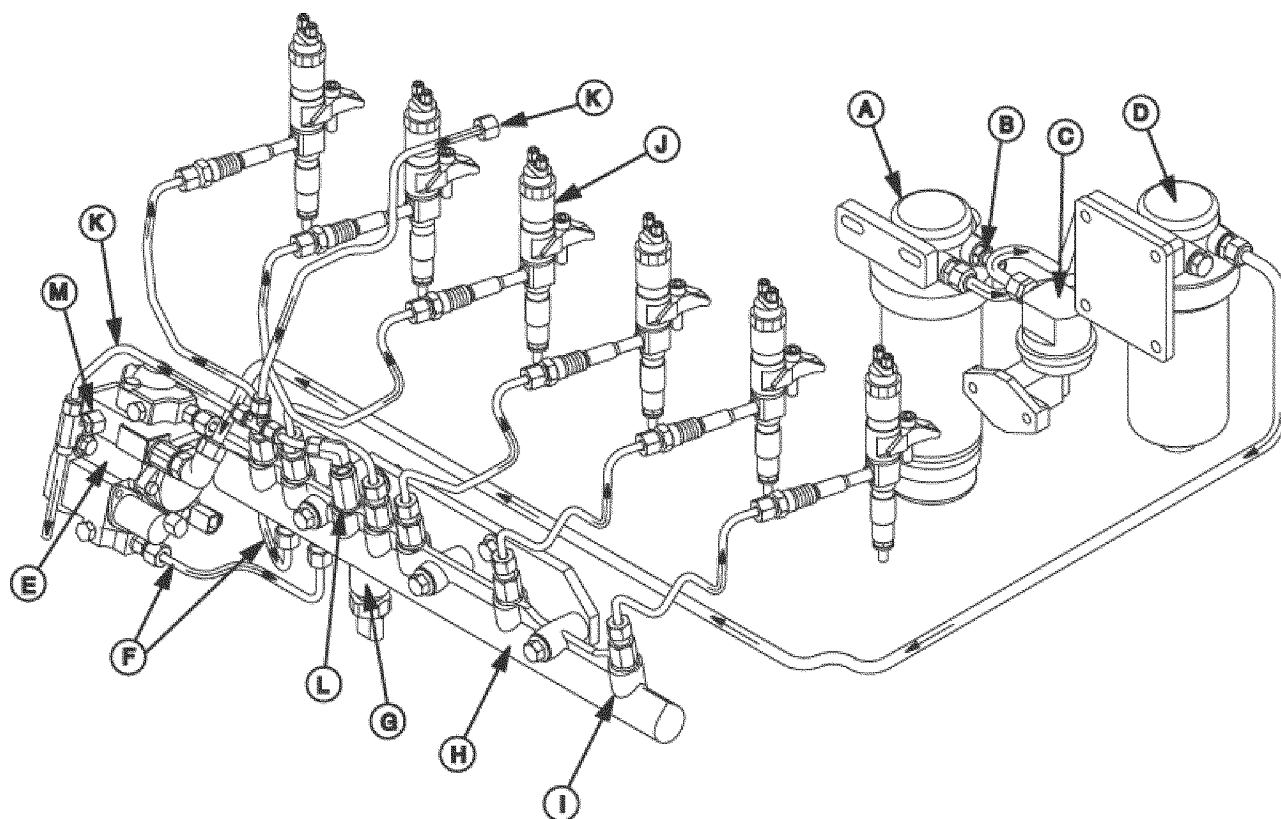
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About This Group

In this group, the fuel system information is described in the following categories:

- Fuel System Operation
- Pre-filter Operation
- Fuel Transfer Pump Operation
- Electronic Fuel Transfer Pump Operation
- Final Fuel Filter Operation
- High Pressure Fuel Pump Operation
- High Pressure Common Rail (HPCR)
- Electronic Injector (EI) Operation
 - EI - No Injection
 - EI - Begin Injection
 - EI - Ending Injection

Fuel System Operation



RG14049 -UN-28MAY05

A—Pre-Filter
B—Fuel Inlet
C—Fuel Transfer Pump
D—Final Fuel Filter

E—High Pressure Fuel Pump
F—Pressurized Fuel Lines
G—Fuel Rail Pressure Sensor
H—High Pressure Common Rail (HPCR)

I—Flow Damper
J—Electronic Injector (EI)
K—Fuel Leak-off Line

L—Pressure Limiter
M—Overflow Orifice

Low Pressure Fuel

The fuel transfer pump (C) draws fuel from the fuel tank through the prefilter (A), and sends it through the final fuel filter (D) on its way to the high pressure fuel pump (E). The type and location of the prefilter and the fuel transfer pump may vary depending on application requirements.

High Pressure Fuel

This pump is timed consistent with the engine timing to ensure correct fuel delivery amount for optimum cylinder firing. The high pressure fuel pump raises fuel pressure to the required amount for injection. This high-pressure fuel is routed through the pressurized

fuel lines (F) and into the High Pressure Common Rail (HPCR) (H). HPCR evenly distributes fuel to all of the Electronic Injectors (EIs) (J) through the flow dampers (I). The HPCR uses flow dampers to regulate a constant pressure to the EIs. EIs produce measured amounts of fuel into their respective cylinders to be fired.

Leak Off Fuel

If excess fuel pressure develops in the HPCR, the pressure limiter (L) opens and bleeds off fuel through the fuel leak-off line back to the tank. Excess fuel in the high pressure fuel pump exits the overflow orifice (M) and is routed back to tank through the fuel leak-off line (K).

Continued on next page

RE38635,0000135 -19-04AUG07-1/2

The Engine Control Unit (ECU) (A) sends a signal in specific sequence to each EI. This controls the volume of fuel, the timing of delivery, and the rate of delivery for each EI. Once the fuel enters the EI, the high pressure overcomes the nozzle valve allowing the fuel

to spray into the respective cylinder. Excess fuel from the nozzle routes through the fuel return line (K) and back to the fuel tank. On some applications the fuel goes through a fuel cooler prior to returning to the fuel tank.

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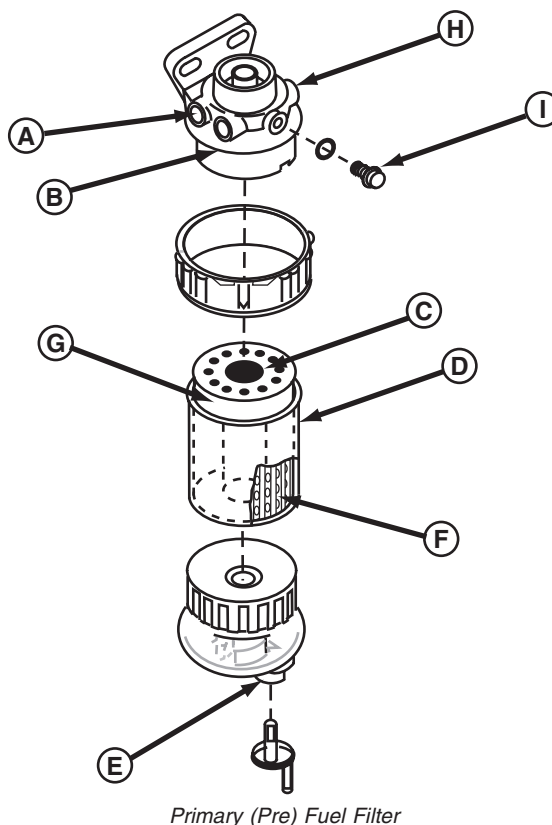
Prefilter Operation

This optional fuel filter is called the prefilter. It is called this whenever it has been placed between the fuel tank and the fuel transfer pump. It is positioned to protect the pump from coarse contaminants, which could damage, clog, or get stuck in, its diaphragm. This filter is also called the primary fuel filter. This is because it is the first filter through which fuel must pass on its way to the fuel high pressure pump. Being the first filter in line, it captures the coarsest of, and most, fuel contaminants.

Fuel enters the filter through inlet (A) at filter head (B), and flows down through the tube (C) in the center of the canister (D). Water and the heavier fuel contaminants settle to the bottom of the canister, and from there, they pass into the water/sediment bowl (E). Water can be drained off, and contaminants removed, from the bowl, without removing the filter assembly.

Fuel flows up a passage (F) between the outside of the filter element and the inside of the canister, and up through the 30-micron particle filter element (G) and out of the holes in the filter element. From there, fuel exits through the outlet (H) at the filter head.

Air can be bled from this part of the fuel system by loosening the plug (I) in the front of the filter head.

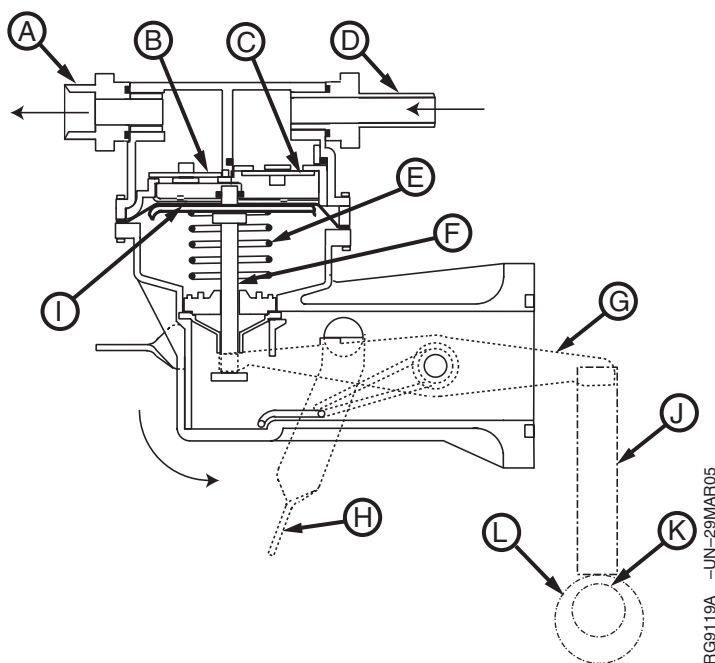


- Primary (Pre) Fuel Filter
- A—Fuel Inlet
 - B—Filter Head
 - C—Tube
 - D—Canister
 - E—Water/Sediment Bowl
 - F—Passage Between Filter and Canister
 - G—Filter Element
 - H—Fuel Outlet
 - I—Bleed Screw

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Mechanical Fuel Transfer Pump Operation



Fuel Transfer Pump

A—Fuel Outlet
B—Outlet Check Valve
C—Inlet Check Valve

D—Fuel Inlet
E—Return Spring
F—Rod

G—Lever Arm
H—Hand Primer Lever
I—Diaphragm

J—Push Rod
K—Eccentric Lobe
L—Engine Camshaft

The mechanical fuel transfer pump is operated by an eccentric lobe (K) on the engine camshaft (L). A push rod (J), positioned between the lobe and the pump's lever (G), is moved up and down, once every engine revolution, corresponding with the lobe's eccentricity. This action moves the lever arm on the transfer pump up and down. As the push rod side of the lever goes up, the lever's opposite side goes down. As the opposite side goes down, it pulls down the rod (F), the diaphragm (I) attached to the rod is also pulled down, and return spring (E) is compressed. Suction pressure from the diaphragm opens the inlet check valve (C), and draws fuel into the chamber above the diaphragm. As the eccentric lobe is turned past its peak height, return spring decompresses, pushing the diaphragm back into its original position. As the diaphragm is returned to its original position, the increased volume

of fuel in the chamber above the diaphragm pushes shut the inlet check valve, and opens the outlet check valve, allowing fuel into the fuel outlet chamber. As this sequence is repeated, fuel pressure is developed in the fuel outlet chamber, causing fuel to exit the transfer pump and flow into the final filter.

As the camshaft lobe rotates to the low side, return spring (E) forces diaphragm upward. The resulting fuel pressure closes the inlet check valve and opens outlet check valve (B), delivering fuel through outlet (A) to the final fuel filter.

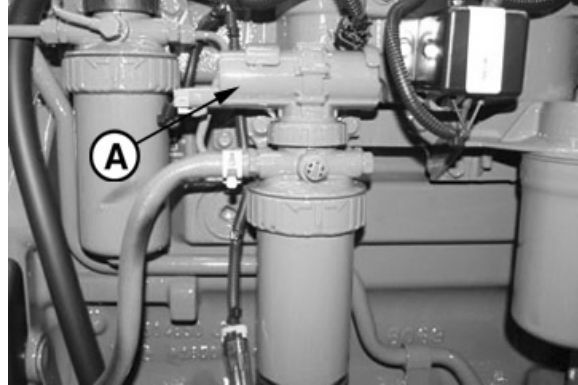
A hand primer lever (H) is provided for manually forcing fuel through the system to bleed air from the fuel filter, lines, etc.

Electric Fuel Transfer Pump Operation (Stanadyne)

Some applications, such as the large frame 7030 tractors, utilize an electric fuel pump option on 350 Series PowerTech engines to aid in cold starting. The electric fuel pump (A) is located on the primary fuel filter, and is an integral part of the primary fuel filter assembly design. If the electric fuel transfer pump requires replacement, the entire primary fuel filter assembly must also be replaced. Service of the electric fuel transfer pump as an individual component is not recommended do to the risk of fuel leaks.

The electric pump is powered when the operator turns the ignition key to the “on” position. This activates the pump to draw fuel from the tank, through the low pressure system to prime the primary and final fuel filters and the low pressure fuel line leading to the high pressure pump.

The electric fuel transfer pump is also used when bleeding air from the fuel system.



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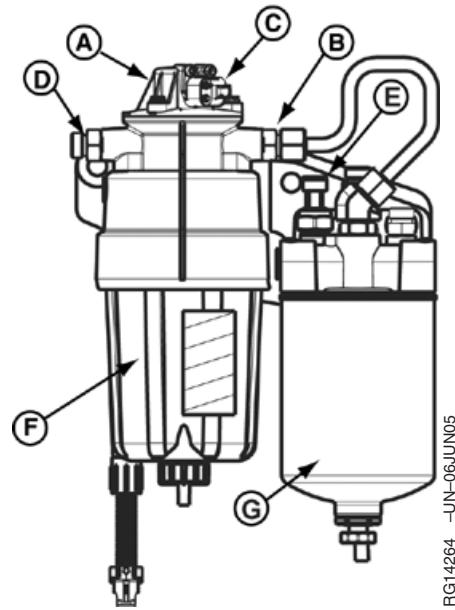
Electric Fuel Transfer Pump Operation (Racor)

NOTE: This pump is not repairable.

The speed of the fuel transfer pump (A) is controlled by the ECU through the fuel transfer pump power connector (C) and varies from 1600 to 4200 rpm. Suction pulls fuel from the fuel tank through the fuel inlet (D) and through the primary filter (F). The pump pushes fuel through the outlet (B) into the secondary filter (G) and on to the high pressure fuel pump.

To keep the low-pressure fuel error from setting, pump speed is controlled to keep a constant pressure of 20 kPa (2.9 psi) gauge at the outlet of the secondary filter (G). The low-fuel-pressure-system fuel pressure sensor (E) is used to indicate a low pressure fuel system problem. It could be a plugged primary filter, secondary filter, an air leak between the fuel tank and the low pressure pump fuel inlet, or a plugged fuel tank screen.

There is a pressure limiter in the pump to protect the filters from damage.



Fuel Transfer Pump Assembly

- A—Fuel Transfer Pump
- B—Fuel Outlet
- C—Fuel Transfer Pump Power Connector
- D—Fuel Inlet
- E—Low Pressure Fuel Pressure Sensor
- F—Primary Filter
- G—Secondary Filter

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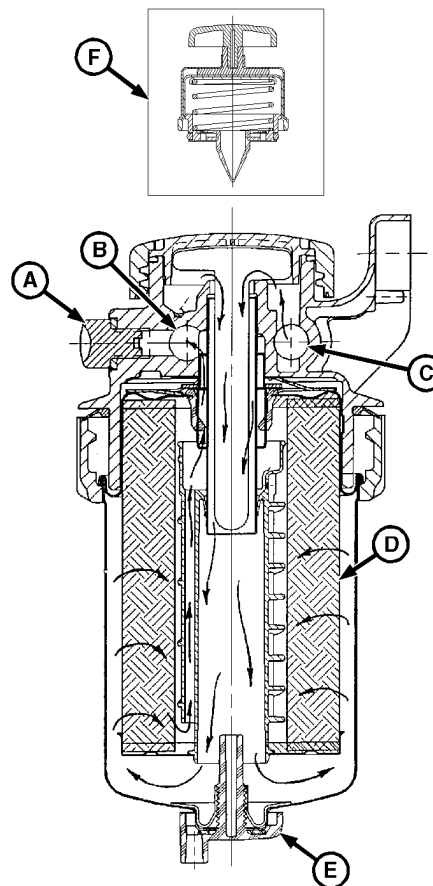
Final Fuel Filter Operation

Fuel enters the filter at inlet (C), flows through filter element (D) and exits through outlet (B) to the fuel high pressure pump. The 5-micron filter element is housed in a sediment bowl attached to the base with a threaded retaining ring.

Since water and contaminants settle at the bottom of the sediment bowl, a drain plug (E) is provided. On some options, a water bowl is attached to the bottom of the sediment bowl.

Air in the system can be expelled through the air vent when bleed screw (A) is loosened. Optional priming pump (F) draws fuel from the fuel tank to fill the filter bowl when the filter element is changed. The priming pump also supplies fuel from the filter to the high pressure pump.

- A—Bleed Screw
- B—Fuel Outlet
- C—Fuel Inlet
- D—Filter Element
- E—Drain Plug
- F—Primer Pump



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Doser Operation

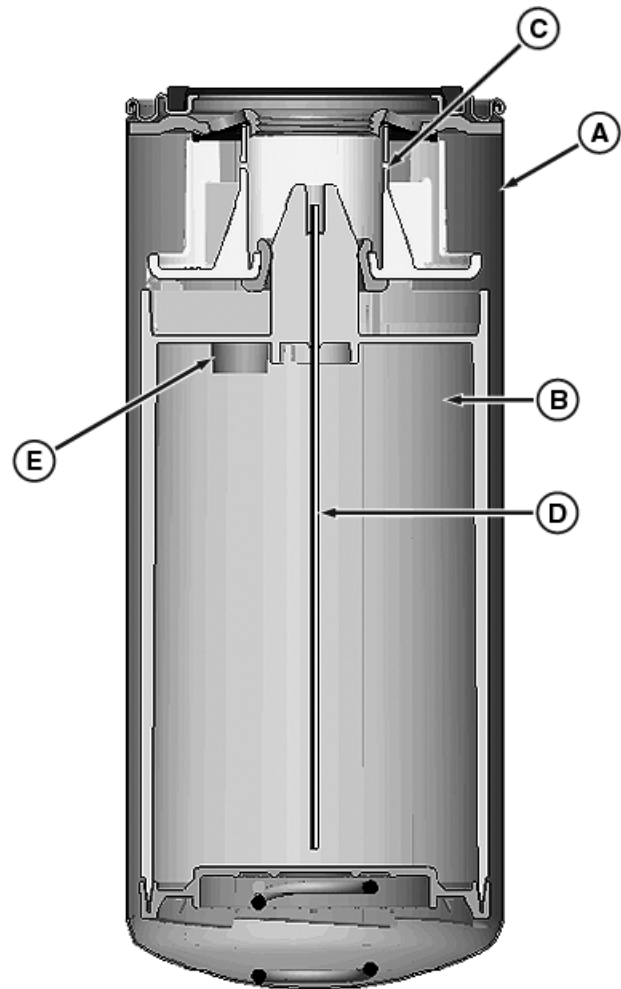
Jet fuel has poor lubricity as compared to diesel. This can lead to excessive high pressure fuel system wear and early failure or severe performance problems.

The doser is designed to add a small amount of an additive to the fuel as the engine runs. The additive improves the lubricity of the fuel.

The doser looks like a spin on fuel filter. It is a cartridge that spins. The can (B) contains the additive. All the fuel that flows to the engine passes through the doser element. The doser contains an orifice (C) which all the fuel flows through. The orifice creates a delta pressure across the device. The pressure rise pushes fuel into the container of additive and pushes additive up the capillary tube (D) back into the fuel stream.

Also there is wax plug (E) at the top of the container that seals the device from shipping. The wax plug dissolves on contact with the fuel. It is supposed to take 24 hours to dissolve. The wax plug contains additive in the top of the doser that wicks into the fuel during the first 24 hours while the wax plug is dissolving.

- A—Doser Element
- B—Can
- C—Orifice
- D—Capillary Tube
- E—Wax Plug

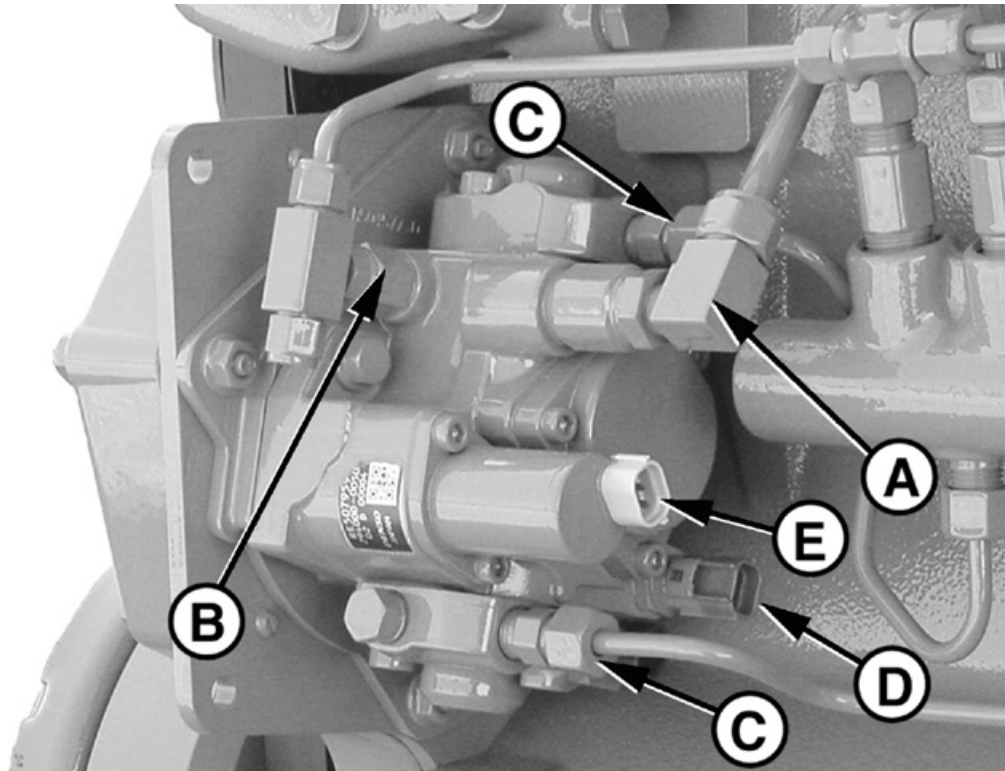


Doser Element

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Type 1 High Pressure Fuel Pump Operation



A—Fuel Inlet
B—Overflow Valve

C—Fuel Outlets

D—Fuel Temperature Sensor

E—Suction Control Valve
Solenoid

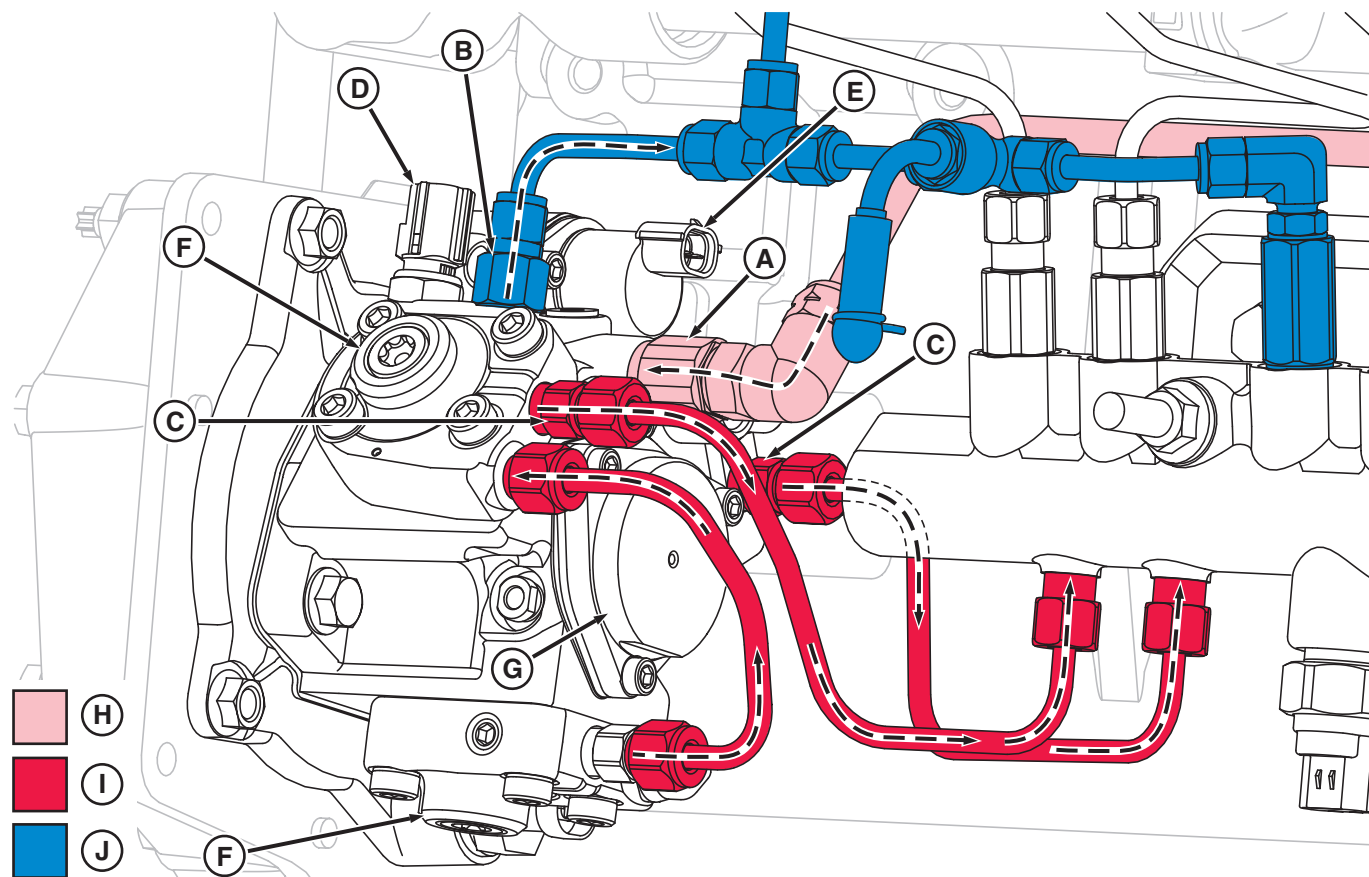
The high pressure common rail engine uses the Denso HP3 high pressure fuel pump. Filtered fuel enters the high pressure pump through the fuel inlet (A). Once fuel passes through the inlet, it goes through a fuel inlet filter and continues through an internal transfer pump. Fuel is then routed either to lubricate the pump crankcase or to the Suction Control Valve (E). The ECU supplies the suction control valve current when it is time to release fuel to the high pressure common rail. For more information on the Suction Control Valve Solenoid, see SUCTION CONTROL VALVE in Group 140 of this manual. There is one chamber on the top

of the pump and another chamber on the bottom of the pump. Fuel in each chamber is pressurized when the pump camshaft rotates. Excess fuel leaves the pump through the overflow valve (B), so it can return to the fuel tank.

A fuel temperature sensor (D) is included on the pump to measure the fuel temperature in the pump housing. For more fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 later in this manual.

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Type 2 High Pressure Fuel Pump Operation



Type 2 High Pressure Pump

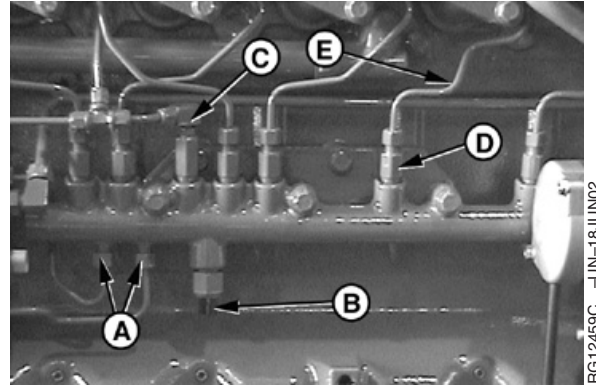
A—Fuel Inlet	D—Fuel Temperature Sensor	G—Transfer Pump	I—High Pressure Fuel
B—Overflow Port	E—Suction Control Valve	H—Low Pressure Fuel	J—Return Fuel
C—High Pressure Outlets to Rail	F—Pumping Chambers		

The 6068 high pressure common rail engine (jet fuel) uses the high pressure fuel pump shown above. Filtered fuel enters the high pressure pump through the fuel inlet (A). Fuel temperature sensor (D) measures the temperature of the fuel just past the inlet filter (not serviceable). Once fuel passes through the inlet, it goes through a fuel inlet filter and continues through an internal transfer pump (G). Fuel is then routed either to lubricate the pump crankcase or to the suction control valve (E). The suction control valve meters fuel to be sent to the pumping chambers. There are three high-pressure plunger chambers (F) on this

pump located 120 degrees from one another. Fuel in each chamber is pressurized when the pump drive shaft rotates. Each chamber is pressurized once per complete rotation of the engine. The engine takes two revolutions to fire all 6 injectors so each plunger chamber is pressurized twice for one complete firing of all 6 injectors. The pressurized fuel leaves through the two high pressure outlets (C). Excess fuel leaves the pump through the overflow port (B) and into the return-to-tank line. The overflow is controlled to a pressure less than 20 kPa (2.9 psi).

High Pressure Common Rail (HPCR) Operation

High pressure fuel is delivered to the high pressure common rail (HPCR) through two high pressure pump delivery lines (A). The high pressure common rail delivery lines (E) transport the fuel to the Electronic Injectors (EIs). The fuel rail pressure sensor (B) detects the fuel pressure inside the rail. The Engine Control Unit (ECU) uses this sensor to monitor the fuel pressure to determine the timing of the suction control valve on the high pressure fuel pump. For more information on the fuel rail pressure sensor, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 later in this manual. If an abnormally high pressure is generated within the HPCR, the pressure limiter (C) opens to release the excess pressure and drain fuel back to the tank. The flow dampers (D) are used to control the maximum fuel flow to the EIs and prevent damage if the EI should fail, or if a high pressure leak develops, by shutting off fuel flow to the failed EI.



- A—High Pressure Pump Delivery Lines
- B—Fuel Rail Pressure Sensor
- C—Pressure Limiter
- D—Flow Damper
- E—High Pressure Common Rail Delivery Lines

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Electronic Injector (EI) Operation

NOTE: For schematics graphics, reference Section 6 Group 210 ECU Engine Schematics later in this group.

The electronic injectors (EIs) are located in the engine's cylinder head and are electronically controlled

by the ECU. The amount of fuel delivered to the cylinder is controlled by the length of time current is supplied to the two-way electromagnetic valve (TWV) on each EI. The ECU sends signals in specific sequence to each EI. This controls the volume of fuel, and the timing of delivery for each EI.

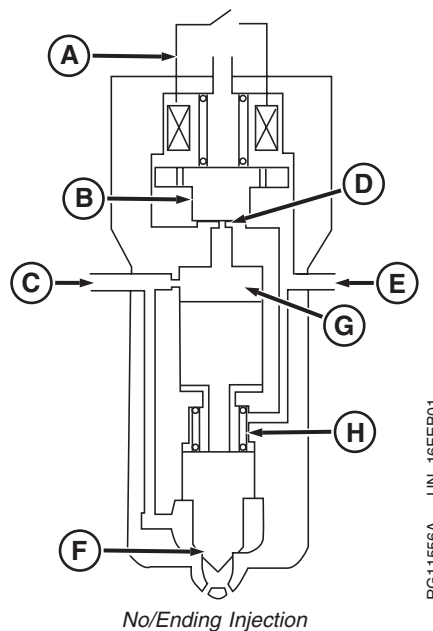
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EI - No Injection

Fuel from the HPCR enters the EI at the fuel inlet (C). When no current is supplied to the TWV (A), the valve spring (H) and the hydraulic pressure of the fuel in the control chamber (G) cause the hydraulic piston to push the needle down and close the nozzle. This holds the high pressure fuel from the common rail inside the nozzle until injection.

- A—Two-Way Valve (TWV)
- B—Solenoid Valve
- C—Fuel Inlet
- D—Orifice Seat
- E—Fuel Leakoff
- F—Nozzle
- G—Control Chamber
- H—Valve Spring



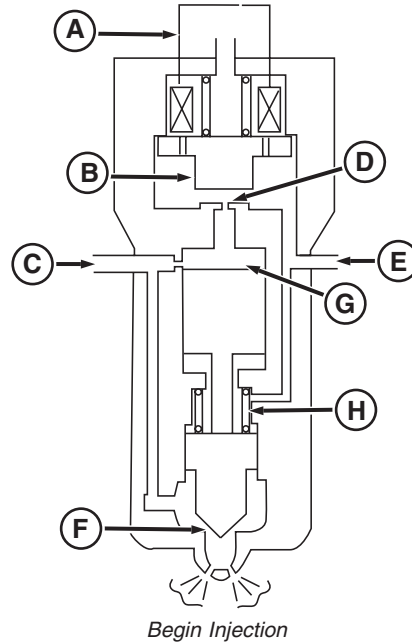
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EI - Begin Injection

Injection begins when current is supplied from the ECU to the TWV (A). The electromagnetic force pulls the solenoid valve (B) up, causing the orifice seat (D) to open. The fuel in the control chamber (G) flows out of the injector to the fuel leak-off (E) line. Fuel is then routed back to the fuel tank. As the fuel exits the injector, the force is removed from the hydraulic piston, the nozzle needle lifts, allowing fuel through the nozzle (F) to start the injection process.

- A—Two-Way Valve (TWV)
- B—Solenoid Valve
- C—Fuel Inlet
- D—Orifice Seat
- E—Fuel Leakoff
- F—Nozzle
- G—Control Chamber
- H—Valve Spring



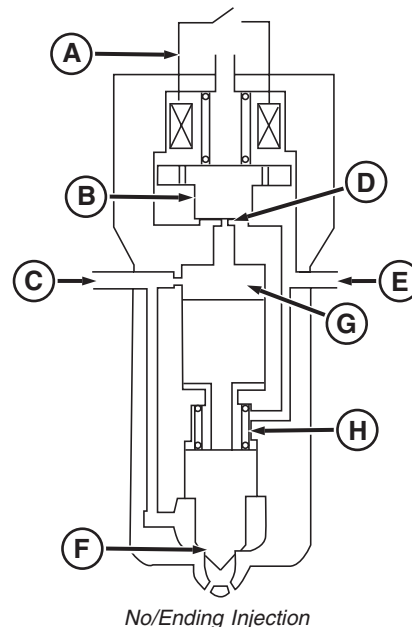
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EI - Ending Injection

Injection ends when the current is removed from the TWV (A). The solenoid valve (B) closes causing fuel to fill the control chamber (G). The valve spring and the hydraulic force from the fuel in the control chamber cause the hydraulic piston to push the needle down and close the nozzle. At this time the injection is complete.

- A—Two-Way Valve (TWV)
- B—Solenoid Valve
- C—Fuel Inlet
- D—Orifice Seat
- E—Fuel Leakoff
- F—Nozzle
- G—Control Chamber
- H—Valve Spring



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About This Group

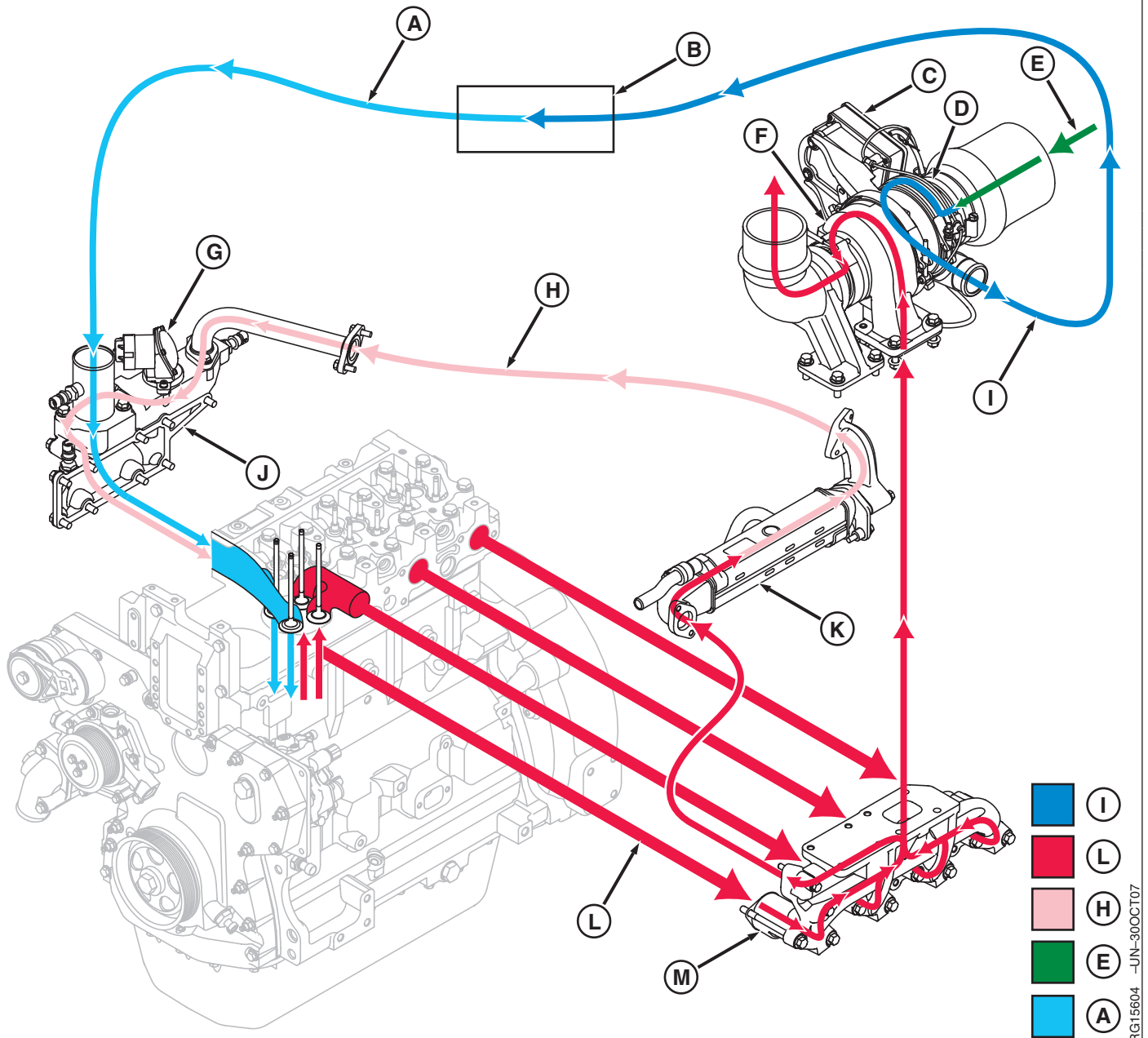
In this group, the electronic air system information is described under the following headings:

- Electronic Air System Operation
- Exhaust Gas Recirculation flow and calculations
- Turbocharger
- Turbocharger Actuator
- Exhaust Gas Recirculation Cooler
- Exhaust Gas Recirculation Valve

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Electronic Air System Control Operation



A—Cooled charge air
 B—Charge air cooler
 C—VGT actuator
 D—Turbocharger compressor

E—Fresh air in from filter
 F—Turbocharger turbine
 G—EGR valve

H—Cooled exhaust gas
 I—Compressed air
 J—Air intake manifold

K—EGR cooler
 L—Hot exhaust gas
 M—Exhaust manifold

Air System with EGR

As the piston reaches the intake stroke it, sucks air (E) through the intake air filter, turbocharger compressor (D), which compresses and heats the air (I), charge air

cooler (B), which cools the compressed air (A), into the air intake manifold (J), through ports in the head and into the piston cylinder. On the exhaust stroke the engine pushes exhaust gas (L) into the exhaust manifold (M), then into two different directions:

Continued on next page

DB92450,0000005 -19-30OCT07-1/4

1. Through the turbocharger turbine (F), through the muffler and out to the atmosphere.
2. Through the EGR cooler (K) which cools the hot exhaust gas (H) and onto the EGR valve (G).

The exhaust of the hot gas speeds up the turbine helping to pull in and compress more air to create more power.

During engine operation the ECU continuously monitors and compares signal inputs from the temperature and pressure sensors on the engine. The ECU then calculates the amount of fuel needed to meet the required or requested condition.

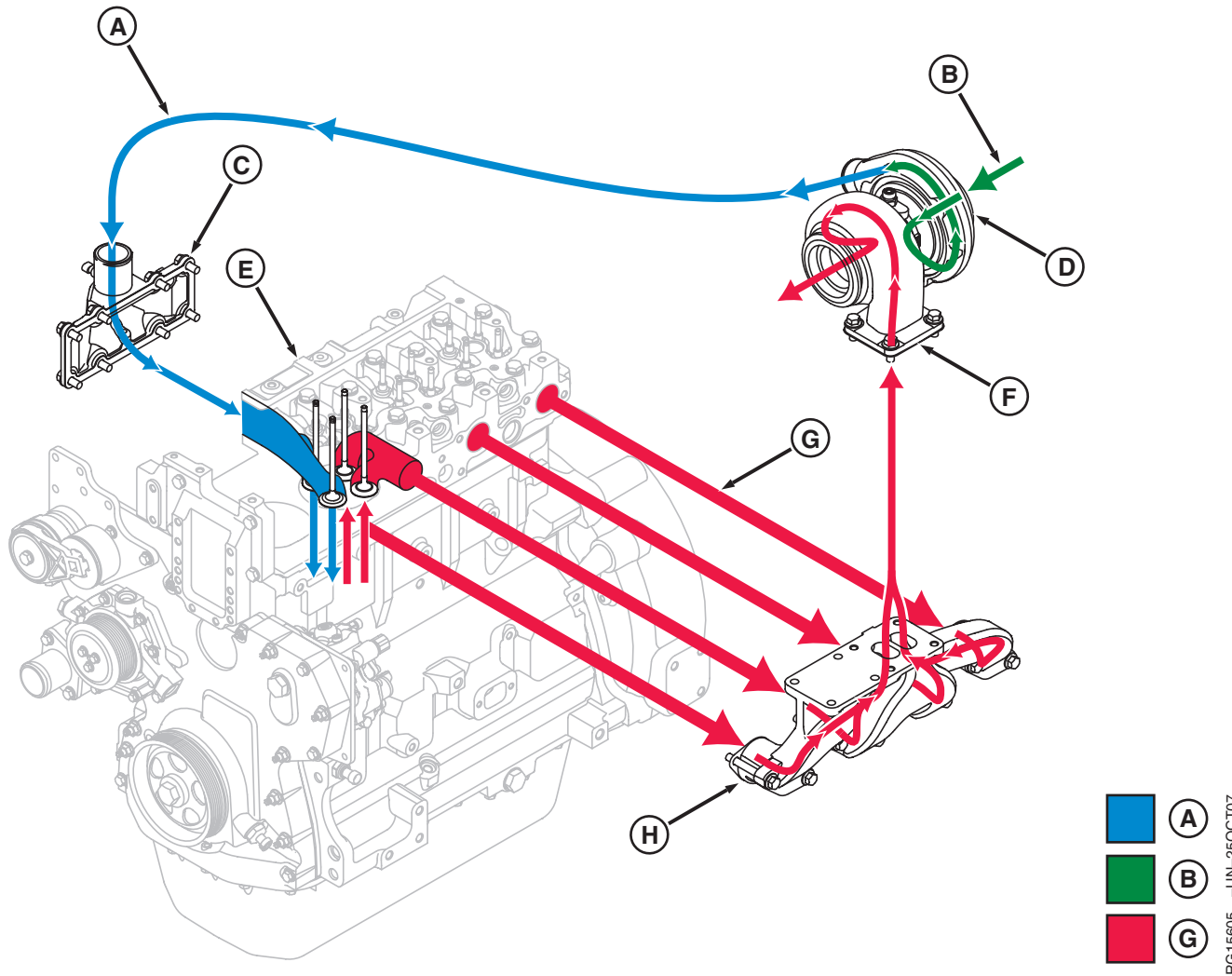
The ECU also continuously monitors and compares signal inputs from the EGR temperature, charge air cooler outlet temperature, manifold air temperature, manifold absolute pressure, turbocharger speed and several other calculated values. The ECU then

calculates the amount of exhaust gas to be mixed with the charge air. Once the ECU calculates that all required conditions have been met, it signals the EGR valve to open. It also signals the turbocharger actuator (C) to begin closing the turbocharger variable vanes. This increases the exhaust pressure and when the EGR valve opens the exhaust gas is pushed into the air intake manifold and is mixed with the cooled charge air. To increase the amount of exhaust gas being pushed into the air intake manifold the ECU commands the variable vanes on the turbocharger to close farther increasing exhaust pressure.

If the ECU determines any of the input signals are not what is expected for the current operating conditions it will try to calculate the amount of required EGR using available inputs. It may use default values or values from tables within the ECU to help make proper decisions.

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A—Compressed air
B—Fresh air in from filter

C—Intake air manifold
D—Turbocharger compressor

E—Head
F—Turbocharger turbine

G—Hot exhaust gas
H—Exhaust manifold

IMPORTANT: The EGR valve is normally in either the fully closed or fully open condition. There are some instances where it may be at other positions but normally fully open or fully closed. The EGR valve is normally closed at startup, low load and high load low speed conditions.

NOTE: Mixing of charge air and exhaust gas helps lower the NOX emissions released to the atmosphere after combustion.

NOTE: During normal operation, the vanes never close completely, as they provide the only path for exhaust gas to escape to the atmosphere.

Air System without EGR

During engine cranking, the engine sucks air (B) through the intake air filter, turbocharger compressor (D), which compresses and heats the air (A), into the air intake manifold (C), through ports in the head (E) into the cylinders on the intake stroke of the piston. On the exhaust stroke of the piston the engine pushes exhaust gas (G) into the exhaust manifold (H), through the turbocharger turbine (F), through the muffler and out to the atmosphere.

The exhaust of the hot gas speeds up the turbine helping to pull in and compress more air to create more power.

During engine operation the ECU continuously monitors and compares signal inputs from the temperature and pressure sensors on the engine. The ECU then calculates the amount of fuel needed to meet the required or requested condition.

If the ECU determines any of the input signals are not what is expected for the current operating conditions it will try to calculate the amount of required fuel using available inputs. It may use default values or values from tables within the ECU to help make proper decisions.

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Exhaust Gas Recirculation Flow and Calculations

An Exhaust Gas Recirculation (EGR) system directs exhaust gasses from an exhaust manifold to an intake manifold. When EGR flow is required, the EGR valve is opened and the variable geometry turbocharger (VGT) vane position is adjusted to achieve the desired flow. EGR is used as a primary means of reducing NOx emissions from the engine. If the air-to-fuel ratio becomes too low, the position of the EGR valve is reduced to keep it in the desired range. The required flow is calculated by the ECU using sensor information and other operating conditions.

The primary sensors used include the following.

- Charge Air Cooler Outlet Air Temperature
- Manifold Air Temperature
- EGR Temperature
- Coolant Temperature
- EGR Valve Position
- Manifold Air Pressure

The required EGR flow is determined by engine speed and load at normal operating conditions. In general, no EGR flow is used at slow speed, load conditions and when the engine is in a heavy acceleration. Under certain operating conditions where it is hard for the turbo to provide the required air flow the EGR valve may be in a position other than full open or closed.

There are significant interactions between the EGR and the air intake system. Anything which significantly impacts air flow will cause the EGR system to have difficulty with flow estimation and control. Items such as increased or decreased intake and exhaust restrictions or boost leaks can make it difficult to achieve good control. Poor electrical connections to the intercooler outlet temperature, manifold air temperature, manifold air pressure, and EGR temperature sensor in particular can cause a miscalculation of EGR flow. Any miscalculation will cause an error code.

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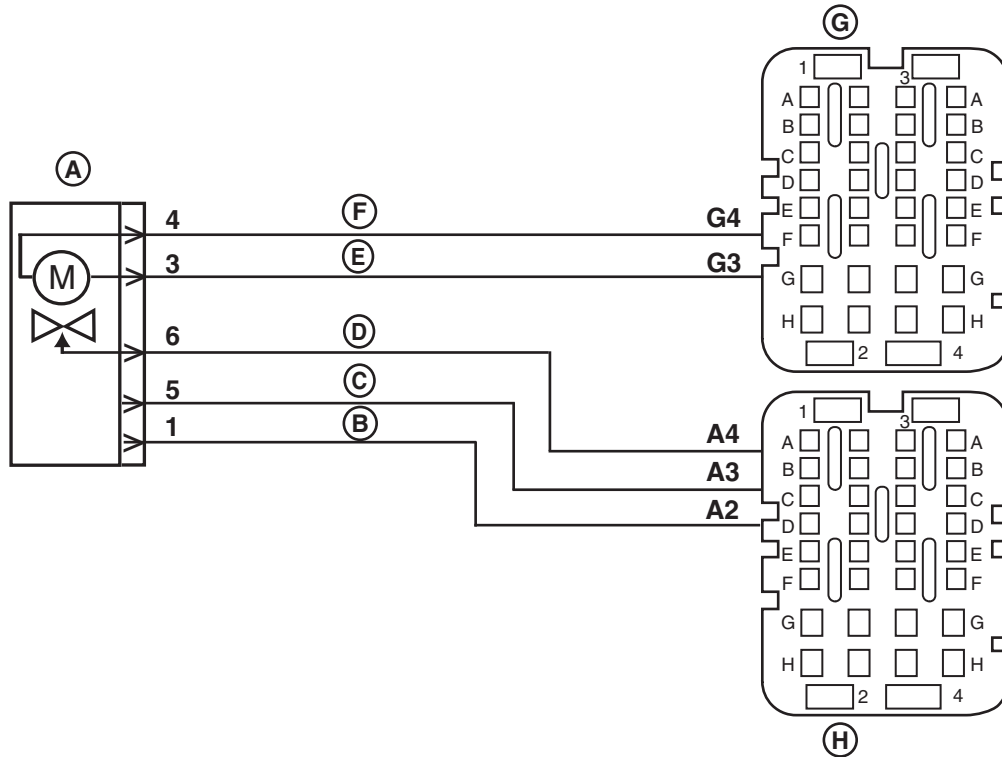
Exhaust Gas Recirculation Cooler

Before exhaust gasses reach the EGR (exhaust gas recirculation) valve, the gasses are cooled in the exhaust gas cooler. The gasses travel through internal tubes surrounded by engine coolant. The coolant is routed from the intake manifold, through the cooler, and returned to the intake manifold. The cooler is a counter-flow design, which means that engine coolant flows in the opposite direction of the exhaust gases.

Exhaust gases enter the cooler at 450-750°C and exit at 170-250°C.

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Exhaust Gas Recirculation Valve



EGR Valve Schematic

A—EGR Valve
B—EGR Valve Position 5V Supply

C—EGR Valve Position Ground
D—EGR Valve Position Input

E—H-Bridge +
F—H-Bridge -

G—ECU Connector #J1
H—ECU Connector #J3

The Exhaust Gas Recirculation (EGR) valve is part of the intake manifold assembly. The function of the EGR valve, which is controlled by the engine ECU, is to mix given volumes of exhaust gases with the intake air. This mixture of exhaust gases and intake air increases engine boost allows more air to be introduced into the combustion chamber. This in turn allows more fuel to be introduced to the combustion process, to increase engine power. Diluting the intake air with as much as 10-12% exhaust gases (full load conditions) aids in controlling NOX (nitrous oxide) emissions.

The valve becomes functional when the engine is under load and the engine coolant is at operating

temperature. At startup and under light load conditions, the valve remains closed.

As engine load and/or speed requirements and inputs from various temperature and pressure sensors change, the ECU calculates the appropriate analog "command" signal for the EGR valve. Valve position will change as the ECU varies the signal to regulate the amount of EGR allowed into the air intake manifold.

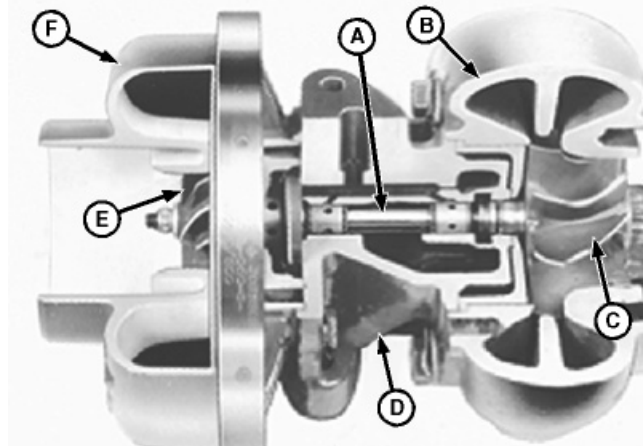
Turbocharger

The turbocharger, which is a turbine driven by exhaust gases, allows the engine to produce additional power using waste exhaust gas. Exhaust gases power the turbine to turn the compressor which draws in and pumps the intake air ("charge air") to the intake manifold.

This engine employs a Variable Geometry Turbocharger (VGT), which uses moveable vanes in the exhaust turbine housing to restrict the flow of exhaust gasses. This decreases gas pressure to the turbine but increases gas velocity. Increased velocity of gas hitting the blades causes the turbocharger to turn faster.

While gas pressure is decreased to the turbine when the vanes close, pressure is increased inside the exhaust manifold (D). This pressure is also used to increase charge air pressure. When pressure rises inside the exhaust manifold due to increased load and the turbine vanes closing, the EGR (exhaust gas recirculation) valve will open to allow a portion of the exhaust gas to bypass the turbocharger through the EGR cooler and be routed to the intake manifold.

When air is compressed its temperature rises, so before entering the intake manifold, the charge air is routed through an air cooler to increase the air's density, resulting in more air entering the combustion chambers. For more turbocharger information, refer to the Base Engine manual.

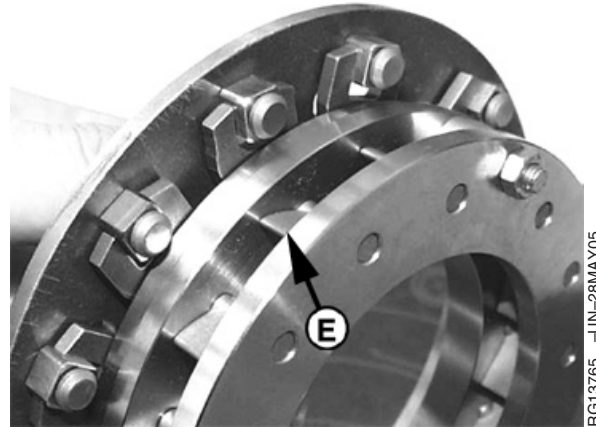


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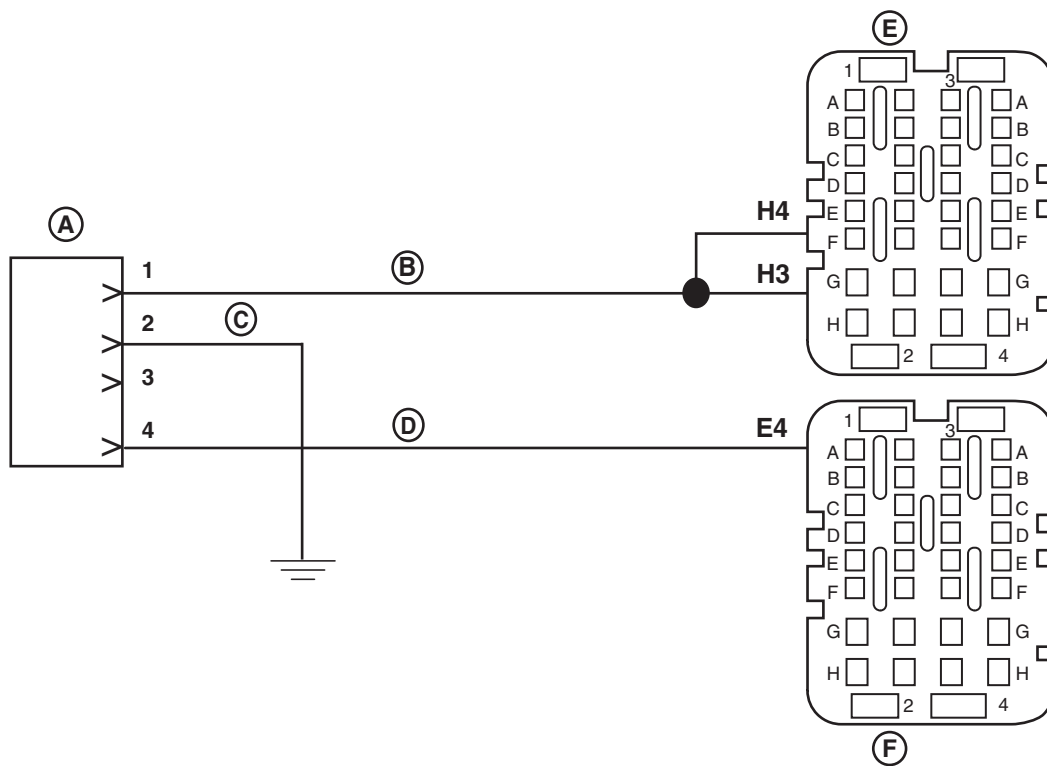
Turbocharger Components

- A—Shaft
- B—Turbine Housing
- C—Turbine Wheel
- D—Center Housing
- E—Compressor Wheel
- F—Compressor Housing

Turbocharger Actuator



Variable Geometry Turbocharger Vanes



VGT Actuator Schematic

A—Actuator
B—H-Bridge

C—Actuator Ground Circuit
D—Actuator Command Circuit

E—ECU Connector J1

F—ECU Connector J3

The Variable Geometry Turbocharger (VGT) uses an electronically controlled actuator to move the vanes in the exhaust turbine housing. The VGT vanes allow exhaust gas pressure to increase or decrease based on engine load demand and speed. The vanes work

by restricting the flow of exhaust gasses, which decreases gas pressure to the turbine but increases gas velocity. Increased velocity of gas hitting the vanes cause the turbocharger turbine wheel to turn faster.

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Various sensor inputs are used by the engine control unit (ECU) to continuously calculate a desired level of boost. The ECU sends analog signals to the actuator to move the vanes and EGR (exhaust gas recirculation) valve to ensure availability of proper exhaust pressures for EGR/fresh air mixing.

The variable output capability of the VGT provides the ability to increase low speed torque, provide a quicker transient response, and increase peak torque while also improving fuel economy. As engine speed and

load demands increase, the ECU signals the VGT actuator to close the vanes on the turbine. This increases exhaust gas pressures and velocities, which increases engine boost. The increase in boost pressure also limits smoke and reduces emission particulates released to the atmosphere.

To keep the actuator's circuit board from overheating, engine coolant is circulated through the actuator and returned to the thermostat housing. For more actuator information, refer to the Base Engine manual.

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Air Intake Manifold, non-EGR engines

Charge air enters the air intake manifold from the charge air cooler. Sensors on the manifold that measure manifold air temperature and manifold absolute pressure are monitored by the ECU. The ECU then determines if the proper amount of air is present for the current operating condition. This air is drawn into the engine piston chambers to be mixed with fuel and ignited.

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About This Group

In this Group, the electronic control system is described in the following categories:

- Electronic Control System Terminology
- Electronic Control System Operation
- Component Location
- Engine Control Unit (ECU)
- Controller Area Network (CAN)
- Monitoring Engine Parameters
- Measuring Temperature
- Engine Control Unit (ECU) Temperature Sensor
- Engine Coolant Temperature (ECT) Sensor
- Fuel Temperature Sensor
- Exhaust Gas Recirculation (EGR) Exhaust Temperature Sensor
- Charge Air Cooler Outlet Air Temperature Sensor
- Intake Manifold Air Temperature (MAT) Sensor
- Turbo Compressor Inlet Temperature Sensor
- Turbo Turbine Inlet Temperature
- Measuring Pressure
- Barometric Air Pressure (BAP) Sensor
- Fuel Rail Pressure Sensor
- Fuel Transfer Pump Pressure Sensor (optional)
- Manifold Air Pressure (MAP) Sensor
- Oil Pressure Sensor
- Measuring Speed
- Crank Position Sensor
- Pump Position Sensor
- Turbo Speed Sensor
- Throttle Descriptions
- CAN Throttle
- Pulse-Width Modulated (PWM) Throttle
- Analog Throttle
- Digital Multi-State Throttle
- Dual-State Throttle
- Tri-State Throttle
- Ramp Throttle
- Throttle Adjustments
- Throttle Offsets
- Self-Calibration
- Combination Throttle
- Marine Throttle
- Engine Derate and Shutdown Protection
- Electronic Injector (EI) Wiring Harness Connector
- Glow Plug Operation
- Torque Curve Selection
- Governor Droop Mode Selection
- Suction Control Valve
- Water in Fuel (WIF) Sensor
- Engine Coolant Level Switch (optional)
- Cruise Control Operation
- Power Supply #1
- Power Supply #2
- Power Supply #3
- Power Supply #4
- Power Supply #5

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Electronic Control System Terminology

Actuator	A device controlled by the ECU to perform a certain function.
Analog	Signal which has a continuous range of possible voltages, usually 0 volts (low) to 24 volts (high).
BAP	Barometric Air Pressure. Pressure of the atmosphere (atmospheric pressure).
Boost	Pressurized air in the intake manifold.
CAC	Charge Air Cooler. Cools the compressed air from the turbine before it enters the intake manifold.
CAN	Controller Area Network. The network on vehicles that allows communication between controllers.
Circuit Power	This is power supplied to a device for use by its internal component circuits.
Crank Sensor	Used to determine the angular position and velocity of the crankshaft in the 360° field of rotation.
Digital	A signal which consists of only two levels of voltage — usually 0 volts (low) to 24 volts (high).
DTC	Diagnostic Trouble Code. This is a code that is stored in the ECU's memory when it detects a problem in the electronic control system. There are two types of codes: Active and Stored. These codes are displayed on monitor panels and can be recalled by the service tool.
ECT	Engine Coolant Temperature. The temperature of the engine coolant.
ECU	Engine Control Unit. Computer that controls the fuel, air, and ignition systems on the engine.
EGR	Exhaust Gas Recirculation. Used to help reduce emissions.
EI	An Electronic Injector that is regulated by the ECU to control the proper amount of fuel.
FMI	Failure Mode Identifier. The second part of a two-part code that identifies control system fault codes according to the J1939 standard. This two-digit code identifies the type of failure that has occurred. The first half of the code is the Suspect Parameter Number (SPN).
H-Bridge	Circuits in the ECU set up in an H-configuration. This allows for current to be reversed to drive DC motors forward and reverse.
HPCR	High Pressure Common Rail. A device that distributes high pressure fuel to the injectors.
Input	This identifies a signal as an input to a device or controller.
J1939	The Society of Automotive Engineers (SAE) standard for communication between the electronic controllers on heavy-duty vehicles, both on- and off-highway.
JDCP	John Deere Custom Performance Program allows the customer to select software features and feature combinations prior to loading the software into the ECU. It is also one way by which embedded software is managed and updated in controllers without removal of the controller from the machine.
JDPS	John Deere Power Systems.
MAP	Manifold Air Pressure. The pressure of the air in the intake manifold, sometimes referred to as “boost” pressure.
MAT	Manifold Air Temperature. The temperature of the air in the intake manifold.
Meter Zero	This is the value the multi-meter reads in the ohm position, when the meter lead tips are held together.

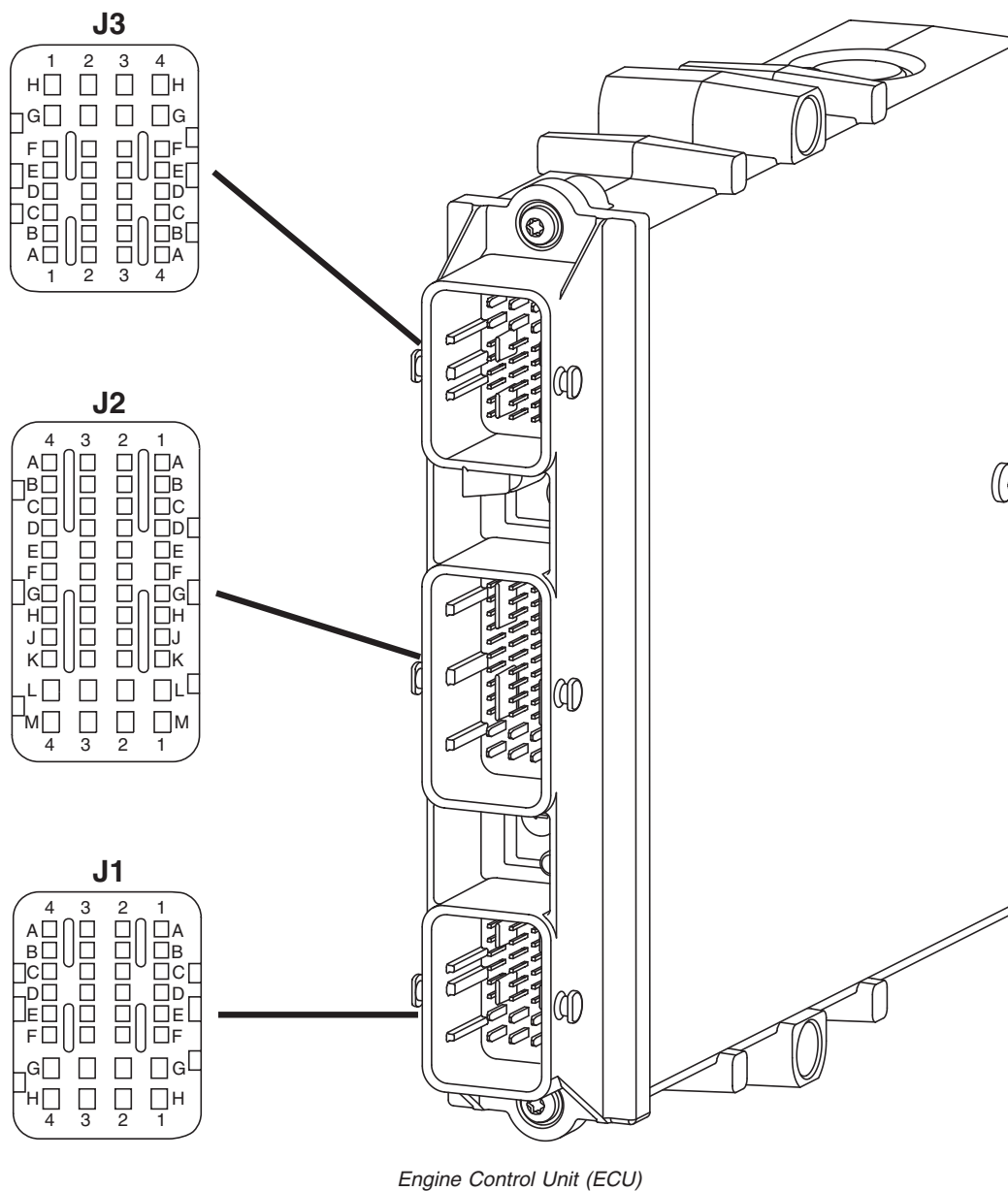
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OOB	Out-of-Range. The signal received by the ECU is out of the expected range of the device.
OOBH	Out-of-Range High. Signal sensed by the ECU is higher than the component can produce (outside of acceptable limit). For some circuit types, this could be caused by an open input wire, an open ground wire, or an input wire shorted to a voltage higher than the ECU expects (+ battery).
OOBL	Out-of-Range Low. Signal sensed by the ECU is lower than the component can produce (outside of acceptable limits). For some circuit types, this could be caused by an input wire or circuit power wire shorted to ground.
Output	This identifies a signal as an output from a device or controller.
Pin	A style of terminal that makes the electrical connection to a connector. Also called a male terminal.
Pump Position Sensor	Used to identify the cylinder that is on the compression stroke.
PWM	Pulse Width Modulation. A digital electronic signal of a fixed frequency. The on-time of the signal is increased or decreased (modulated) to indicate a change in condition.
RAM	Random Access Memory. The portion of the computer memory within the ECU that is used when the ECU is running. All data in this memory is lost when the ECU is "OFF".
Socket	A style of terminal that makes the electrical connection to a connector. Also called a female terminal or receptacle.
Suction Control Valve	Suction Control Valve regulates the amount of fuel that the high pressure fuel pump supplies the HPCR.
SDS	Software Delivery System. Used by JDPS to maintain software and programming records.
Sensor	Device used by the ECU to monitor various engine parameters.
SPN	Suspect Parameter Number. The first half of a two-part code that identifies control system fault codes according to the J1939 Standard. The SPN identifies the system or component that has the failure. The second half of the code is the Failure Mode Identifier (FMI).
TDC	Top Dead Center. Point of uppermost piston travel.
Throttle Rate	How quickly the ECU changes the engine fuel rate in response to a throttle increase signal. Throttle rate has no impact on deceleration.
Trim Options	Options that can be enabled or disabled in the ECU programming, such as throttle selection, torque adjustment, governor gains, derates and shutdowns, etc.
TWV	Two-Way Valve. A component in the Electronic Injector (EI).
VG	Variable Geometry Turbo. Used to reduce emissions.
WIF	Water In Fuel. The WIF sensor sends a signal to the ECU when water is detected in the fuel.

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Electronic Control Unit (ECU) System Operation



**J1—32 Pin Connector - Black
Tip**

**J2—48 Pin Connector - Red
Tip**

**J3—32-Pin Connector - Blue
Tip**

Main Components of the Engine Control Unit (ECU)

The ECU is the controller that follows a defined program to run the engine at the desired operating point while keeping within emissions regulation. This system is made up of input components (i.e. temperature and pressure sensors), and controlled components (i.e. injectors and actuators). The ECU consists of:

- Analog-to-digital converters (A/D)
- Digital-to-analog converters (D/A)
- Microprocessor (CPU)
- Memory (storage)
- Internal power supplies for external components

Analog-to-Digital and Digital-to-Analog Converters (A/D and D/A)

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The A/D takes the analog input information from the external components and converts it to a digital value that the CPU can understand. The D/A converts the digital information from the CPU to analog information that is used by the external components.

Microprocessor (CPU)

The CPU is considered the “brains” of the ECU. It reads instructions from storage (memory) and interprets them. It receives information from external components, like sensors, through the A/D. It sends outputs to control external components, like actuators. It also performs mathematical computations and logical functions.

Memory

Memory is a component capable of retaining digital information. This information can be operation code, data files, or fragments of data.

Temporary memory (RAM) is used to hold data for short periods of time. This information is lost when the key is turned to OFF position.

Permanent memory (Flash) stores information for long periods of time. This is where the program and calibration information is stored. The information in this type of memory is not lost when power is completely removed or if the controller is removed from the engine harness.

Internal Power Supplies for External Components

The ECU has several internal power supplies commonly referred to as sensor supplies, that deliver reference voltages to the engine sensors, throttles, and switches. There are OOR high and OOR low voltage diagnostic trouble codes associated with each power supply. Multiple power supplies are used, because there are so many external components. This also keeps critical components from being affected by shorts in other components.

Functions of the ECU

Basic Functions of the Engine Control System

The electronic control system serves as an engine governor by controlling the Electronic Injectors (EIs) so that the fuel is delivered according to a given set of engine conditions, precise amounts, and at precise time in relation to piston position. In order to achieve this, the control system performs the following functions:

- Constantly monitor engine operating conditions.
- Precisely determines piston position
- Deliver optimum amount of fuel for a given set of operating conditions
- Deliver fuel at optimum piston position
- Provide multiple control modes
- Perform system diagnosis

System Problem Diagnosis

The ECU can detect problems with external components and their associated wiring. There is a Harness Diagnostic Mode Test that can be ran from Service ADVISOR to help diagnose some of the problems (see HARNESS DIAGNOSTIC MODE TEST later this section).

Sensor Monitoring

The ECU monitors its internal temperature to ensure the engine does not overheat and damage components. It monitors the power supplies to ensure they are operating at the proper voltage. Monitors proper running of stored programs. When the key is turned off, it even monitors its shut-down process to ensure it happens properly. If a problem exists, the ECU will generate a Diagnostic Trouble Code (DTC).

The ECU is continuously receiving real-time inputs from temperature, pressure, speed, and position sensors. The ECU compares these values with expected values for the operating conditions. If the ECU detects a problem, it will generate a DTC.

Diagnostic Trouble Codes (DTC)

These are codes that the ECU sends out over the CAN bus to tell the operator or service equipment it sees a problem (See DIAGNOSTIC TROUBLE CODES LIST later in this group). Some of these codes contain a snapshot of certain parameters at the time the codes sets which will be stored in the ECU. There may also be a recording of more data that is stored depending on the DTC (See SNAPSHOT INSTRUCTIONS later this section).

Engine Starting Mode

When the key is turned to the "ON" position, a switched power voltage is sent to the Engine Control Unit (ECU). This energizes the ECU and allows it to "boot-up" and ready itself for engine start.

NOTE: If a wiring problem prevents the key ON signal from getting to the ECU, the engine will not start.

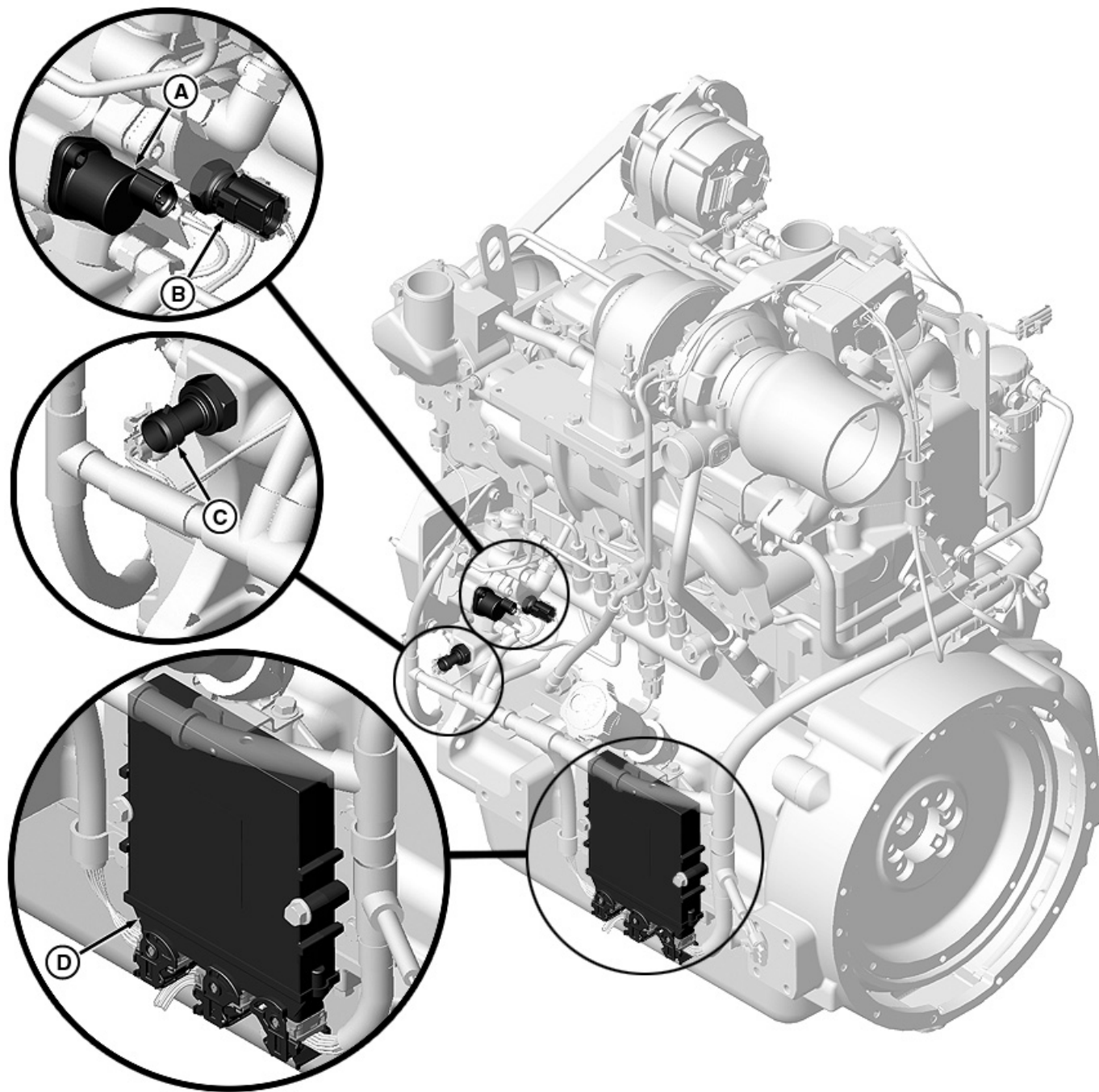
As soon as the ECU determines using the Crank Position Sensor input that the engine is cranking, it will determine using the Pump Position Sensor input when cylinder number 1 is coming to top-dead-center at the end of the compression stroke. It will then start injecting fuel when the next cylinder in the firing order (cylinder number 5) is at the correct position. At this point, the engine will start and the ECU will go into the running mode. To provide cold temperature enrichment, the amount of fuel injected is based on the temperature measured by the Engine Coolant Temperature (ECT) sensor.

Engine Running Mode

In the running mode, both the crank and pump position sensors allow the ECU to precisely determine piston position in relation to top-dead-center. The ECU uses this information to actuate each individual EI of the injection timing and rate. The ECU controls fuel delivery by energizing and de-energizing the two-way valve (TWV), which is located in the EI.

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Component Location Diagram 1



4.5L Engine

A—Suction Control Valve

B—Fuel Temperature Sensor

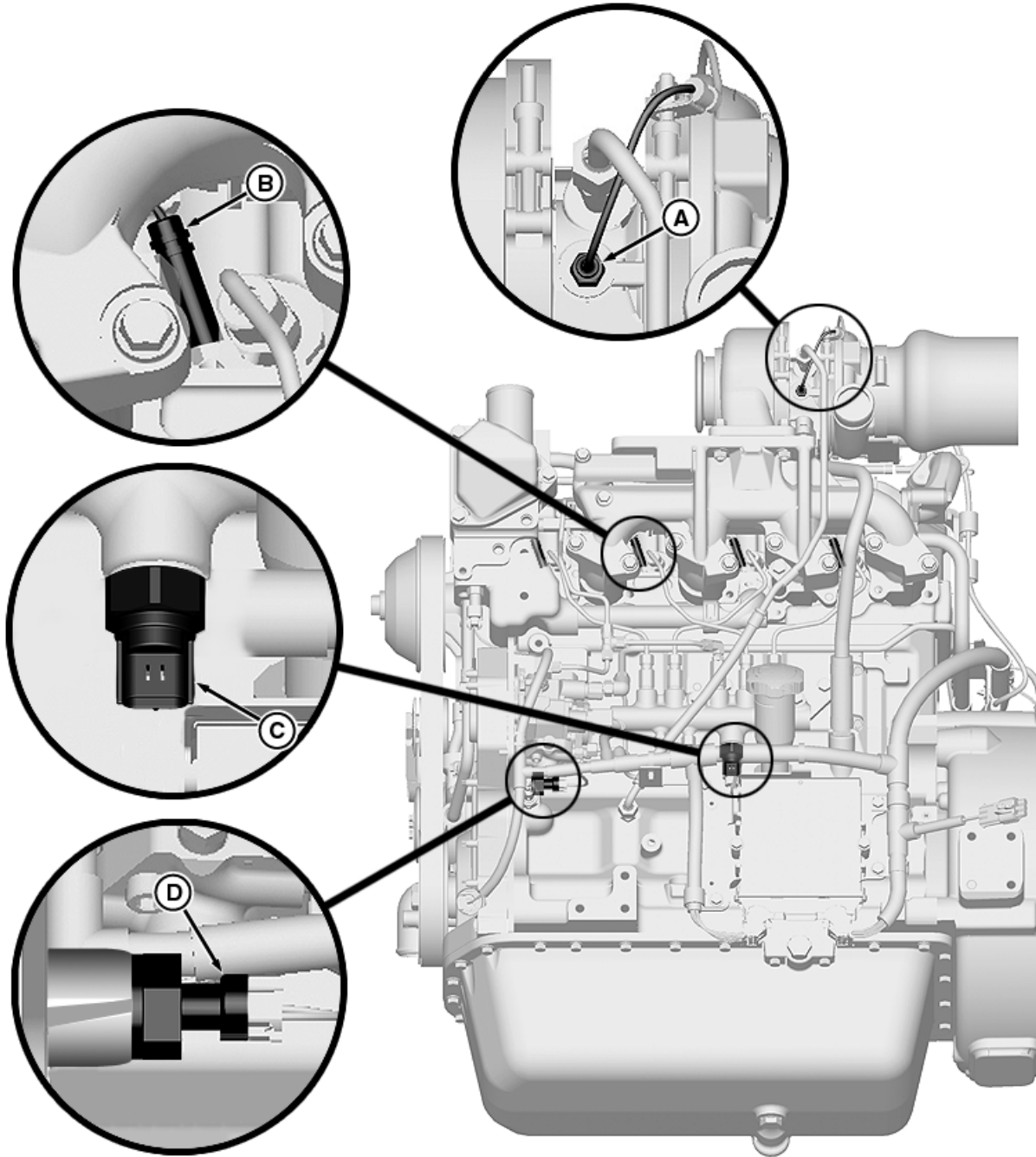
C—Oil Pressure Sensor

D—ECU

NOTE: Some of the components shown are optional and are NOT used on all applications.

RG15021 -UN-27JUN07

Component Location Diagram 2



4.5L Engine

A—Turbo Speed Sensor

B—Glow Plug

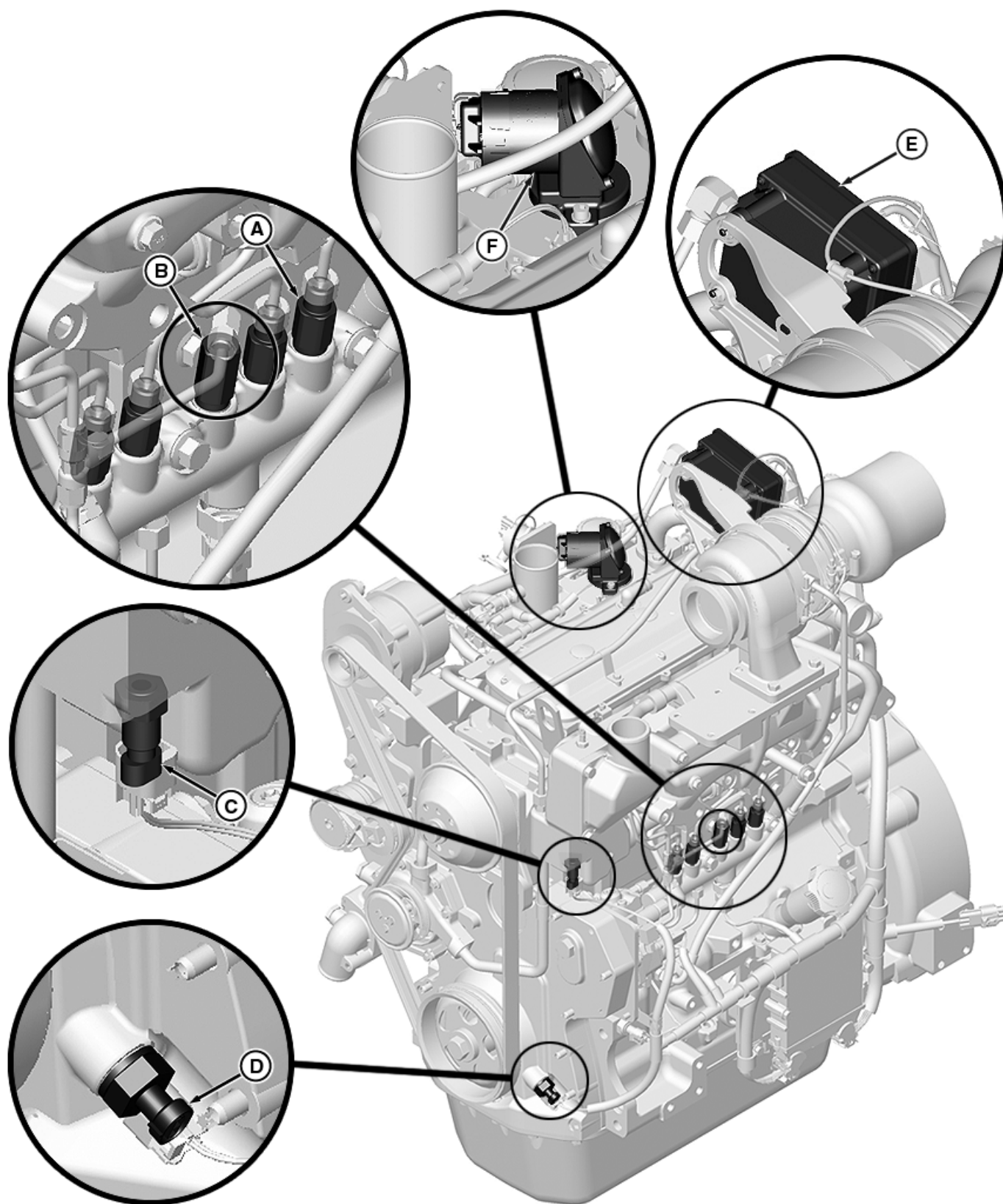
C—Fuel Rail Pressure Sensor

D—Pump Position Sensor

NOTE: Some of the components shown are optional and are NOT used on all applications.

RG15042 -UN-27JUN07

Component Location Diagram 3



4.5L Engine

RG15065 -UN-24/JAN08

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BK53208,0000027 -19-24/JAN08-1/2

A—Fuel Limiter
B—Pressure Limiter

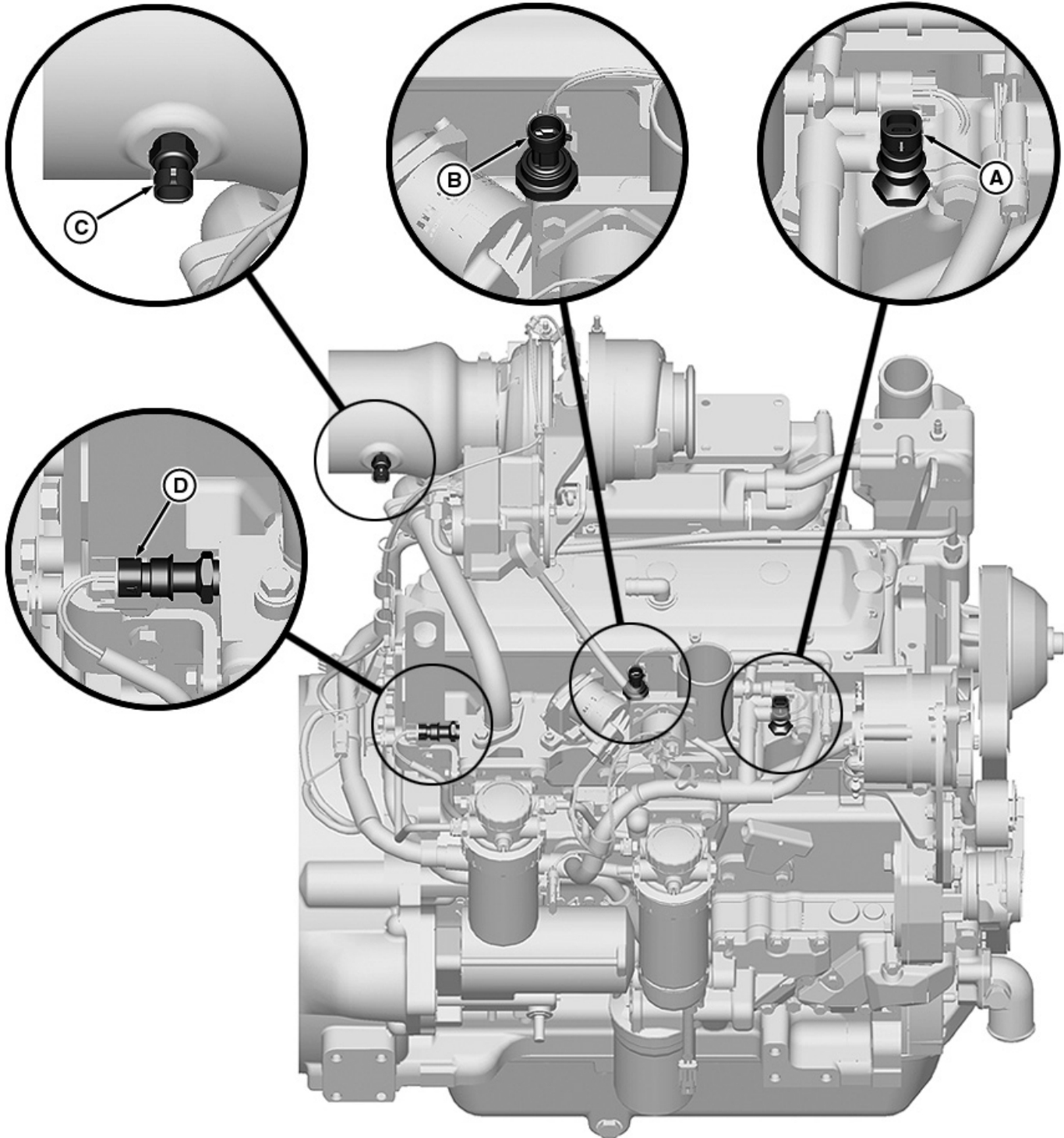
C—Engine Coolant
Temperature Sensor

D—Crank Position Sensor
E—VGT Actuator

F—EGR Valve

NOTE: Some of the components shown are optional
and are NOT used on all applications.

Component Location Diagram 4



4.5L Engine

A—Manifold Air Temperature (MAT) Sensor

B—Manifold Air Pressure (MAP) Sensor

C—Compressor Inlet Temperature Sensor

D—EGR Temperature Sensor

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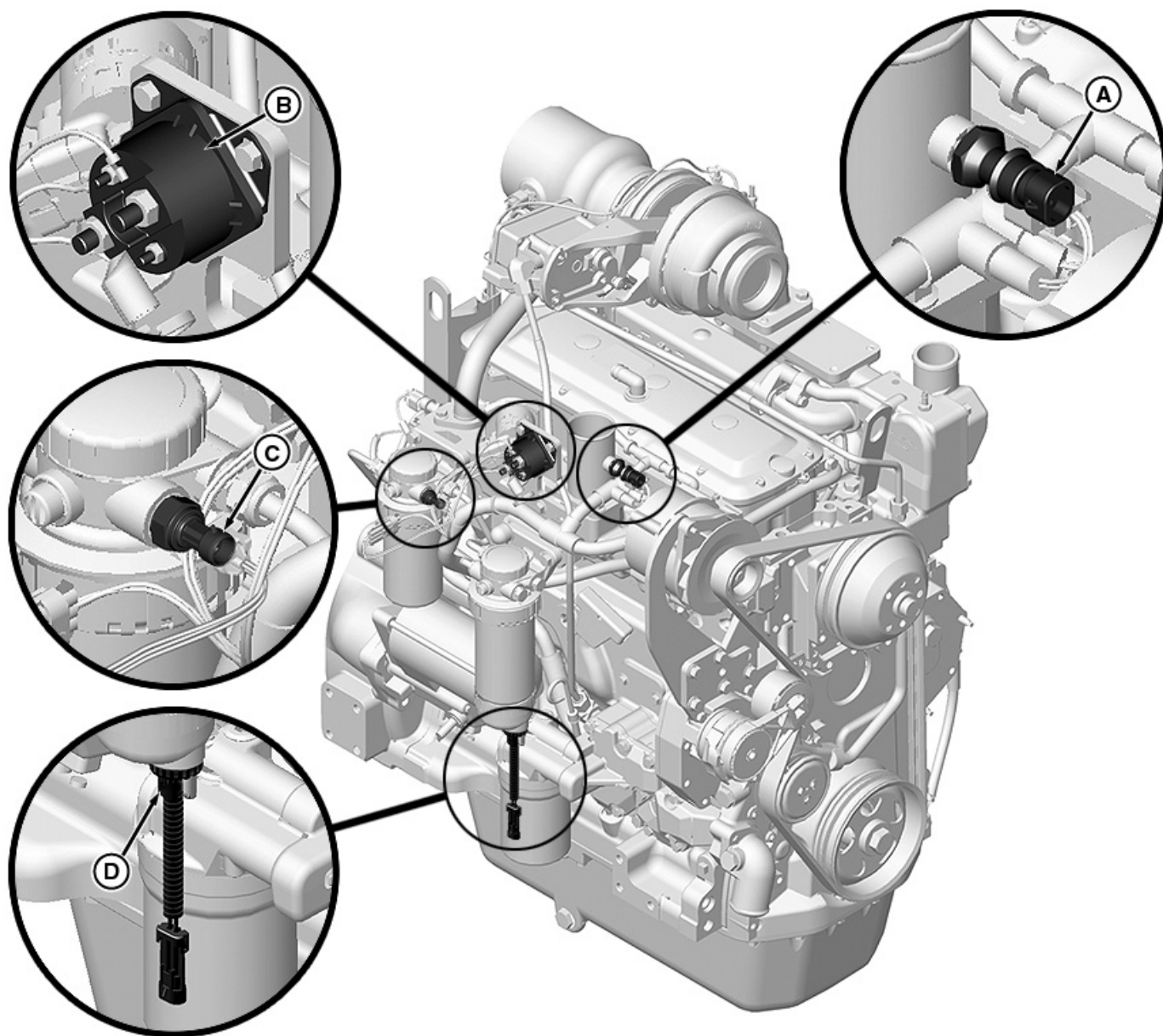
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BK53208,0000028 -19-18JAN08-1/2

NOTE: Some of the components shown are optional and are NOT used on all applications.

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Component Location Diagram 5



4.5L Engine

A—Charge Air Cooler Outlet Temperature Sensor

B—Glow Plug Relay

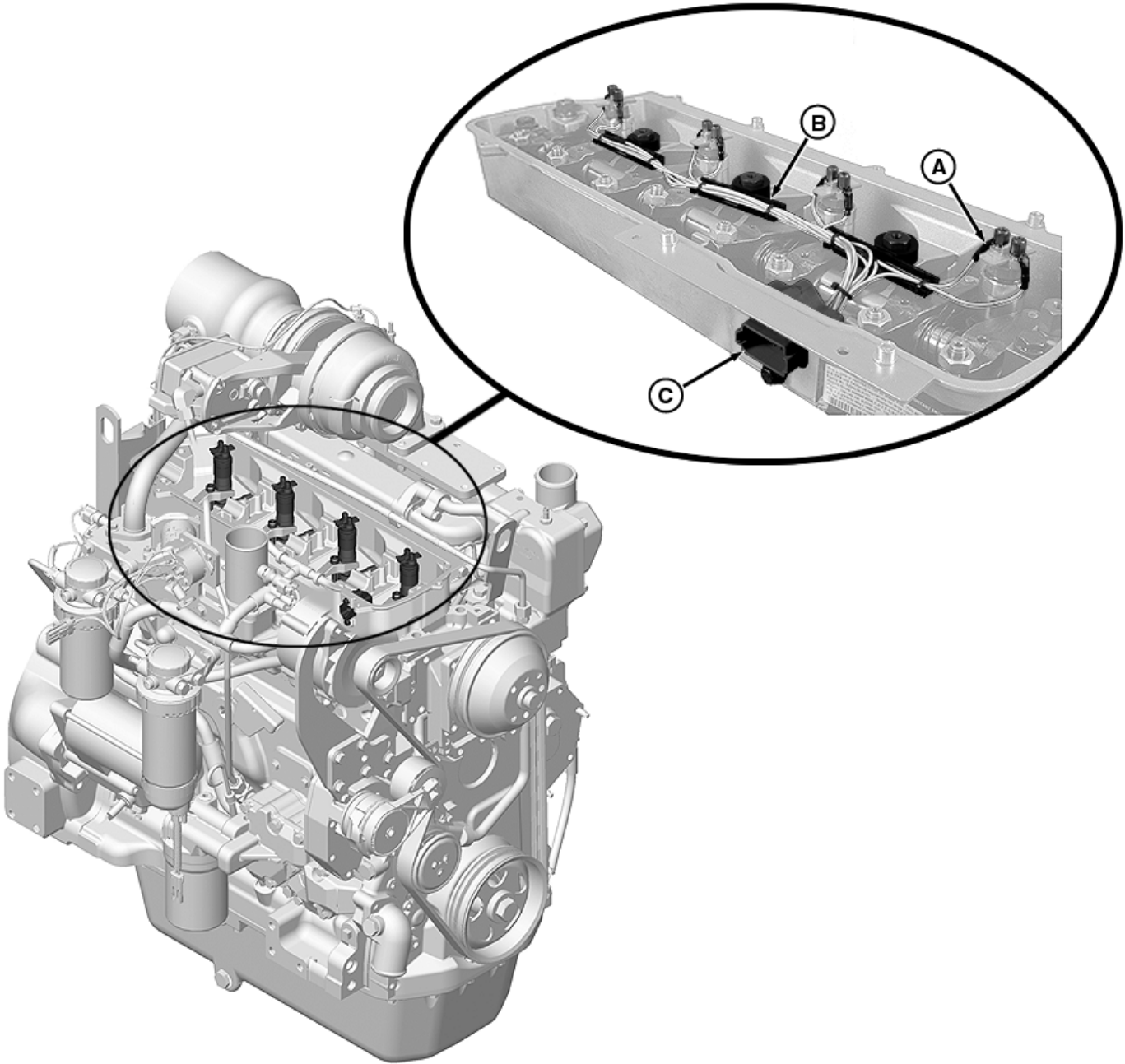
C—Fuel Transfer Pump Pressure Sensor

D—Water In Fuel Sensor

NOTE: Some of the components shown are optional and are NOT used on all applications.

BK53208,0000029 -19-18JAN08-1/1

Component Location Diagram 6



4.5L Engine

A—Eyelets

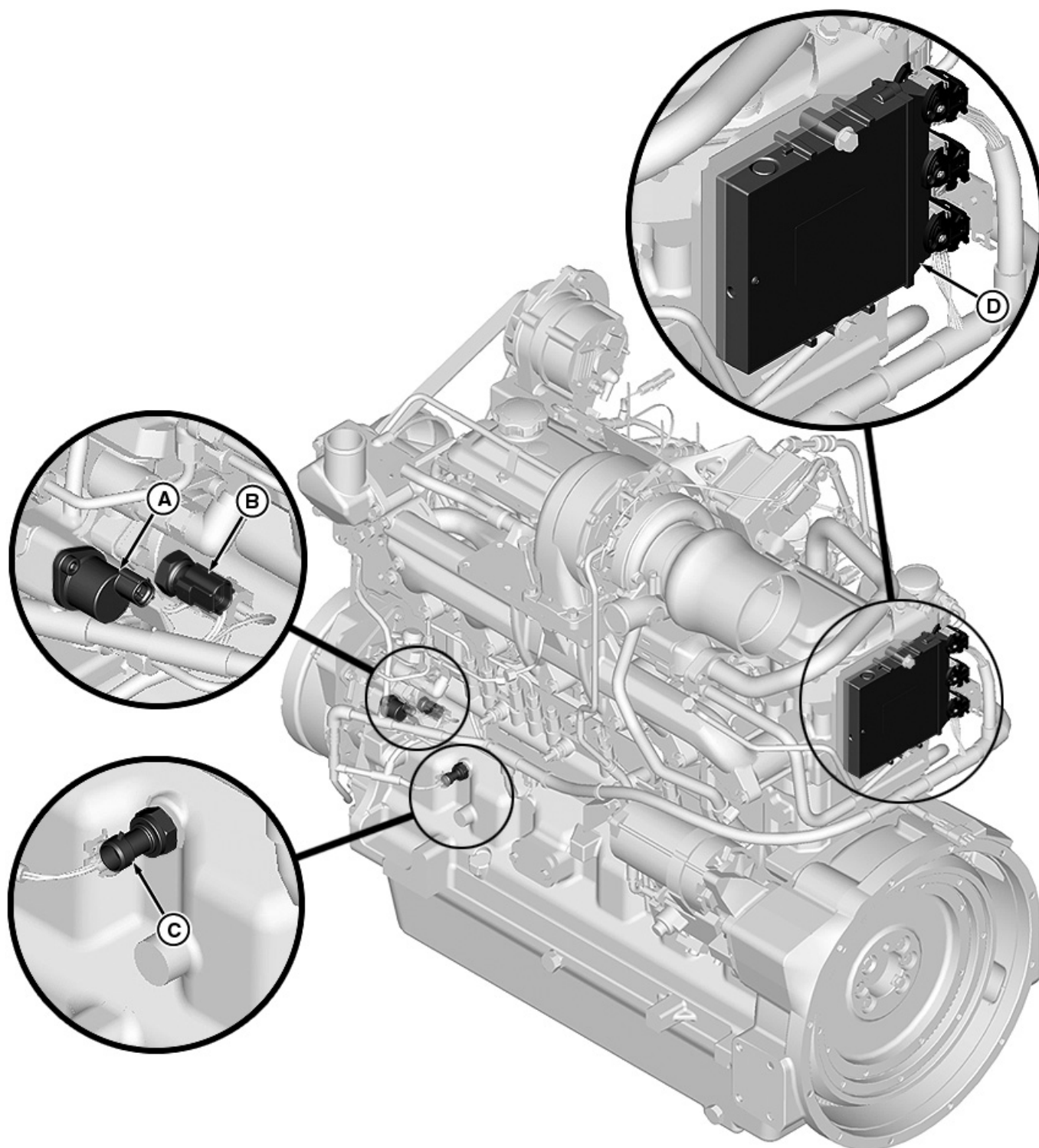
B—Wire Assembly Stiffeners

C—Fuel Injector Wire Harness
Assembly Connectors

NOTE: Some of the components shown are optional
and are NOT used on all applications.

RG15068 -UN-27JUN07

Component Location Diagram 7



6.8L Engine

A—Suction Control Valve

B—Fuel Temperature Sensor

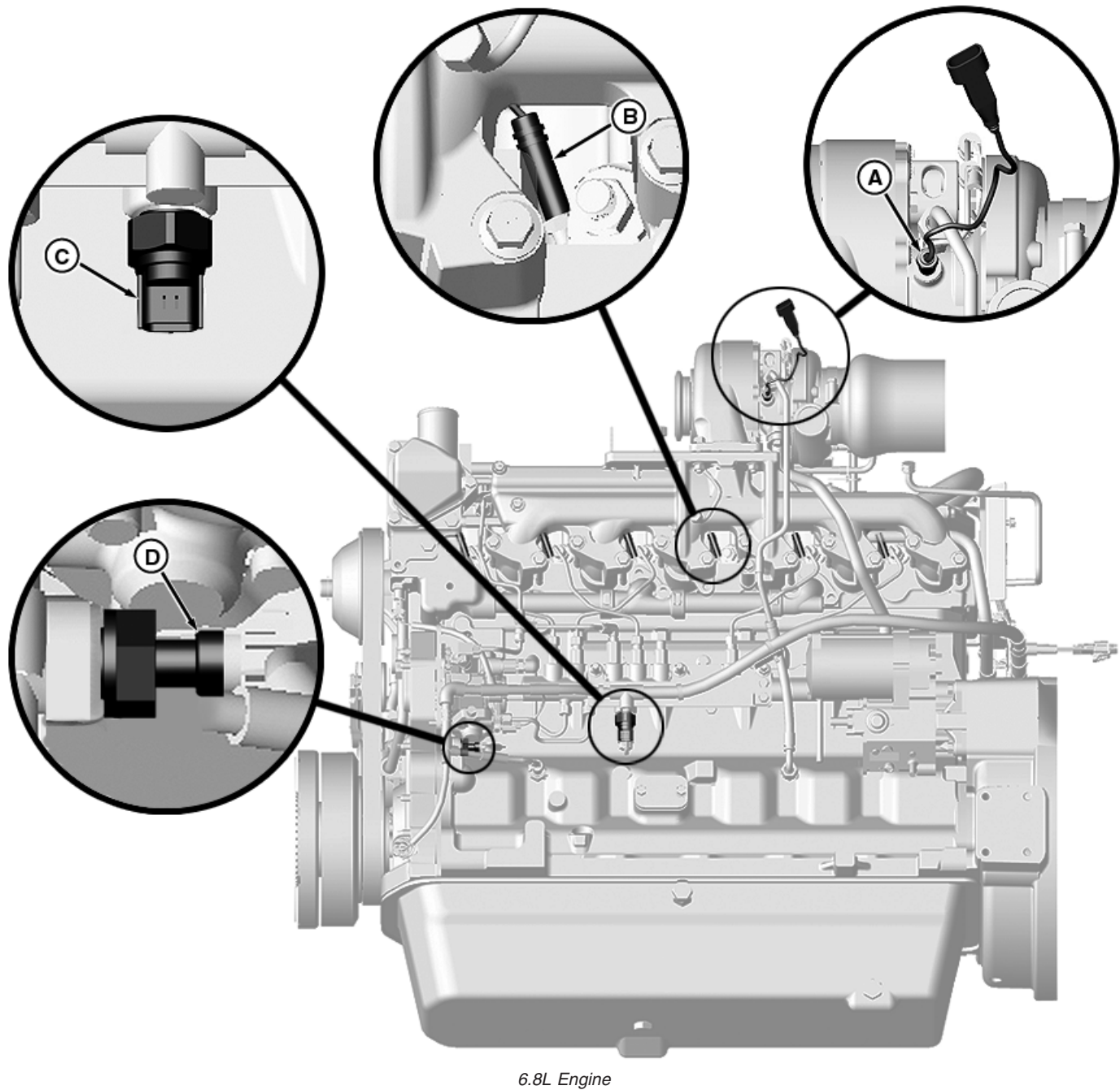
C—Oil Pressure Sensor

D—ECU

NOTE: Some of the components shown are optional and are NOT used on all applications.

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Component Location Diagram 8



A—Turbo Speed Sensor

B—Glow Plug

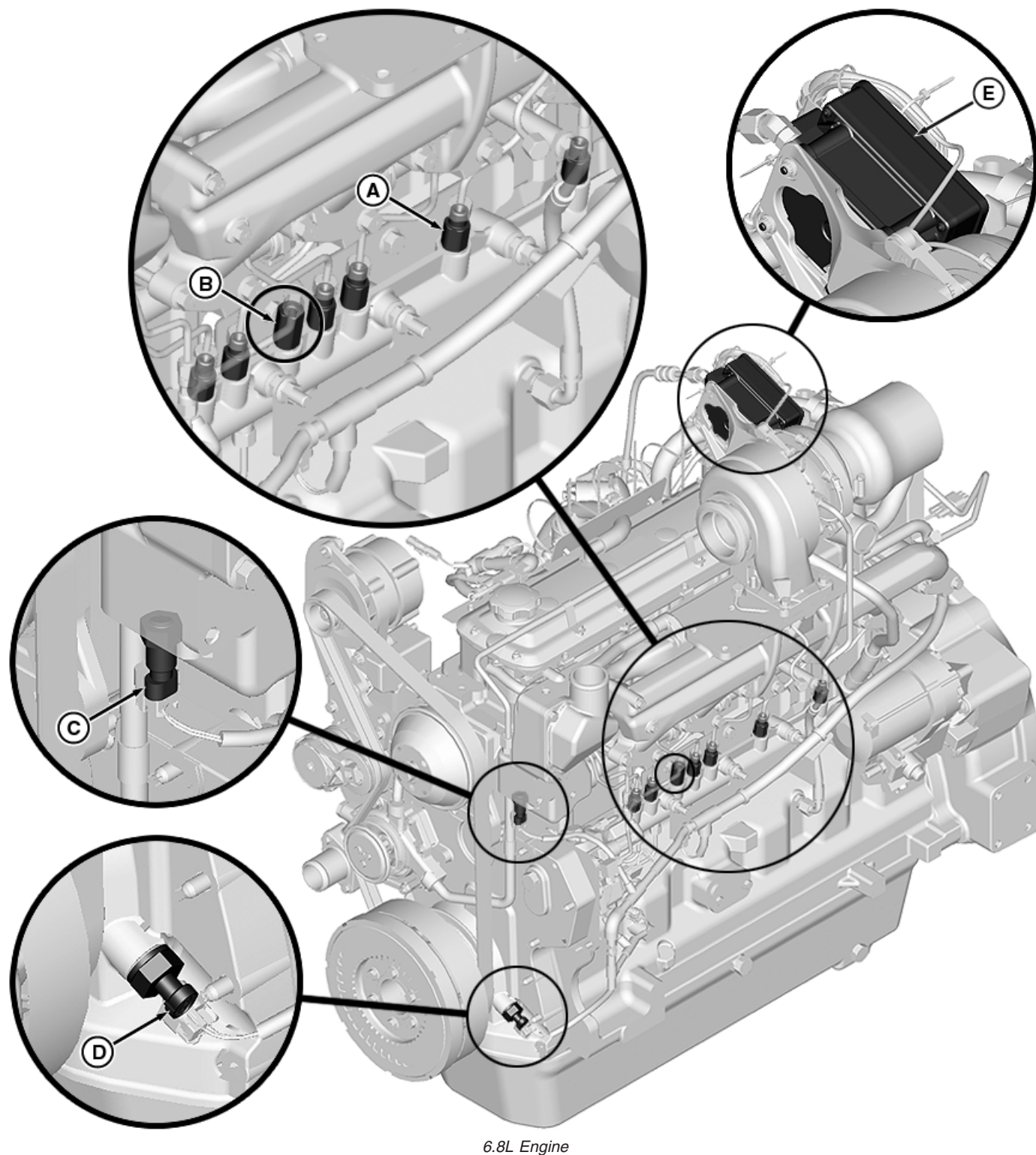
C—Fuel Rail Pressure Sensor

D—Pump Position Sensor

NOTE: Some of the components shown are optional and are NOT used on all applications.

RG14985 -UN-27JUN07

Component Location Diagram 9



6.8L Engine

A—Fuel Limiter
B—Pressure Limiter

C—Engine Coolant
Temperature Sensor

D—Crank Position Sensor

E—VGT Actuator

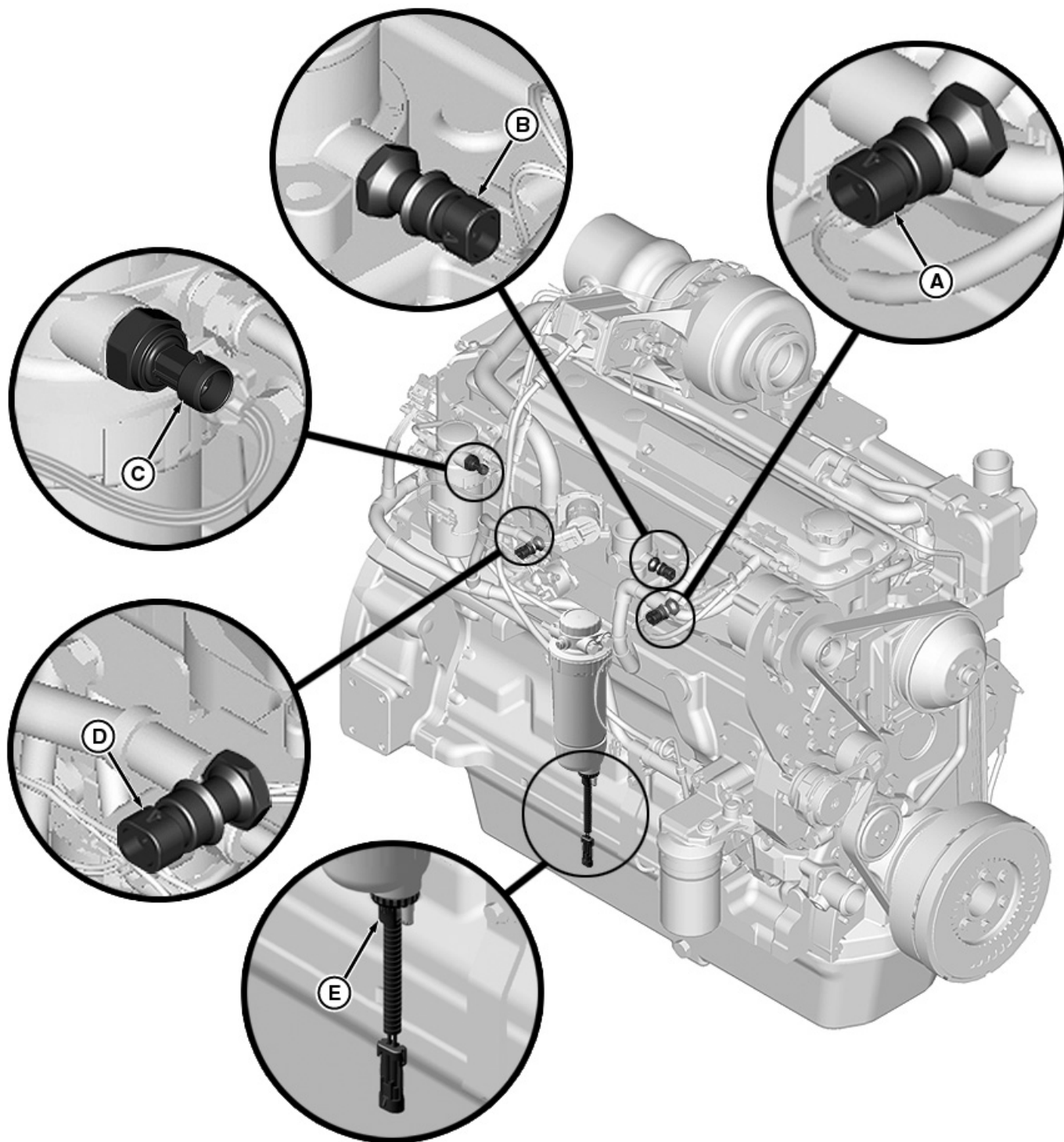
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BK53208,000002D -19-24JAN08-1/2

*NOTE: Some of the components shown are optional
and are NOT used on all applications.*

BK53208,000002D -19-24JAN08-2/2

Component Location Diagram 10



6.8L Engine

A—Manifold Air Temperature (MAT) Sensor

B—Charged Air Cooler Outlet Air Temperature Sensor

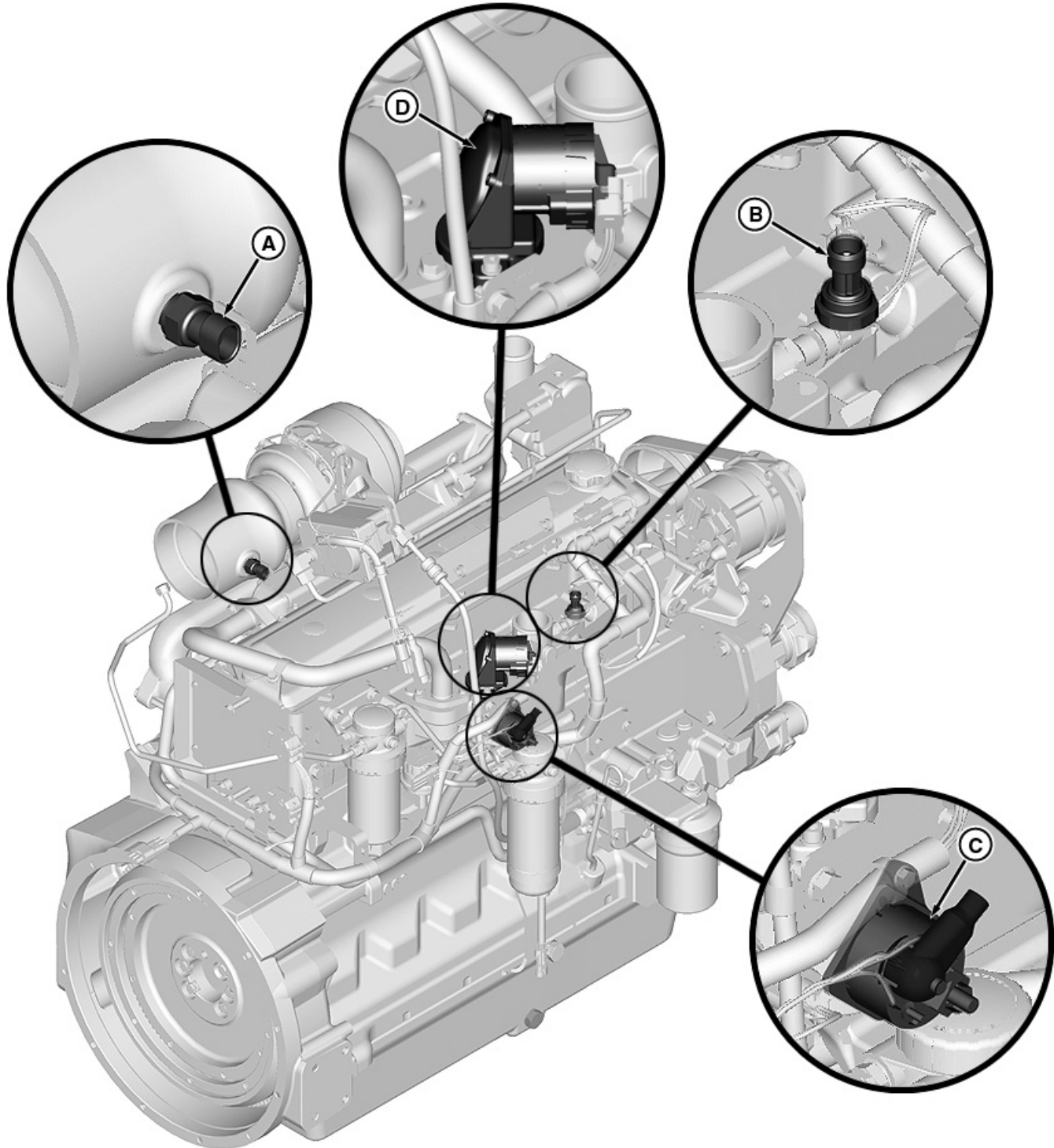
C—Fuel Transfer Pump Pressure Sensor

D—EGR Temperature Sensor
E—Water In Fuel Sensor

NOTE: Some of the components shown are optional and are NOT used on all applications.

BK53208,000002E -19-18JAN08-1/1

Component Location Diagram 11



6.8L Engine

A—Compressor Inlet
Temperature Sensor

B—Manifold Absolute
Pressure (MAP) Sensor

C—Glow Plug Relay

D—EGR Valve

RG15012 -UN-25/JAN08

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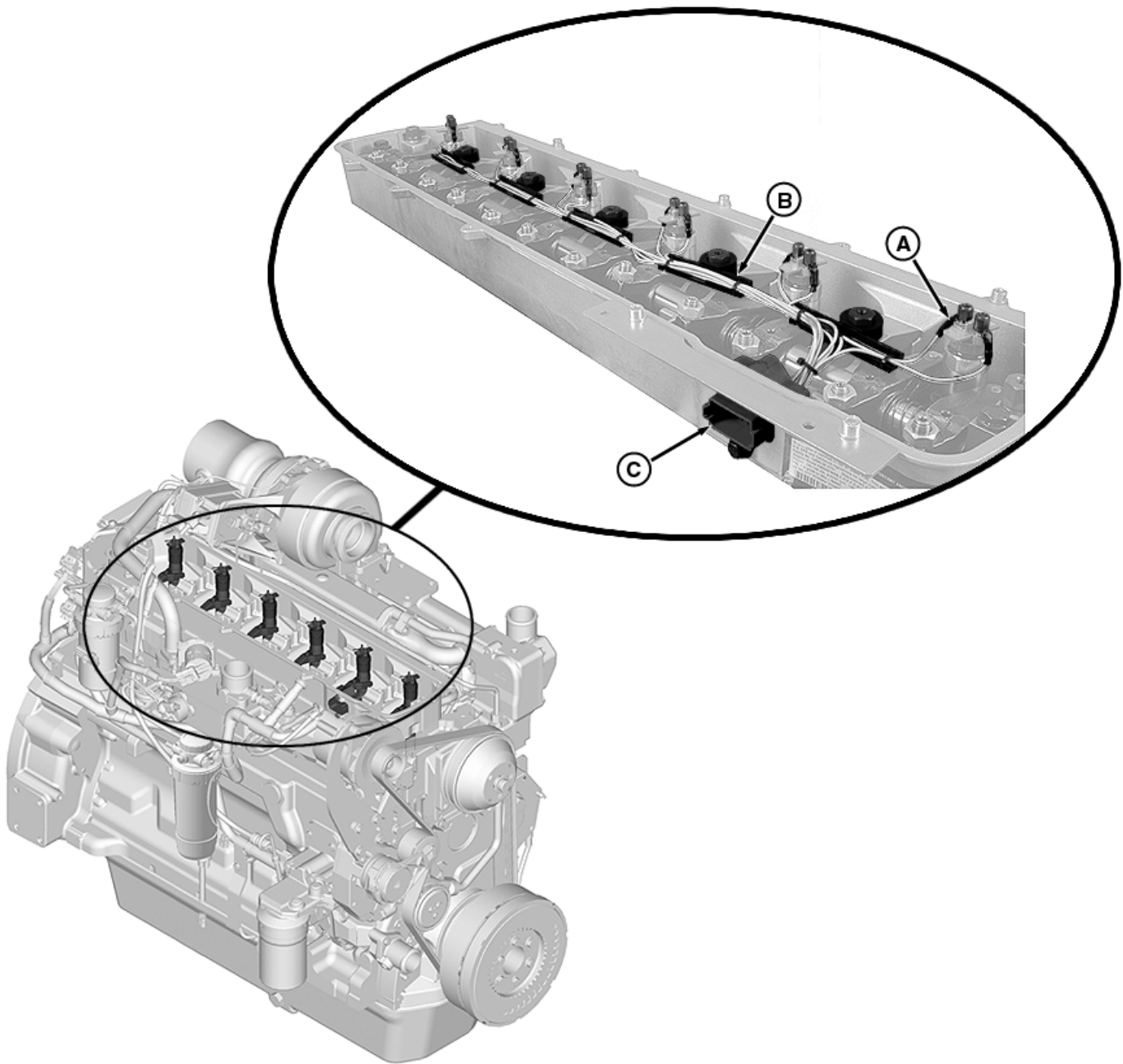
BK53208,000002F -19-24/JAN08-1/2

*NOTE: Some of the components shown are optional
and are NOT used on all applications.*

BK53208,000002F -19-24JAN08-2/2

03
140
21

Component Location Diagram 12



6.8L Engine

A—Eyelets

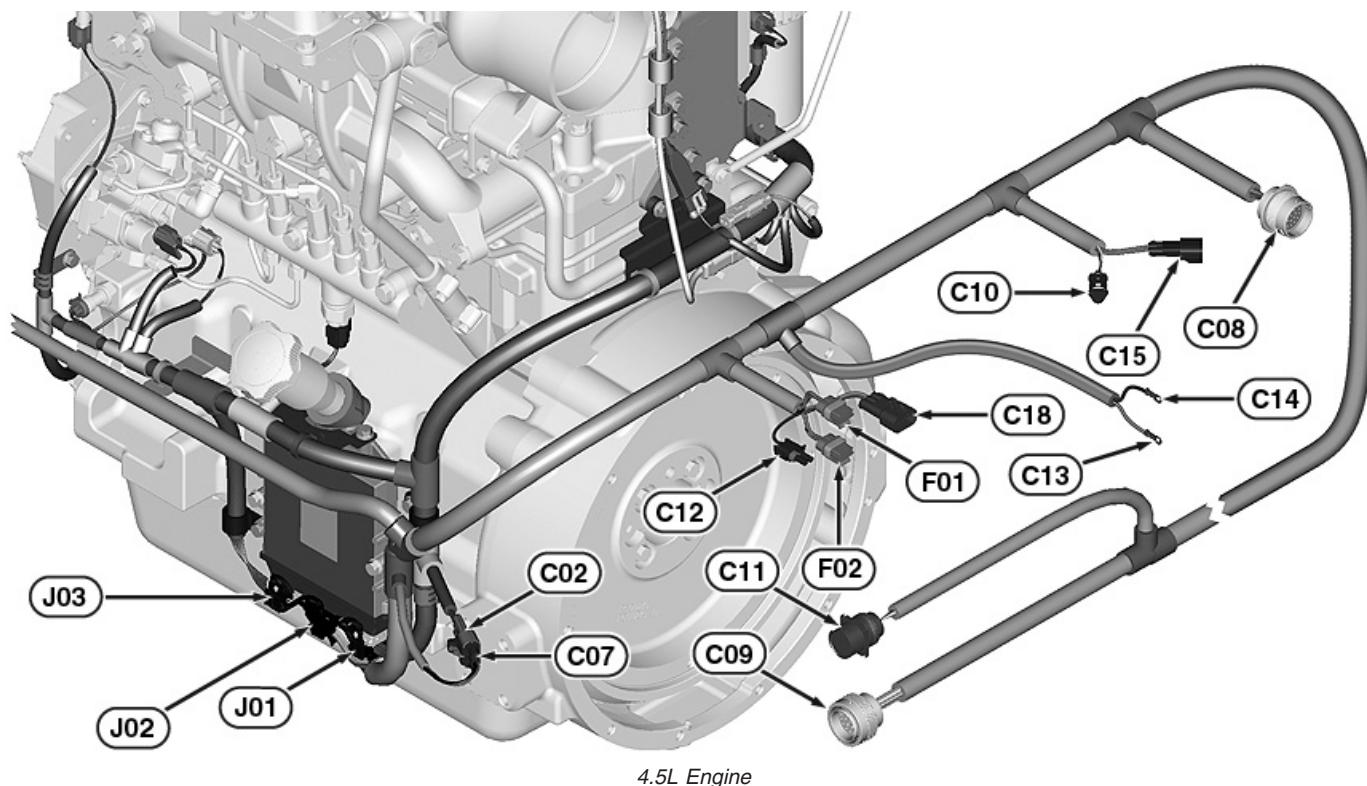
B—Wire Assembly Stiffeners

C—Fuel Injector Wire Harness
Assembly Connector

NOTE: Some of the components shown are optional
and are NOT used on all applications.

RG15069 -UN-27JUN07

Component Location Diagram 13



C02—Auxiliary Power
Connector A
C07—Auxiliary Power
Connector B
C08—Auxiliary Connector
C09—Control Panel Connector

C10—CAN Terminator
C11—CAN Diagnostic
Connector
C12—Transient Voltage
Protector
C13—Starter Relay Coil,
Return

C14—Starter Relay Coil, Signal
C15—Remote On/Off
C18—Air Heater Connector
F01—Fuse, 30 Amp
F02—Fuse, 20 Amp
J01—ECU Harness Connector,
Black Face

J02—ECU Harness Connector,
Red Face
J03—ECU Harness Connector,
Blue Face

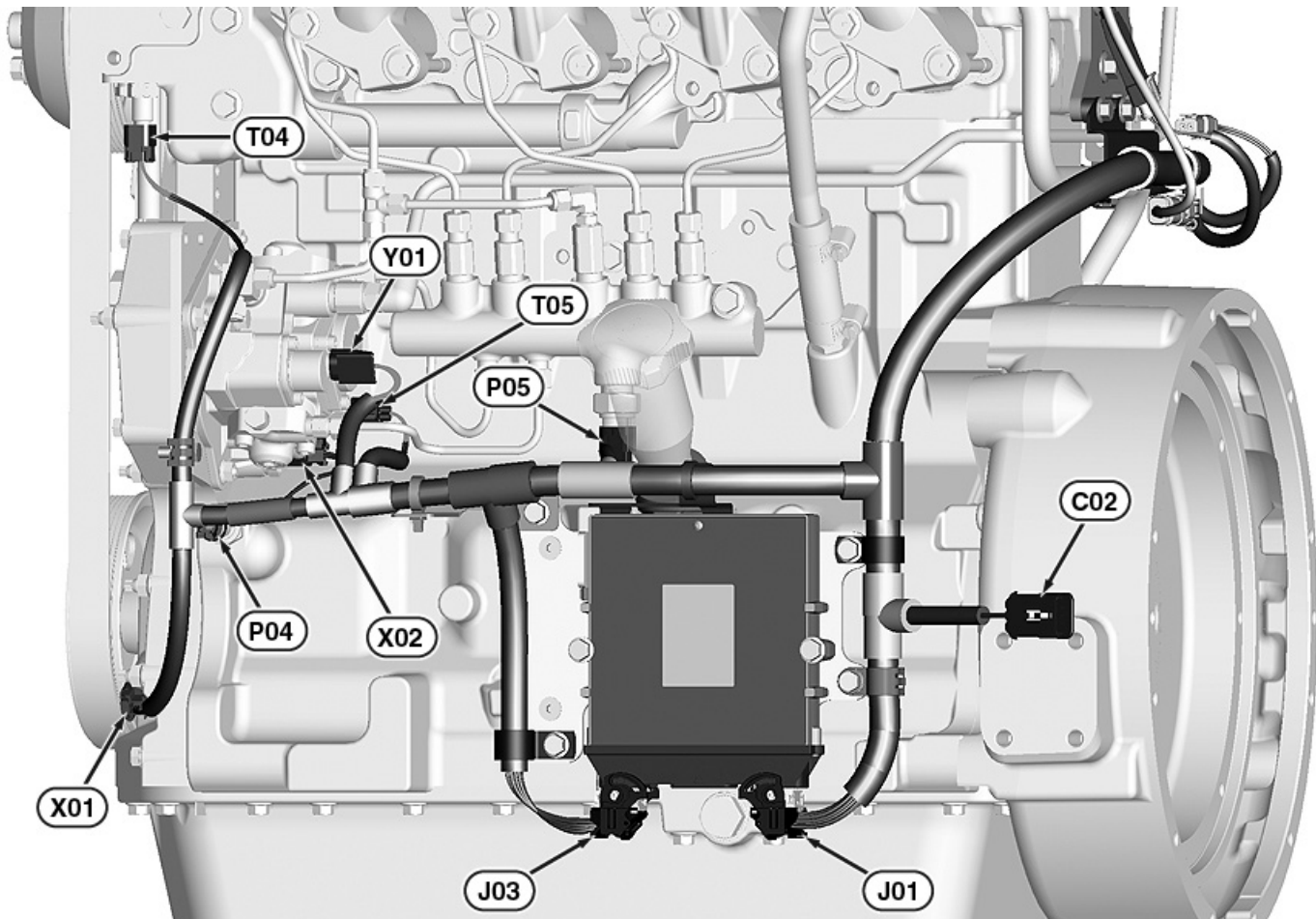
NOTE: Some of the components shown are optional
and are NOT used on all applications.

03
140
23

RG16035 -UN-04JAN08

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Component Location Diagram 14



4.5L Engine

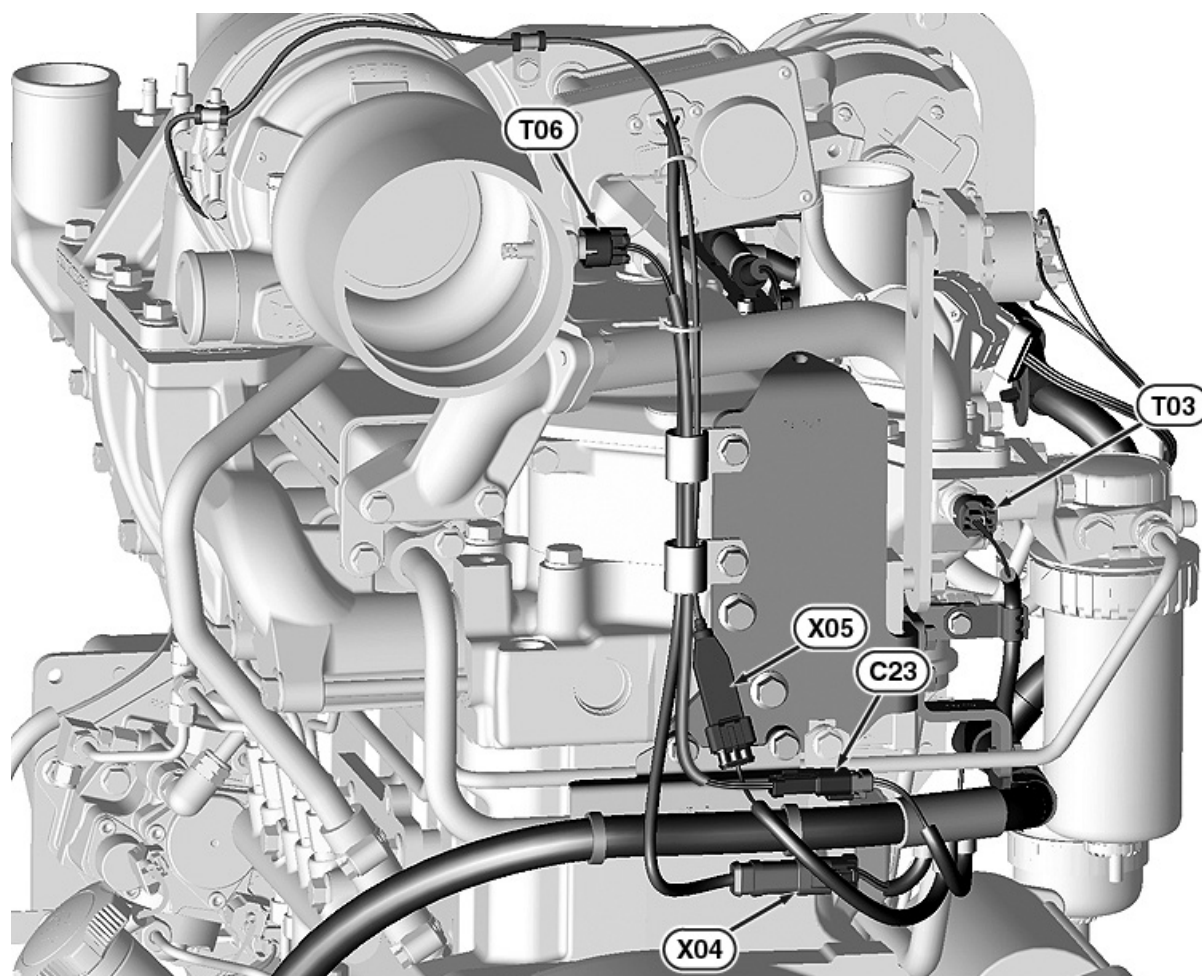
C02—Auxiliary Power Connector	P04—Engine Oil Pressure Sensor Connector	T05—Fuel Temperature Sensor Connector	X02—Pump Position Sensor Connector
J01—ECU Harness Connector, Black Face	P05—Fuel Rail Pressure Sensor Connector	X01—Crank Position Sensor Connector	Y01—Suction Control Valve Connector
J03—ECU Harness Connector, Blue Face	T04—Coolant Temperature Sensor Connector		

NOTE: Some of the components shown are optional and are NOT used on all applications.

RG16036 -UN-04JAN08

BK53208,0000074 -19-18JAN08-1/1

Component Location Diagram 15



4.5L Engine

C23—Compressor Inlet
Temperature Sensor
Interconnect

T03—EGR Temperature
Sensor Connector
T06—Compressor Inlet
Temperature Sensor
Connector

X04—VGT Actuator Connector

X05—Turbo Speed Sensor
Connector

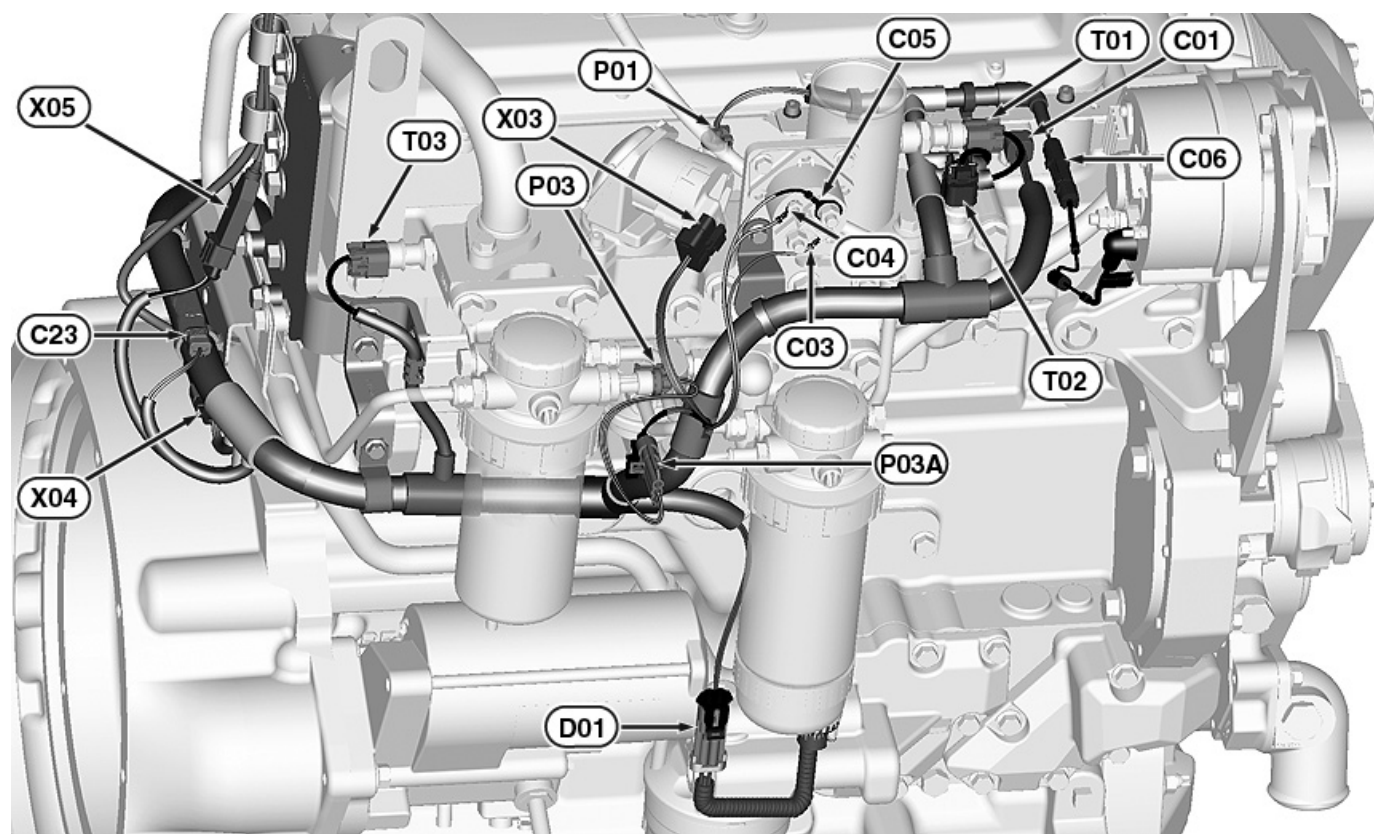
NOTE: Some of the components shown are optional
and are NOT used on all applications.

03
140
25

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Component Location Diagram 16



4.5L Engine

C01—Fuel Injector Connector
 C03—Glow Plug Relay, Ground
 C04—Glow Plug Relay, Driver
 C05—Glow Plug Relay, Diagnostic
 C06—Alternator Excitation
 C23—Compressor Inlet Temperature Sensor Interconnect

D01—Water-In-Fuel Sensor Connector
 P01—Manifold Air Pressure Sensor Connector
 P03—Fuel Pressure Sensor Connector
 P03A—Fuel Pressure Sensor Interconnect

T01—Charge Air Cooler Outlet Temperature Sensor Connector
 T02—Manifold Air Temperature Sensor Connector
 T03—EGR Temperature Sensor Connector

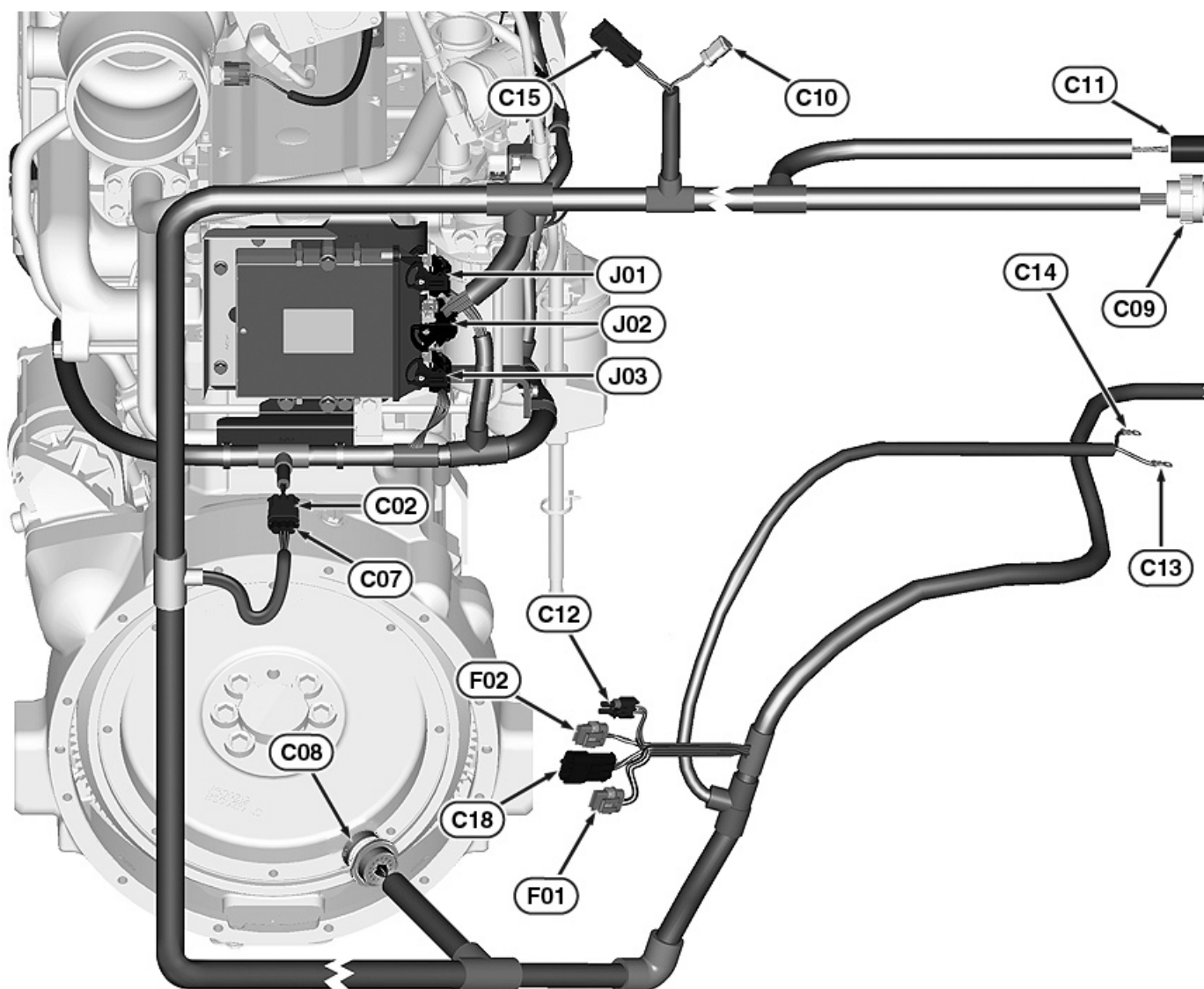
X03—EGR Valve Connector
 X04—VGT Actuator Connector
 X05—Turbo Speed Sensor Connector

NOTE: Some of the components shown are optional and are NOT used on all applications.

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Component Location Diagram 17



6.8L Engine

C02—Auxiliary Power
Connector A
C07—Auxiliary Power
Connector B
C08—Auxiliary Connector
C09—Control Panel Connector

C10—CAN Terminator
C11—CAN Diagnostic
Connector
C12—Transient Voltage
Protector
C13—Starter Relay Coil,
Return

C14—Starter Relay Coil, Signal
C15—Remote On/Off
C18—Air Heater Connector
F01—Fuse, 30 Amp
F02—Fuse, 20 Amp
J01—ECU Harness Connector,
Black Face

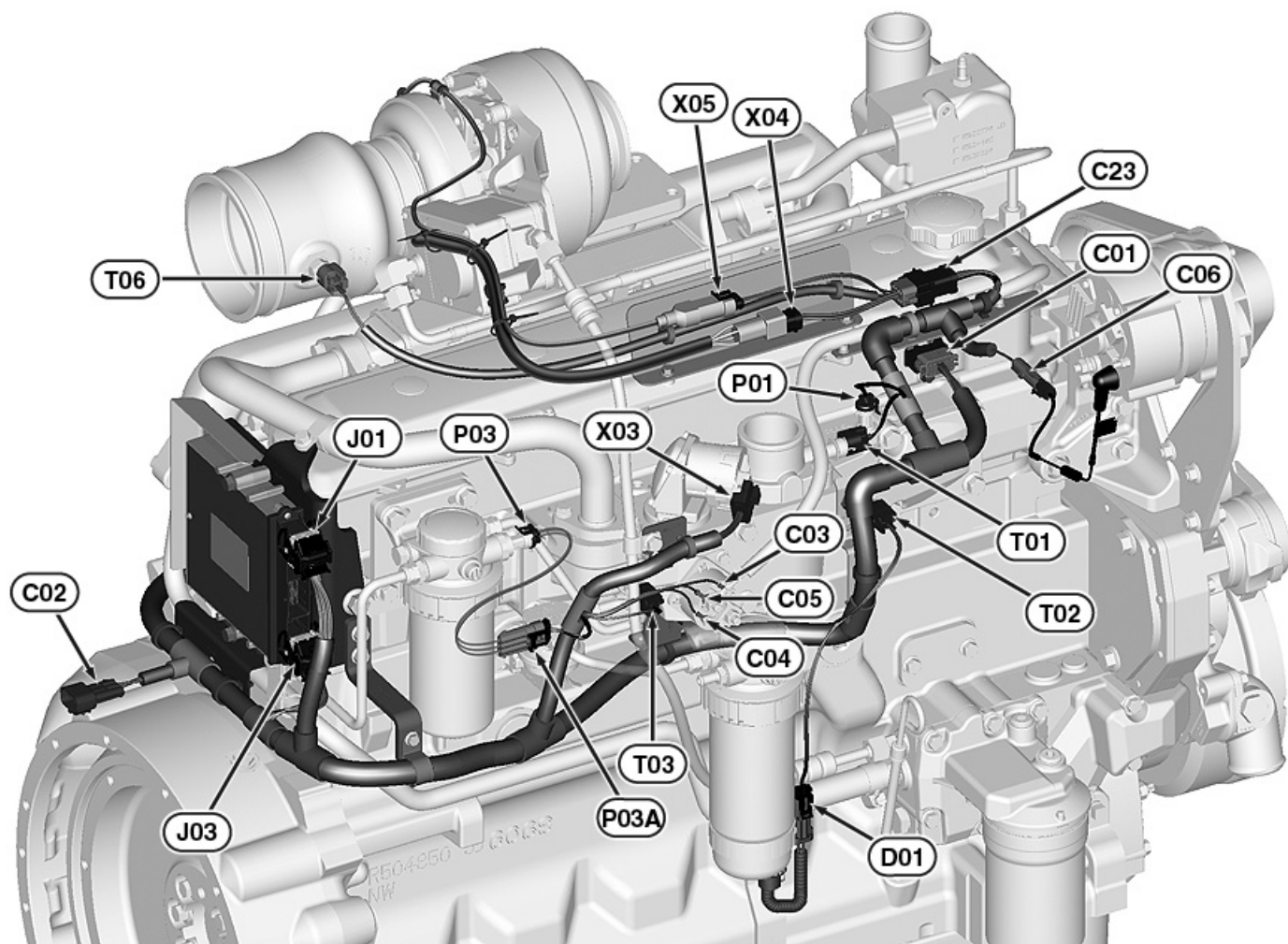
J02—ECU Harness Connector,
Red Face
J03—ECU Harness Connector,
Blue Face

NOTE: Some of the components shown are optional
and are NOT used on all applications.

FG16032 -UN-04JAN08

03
140
27

Component Location Diagram 18



6.8L Engine

C01—Fuel Injector Connector
 C02—Auxiliary Power Connector
 C03—Glow Plug Relay, Ground
 C04—Glow Plug Relay, Driver
 C05—Glow Plug Relay, Diagnostic
 C06—Alternator Excitation
 C23—Turbocharger Interconnect

D01—Water-In-Fuel Sensor Connector
 J01—ECU Harness Connector, Black Face
 J03—ECU Harness Connector, Blue Face
 P01—Manifold Air Pressure Sensor Connector
 P03—Fuel Pressure Sensor Connector

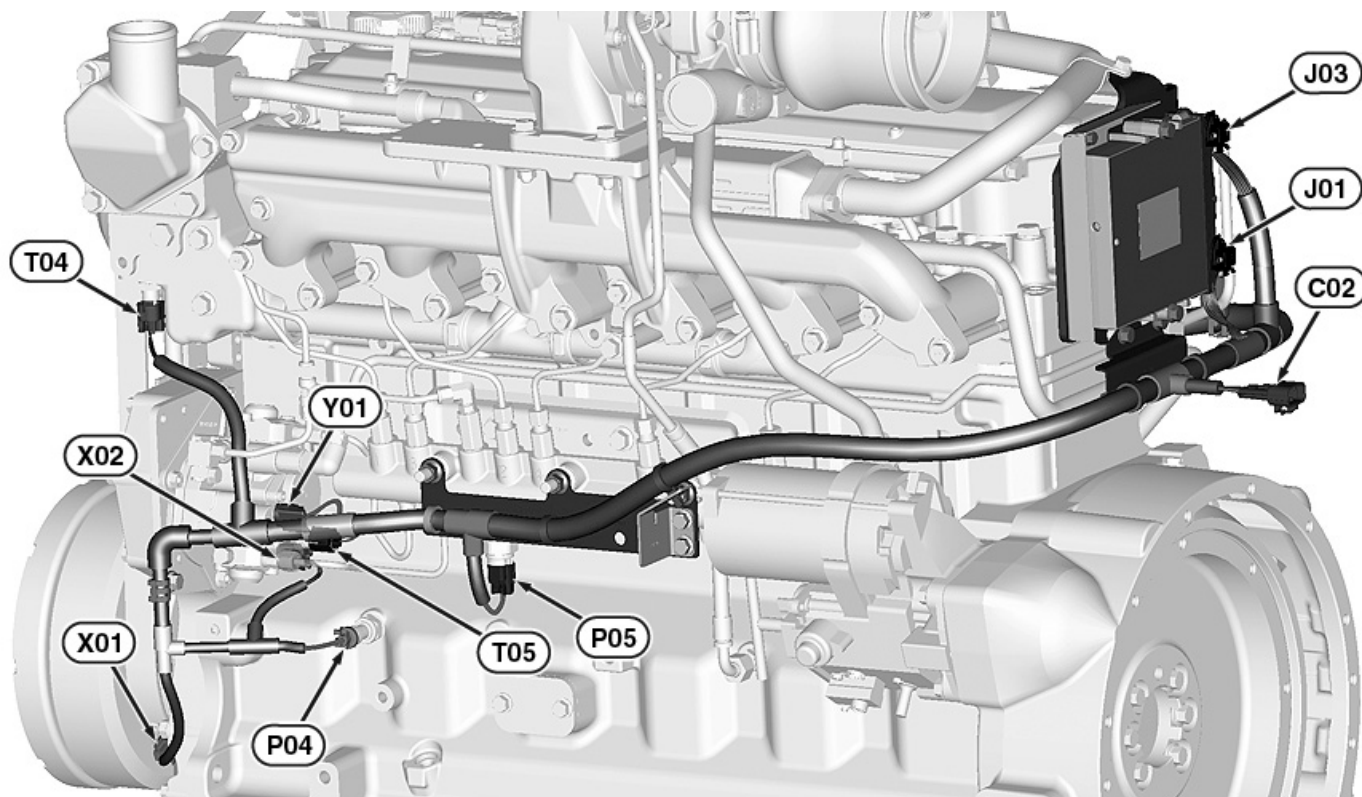
P03A—Fuel Pressure Sensor Interconnect
 T01—Charge Air Cooler Outlet Temperature Sensor Connector
 T02—Manifold Air Temperature Sensor Connector
 T03—EGR Temperature Sensor Connector

T06—Compressor Inlet Temperature Sensor Connector
 X03—EGR Valve Connector
 X04—VGT Actuator Connector
 X05—Turbo Speed Sensor Connector

NOTE: Some of the components shown are optional and are NOT used on all applications.

RG16033 -UN-23JAN08

Component Location Diagram 19



6.8L Engine

C02—Auxiliary Power
Connector

J01—ECU Harness Connector,
Black Face

J03—ECU Harness Connector,
Blue Face

P04—Engine Oil Pressure
Sensor Connector

P05—Fuel Rail Pressure
Sensor Connector

T04—Coolant Temperature
Sensor Connector

T05—Fuel Temperature Sensor
Connector

X01—Crank Position Sensor
Connector

X02—Pump Position Sensor
Connector

Y01—Suction Control Valve
Connector

NOTE: Some of the components shown are optional
and are NOT used on all applications.

03
140
29

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Controller Area Network (CAN)

The CAN bus is a high-speed open interconnect network for electronic systems on the vehicle. It allows electronic systems to communicate with each other through a standard architecture of electronic signals over shielded twisted-pair wires. Just about any type of information can be communicated over the CAN Bus. Information such as throttle position, safety systems, engine condition, fuel system information, etc, can be transferred between vehicle controllers. Vehicles can communicate with laptop computers and other

accessories. Information on the network can be displayed to the operator on a display panel, or relayed to another location via telemetry. Up to 30 Electronic Control Units or modules can be connected together through a single CAN network segment. A CAN connection (SAE J1939) is provided on the vehicle wiring harness. A round Deutsch 9-pin connector is provided primarily for service/diagnostic purposes. CAN also allows diagnostic software to communicate with the vehicle.

DM80898,00000E1 -19-15OCT07-1/1

Monitoring Engine Parameters

In order for the electronic control system to deliver fuel according to a given set of operating conditions and, on some applications to provide engine protection, the following engine parameters are monitored by the ECU:

- Crank Position
- Engine Control Unit (ECU) Temperature
- Engine Coolant Temperature (ECT)
- Fuel Rail Pressure
- Fuel Temperature
- Fuel Transfer Pump Pressure
- Manifold Air Pressure (MAP)
- Oil Pressure
- Pump Position
- Throttle Position
- Turbo Compressor Inlet Temperature
- Turbo Speed
- Turbo Turbine Inlet Temperature
- Water In Fuel (WIF)
- Manifold Air Temperature (MAT)
- Barometric Air Pressure (BAP)
- Throttle Position
- Power Supply #1
- Power Supply #2
- Power Supply #3
- Power Supply #4
- Power Supply #5
- External Derate
- External Shutdown
- VGT Valve Position
- EGR Valve Position

Measuring Temperature

Temperature sensors are generally thermistors—temperature-sensitive variable resistors. The resistance of the sensor decreases as temperature increases (negative temperature coefficient). As the temperature changes it causes the voltage (D) to change. The ECU compares this voltage with values programmed into its memory. If the value measured is near the expected value, the ECU assumes everything is correct. If the value is above or below the expected value, the ECU will set the appropriate diagnostic trouble code (DTC). For more information on DTCs, see DIAGNOSTIC TROUBLE CODES LIST in Section 4, Group 160.

The ECU has the ability to derate the engine power, engine speed, or to shut down the engine in an attempt to protect the engine and its components. If certain temperatures exceed the threshold, the ECU will enable the engine protection. For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

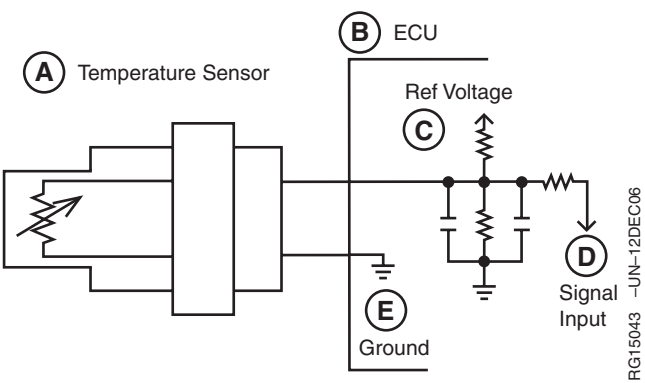


Figure 1

- A—Temperature Sensor
- B—ECU
- C—Reference Voltage
- D—Signal Input
- E—Ground

RG40854,00000E4 -19-15OCT07-1/1

Engine Control Unit (ECU) Temperature Sensor

The ECU temperature sensor is located internal to the ECU. This sensor cannot be repaired or replaced without replacing the entire ECU. This sensor is used to determine the internal temperature of the ECU. If

the temperature exceeds the temperature specification, the ECU will limit the speed of the engine in an attempt to protect the ECU from permanent damage.

RG41221,00002A7 -19-15OCT07-1/1

Engine Coolant Temperature (ECT) Sensor

The ECU monitors engine coolant temperature for:

- Engine protection purposes. Depending on the severity of the temperature increase, ECU transmits a diagnostic code for either moderate or extreme levels. The engine is derated correspondingly to each level of severity.
- If the ECU determines the coolant temperature is too low for the current operating conditions it will set an diagnostic trouble code. This normally indicates a thermostat that is stuck open.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

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DB92450,000000F -19-15OCT07-1/1

Fuel Temperature Sensor

The ECU uses this sensor input to calculate fuel density and adjust fuel delivery accordingly. The ECU also uses the fuel temperature sensor for engine protection purposes. In addition, the glow plug/air heater (optional) operation is driven off of the fuel temperature. If the temperature of the fuel drops below specification, the glow plugs or air heater (optional) will turn on for a predetermine length of time.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

For more glow plug information, see GLOW PLUG OPERATION later in this Group.

For more air heater information, see AIR HEATER OPERATION later this Group.

DB92450,0000010 -19-04OCT07-1/1

Exhaust Gas Recirculation (EGR) Exhaust Temperature Sensor

The ECU uses this sensor to measure the temperature of the exhaust gas entering the EGR valve. The ECU then compares the temperatures of the EGR exhaust, charge air cooler outlet air, and the manifold air to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU can adjust the signal going to the EGR valve to compensate the mixture accordingly. The ECU also uses this sensor for engine protection purposes.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 3 earlier in this Group.

DB92450,0000011 -19-15OCT07-1/1

Charge Air Cooler Outlet Air Temperature Sensor

The ECU uses this sensor to measure the temperature of the charge air cooler outlet air entering the manifold. The ECU then compares the temperatures of the EGR exhaust, charge air cooler outlet air, and the manifold air to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU can adjust the signal going to the EGR valve to compensate the mixture accordingly. The ECU also uses this sensor for engine protection purposes.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 3 earlier in this Group.

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RG41221,00002A6 -19-15OCT07-1/1

Intake Manifold Air Temperature (MAT) Sensor

EGR engines

The ECU uses this sensor to measure the temperature of the air in the intake manifold. The ECU then compares the temperatures of the EGR exhaust, charge air cooler outlet air, and the intake manifold air to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU can adjust the signal going to the EGR valve to compensate the mixture accordingly. The MAT sensor helps the ECU calculate the correct fueling for the engine. The intake manifold air is the air that will be used in the cylinder for engine combustion. The ECU also uses this sensor for engine protection purposes.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 4 component (A) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 10 component (A) for the 6.8L engine earlier in this Group.

Non-EGR engines

The ECU uses this sensor to measure the temperature of the air in the intake manifold. The ECU also uses this sensor for engine protection purposes.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

Continued on next page

RG41221,00002A6 -19-23OCT07-1/2

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 4 component (A) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 10 component (A) for the 6.8L engine earlier in this Group.

RG41221,00002A6 -19-23OCT07-2/2

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Turbo Compressor Inlet Temperature Sensor

The ECU uses this sensor to calculate the ambient air temperature into the turbo. The ECU also uses this sensor in addition to the charge air cooler outlet air temperature to calculate the temperature of the turbo compressor outlet temperature. From these calculations, the ECU can determine if the air/fuel ration is correct, or if changes are required.

For more information on how temperature sensors operate, see MEASURING TEMPERATURE earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 1 earlier in this Group.

DN22556,000003D -19-15OCT07-1/1

Turbo Turbine Inlet Temperature

There is no turbo turbine temperature sensor. This temperature is calculated by the ECU. The ECU uses the following parameters to create the model based temperature:

- Manifold Air Pressure
- Timing base on the crank position or the pump position sensor
- Fuel Rail Pressure
- Engine Speed

- Fresh Air to Fuel Ratio
- A software filter to represent a time delay for component heat up rate.

The ECU also uses this temperature for engine protection purposes.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

RG41221,00002A8 -19-15OCT07-1/1

Measuring Pressure

All engine pressure sensors (A) are 3-wire devices. As pressure changes, output changes. The ECU (B) supplies the sensor with a reference voltage (C) and ground (F). It monitors the output voltage from the sensor signal output wire (D). As the pressure changes, it causes the input to the ECU to change. The ECU compares the input value to a pre-programmed value in the ECU's memory.

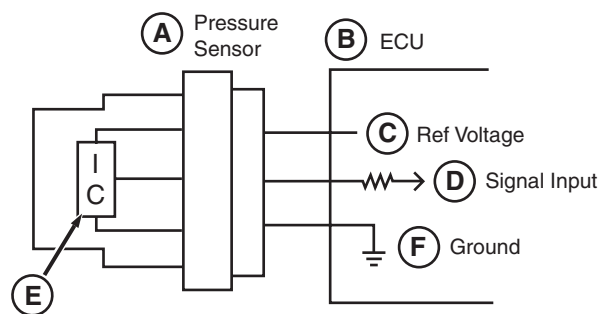
There are many types of devices, and depending on the circuitry (E) in the device, the ECU determines how to process the input signal.

If the input value is near the expected value, then the ECU assumes everything is functioning properly. If the value is above or below the expected value, the ECU will set the appropriate diagnostic trouble code (DTC).

The ECU has the ability to derate the engine power, engine speed, or shut down the engine in an attempt to protect the engine and its components. If certain pressures exceed the threshold, the ECU will enable the engine protection.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on DTC's, see DIAGNOSTIC TROUBLE CODES LIST in Section 4, Group 160.



Typical Pressure Sensor Schematic

- A—Pressure Sensor
- B—ECU
- C—Ref Voltage
- D—Signal Input
- E—IC (Integrated Circuit)
- F—Ground

RG15044 -UN-05DEC06

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RG40854,00000E5 -19-04JAN08-1/1

Barometric Air Pressure (BAP) Sensor

The BAP sensor is located internal to the ECU. This sensor cannot be repaired or replaced without replacing the entire ECU. This sensor is used to determine the pressure of the ambient air at the mounting location of the ECU. This helps the ECU determine the air density for calculating the correct air/fuel ratio.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

RG41221,00002A9 -19-15OCT07-1/1

Fuel Rail Pressure Sensor

The fuel rail pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel pressure to control the amount and timing of fuel being transferred from the high pressure fuel pump to the high pressure common rail (HPCR). The ECU uses this signal input to determine if fuel rail pressure is adequate for the current operating condition. The ECU will command more or less fuel from the high pressure fuel pump by altering the signal to the suction control valve. The ECU also uses this sensor to determine if there is an electronic injector problem by measuring the drop of pressure every time the engine injects fuel to a specific cylinder. This sensor is used for engine protection.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

For more information on the suction control valve, see SUCTION CONTROL VALVE later in this Group.

DB92450,0000015 -19-30AUG07-1/1

Fuel Transfer Pump Pressure Sensor

The fuel pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel pressure to determine if fuel is continuously passing through the low pressure side of the fuel system, or if there is a leak or blockage in it.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

DM80898,0000420 -19-27AUG07-1/1

Manifold Air Pressure (MAP) Sensor

The ECU uses manifold absolute pressure to help calculate the amount of airflow into the engine. The MAP sensor also supplies the ECU with a direct measurement of turbo boost.

The ECU computes what MAP should be based on engine operating conditions and turbo speed. If the actual value of MAP from the sensor is significantly different for the current operating conditions the ECU will default to a MAP model and set DTC 000102.02.

The most probable causes of this error are boost air leaks and air intake restrictions.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

DM80898,0000422 -19-15OCT07-1/1

Oil Pressure Sensor

The oil pressure sensor sends an oil pressure equivalent signal to the ECU. The ECU uses this signal to determine if engine oil pressure is adequate for the current operating conditions. The ECU monitors oil pressure for engine protection purposes.

For more information on how pressure sensors operate, see MEASURING PRESSURE earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

DB92450,0000016 -19-15OCT07-1/1

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Measuring Speed

The camshaft position sensor measures engine speed by detecting the rotating teeth of a timing wheel mounted on the front of the camshaft drive gear. It can also measure the position of the rotation of the engine because it can detect a gap in teeth of the timing wheel where two of the teeth have been removed. This gap corresponds to top-dead-center of piston #1.

The sensor uses a coil wound around a magnet to create a voltage signal. As the tooth in the timing

wheel passes directly under the sensor, the magnetic field is pulled towards the tooth. As the tooth passes the sensor, the magnetic field moves back toward the sensor. This creates a voltage in the coil that is sent to the ECU. By monitoring the frequency of these signals, the ECU calculates the component speed. When the gap in the teeth of the timing wheel is detected, the ECU interprets this change in the voltage pattern to be top-dead-center.

RG40854,00000E8 -19-15OCT07-1/1

Crank Position Sensor

It is an inductive type pickup sensor that detects teeth on the crankshaft timing gear. The ECU uses the crank position input to determine engine speed and the angular position of the crankshaft in its 360° field of rotation. The crankshaft timing gear is composed of 45 evenly-spaced teeth. There is a 3-tooth section with no notches. The 3-tooth section helps the ECU determine when cylinder #1 is at Top-Dead-Center (TDC).

The ECU uses the inputs of both the crank position and pump position sensors to precisely control the timing and duration of fuel injection.

If there is a problem with the crank position sensor, the ECU will use the pump position sensor to determine

engine timing. This may require prolonged engine cranking to start the engine. The ECU provides engine protection for crank position sensor problems.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

RG41221,00002AF -19-30AUG07-1/1

Pump Position Sensor

It is an inductive type pickup sensor that detects teeth on the upper idler gear. The upper idler gear is composed of 12 evenly-spaced notches with one additional notch offset to tell the ECU that cylinder #1 is approaching Top-Dead-Center.

If there is a problem with the Pump Position Sensor, the ECU will use the Crank Position Sensor to

determine engine timing. This may require prolonged engine cranking to start the engine.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

DM80898,00000FB -19-30AUG07-1/1

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Turbo Speed Sensor

The turbo speed sensor is located on the turbocharger. The turbo speed sensor uses a flat spot on the shaft to measure turbo speed. The ECU monitors turbo speed to ensure that turbo is running within acceptable range. At most severe high turbo speed levels, the ECU will use this sensor for engine protection.

For more information on how speed sensors operate, see MEASURING SPEED earlier in this Group.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION DIAGRAM 3 earlier in this Group.

RG41221,00002B1 -19-15OCT07-1/1

Throttle Descriptions

John Deere engines can accept several types of throttle inputs and in several different connection schemes depending on the application. Types of throttles are:

- Analog
- Digital
- Pulse Width Modulated (PWM)

- CAN (messages on the CAN bus)

More than one throttle can be enabled at a time in the ECU software. For finer control of engine speed, a combination throttle can be enabled in the ECU software (discussed later in this group).

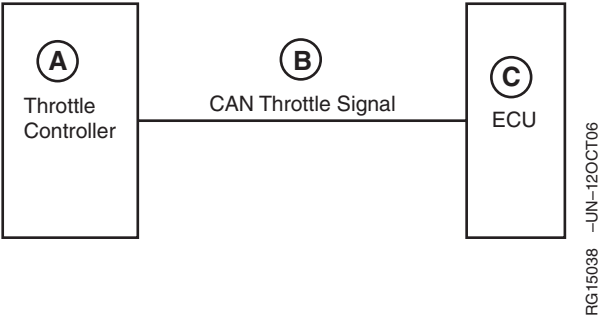
A description of each type follows later in this group.

DM80898,0000003 -19-15OCT07-1/1

CAN Throttle

CAN (Controller Area Network) throttle is information of the desired throttle position that is sent to the ECU by another controller over the CAN bus.

- A—Throttle Controller
- B—CAN Throttle Signal
- C—ECU



CAN Throttle Schematic

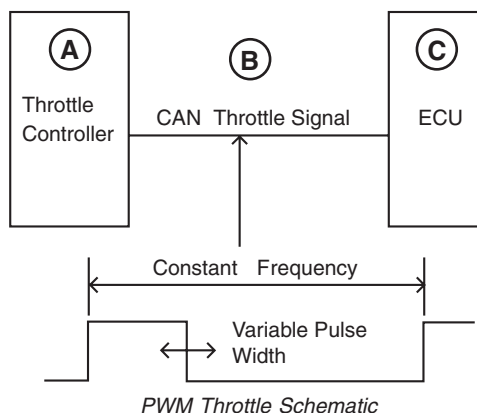
DM80898,0000045 -19-15OCT07-1/1

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Pulse-Width-Modulated (PWM) Throttle

The PWM throttle signal is sent to the ECU by another controller. The PWM signal is a square wave signal with a constant frequency. The pulse width of the signal varies to indicate the desired throttle opening.

A—Throttle Controller
B—CAN Bus Throttle Signal
C—ECU



RG15076 -UN-13OCT06

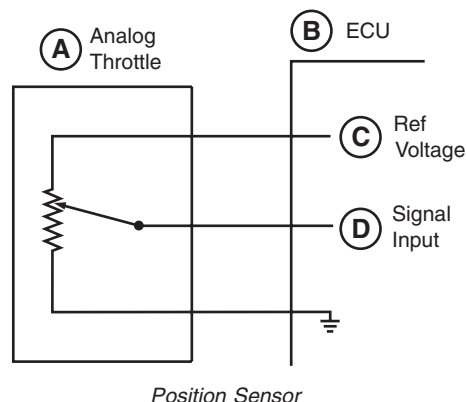
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DM80898,000012A -19-15OCT07-1/1

Analog Throttle

An analog throttle uses a variable resistor (potentiometer) to supply voltage to the ECU. A reference voltage is sent to the throttle by the ECU. The resistance changes as the throttle position changes. In turn, input voltage to the ECU will vary according to the throttle position. The input voltage is monitored by the ECU which responds by sending out the appropriate control signals according to its programming.

A second analog throttle can also be enabled with the first (primary) analog throttle if that option has been set in the ECU software.



A—Analog Throttle
B—ECU
C—Reference Voltage
D—Signal Input

RG15037 -UN-12OCT06

RG41221,00002B7 -19-15OCT07-1/1

Digital Multi-State Throttle

The multi-state throttle is used when a few fixed engine speeds are desired. There are three types of multi-state throttles:

- Dual-State Throttle - See DUAL-STATE THROTTLE later in this Group.

- Tri-State Throttle - See TRI-STATE THROTTLE later in this Group.
- Ramp Throttle - See RAMP THROTTLE later in this Group.

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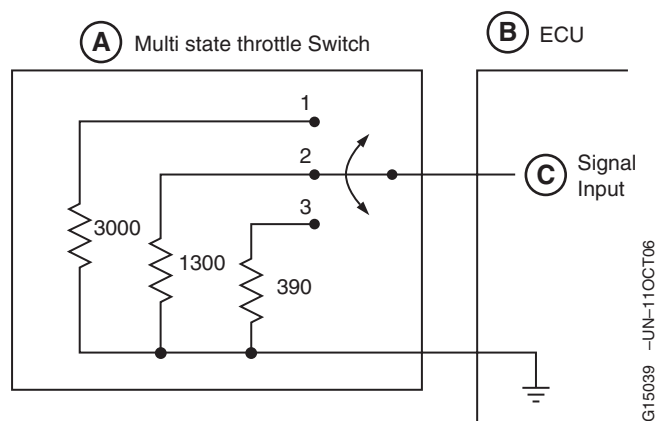
Dual-State Throttle

The dual-state throttle is used on applications that use two fixed engine speeds. The available positions are “Low Idle” (turtle) and “High Idle” (rabbit). The standard tri-state detent switch may be replaced with a 2-position detent switch with only the “turtle/low” and “rabbit/high” position resistance settings.

The switch uses two different resistors to change the voltage returned to the ECU. The ECU uses an internal conversion table to convert the voltage to a specific engine speed. When the switch is in the low idle position, the current is routed through a 390-ohm resistor. High idle position uses a 3000-ohm resistor.

If the panel has an analog throttle then the engine speed can be adjusted when the dual state throttle switch is in the low idle position.

NOTE: The three-position multi-state throttle switch may be used. The middle position is ignored.



Dual-State Throttle Switch Schematic

A—Multi state throttle switch
B—ECU
C—Signal input

RG15039 -UN-11OCT06

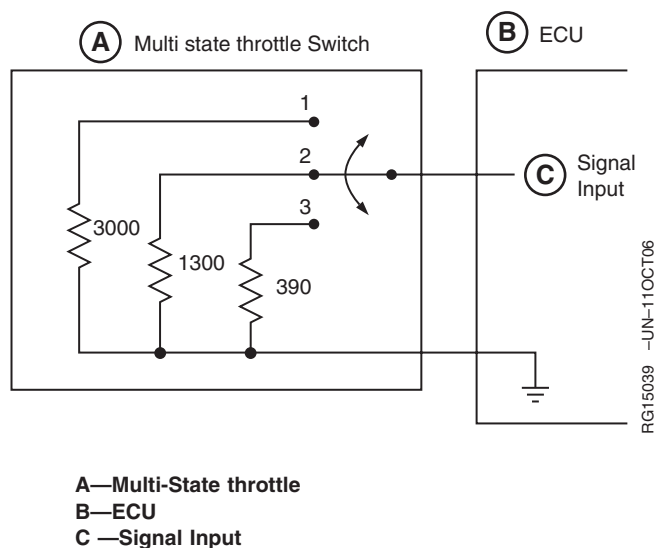
DM80898,0000047 -19-15OCT07-1/1

Tri-State Throttle

The digital tri-state (or “3-state”) throttle works similar to the dual-state throttle. This throttle uses a switch with three positions: minimum throttle (turtle–3), maximum throttle (Adj–2), and fast idle (rabbit–1). In the minimum throttle position, engine RPM defaults to a speed that has been set in the ECU according to the needs of the application. The fast idle (no-load) position speed is set in the ECU according to the needs of the application. In the maximum (Adj–2) throttle position, engine speed can be set within a range programmed into the ECU.

The switch uses three different resistors to change the voltage returned to the ECU. When the switch is in the minimum throttle position, current is routed through a 390-ohm resistor. The maximum throttle position uses a 1300-ohm resistor and the fast idle position uses a 3000-ohm resistor.

To change engine speed, the tri-state throttle must be in the Adj position and the “Bump Enable” switch must be in the “enable up” or “enable down” position while the “Idle Select” switch is held in the increase (+) or the decrease (–) position.



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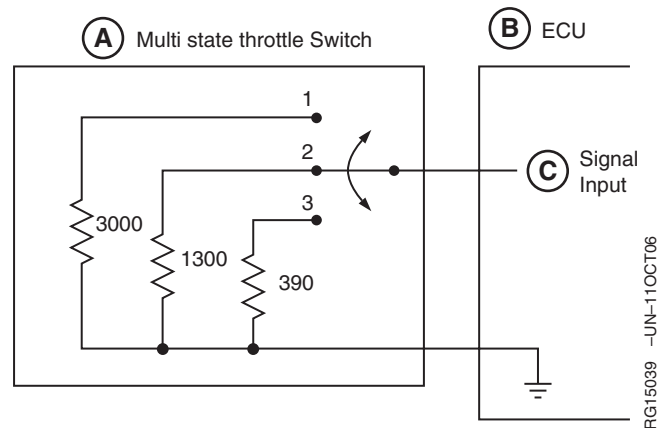
Ramp Throttle

The digital ramp throttle operates between minimum throttle and fast idle and uses a 3-position "Ramp Throttle" switch. If the switch is held in the "Increase Throttle" (rabbit-1) position, the engine speed will ramp up in small increments. If the switch is held in the "Decrease Throttle" (turtle-3) position, the engine speed will ramp down. As long as this switch is held in a momentary position, the engine continues to ramp up or down until the maximum high or low throttle speed setting is reached. When released, the switch returns to the center "Hold Throttle" position.

This is a 3-position, spring-loaded-to-center switch. The "Increase" speed position (1) uses a 3000-ohm resistor. The "Decrease" speed position (3) uses a 390-ohm resistor, and the "Hold" position (2) uses a 1300-ohm resistor. The ramp throttle settings are reset to the factory settings when the key is turned off and back on.

The ramp rate selection is a trim option and sets the rate of change for engine speed increases or decreases. There are four ramp rate options available.

- **3-Second Exponential:** Engine speed will start to increase/decrease at a slow rate and will accelerate/decelerate at an increasingly faster rate the longer the switch is held. The engine throttle setting will go from 0% to 100% throttle in 3 to 5 seconds.
- **5-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 5 seconds.
- **7-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 7 seconds.
- **9-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 9 seconds.
- **25-Second Linear:** Engine speed will increase/decrease at a constant rate. With this setting the engine throttle setting will go from 0% to 100% throttle in 25 seconds.



A—Multi-State throttle
B—ECU
C—Signal Input

RG15039 -UN-11OCT06

Continued on next page

DM80898,000004A -19-15OCT07-1/2

- **Custom Linear:** Engine speed will increase/decrease at a rate set by the user. With this setting the engine throttle setting will go from 0% to 100% throttle at a rate between 5 and 30 seconds determined by the user.

Ramp steps or “bumps” are minor increases or decreases, in the engine speed setting. When the ramp throttle switch is momentarily held in the “Increase Throttle” or “Decrease Throttle” positions, the engine speed will increase/decrease a selected percentage of the throttle range. The actual engine RPM speed change for each setting will vary.

Four ramp step rates are available:

- 0.4% of throttle range
- 0.8% of throttle range
- 1.6% of throttle range
- 2.8% of throttle range

DM80898,000004A -19-15OCT07-2/2

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Throttle Adjustments

Throttle Rate

Throttle rate is how quickly the ECU changes the engine fuel rate in response to a throttle increase signal. Throttle rate has no impact on the deceleration. The ECU is shipped with the Maximum rate selected. Four rates are available: Maximum, Fast, Medium, and Slow.

NOTE: If Ramp Throttle is enabled, the Throttle Rate feature is disabled for all throttles.

Throttle Out-of-Range (OOR) Recovery

A throttle is determined to be Out-of-Range (OOR) when the ECU detects the input signal from that device is outside its expected normal limits (invalid). When the OOR condition is detected the ECU will set an diagnostic trouble code. The ECU will then ignore the input from the OOR throttle until it becomes valid, essentially setting its input to 0%. When the input becomes valid again the ECU will take appropriate action, which is determined by the recovery type programmed into the ECU. Typically, these errors occur when analog throttle endpoints are misaligned, but it can also be caused by faulty wiring.

Recovery types are:

- **Resume Recovery:** When a throttle Out-of-Range Error (OORE) condition is detected, only the OOR

throttle input will be considered 0% until a valid input is received. The OOR throttle will immediately operate again as soon as the input is valid.

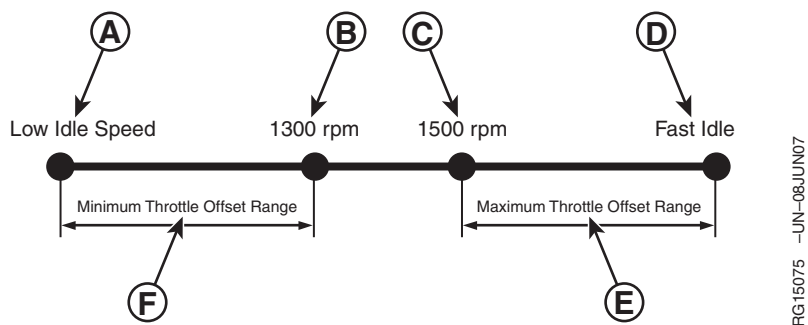
IMPORTANT: This setting can cause rapid changes in the throttle if an intermittent OOR condition exists.

- **Idle Recovery:** When a throttle OOR condition is detected, only the OOR throttle input will be considered 0%. If the input becomes valid again after the OOR condition, the OOR throttle must be returned to low idle position (0% throttle) before the output of the throttle is allowed to increase above 0%.
- **Locked Recovery:** When a throttle OOR condition is detected, only the OOR throttle input will be considered 0% and will not be allowed to operate again until the power is reset on the ECU and the throttle input is valid.

The Throttle Out-of-Range (OOR) Recovery applies to all throttles except ramp throttle. Because the ramp throttle resets itself to minimum throttle for any Out-of-Range condition, selecting a different "Throttle Out-of-Range Recovery" will have no effect on the ramp throttle.

DM80898,000004B -19-15OCT07-1/1

Throttle Offsets



Minimum Throttle Offset

The Minimum Throttle Offset is used to pre-set the low speed idle bump. The number entered into the field on the Trim Page will be the rpm increase from the standard factory setting of the idle speed. This offset will apply to all active throttles. The maximum setting for the Minimum Throttle Offset is the difference between the Low Idle speed and 1300 rpm.

Maximum Throttle Offset (Tri-State Throttle Only)

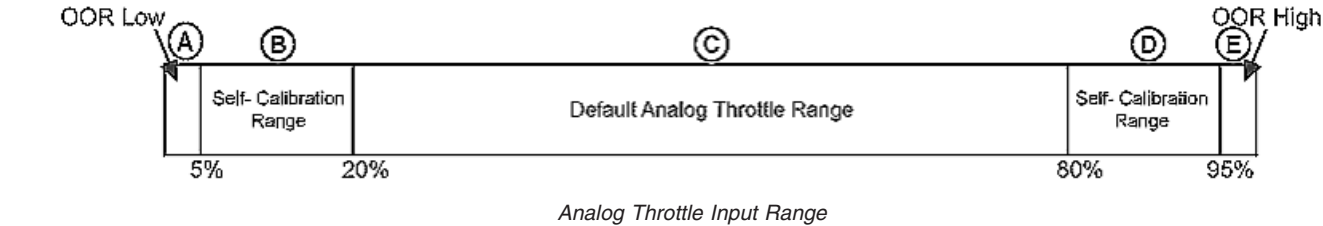
The Maximum Throttle Offset is used to pre-set the

high-speed idle bump. The number entered into the field on the Trim Page will be the amount of rpm below the fast idle speed. The engine will operate in the “mid” position only if the 3-state throttle option is selected. This offset will apply to all active throttles, but only if the 3-state throttle is active. The maximum setting for the Maximum Throttle Offset is the difference between the fast idle speed and 1500 rpm.

DM80898,000004C -19-15OCT07-1/1

Self-Calibration

RG15048 -UN-07FEB07



A—OOR (Out Of Range) Low C—Default Analog Throttle D—Self-Calibration Range E—OOR (Out Of Range) High
B—Self-Calibration Range Range

With this feature enabled, it will automatically adjust throttle dead-band on every sweep of the throttle from idle to full throttle position. The Self-Calibration feature can adjust the 0% throttle setpoint from 20% to 5% of the Analog Throttle Input Range. Similarly, the 100% throttle setpoint can be adjusted between 80% and 95% of the Analog Throttle Input Range.

If the Self-Calibration feature is disabled, the operating range of the throttle will be limited to the Default Analog Throttle Range.

DM80898,0000004 -19-15OCT07-1/1

Combination Throttle

The combination throttle is the use of two or more throttle controls on an application to give coarse/fine/extra fine control. A maximum of 3 throttles may be combined. Normally, only two are used.

If the combination throttle is enabled, a master and a secondary throttle are selected. An additional third throttle can be selected as part of the combination. Each throttle can only be used once in the combination series (i.e. The Primary Analog Throttle selected as the master throttle cannot be selected as the second or third throttle in the combination).

Any type of throttle can be used in the combination. Currently, the only OEM throttle types used are 2-state, 3-state, ramp, and analog. PWM and CAN throttles can be used but are not currently configured for use within the software.

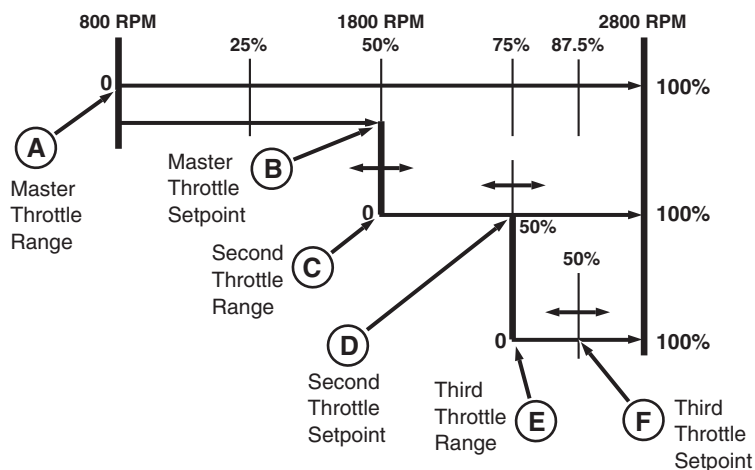
The ECU uses inputs from all enabled throttles to set engine speed. If a combination throttle with 2 throttles

is enabled, and a third throttle is enabled, the ECU will look at the input from the combination throttle and compare it to the third throttle. The engine speed will then be set to whichever one is highest.

The basic role of the throttle controls is to act as accelerators. This means that, as the throttle input increases, the engine speed increases. The master throttle always functions in this fashion.

While not common, there are throttle controls that function as decelerators. This means as the throttle input increases, the engine speed decreases. However, this function is not compatible with 3-state throttles.

The combination throttle operates in the following fashion: each throttle has an available throttle range of 0-100% (low idle to high idle speed), and as each throttle is added to the master, a finer resolution in engine speed is defined (see figure below).



A—Master Throttle Range
B—Master Throttle Setpoint

C—Second Throttle Range
D—Second Throttle Setpoint

E—Third Throttle Range

F—Third Throttle Setpoint

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DM80898,0000005 -19-15OCT07-2/2

Marine Throttle

The marine engine has two dual throttle options:

- Dual throttles with transfer control
- Engine synchronization control.

To operate either option requires a variation of the marine transition harness. Which variation depends on feature configuration(s). Both options cannot operate simultaneously. Operation of each option is described as follows:

Dual-Throttle Transfer Control

This feature allows throttle control from one of two locations: the wheelhouse, or a secondary (auxiliary) station. When the ECU is initialized at key ON, throttle control defaults to the station selected via the trim options and is set up in the ECU during programming.

To change throttle control location during engine operation, the station select push-button switch at the requesting throttle is held engaged. The indicator lamp will briefly flash, indicating the throttle control transfer has started. The push-button is held engaged until the station indicator lamp is solid, indicating that throttle control transfer has been successful.

For transfer of throttle control to be successful, the position of the requested throttle must be within 2% of the active throttle position. For example, if the ECU is sampling a throttle command of 55% at the active throttle, then the ECU must receive a throttle command between 53% and 57% at the requesting throttle. If the requesting throttle is not within 2% (approximately 33 rpm) of the active throttle, the lamp flashes on and off. If the station select push-button switch is held engaged and the operator moves the requesting throttle to within 2%, transfer will occur. The lamp will go from flashing to solid and the switch at the requesting throttle can be released.

If the requesting throttle position is outside normal operating range, its lamp momentarily lights, then

shuts off and remains off. If the switch contacts of both throttles are simultaneously closed, the ECU selects the "highest priority location", which has been designated during ECU programming, via trim options.

At key ON, a test of the lamps at the throttle station(s) will occur. If any lamp does not briefly come on, replace the bulb. The lamp test will occur only if the key has been OFF for at least 30 seconds.

Engine Synchronization Control

The Engine Sync feature is selected via trim options and is set up in the ECU during programming. This feature allows the synchronous operation of two engines through a two-throttle, lead-follow system; one ECU is programmed as the Lead, and the other as the Follower. When the system is successfully engaged, the follower ECU runs off the lead ECU's signal. On engines that also have the dual throttle option described above, auxiliary throttle location input is automatically deselected when the engine synchronization is in operation.

In order to enable this system, the following three criteria must be met and sustained for at least two seconds:

1. Both engines must be running at greater than, or equal to, 975 rpm.
2. The engines must be running to within 100 rpm, or less, of each other.
3. The individual throttle commands of each ECU must be within 5% of each other's value.

When the synchronous throttle switch is turned on with the initial criteria met, the throttle station lamp comes on. If at least one of the three criteria is not met, the throttle station lamp flashes on and off until the failing condition has been corrected.

When engine synchronization is successful, the ECU will have automatically disabled the tachometer of the follower engine and will have set each engine to isochronous governor operation. When an engine is above or below engine rpm demand, its governor sends a signal back to the engine's ECU and the ECU makes the appropriate adjustment.

During large demands for acceleration or deceleration, it is normal for the synchronization system to shut

down. Synchronous operation may, at any time, be re-enabled, as long as the initial criteria are met.

At key ON, a test of the lamps at the throttle station(s) will occur. If any lamp does not briefly come on, replace the bulb. The lamp test will occur only if the key has been OFF for at least 30 seconds.

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Engine Derate and Shutdown Protection

The Engine Control Unit (ECU) will decrease the amount of fuel that is delivered to the engine (fuel derate), set the engine to a certain speed (speed derate), or shut the engine down when sensor inputs exceed normal operating ranges. A Diagnostic Trouble Code (DTC) always accompanies a derate.

See OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual for derate specifications per application.

There are three ECU engine protection options:

- **No Protection**— Engine ECU's with "No Protection" do not derate or shut down the engine if a fault occurs. The standard fault lamp will illuminate when a "Warning" fault is detected by the ECU, and the standard stop-engine lamp will illuminate when a "Shutdown" fault is detected. The engine operator is responsible for reducing engine speed and power when a "Warning" fault exists and for shutting down the engine when a "Shutdown" fault exists.
- **Engine Derate Protection WITHOUT Shutdown**— In addition to illuminating the standard fault indicating lights, the ECU will derate the engine when certain "Warning" faults are detected (depending on application). It is the responsibility of the operator to decide if it is necessary to shut down the engine.
- **Engine Derate Protection with Shutdown**— In addition to illuminating the standard fault indicating lights, the ECU will derate the engine when certain "Warning" and "Shutdown" faults are detected (depending on application). If a DTC that requires shutdown is set, the ECU will severely derate the engine and shut down the engine either immediately or in 30 seconds, depending on the shutdown timer setting in the ECU. If the fault has a 30-second shutdown delay, and the problem is corrected within the 30-second delay period, the power will increase at a rate determined by the fault, until full power is reached.

NOTE: CAN wait-to-start enables the CAN bus messages for shutdown and for wait-to-start. Disabling this feature disables both the wait-to-start broadcast and the shutdown broadcast.

Shutdown Override

NOTE: Holding the shutdown override switch continuously "ON" will not reset the 30-second timer.

Shutdowns can be overridden for 30 seconds at a time. This can be used to move a vehicle to a safe location. Each time the switch is pushed, the shutdown timer is reset to 30 seconds and the engine will run in a derated power mode.

Similarly, if the key switch is turned off, the engine Shutdown feature will be reset, but when restarted only 30 seconds of running is allowed until the engine will shut down again. Engine will remain in shutdown mode until fault condition has been corrected.

External Derate

Wiring is provided on the engine harness for additional switches that control engine derate. These additional external switches can provide an additional level of engine control. The external switch type and derate rate are selectable:

- **External Derate Enable:** When enabled with an active external derate circuit, the external derate feature will derate the engine when activated by an external device.
- **External Derate Input:** Input can range from ground to 24V, depending on application battery voltage. Either a normally open switch, or normally closed switch is used for the external derate input.

- **External Derate Rate:** Three external derate rates are available: 20% derate over 10 minutes, 20% derate over 1 minute, and 50% derate over 1 minute. Each provides a linear derate of engine power over the time selected. Derates are based on the 100% torque curve value, so operation below the derated power level is still possible.

NOTE: External Derate is not compatible with cruise control.

External Shutdown

Wiring is provided on the engine harness for additional engine shutdown switches. Either a normally-open or normally-closed switch can be used for the external shutdown input. When enabled and the external shutdown circuit is activated, the ECU will shut down the engine. Features include:

- **External Shutdown Timer:** The external shutdown timer can be set for either immediate shutdown, or a 30-second delayed shutdown. If the shutdown switch returns to normal before the end of the 30-second delay, the engine will resume normal running.
- **Override External Shutdown at Engine Start:** Some external shutdowns must be overridden when starting the engine. When enabled, the ECU will disable external shutdowns during engine startup.
- **Override External Shutdown Time:** Once the engine switches to "Run" mode (reaches low idle), the ECU will continue to disengage external shutdown for the time that has been selected. Three override times are available: 5 seconds, 30 seconds, and 1 minute.

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Electronic Injector (EI) Wiring Harness Connector

The EI wiring harness connector is located on the cylinder head carrier. This connector provides voltage and a ground from the ECU to the EI wiring harness internal to the cylinder head carrier.

For wiring information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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Glow Plug Operation

Glow plugs are located above each cylinder's combustion chamber. The glow plug heaters are used to increase the intake air temperature to improve cold starting. When the operator turns the key from "OFF" to "ON", the ECU receives fuel temperature information from the fuel temperature sensor, determines if the temperature is below the set point, turns on the "Wait to Start" light on and energizes the coil of the glow plug relay. This closes the normally-open glow plug relay contacts which provide current path to the glow plugs located above each cylinder. The ECU will keep the glow plugs energized for an amount of time that is determined by the measured temperature- colder is longer. When the predetermined time has passed, ECU turns off the "Wait to Start" light and de-energizes the glow plug relay. If the operator turns the ignition from "ON" to "START" at this time, the engine will crank and start.

If the operator turns the key from "START" to "ON" without waiting for the "Wait to Start" light to turn off, the ECU will de-energize the glow plug relay and a key-off/key-on cycle is required before preheating is allowed again.

Anytime the engine cranks but does not start, a key-off/key-on cycle will be required before preheating is allowed again.

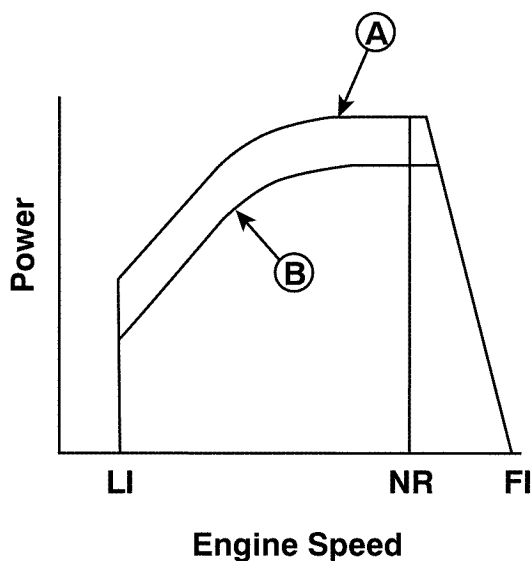
For application specific information on glow plug times vs. temperatures, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

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Torque Curve Selection

The ECU has the ability to select one of the multiple torque curves that are stored in its memory. The ECU can switch between torque curves while the engine is running. This provides the proper speed and torque for the current conditions. The other controllers on the vehicle can also send CAN messages to the ECU to change torque curves. There is usually one normal torque curve, and then there are others that reduce power for component protection (i.e. hitches, axles, transmissions). In some instances a power boost for a short period of time is an option (i.e. unloading a combine while still picking).

NOTE: OEM applications have only 1 torque curve.



A—Normal Power Curve
B—Derated Power Curve
LI—Low (Slow) Idle
NR—Normal Rated
FI—Fast Idle
Torque Curves

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Governor Droop Mode Selection

The electronic control system provides all-speed governing. The Engine Control Unit (ECU) controls the engine speed based on the analog throttle input.

The ECU also has the ability to provide normal and isochronous (0%) droop governing. The normal droop gives a drop in engine speed with an increase in load or an increase in engine speed with a decrease in load. When in isochronous, the droop is set at 0%, and

there is a no change in engine speed with changing loads until engine's torque limit is reached. The factory low idle speed is always set for isochronous governing. Droop selection can be determined by engine speed, load, and cruise control depending on the application.

Refer to application manual for information on governor droop parameters.

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Suction Control Valve

The Suction Control Valve is located on the high pressure fuel pump. The ECU sends an electronic signal to the Suction Control Valve through the solenoid to regulate the delivery of fuel to the High Pressure Common Rail (HPCR). When the Suction Control Valve is energized, fuel is allowed into the pumping chamber of the high pressure fuel pump. The pressurized fuel is then sent to the high pressure common rail (HPCR). The ECU varies the ON-time of

this signal to ensure the proper amount of fuel is available.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

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Water in Fuel (WIF) Sensor

The water in fuel (WIF) sensor is located on the bottom of the final fuel filter in the water separator bowl. When water is detected in the fuel, a signal is sent to the ECU. The WIF sensor uses the resistance of fuel and water in the fuel system along with the principle that water is a better conductor than fuel. If water is present, the voltage will be lower. The ECU monitors this for engine protection purposes.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on sensor locations, see COMPONENT LOCATION earlier in this Group.

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Engine Coolant Level Switch

This sensor provides ECU signal with a path to ground, whenever the engine coolant drops below a certain level.

Loss of coolant switch is used for engine protection purposes and is a trimmable option. The user has the ability to choose a normally open or a normally closed switch. Depending on the switch configuration, diagnostics will vary.

For more information on engine protection and derate programs, see ENGINE DERATE AND SHUTDOWN PROTECTION later in this Group.

For more information on trimmable options, see TRIM OPTIONS INFORMATION in Section 04, Group 160 later in this manual.

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Cruise Control Operation

The ECU is available with and without the cruise control function. It is an off-road cruise control that maintains constant engine speed under varying load conditions. This function is especially intended for field applications where an operator faces the need to turn the vehicle around at the end of each row. This cruise control allows the driver to use the throttle and/or brake to turn the vehicle around. When ready to resume field operations, the operator brings the engine speed above 1300 rpm and activates the Cancel/Resume function again to resume cruise speed. An internal timer gives the operator one minute to complete the turnaround maneuver.

The cruise control has the normal functions of:

- Cruise control power “ON” or “OFF”
- “Set” or “Bump Up” engine speed
- “Resume” or “Bump Down” engine speed
- Vehicle brake or clutch pedal to disengage cruise control

On 12-volt ECUs, the engine speed can be set from two different locations. The primary location would normally be in the cab of the vehicle and is used to set a constant engine speed while the vehicle is being driven. The secondary cruise control is normally used in a location that provides PTO speed control and is used with the engine in “neutral” or out of gear. Both locations have the normal cruise control functions.

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Power Supply #1

John Deere engine sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors to for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Power Supply #1:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Fuel Rail Pressure Sensor

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Power Supply #2

John Deere engine sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors to for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Power Supply #2:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Fuel Transfer Pump Pressure Sensor
- Manifold Air Pressure Sensor
- Oil Pressure Sensor

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Power Supply #3

John Deere engine sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors to for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Power Supply #3:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Analog Throttle
- Fan Speed Sensor (some applications)
- A/C Pressure Switch (some applications)
- External Shutdown Switch (some applications)
- Multi-State Throttle (some applications)

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Power Supply #4

John Deere engine sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors to for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Power Supply #4:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Secondary Analog Throttle (some applications)
- Loss of Coolant Switch
- External Shutdown Switch
- External Derate Switch
- Override Shutdown Switch
- PTO Speed (some applications)
- Vehicle Speed (some applications)

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Power Supply #5

John Deere engine sensors must have 5 volts and sensor return (ground) supplied to them to function properly. There are too many sensors to for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Power Supply #5:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Exhaust Gas Recirculation Valve

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Section 04 Diagnostics

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About This Group

This section of the manual contains necessary information for observable diagnostics and fuel-related test procedures. Use this information in conjunction with the base engine manual.

NOTE: Follow the diagnostic procedure of an active or stored DTC before pursuing any observable diagnostic procedure.

- E1 - Engine Cranks/Won't Start
- E2 - Engine Misfires/Runs Irregularly
- E3 - Engine Does Not Develop Full Power
- E4 - Engine Emits Excessive White Exhaust Smoke
- E5 - Engine Emits Excessive Black Or Gray Exhaust Smoke
- E6 - Engine Will Not Crank
- E7 - Engine Idles Poorly
- E8 - Abnormal Engine Noise
- E9 - Primary Analog Throttle Does Not Respond
- E10 - Secondary Analog Throttle Does Not Respond
- F1 - Low Pressure Fuel Supply System Test
- F2 - High Pressure Fuel Supply System Test
- F3 - Excessive Fuel Consumption
- F4 - Fuel in Oil
- D1 - ECU Does Not Communicate With SERVICE ADVISOR
- D2 - Diagnostic Gauge Does Not Communicate With ECU
- A2 - Glow Plug Check
- Fuel System Procedures:
 - Check Fuel Supply Quality
 - Test for Air in Fuel
 - Check for Restricted Fuel Leak-off Line
 - Bleed the Fuel System
 - Check and Adjust High Pressure Fuel Pump Static Timing
- Intake and Exhaust System Procedures:
 - Charge Air System
 - Excessive Engine Crankcase Pressure (Blow-By)
 - Exhaust Gas Recirculation (EGR) System Diagnostic
 - Variable Geometry Turbocharger (VGT) Component Test
 - EGR-VGT System Temperature and Flow Test
- Temperature Sensor Validity Test

E1 - Engine Cranks/Won't Start

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E1 - Engine Cranks/Won't Start Diagnostic Procedure

Additional References:

NOTE: This procedure should be followed if engine cranks, but will not start. If the engine will not crank, see E6 - ENGINE WILL NOT CRANK to diagnose the cranking system.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

-- -1/1

Observable Diagnostics and Tests

❶ Preliminary Checks	1. Verify sufficient fuel in fuel tank. 2. Verify that any remote switch used to shut down engine is in the RUN position. 3. Check for major intake air restriction. 4. Check for major exhaust restriction. 5. Check battery state of charge. 6. Verify engine cranking speed is adequate to start engine. See TEST ENGINE CRANKING SPEED in Section 04, Group 150 of the base engine manual for minimum cranking speed specification. 7. Verify glow plugs are functional if temperature is below 0°C (32°F). See A2 - GLOW PLUG CHECK later in this section. Does engine start?	YES: Problem fixed. NO: GO TO 2 -- -1/1
❷ Attempt to Connect to ECU with Service ADVISOR	1. Ignition ON, engine OFF. 2. Attempt to connect to ECU with Service ADVISOR. Were you able to connect to ECU with Service ADVISOR?	YES: GO TO 3 NO: Discontinue this test and perform test D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR. -- -1/1
❸ Check for Active DTCs	Are there any active DTCs?	YES: Discontinue this test and perform test for the active DTC. NO: GO TO 4 -- -1/1
❹ Read DTCs and Store Snapshot Information	1. Write down any stored DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Clear stored DTCs. 3. Crank engine for 15 seconds. Are there any stored or active DTCs after cranking engine?	YES: Discontinue this test and perform test for the stored or active DTC. NO: GO TO 5 -- -1/1

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Observable Diagnostics and Tests

5 Harness Diagnostic Mode Test	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Were any active DTCs generated during Harness Diagnostic Mode Test?	YES: Discontinue this test and perform test for the active DTC. NO: GO TO 6 -- -1/1
6 Low Pressure Fuel Supply System Test	Perform F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Use fuel that has known-good quality for the test. Did engine start?	YES: Problem fixed. NO: GO TO 7 -- -1/1
7 High Pressure Fuel Supply System Test	Perform F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Did engine start?	YES: Problem fixed. NO: GO TO 8 -- -1/1
8 Check Fuel Quality	Perform procedure CHECK FUEL SUPPLY QUALITY, found later in this group. Did engine start?	YES: Problem fixed. NO: GO TO 9 -- -1/1

9 Pump Position and Crank Position Signal Test	<i>NOTE: See DTC procedures 000636.02 and 000637.02 in Group 04, Section 160 later in this manual for more information on speed sensor data points.</i> - Monitor and record the following data points in Service ADVISOR: - Crank Position Status - Pump Position Sensor Status - Crank Position Sensor Speed - Pump Position Sensor Speed - Crank Improper Pattern Indicator - Pump Position Sensor Improper Pattern Indicator - Crank Position Input Noise Indicator - Pump Position Sensor Improper Pattern Indicator - Crank engine for 15 seconds. - Replay recording and review the recorded data points. Did the data points indicate the following while the engine is cranking at a steady speed? <i>NOTE: When engine first begins cranking, the data points may not indicate these values. Ignore data point values until engine has rotated at least two full revolutions.</i> - Crank Position Status – 63 for speeds below 400 rpm, 47 for speeds above 400 rpm. - Pump Position Status – 63 for speeds below 400 rpm, 47 for speeds above 400 rpm. - Crank Position Sensor Speed - The actual cranking speed (nearly same as pump position sensor speed). - Pump Position Sensor Speed - The actual cranking speed (nearly same as crank position sensor speed). - Crank Improper Pattern Indicator - 0 - Pump Position Sensor Improper Pattern Indicator - 0 - Crank Position Input Noise Indicator - 0 - Pump Position Sensor Improper Pattern Indicator - 0	YES: GO TO 12 NO: GO TO 10 -- -1/1
10 Check for Crank Sensor Pattern Problem	- Ignition OFF, engine OFF. - Disconnect crank sensor and secure connector away from rotating components. - Ignition ON, engine OFF. - Crank engine for 30 seconds. - Ignition OFF, engine OFF. - Reconnect crank sensor. Did engine start?	YES: Perform diagnostic procedure for 000637.02 as though DTC were active. NO: GO TO 11 -- -1/1

Observable Diagnostics and Tests

11 Check for Pump Position Pattern Problem	1. Verify crank sensor is reconnected. 2. Disconnect pump position sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Crank engine for 30 seconds. 5. Clear DTCs. 6. Ignition OFF, engine OFF. 7. Reconnect pump position sensor. Did engine start?	YES: Perform diagnostic procedure for 000636.02 as though DTC were active. NO: GO TO 12
12 Service ADVISOR Compression Test	<i>NOTE: Service ADVISOR Compression Test determines the relative compression between cylinders. A problem that causes low compression in all cylinders is not detected by this test. An engine with low compression in all cylinders will sound and feel different while cranking than an engine with good compression due to a lack of cranking speed fluctuation.</i> 1. Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR. 2. Listen and feel for cranking speed fluctuation during the Compression Test and compare against another engine, if available. Did Compression Test results indicate a significant difference between cylinders or did engine crank as though compression were low in all cylinders?	YES: Perform compression test using mechanical gauge. NO: GO TO 13
13 Inspect Valve Train	1. Ignition OFF, engine OFF. 2. Remove rocker arm cover. 3. Inspect valve train for obvious damage or valves that are out of adjustment. 4. Rotate engine using JDG820 Flywheel Turning Tool while observing valve train for proper operation. 5. Set engine at #1 TDC of compression stroke using JDE81-4 Timing Pin. 6. Verify intake and exhaust valves are closed on #1 cylinder. 7. Remove timing pin and turning tool. Were any problems found?	YES: Engine starts. Problem fixed. NO: Reinstall rocker arm cover. GO TO 14

Observable Diagnostics and Tests

14 Reprogram ECU

- 1. Ignition OFF, engine OFF.
 - 2. Download latest ECU payload and reprogram ECU.
- Did engine start?

YES: Problem fixed.
NO: GO TO 15

-- -1/1

15 Replace ECU

- 1. Ignition OFF, engine OFF.
 - 2. Replace ECU.
- Did engine start?

YES: Problem fixed.
NO: Open DTAC case.

-- -1/1

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E2 - Engine Misfires - Runs Irregularly

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E2 - Engine Misfires/Runs Irregularly Diagnostic Procedure

-- -1/1

① Check for Active DTCs

Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?

YES: GO TO 2

NO: Check for and resolve any active DTCs prior to performing this test.

-- -1/1

② Items Possibly Mistaken As Misfire or Irregular Running Engine

Check for the following items which may be mistaken for a misfire:

- Engine accessories such as A/C clutch or fan drives cycling on and off.
- Alterations to the engine and/or machine harness such as radios or non-John-Deere accessories.

Does disabling or switching off these devices temporarily restore engine performance?

YES: Problem fixed.**NO:** GO TO 3

-- -1/1

③ Misfire and Cut-Out Test

1. Perform ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR.
2. Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR with engine at low idle.

Is each cylinder's contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?

YES: GO TO 5**NO:** GO TO 4

-- -1/1

④ Check Compression

Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR.

Is compression in the cylinder(s) with low contribution identified in Step 3 also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder)?

YES: Check compression with mechanical gauge.

NO: Replace injector(s) in cylinder(s) with low contribution.

-- -1/1

Observable Diagnostics and Tests

5 Check for Air in Fuel	Perform TEST FOR AIR IN FUEL procedure, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 Low Pressure Fuel Supply System Test	Perform F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 7 -- -1/1
7 High Pressure Fuel Supply System Test	Perform F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 8 -- -1/1
8 Check Fuel Quality	Perform procedure CHECK FUEL SUPPLY QUALITY, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 9 -- -1/1
9 Pump Position and Crank Position Signal Test	<i>NOTE: See DTC procedures 000636.02 and 000637.02 in Group 04, Section 160 later in this manual for more information on speed sensor data points.</i> - Monitor and record the following data points in Service ADVISOR: - Crank Position Status - Pump Position Sensor Status - Crank Position Sensor Speed - Pump Position Sensor Speed - Crank Improper Pattern Indicator - Pump Position Sensor Improper Pattern Indicator - Crank Position Input Noise Indicator - Pump Position Sensor Improper Pattern Indicator - Operate engine at speed and load where problem occurs. - Replay recording and review the recorded data points. Did the data points indicate the following with engine running? - Crank Position Status – 47 for speeds above 400 rpm. - Pump Position Status – 47 for speeds above 400 rpm. - Crank Position Sensor Speed - The actual engine speed (nearly same as pump position sensor speed). - Pump Position Sensor Speed - The actual engine speed (nearly same as crank position sensor speed). - Crank Improper Pattern Indicator - 0 - Pump Position Sensor Improper Pattern Indicator - 0 - Crank Position Input Noise Indicator - 0 - Pump Position Sensor Improper Pattern Indicator - 0	YES: GO TO 12 NO: GO TO 10 -- -1/1

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Observable Diagnostics and Tests

10 Check for Crank Sensor Pattern Problem	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Operate engine at speed and load where problem occurs. 5. Ignition OFF, engine OFF. 6. Reconnect crank sensor. Was engine performance restored?	YES: Perform diagnostic procedure for 000637.02 as though DTC were active. NO: GO TO 11 ---1/1
11 Check for Pump Position Pattern Problem	1. Verify crank sensor is reconnected. 2. Disconnect pump position sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Operate engine at speed and load where problem occurs. 5. Ignition OFF, engine OFF. 6. Reconnect pump position sensor. Was engine performance restored?	YES: Perform diagnostic procedure for 000636.02 as though DTC were active. NO: GO TO 12 ---1/1
12 Check Throttle	1. Engine running at speed where misfire or irregular running occurs. 2. Throttle held at a steady position. 3. Monitor Throttle Position data point in Service ADVISOR. Does Throttle Position data point indicate throttle signal is changing by more than 3 percent?	YES: Check for throttle circuit problem. NO: GO TO 13 ---1/1

Observable Diagnostics and Tests

13 Check EGR Valve	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	YES: Part 2 NO: GO TO 14
	Part 2 <i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Operate engine under load until coolant temperature is at operating temperature. 2. Operate engine unloaded at low idle for five minutes. 3. Ignition OFF, engine OFF. 4. Remove EGR valve. 5. Check for stuck open EGR valve. 6. Inspect EGR valve and O-rings for damage. 7. Inspect intake and exhaust passages for damage which would permit EGR flow with EGR valve closed. 8. Verify that the part number of the EGR valve removed is the correct part for the engine. 9. Inspect EGR cooler for indication of coolant leakage. Were any problems found?	YES: Fix problem or replace incorrect EGR valve. GO TO 14 NO: Reinstall EGR valve. GO TO 14 -- -1/1
14 Reprogram ECU	Download latest payload and reprogram ECU. Is engine performance restored?	YES: Problem fixed. NO: Open DTAC case. -- -1/1

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E3 - Engine Does Not Develop Full Power

RG41221,00000F2 -19-20FEB08-1/1

E3 - Engine Does Not Develop Full Power Diagnostic Procedure

-- -1/1

① Check for Active DTCs

Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?

YES: GO TO 2

NO: Check for and resolve any active DTCs prior to performing this test.

-- -1/1

② Harness Diagnostic Mode Test

1. Write down any stored DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.

2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

Were any active DTCs generated during Harness Diagnostic Mode Test?

YES: Discontinue this test and perform test for the active DTC.

NO: GO TO 3

-- -1/1

③ Preliminary Checks

NOTE: Low engine power complaints are often due to the operator's expectations, rather than the engine not actually developing rated power. Compare the suspect engine's performance to another identical application, if possible.

Check for the following, if applicable, on the application.

- Transmission problems, overheating or slipping.
- Driven load has changed.
- Auxiliary drives with abnormally high loads.
- Hydraulic system problems causing high engine loads.
- Engine is otherwise overloaded.

Is engine performance restored?

YES: Problem fixed.**NO:** GO TO 4

-- -1/1

Observable Diagnostics and Tests

4 Exhaust Check	Operate engine under the conditions where the low power complaint occurs. Does the engine produce excessive blue, white, or black exhaust smoke?	YES: Blue smoke - Check for internal engine damage. Perform CHECK FOR EXCESSIVE ENGINE CRANKCASE PRESSURE (BLOW-BY). See Group 150 Section 04 of Base Engine Manual. YES: White smoke - Perform test E4 - ENGINE EMITS EXCESSIVE WHITE EXHAUST SMOKE. YES: Black smoke - Perform test E5 - ENGINE EMITS EXCESSIVE BLACK OR GRAY EXHAUST SMOKE. NO: GO TO 5 -- -1/1
5 Check for Misfire	Does engine misfire or run irregularly?	YES: Perform test E2 - ENGINE MISFIRES - RUNS IRREGULARLY. NO: GO TO 6 -- -1/1
6 Throttle Test	<i>NOTE: Some applications may have a limit on maximum throttle percentage by design. Consult engine distributor for more information.</i> 1. Ignition ON, engine OFF. 2. Monitor Throttle Position data point in Service ADVISOR. 3. Fully advance throttle lever. Is Throttle Position 97% or higher?	YES: GO TO 7 NO: Check for throttle circuit problem. -- -1/1
7 Charge Air System Analysis	Perform CHARGE AIR SYSTEM found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 8 -- -1/1

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Observable Diagnostics and Tests

8 Low Pressure Fuel Supply System Test	Perform F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 9 -- -1/1
9 High Pressure Fuel Supply System Test	Perform F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 10 -- -1/1
10 Check Fuel Quality	Perform procedure CHECK FUEL SUPPLY QUALITY, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 11 -- -1/1
11 VGT and Actuator Test	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	YES: Part 2 NO: GO TO 12
	Part 2 Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST, found later in this section. Was a problem found?	YES: Fix problem, recheck engine performance. NO: GO TO 13 -- -1/1
12 Non VGT Boost Test	Check turbocharger boost pressure, see INTAKE MANIFOLD PRESSURE (TURBOCHARGER BOOST) SPECIFICATIONS Section 6 Group 210 of the base engine manual. Was boost pressure within specifications?	YES: GO TO 13 NO: Fix boost problem then GO TO 13 -- -1/1
13 Intake and Exhaust Restriction and Air Leak Test	Check for intake and exhaust restrictions and leaks. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS and CHECK FOR EXHAUST AIR LEAKS (TURBOCHARGED ENGINES) in Section 04 of the base engine manual. Was a problem found?	YES: Fix problem, recheck engine performance. NO: GO TO 14 -- -1/1

Observable Diagnostics and Tests

14 Governor Selection Check	<i>NOTE: The following procedure does not apply to all applications.</i> 1. Monitor Desired Speed Governor Curve data points in Service ADVISOR. 2. Toggle the governor type switch between the two settings. Did the Desired Speed Governor Curve data point change?	YES: GO TO 15 NO: See application manual for switch wiring and repair problem. Recheck engine performance. -- -1/1
15 Reprogram ECU	1. Download latest ECU payload. 2. Modify Custom Performance trimable options to values specified by the engine distributor, if applicable. 3. Reprogram ECU. Is engine performance restored?	YES: Problem fixed. NO: GO TO 16 -- -1/1
16 EGR-VGT System Temperature and Flow Test	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	YES: Part 2 NO: GO TO 20
	Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Did system respond as described in the test?	YES: GO TO 20 NO: One air temperature sensor is not indicating correct temperature at start of test. GO TO 16 NO: MAP and barometric pressure are not as described. GO TO 19 NO: EGR temperature sensor indicates EGR flow is present before EGR is commanded open. GO TO 20 -- -1/1

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Observable Diagnostics and Tests

17 Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet temperature sensor (Exhaust Gas Recirculation Fresh Air Temperature data point) • Intake manifold air temperature sensor (Manifold Air Temperature data point) • EGR exhaust gas temperature sensor (Exhaust Gas Recirculation Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • Exhaust Gas Recirculation Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • Exhaust Gas Recirculation Temperature within 7°C (13°F) of Exhaust Gas Recirculation Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 20 NO: GO TO 18 -- -1/1
18 Check Wiring and Sensor	1. Check wiring and terminals for air temperature sensor that does not indicate temperature correctly. 2. If no wiring problem found, replace air temperature sensor that does not agree with the other two air temperature sensors. Is engine performance restored?	YES: Problem fixed. NO: GO TO 20 -- -1/1
19 Check EGR Valve and EGR Cooler	<i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Monitor EGR Valve Position - Actual in Service ADVISOR. 2. Operate engine under load at 1500 rpm until coolant temperature is above 79°C (175°F) and EGR valve begins to open as indicated by EGR valve position. Note that EGR valve will not open unless engine is under load. 3. Permit engine to run at low idle for five minutes. 4. Ignition OFF, engine OFF. 5. Remove EGR valve and check for presence of coolant in EGR cooler. 6. Check for damaged or broken EGR valve. 7. Verify that the part number of the EGR valve removed is the correct part for the engine. Is coolant present in EGR cooler or is EGR valve damaged or the incorrect part?	YES: Cooler leaking. Replace EGR cooler. YES: EGR valve damaged or incorrect part. Replace EGR valve. NO: Reinstall EGR valve. GO TO 20 -- -1/1

Observable Diagnostics and Tests

20 Check Pressure Sensors	1. Check MAP sensor wiring and terminals. 2. Replace MAP sensor if no wiring problems found. 3. Ignition ON, engine OFF. 4. Compare Manifold Absolute Pressure data point to Barometric Pressure data point. Are the Manifold Absolute Pressure and Barometric Pressure within 10 kPa (1.5 psi) of each other with ignition ON, engine OFF?	YES: Engine performance is restored. Problem fixed. YES: Engine performance is NOT restored. GO TO 21 NO: Replace ECU and recheck engine performance. -- -1/1
21 Valve Clearance Check	Perform CHECK AND ADJUST VALVE CLEARANCE procedure found in the base engine manual. Is engine performance restored?	YES: Problem fixed. NO: GO TO 22 -- -1/1
22 Check Engine Load	1. Monitor Engine Load at Current Speed data point in Service ADVISOR. 2. Operate engine at speed and load where low power complaint occurs. Does Engine Load at Current Speed data point indicate a value of 95 percent or more?	YES: GO TO 23 NO: ECU is limiting engine power. Open DTAC case. -- -1/1
23 Check Fuel Rail Pressure Sensor	1. Ignition OFF, engine OFF. 2. Disconnect fuel rail pressure sensor connector P05. 3. Disconnect ECU J3 connector. 4. Perform TERMINAL TEST on rail pressure sensor connector and J3 connector. 5. On the harness, measure the resistance between the rail pressure sensor signal (P05-1) and the ECU rail pressure signal (J3-C1). 6. On the harness, measure the resistance between the rail pressure sensor 5V supply (P05-3) and the ECU 5V supply (J3-G1). 7. On the harness, measure the resistance between the rail pressure sensor return (P05-2) and the ECU return (J3-G2). Were Terminal Test results good and all resistance measurements less than 10 ohms?	YES: GO TO 24 NO: Fix problem. Retest engine performance. -- -1/1

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Observable Diagnostics and Tests

24 Replace Fuel Rail Pressure Sensor	1. Replace fuel rail pressure sensor. <i>NOTE: Verify that the replacement fuel rail pressure sensor is the correct part number for the 6.8L/4.5L engine.</i> 2. Reconnect all electrical connectors. 3. Retest engine performance. Is engine performance restored?	YES: Problem fixed. NO: GO TO 25 -- -1/1
25 Check on Dynamometer	Check engine power on a certified dynamometer, if possible. Does engine develop rated power on dynamometer?	YES: Engine is operating as designed. NO: GO TO 26 NO: Engine cannot be tested on a dynamometer. Open DTAC case. -- -1/1
26 Replace Injectors	<i>NOTE: For injector replacement instructions, see REMOVE ELECTRONIC INJECTORS (EIs) INSTALL ELECTRONIC INJECTORS (EIs) in section 2, group 090 earlier in this manual.</i> Replace injectors. Does engine develop rated power on dynamometer?	YES: Problem fixed. NO: Open DTAC case. -- -1/1

E4 - Engine Emits Excessive White Exhaust Smoke

E4 - Engine Emits Excessive White Exhaust Smoke Diagnostic Procedure

NOTE: This procedure should be used if the engine emits excessive white exhaust smoke. If engine emits a less heavy, bluish exhaust smoke, see 4.5L/6.8L - L1 - EXCESSIVE OIL CONSUMPTION in Section 04 of the Base Engine manual.

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--1/1

① Check for Active DTCs	Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	YES: GO TO 2 NO: Check for and resolve any active DTCs prior to performing this test. GO TO 2 --1/1
② Check for Type of White Smoke	<i>NOTE: White exhaust smoke is caused by condensing liquid in the exhaust system. The liquid is typically diesel fuel or coolant. Unburned diesel fuel in the exhaust has an strong diesel fuel odor and causes a severe burning sensation in the eyes. Unburned diesel fuel is caused by a misfire or incomplete combustion. Too low of a coolant temperature may result in white smoke due to incomplete combustion. Poor quality fuel or fuel not blended for the operating conditions may also cause incomplete combustion.</i> <i>Coolant in the exhaust causes an odor that can be described as sweet. White smoke accompanied with coolant loss and overheating indicates that the white smoke is likely due to coolant in the exhaust.</i> Are you able to determine if the white smoke is caused by fuel or coolant?	YES: White smoke is due to fuel in exhaust. GO TO 3 YES: White smoke is due to coolant in exhaust. GO TO 9 NO: Not sure if fuel or coolant. Perform steps 3-11. Open DTAC case if no problem found. --1/1
③ Check Engine Performance	Is engine idle quality and engine performance good?	YES: Reprogram ECU with latest payload. If white smoke still present, GO TO 4 NO: Engine performance is not acceptable. GO TO 4 --1/1

Observable Diagnostics and Tests

4 Misfire and Cut-Out Test	<i>NOTE: If white smoke is decreased substantially when a cylinder is cut-out, the white smoke is likely caused by a misfire of that cylinder.</i> 1. Perform ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR. 2. Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR with engine at low idle. Is each cylinder's contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?	YES: GO TO 6 NO: GO TO 5 -- -1/1
5 Check Compression	Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR. Is compression in the cylinder(s) with low contribution identified in Step 4 also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder)?	YES: Recheck compression with mechanical gauge. Determine cause of low compression. NO: Replace injector(s) in cylinders with low contribution. -- -1/1
6 Fuel Quality	Perform CHECK FUEL SUPPLY QUALITY procedure found later in this section. Is white smoke still present?	YES: GO TO 7 NO: Problem fixed. -- -1/1
7 Check Cooling System	1. Operate engine, under load if possible, until coolant temperature is above 88°C (190°F). 2. Return engine to low idle, no load for 10 minutes. Were you able to cause coolant temperature to increase to 88°C (190°F) and is coolant temperature greater than 80°C (175°F) after 10 minutes at low idle?	YES: GO TO 8 NO: Replace thermostat(s) and check for sources of cooling system heat loss. -- -1/1
8 Reprogram ECU	Reprogram ECU with latest payload, if not already performed during this procedure. Is white smoke still present?	YES: Perform steps 9-10. Open DTAC case if no problem found. NO: Problem fixed. -- -1/1

Observable Diagnostics and Tests

9 Check EGR Cooler	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i> Part 2 1. Monitor EGR Valve Position - Actual in Service ADVISOR. 2. Operate engine under load at 1500 rpm until coolant temperature is above 79°C (175°F) and EGR valve begins to open as indicated by EGR valve position. Note that EGR valve will not open unless engine is under load. 3. Permit engine to run at low idle for five minutes. 4. Ignition OFF, engine OFF. 5. Remove EGR valve and check for presence of coolant in EGR cooler. Is coolant present in EGR cooler?	YES: Part 2 NO: GO TO 11 YES: Replace EGR cooler. NO: GO TO 10 -- -1/1
10 Pressurize Cooling System	Pressurize cooling system and check for accumulation of coolant in EGR cooler. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in Section 04 the base engine manual. Is coolant present in EGR cooler?	YES: Replace EGR cooler. NO: Reinstall EGR valve. GO TO 11 -- -1/1
11 Check for Head Gasket Failure	Check for failed head gasket. See CHECK FOR HEAD GASKET FAILURES in Section 04 of the base engine manual. Was problem found?	YES: Fix problem. NO: Locate source of coolant leakage into combustion chamber. -- -1/1

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E5 - Engine Emits Excessive Black Or Gray Exhaust Smoke

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E5 - Engine Emits Excessive Black or Gray Exhaust Smoke Diagnostic Procedure

Additional References:

NOTE: This procedure should be used if the engine emits excessive black or gray smoke. If engine emits a bluish exhaust smoke, see 4.5L/6.8L - L1 - EXCESSIVE OIL CONSUMPTION in Section 04, of the base engine manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 later in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 later in this manual, if equipped.

For more information on EGR system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 later in this manual, if equipped.

For more information on temperature sensor validity test, see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 later in this manual, if applicable.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

-- -1/1

Observable Diagnostics and Tests

❶ Check for Active DTCs	Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	YES: GO TO 2 NO: Check for and resolve any active DTCs prior to performing this test. GO TO 2 -- -1/1
❷ Harness Diagnostic Mode Test	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Were any active DTCs generated during Harness Diagnostic Mode Test?	YES: Discontinue this test and perform test for the active DTC. NO: GO TO 3 -- -1/1
❸ Check Charge Air System	Perform CHARGE AIR SYSTEM. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 4 NO: Problem fixed. -- -1/1
❹ Intake and Exhaust Restriction and Air Leak Test	Check for intake and exhaust restrictions and leaks. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS and CHECK FOR EXHAUST AIR LEAKS in Section 04 of the base engine manual. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 5 NO: Problem fixed. -- -1/1
❺ Check VGT System	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	YES: Part 2 NO: GO TO 11
	Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 6 NO: Problem fixed. -- -1/1

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Observable Diagnostics and Tests

⑥ EGR-VGT System Temperature and Flow Test	Part 2 Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Did system respond as described in the test?	YES: GO TO 10 NO: One air temperature sensor is not indicating correct temperature at start of test. GO TO 7 NO: MAP and barometric pressure are not as described. GO TO 9 NO: EGR temperature sensor indicates EGR flow is present before EGR is commanded open. GO TO 10
⑦ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet temperature sensor (Exhaust Gas Recirculation Fresh Air Temperature data point) • Intake manifold air temperature sensor (Manifold Air Temperature data point) • EGR exhaust gas temperature sensor (Exhaust Gas Recirculation Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • Exhaust Gas Recirculation Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • Exhaust Gas Recirculation Temperature within 7°C (13°F) of Exhaust Gas Recirculation Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 11 NO: GO TO 8
⑧ Check Wiring and Sensor	1. Check wiring and terminals for air temperature sensor that does not indicate temperature correctly. 2. If no wiring problem found, replace air temperature sensor that does not agree with the other two air temperature sensors. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 11 NO: Problem fixed.

Observable Diagnostics and Tests

9 Check Pressure Sensors	1. Check MAP sensor wiring and terminals. 2. Replace MAP sensor if no wiring problems found. 3. Ignition ON, engine OFF. 4. Compare Manifold Absolute Pressure data point to Barometric Pressure data point. Are the Manifold Absolute Pressure and Barometric Pressure within 10 kPa (1.5 psi) of each other with ignition ON, engine OFF?	YES: Recheck for black smoke. NO: Replace ECU and recheck for black smoke. -- -1/1
10 Check EGR Valve	<i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Operate engine under load until coolant temperature is above 79°C (174°F). 2. Operate engine unloaded at low idle for five minutes. 3. Ignition OFF, engine OFF. 4. Remove EGR valve. 5. Check for stuck open or broken EGR valve. 6. Inspect EGR valve and O-rings for damage. 7. Inspect intake and exhaust passages for damage which would permit EGR flow with EGR valve closed. 8. Verify that the part number of the EGR valve removed is the correct part for the engine. 9. Inspect EGR cooler for indication of coolant leakage. Were any problems found?	YES: Fix problem or replace incorrect EGR valve. Recheck for black smoke. NO: GO TO 11 -- -1/1
11 Cut-Out Test	Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOFF TEST in Service ADVISOR and watch for a decrease in exhaust smoke when each cylinder is cut out. Did smoke decrease substantially when a cylinder was cut-out?	YES: Replace injector in the affected cylinder and recheck for black smoke. NO: GO TO 11 -- -1/1
12 Fuel Quality	Perform CHECK FUEL SUPPLY QUALITY procedure found later in this section. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 12 NO: Problem fixed. -- -1/1

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Observable Diagnostics and Tests

13 Reprogram ECU	Reprogram ECU with latest payload, if not already performed during this procedure. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: GO TO 13 NO: Problem fixed. -- -1/1
14 Check Fuel Rail Pressure Sensor Circuit Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector. 3. Perform TERMINAL TEST on rail pressure sensor connector P05 and J3 connector. 4. On the harness, measure the resistance between the rail pressure sensor signal (P05-1) and the ECU rail pressure signal (J3-C1). 5. On the harness, measure the resistance between the rail pressure sensor 5V supply (P05-3) and the ECU 5V supply (J3-G1). 6. On the harness, measure the resistance between the rail pressure sensor return (P05-2) and the ECU return (J3-G2). Were Terminal Test results good and all resistance measurements less than 10 ohms?	YES: GO TO 15 NO: Fix problem. If black smoke still present, GO TO 15 -- -1/1
15 Replace Rail Pressure Sensor	Replace rail pressure sensor. Is black smoke still present when engine is operated under conditions where black smoke was observed?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

E6 - Engine Will Not Crank

E6 - Engine Will Not Crank Diagnostic Procedure

Control Unit Response:

The ECU is not part of the engine cranking circuit.

Additional References:

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3, 4.5L 12V ECU WIRING DIAGRAM 5
 - see 4.5L 24V ECU WIRING DIAGRAM 3, 4.5L 24V ECU WIRING DIAGRAM 5
 - see 6.8L 12V ECU WIRING DIAGRAM 3, 6.8L 12V ECU WIRING DIAGRAM 5
 - see 6.8L 24V ECU WIRING DIAGRAM 3, 6.8L 24V ECU WIRING DIAGRAM 5
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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--1/1

❶ Preliminary Checks

1. Inspect batteries, stater motor, starter solenoid, starter relay, and single point ground for loose connections, corroded terminals, or cables that are not connected.
 2. Check fuse F01.
 3. Verify that any remote switch used to shut down engine is in the RUN position.
 4. If application has no remote switches, verify that remote switch jumper at connector C15 is present.
- Were any problems found?

YES: Fix problem. GO TO 13

NO: GO TO 2

--1/1

Observable Diagnostics and Tests

② Check Battery State of Charge	1. Ignition OFF, engine OFF. 2. Measure battery terminal voltage. Is the voltage greater than 12.2V for 12V systems or 24.4V for 24V systems?	YES: GO TO 3 NO: Recharge or replace batteries. GO TO 13 -- -1/1
③ Check Battery Voltage While Attempting Crank	1. Ignition ON, engine OFF for 30 seconds. 2. Monitor battery terminal voltage. 3. Hold key switch in start position for 3 seconds. Is the voltage greater than 11V for 12V systems or 22V for 24V systems while attempting to crank engine?	YES: GO TO 5 NO: GO TO 4 -- -1/1
④ Load Test Batteries	1. Ignition OFF, engine OFF. 2. Load test batteries. Do batteries pass load test?	YES: Check for internal starter problem Check for hydro locked or seized engine, or load not disengaged. NO: Recharge or replace batteries. GO TO 13 -- -1/1
⑤ Check Starter Relay Battery Supply Voltage	1. Ignition OFF, engine OFF. 2. Measure the voltage from the starter relay battery voltage supply terminal to single point ground. Is the voltage within 1V of battery terminal voltage?	YES: GO TO 6 NO: Fix problem. GO TO 13 -- -1/1
⑥ Check Voltage at Starter Relay Coil	<i>NOTE: Some applications may have safety switches or other interlocks which interrupt the starter relay control circuit (high side or ground). Consult equipment manufacturer's information to determine if application has any starter interlocks.</i> 1. Monitor the voltage between the starter relay coil high side terminal (wire between key switch and relay) and single point ground. 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: GO TO 7 NO: GO TO 11 -- -1/1

Observable Diagnostics and Tests

7 Check Starter Relay Coil Ground	1. Monitor the voltage between the starter relay coil high side terminal and starter relay coil ground terminal. 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: GO TO 8 NO: Fix open ground circuit. GO TO 13 -- -1/1
8 Check Starter Relay Output Voltage	1. Monitor the voltage between the starter relay output terminal and single point ground. 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: GO TO 9 NO: Replace starter relay. GO TO 13 -- -1/1
9 Check Starter Solenoid Control Circuit	<i>NOTE: Some gear-reduction type starter motors may have an additional starter relay located near the starter motor which controls the voltage supplied to the starter solenoid. Consult stater motor manufacturer for more information.</i> 1. Monitor the voltage between the starter solenoid "S" terminal and single point ground. 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: GO TO 10 NO: Fix open circuit between starter relay output and starter solenoid. GO TO 13 -- -1/1
10 Check Starter Cables	1. Monitor the voltage between the starter solenoid battery terminal and starter ground terminal (large cable connections). 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: Remove and bench test stater motor and starter solenoid. NO: Check starter cables for poor connections or high resistance. GO TO 13 -- -1/1
11 Check Key Switch Voltage Supply	1. Ignition OFF, engine OFF. 2. Measure the voltage between the key switch battery supply terminal and single point ground. Is the voltage within 2V of battery terminal voltage?	YES: GO TO 12 NO: Fix open circuit between key switch and battery positive terminal. GO TO 13 -- -1/1

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Observable Diagnostics and Tests

12 Check Key Switch	1. Monitor the voltage between the key switch start terminal and single point ground. 2. Hold key switch in start position for 3 seconds. Is the voltage within 2V of battery terminal voltage while attempting to crank engine?	YES: Fix open circuit between key switch and starter relay coil high side terminal. GO TO 13 NO: Replace key switch. GO TO 13 ---1/1
13 Verification	Attempt to crank engine. Does engine crank?	YES: Problem fixed. NO: GO TO 1 ---1/1

E7 - Engine Idles Poorly**E7 - Engine Idles Poorly Diagnostic Procedure**

-- -1/1

❶ Check for Active DTCs	Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	YES: GO TO 2 NO: Check for and resolve any active DTCs prior to performing this test. GO TO 2 -- -1/1
❷ Items Possibly Mistaken As Poor Idle Quality	Check for the following items which may be mistaken for poor idle quality: • Engine accessories such as A/C clutch or fan drives cycling on and off. • Alterations to the engine and/or machine harness such as radios or non-John-Deere accessories. Does disabling or switching off these devices temporarily restore engine performance?	YES: Problem fixed. NO: GO TO 3 -- -1/1
❸ Cut-Out Test	Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOFF TEST in Service ADVISOR with engine at low idle. Does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?	YES: GO TO 5 NO: GO TO 4 -- -1/1
❹ Check Compression	Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR. Is compression in the cylinder(s) with low contribution identified in Step 3 also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder)?	YES: Check compression with mechanical gauge. NO: Replace injector(s) in cylinder(s) with low contribution. Recheck idle quality. -- -1/1

Observable Diagnostics and Tests

5 Check for Air in Fuel	Perform TEST FOR AIR IN FUEL procedure, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 Low Pressure Fuel Supply System Test	Perform F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 7 -- -1/1
7 High Pressure Fuel Supply System Test	Perform F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST, found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 8 -- -1/1
8 Check Fuel Quality	Perform procedure CHECK FUEL SUPPLY QUALITY,found later in this group. Is engine performance restored?	YES: Problem fixed. NO: GO TO 9 -- -1/1
9 Check Throttle	1. Throttle at low idle position. 2. Monitor Throttle Position data point in Service ADVISOR. Does Throttle Position data point indicate throttle signal is changing by more than 3 percent?	YES: Check for throttle circuit problem. NO: GO TO 10 -- -1/1

Observable Diagnostics and Tests

10 Check EGR Valve	Part 1 Is engine equipped with a VGT and EGR valve? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i> Part 2 <i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Remove EGR valve. 2. Check for stuck open EGR valve. 3. Inspect EGR valve and O-rings for damage. 4. Inspect intake and exhaust passages for damage which would permit EGR flow with EGR valve closed. 5. Inspect EGR cooler for indication of coolant leakage. Were any problems found?	YES: Part 2 NO: GO TO 11 YES: Fix problem. Check idle quality. NO: Reinstall EGR valve. GO TO 11 -- -1/1
11 Check Valve Adjustment	Perform valve adjustment. Is engine performance restored?	YES: Problem fixed. NO: GO TO 12 -- -1/1
12 Reprogram ECU	Download latest payload and reprogram ECU. Is engine performance restored?	YES: Problem fixed. NO: Open DTAC case. -- -1/1

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E8 - Abnormal Engine Noise

Symptom	Problem	Solution
E8 - Abnormal Engine Noise	Air in Fuel	Perform procedure TEST FOR AIR IN FUEL later in this section.
	Worn main or connecting rod bearings	Determine bearing clearance. See CYLINDER BLOCK, LINERS, PISTONS, AND RODS SPECIFICATIONS in Section 06, Group 200 of base engine manual. CRANKSHAFT, MAIN BEARINGS, AND FLYWHEEL SPECIFICATIONS in Section 06, Group 200 of the base engine manual.
	Excessive crankshaft end play	Check crankshaft end play. See CHECK CRANKSHAFT END PLAY in Section 02, Group 040 of the base engine manual.
	Loose main bearing caps	Check bearing clearance; replace bearings and bearing cap screws as required. See CRANKSHAFT, MAIN BEARINGS, AND FLYWHEEL SPECIFICATIONS in Section 06, Group 200 of the base engine manual.
	Worn connecting rod bushings and piston pins	Inspect piston pins and bushings. See INSPECT PISTON PINS AND BUSHINGS in Section 02, Group 030 of the base engine manual.
	Scored pistons	Inspect pistons. See INSPECT PISTON PINS AND BUSHINGS in Section 02, Group 030 of the base engine manual.

Continued on next page

RG41221,00000F7 -19-20FEB08-1/3

Symptom	Problem	Solution
	Worn timing gears or excess back lash	Check timing gear back lash, and MEASURE CAMSHAFT END PLAY and MEASURE TIMING GEAR BACKLASH in Section 02, Group 050 of the base engine manual.
	Excessive valve clearance	Check and adjust valve clearance. See CHECK AND ADJUST VALVE CLEARANCE in Section 02, Group 021 of the base engine manual.
	Worn camshaft	Inspect camshaft. See VISUALLY INSPECT CAMSHAFT in Section 02, Group 050 of the base engine manual.
	Worn rocker arm shaft(s)	Inspect rocker arm shafts. See DISASSEMBLE AND INSPECT ROCKER ARM SHAFT ASSEMBLY in Section 02, Group 021 of the base engine manual.

Continued on next page

RG41221,00000F7 -19-20FEB08-2/3

Symptom	Problem	Solution
	Insufficient engine lubrication	See 4.5L/6.8L - L2 - ENGINE OIL PRESSURE LOW in Section 04, Group 150 of the base engine manual.
	Whining turbocharger noise	Inspect the compression outlet side of the turbo for loose hose. Make sure all hose clamps from the turbo compression outlet to the aftercooler are tightened and in good condition. <i>NOTE: It may be necessary to warm the hoses by running the engine for a short time to achieve the proper torque on the hose clamps.</i>  CAUTION: Parts may be hot! Also make sure that the alignment of the turbo to the charge air cooler is correct and not putting stress on the hose or the clamps. <i>NOTE: It may be necessary to realign the charge air cooler in the vehicle frame.</i> See TURBOCHARGER INSPECTION in Section 02, Group 080 in the base engine manual.

RG41221,00000F7 -19-20FEB08-3/3

E9 - Primary Analog Throttle Does Not Respond

RG41221,00000F8 -19-03OCT07-1/1

E9 - Primary Analog Throttle Does Not Respond

--1/1

1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.
NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Refresh Codes.
- Are there any active DTC codes?

YES: Troubleshoot those codes first.
NO: GO TO 2

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--1/1

2 Low Pressure Fuel Test

Perform low pressure fuel test, see F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST later in this Section.

Did test pass?

YES: GO TO 3
NO: Return to F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST procedure and perform tests.

--1/1

Observable Diagnostics and Tests

③ High Pressure Fuel Test	Perform high pressure fuel test, see F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST later in this Section. Did test pass?	YES: GO TO 4 NO: Return to F2 - HIGH PRESSURE FUEL SYSTEM CHECK procedure and perform tests. ---1/1
④ Throttle Response Test	1. Ignition ON, Engine ON. 2. Adjust throttle to different speed points. Did engine respond to throttle movement?	YES: Problem fixed, return to service. NO: GO TO 5 ---1/1
⑤ Reprogram ECU	1. Download latest ECU software payload file. 2. Program ECU and ensure the correct throttle options are set on the trim page as you start the programming sequence. Was programming successful?	YES: GO TO 6 NO: Repeat this step. If ECU will still not program, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 4 Group 160 later in this manual. ---1/1
⑥ Throttle Response Test	1. Ignition ON, Engine ON. 2. Adjust throttle to different speed points. Did engine respond to throttle movement?	YES: Problem fixed, return to service. NO: Start a DTAC case. ---1/1

E10 - Secondary Analog Throttle Does Not Respond

RG41221,00000F9 -19-03OCT07-1/1

E10 - Secondary Analog Throttle Does Not Respond

-- -1/1

1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.
NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Refresh Codes.
- Are there any active DTC codes?

YES: Troubleshoot those codes first.
NO: GO TO 2

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-- -1/1

2 Primary Analog Throttle Test

Perform primary analog throttle test, see E9 - PRIMARY ANALOG THROTTLE DOES NOT RESPOND later in this Section.

Did test pass?

YES: GO TO 3
NO: Return to E9 - PRIMARY ANALOG THROTTLE DOES NOT RESPOND procedure and perform tests.

-- -1/1

Observable Diagnostics and Tests

③ Throttle Response Test	1. Ignition ON, Engine ON. 2. Select secondary analog throttle. 3. Adjust secondary analog throttle to different speed points. Did engine respond to throttle movement?	YES: Problem fixed, return to service. NO: GO TO 4 ---1/1
④ Reprogram ECU	1. Download latest ECU software payload file. 2. Program ECU and ensure the correct throttle options are set on the trim page as you start the programming sequence. Was programming successful?	YES: GO TO 5 NO: Repeat this step. If ECU will still not program, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 4 Group 160 later in this manual. ---1/1
⑤ Throttle Response Test	1. Ignition ON, Engine ON. 2. Adjust secondary analog throttle to different speed points. Did engine respond to throttle movement?	YES: Problem fixed, return to service. NO: Start a DTAC case. ---1/1

F1 - Low Pressure Fuel Supply System Test

BK34394,0000033 -19-18OCT07-1/1

F1 – Low Pressure Fuel Supply System Test Diagnostic Procedure

Additional References:

For more information on Stanadyne low pressure fuel pump, see ELECTRIC FUEL TRANSFER PUMP OPERATION (STANADYNE) in Section 03, Group 130 earlier in this manual.

For more information on Raycor low pressure fuel pump, see ELECTRIC FUEL TRANSFER PUMP OPERATION (RACOR) in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2, 4.5L 12V ECU WIRING DIAGRAM 8
 - see 4.5L 24V ECU WIRING DIAGRAM 2, 4.5L 24V ECU WIRING DIAGRAM 8
 - see 6.8L 12V ECU WIRING DIAGRAM 2, 6.8L 12V ECU WIRING DIAGRAM 8
 - see 6.8L 24V ECU WIRING DIAGRAM 2, 6.8L 24V ECU WIRING DIAGRAM 8
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST for information on use.

-- -1/1

1 Check for Active DTCs	Were you referred to this Low Pressure Fuel Supply Test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	YES: GO TO 2 NO: Check for and resolve any active DTCs prior to performing this test.

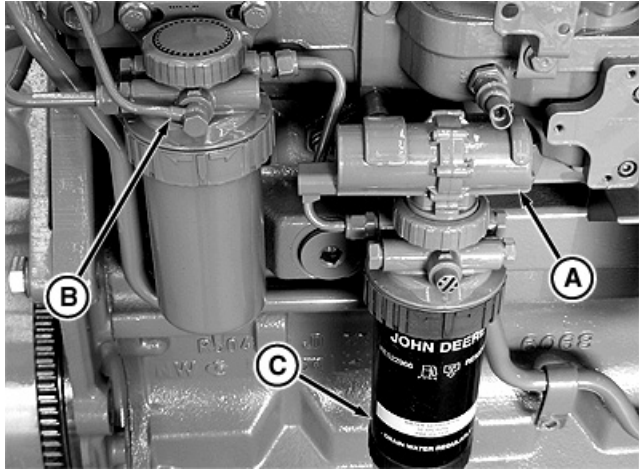
-- -1/1

2 Preliminary Check



CAUTION: DO NOT PRESSURIZE THE FUEL TANK! Doing this causes the seal on the front of the high pressure pump to rupture. When such a rupture occurs, fuel passes around the seal, and fills the engine crankcase. This condition causes severe damage to the engine and requires replacement of the high pressure pump.

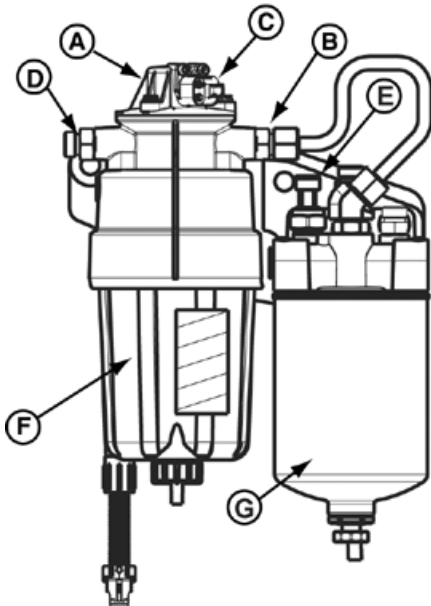
NOTE: There are three different low pressure fuel pump options: mechanical pump, Stanadyne 2-wire electric pump, and Raycor 5-wire electric pump. The mechanical pump and Stanadyne pump systems may also have an option low pressure fuel pressure sensor in the secondary fuel filter outlet. The low pressure fuel pressure sensor is standard with the Raycor low pressure fuel system.



RG15385 -UN-03AUG07

Stanadyne Electric Low Pressure Fuel Pump

- A—Stanadyne Pump
- B—Secondary Fuel Filter
- C—Primary Fuel Filter

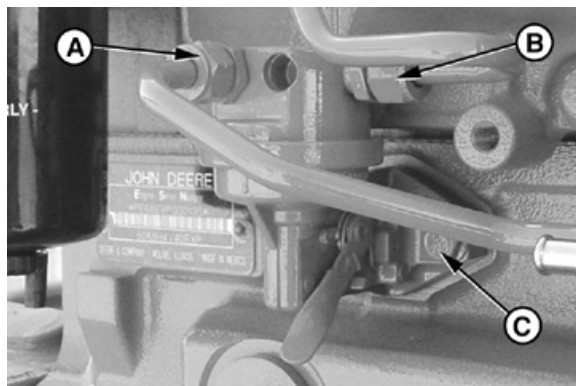


RG14264 -UN-06JUN05

Raycor Low Pressure Fuel Pump

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- A—Raycor Pump
- B—Fuel Outlet
- C—Pump Electrical Connector
- D—Fuel Supply Inlet
- E—Low Pressure Fuel Sensor
- F—Primary Filter
- G—Secondary Filter



RG12453A -UN-14JUN02

Mechanical Low Pressure Fuel Pump

- A—Pump Inlet
- B—Pump Outlet
- C—Mechanical Pump

1. Check for adequate fuel level in fuel tank.
2. Check for restricted vent in fuel tank or fuel cap.
3. Check for loose or misaligned fuel filter housing.
4. Check for ruptured fuel lines.
5. Check for pinched or kinked fuel lines.
6. Check for loose, broken, or cracked fuel line fittings.

Was the problem found?

YES: Fix problem. Check engine performance.

NO: Engine has mechanical pump GO TO 3

NO: Engine has Stanadyne 2-wire electric pump. GO TO 14

NO: Engine has Raycor 5-wire electric pump. GO TO 35

-19- -2/2

③ Replace Fuel Filters

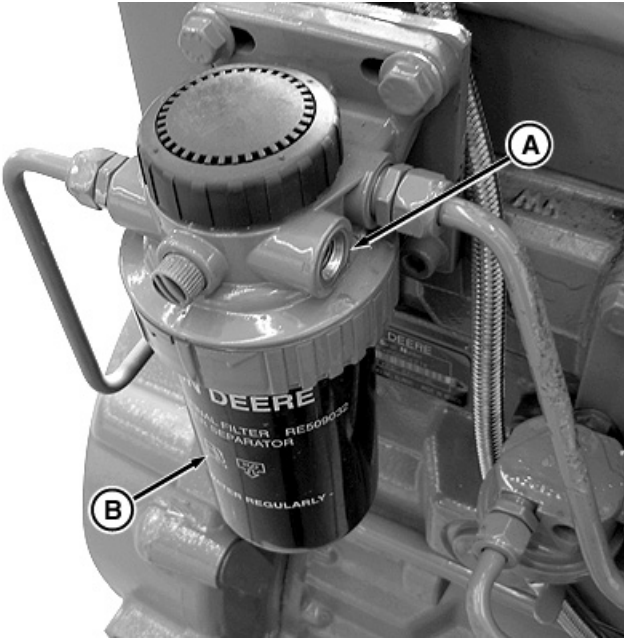
1. Ignition OFF, engine OFF.
2. Drain primary and secondary filter into a clean container.
3. Check for water, dirt, or other contaminants in the drained fuel.
4. Replace primary and secondary fuel filter elements. See REPLACE FUEL FILTER ELEMENTS in Group 02, Section 090.

Was an abnormal amount of water or contaminants present in the drained fuel?

YES: Inspect fuel tank for cause of contamination. Drain and replace fuel in tank with known good fuel. GO TO 4

NO: GO TO 4

-- -1/1

4 Fuel Pressure Check	a. With low pressure fuel sensor: Remove low pressure fuel sensor and adaptor fitting from the secondary filter (B). b. Without low pressure fuel sensor: Remove plug from secondary filter (B).  RG15384 -UN-03AUG07 Low Pressure Fuel System Gauge Test Port A—Plug or Sensor Location B—Secondary Fuel Filter 2. Install pressure gauge from Universal Pressure Kit JT05412 in location (A) where plug or sensor was removed using an M12 x 1.5 fitting. <i>NOTE: Some non-OEM engines may use a different secondary filter head which requires standard (SAE) fittings. Verify thread size and pitch before inserting adaptor.</i> 3. Ignition ON, engine CRANKING or running at low idle. Is the fuel pressure 30 kPa (4.4 psi) or above?	YES: GO TO 7 NO: GO TO 5 04 150 45 ---1/1
5 Temporary Fuel Supply Check	1. Ignition OFF, engine OFF. 2. Disconnect fuel inlet line from the primary fuel filter. 3. Install a hose on filter housing fuel inlet port and place other end of hose in a container of clean fuel. 4. Ignition ON, engine CRANKING or running at low idle. Is the fuel pressure 30 kPa (4.4 psi) or above?	YES: Check for pinched, restricted or loose fittings on fuel lines between the tank and the primary fuel filter. Repair and GO TO 6 NO: Replace low pressure fuel pump. GO TO 6 ---1/1

Observable Diagnostics and Tests

6 Recheck Fuel Pressure	1. Ignition OFF, engine OFF. 2. Reconnect fuel inlet line from fuel tank. 3. Bleed air from fuel system. 4. Ignition ON, engine CRANKING or running at low idle. Is the fuel pressure 30 kPa (4.4 psi) or above?	YES: GO TO 7 NO: Check for broken or worn camshaft or other mechanical problem that would effect pump performance. -- -1/1
7 Check for Restriction	Check for restriction in fuel line between secondary filter outlet and high pressure pump inlet. Was line restricted?	YES: Fix problem. GO TO 8 NO: GO TO 8 -- -1/1
8 Check for Low Pressure Fuel Sensor	Does the engine have a low pressure fuel sensor?	YES: GO TO 9 NO: Remove gauge, bleed fuel system. Low pressure fuel system is operating correctly. -- -1/1
9 Check Sensor Accuracy	1. Ignition ON, engine cranking or running at low idle. 2. Record reading on fuel pressure gauge. 3. Ignition OFF, engine OFF. 4. Remove fuel pressure gauge and reinstall low pressure fuel sensor. 5. Monitor Fuel Transfer Pump Pressure data point in Service ADVISOR. 6. Ignition ON, engine cranking or running at low idle. Is the fuel pressure that was indicated by the gauge within 30 kPa (4 psi) of the Fuel Transfer Pump Pressure data point?	YES: Low pressure fuel system is functioning correctly. NO: GO TO 10 -- -1/1
10 Low Pressure Fuel Sensor Atmospheric Pressure Check	1. Remove low pressure fuel sensor and reconnect sensor to wire harness. 2. Ignition ON, engine OFF. 3. Monitor Fuel Transfer Pump Pressure - Actual data point. Does the Fuel Transfer Pump Pressure data point indicate 0 kPa (0 psi) within +/- 7 kPa (1 psi)?	YES: GO TO 13 NO: GO TO 11 -- -1/1

Observable Diagnostics and Tests

11 Barometric Pressure Check	Part 1 Is the engine equipped with a manifold absolute pressure sensor?	YES: GO TO Part 2 NO: GO TO 12
	Part 2 Monitor Barometric Pressure and Manifold Absolute Pressure data points. Are the two data points within 10 kPa (1.5 psi) of each other?	YES: GO TO 12 NO: Perform procedure for 000108.02 as though DTC was active.
12 Low Pressure Fuel Sensor Harness Checks	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and low pressure fuel sensor connector. 3. Perform TERMINAL TEST on J3 and low pressure fuel sensor connectors. 4. On the harness, measure the resistance between the ECU fuel pressure signal (J3-C2) and fuel pressure connector signal (P03-3). 5. On the harness, measure the resistance between the ECU fuel pressure return (J3-H3) and fuel pressure connector return (P03-1). 6. On the harness, measure the resistance between the ECU fuel pressure 5V supply (J3-H4) and fuel pressure connector 5V supply (P03-2). Were Terminal Test results good and were all resistance measurements less than 10 ohms?	YES: Replace low pressure fuel sensor. GO TO 13 NO: Fix problem. GO TO 13
		04 150 47
13 Recheck Fuel Pressure	1. Reinstall low pressure fuel sensor, if removed. 2. Monitor Fuel Transfer Pump Pressure data point in Service ADVISOR. 3. Ignition ON, engine cranking or running at low idle. Is the fuel pressure that was indicated by the gauge within 30 kPa (4 psi) of the Fuel Transfer Pump Pressure data point?	YES: Low pressure fuel system is functioning correctly. NO: Verify accuracy of pressure gauge. Open DTAC case if DTC 000094.17 is being generated.

Observable Diagnostics and Tests

14 Check for Pump Operation with Stanadyne Electric Pump	<i>NOTE: The voltage supply for the Stanadyne electric fuel pump may an ignition source on some applications or the voltage may be supplied by a relay that is controlled by the ECU on other applications. The ECU provides the high side for the relay coil with engine running. The ECU also energizes the relay for a programmable time (typically 60 seconds) to prime the fuel system if ignition is ON and engine is not running. For 24V models, a resistor in the wire harness is used to limit voltage supplied to the pump.</i> 1. Ignition OFF, engine OFF for at least 5 seconds. 2. Ignition ON, engine OFF. 3. Feel or listen for fuel pump running within 60 seconds of ignition ON. Does low pressure fuel pump run?	YES: GO TO 24 NO: GO TO 15 -- -1/1
15 Check Pump Power Supply	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel pump 2-wire electrical connector. 3. Ignition ON, engine OFF. 4. Within 60 seconds of ignition ON - on the harness, measure the voltage between the pump power (A) and ground (B). Is the voltage within 2V of battery terminal voltage?	YES: Replace low pressure fuel pump. GO TO 14 NO: With ignition supplied pump - Repair open ignition or ground circuit. GO TO 14 NO: With ECU controlled relay - GO TO 16 -- -1/1
16 Check Pump Terminals and Ground	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on pump 2-way connector. 3. On the harness, measure the resistance between the pump connector ground (B) and single point ground. Are Terminal Test results good and is the resistance less than 10 ohms?	NO: GO TO 17 NO: Fix problem. GO TO 14 -- -1/1
17 Check Relay Supply Voltage	<i>NOTE: Consult application service information for location of relay.</i> On the harness, measure the voltage between the low pressure fuel pump relay battery supply and single point ground. Is voltage within 2V of battery terminal voltage?	YES: GO TO 18 NO: Fix problem. GO TO 14 -- -1/1

Observable Diagnostics and Tests

18 Check Relay Coil Ground	On the harness, measure the resistance between the low pressure fuel pump relay coil ground and single point ground. Is the resistance less than 10 ohms?	YES: GO TO 19 NO: Fix problem. GO TO 14 -- -1/1
19 Check Wire Harness Continuity - Relay to Pump	On the harness, measure the resistance between the low pressure fuel pump relay output and low pressure fuel pump 2-way connector terminal A. Is the resistance less than 10 ohms?	YES: GO TO 20 NO: Fix problem. GO TO 14 -- -1/1
20 Check Relay Control Voltage	1. Ignition ON, engine OFF. 2. Within 60 seconds of ignition ON - on the harness, measure the voltage between the low pressure fuel pump relay coil high side and single point ground. Is the voltage within 2V of battery terminal voltage?	YES: Replace low pressure fuel pump relay. GO TO 14 NO: GO TO 21 -- -1/1
21 Check Terminals and Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J2 connector. 3. Perform TERMINAL TEST J2-M3. 4. On the harness, measure the resistance between the ECU low pressure fuel pump relay control (J2-M3) and the low pressure fuel pump relay coil high side terminal. Are Terminal Test results good and is the resistance less than 10 ohms?	YES: GO TO 22 NO: Fix problem. GO TO 14 -- -1/1
22 Reprogram ECU	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Reprogram ECU with the latest payload. 4. Ignition OFF, engine OFF for 5 seconds. 5. Ignition ON, engine OFF. 6. Within 60 seconds of ignition ON - on the harness, measure the voltage between the low pressure fuel pump relay coil high side and single point ground. Is voltage within 2V of battery terminal voltage?	YES: GO TO 14 NO: GO TO 23 -- -1/1

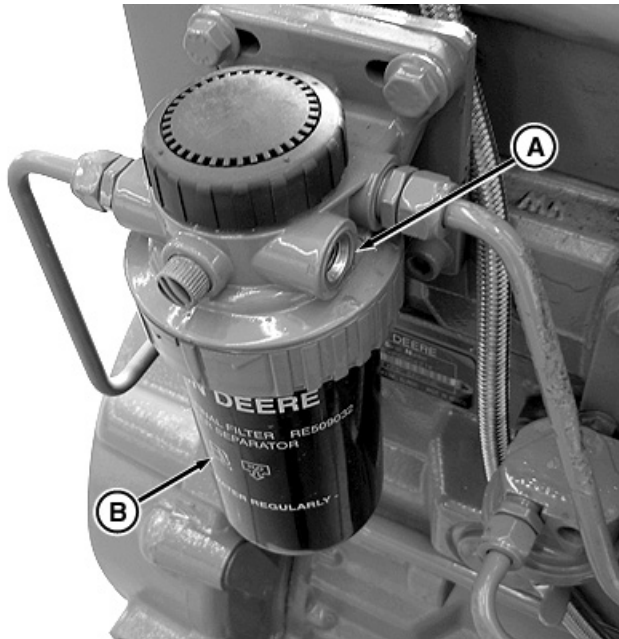
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Observable Diagnostics and Tests

23 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Within 60 seconds of ignition ON - on the harness, measure the voltage between the low pressure fuel pump relay coil high side and single point ground. Is voltage within 2V of battery terminal voltage?	YES: GO TO 14 NO: Open DTAC case. -- -1/1
24 Replace Fuel Filters	1. Ignition OFF, engine OFF. 2. Drain primary and secondary filter into a clean container. 3. Check for water, dirt, or other contaminants in the drained fuel. 4. Replace primary and secondary fuel filter elements. See REPLACE FUEL FILTER ELEMENTS in Group 02, Section 090. Was an abnormal amount of water or contaminants present in the drained fuel?	YES: Inspect fuel tank for cause of contamination. Drain and replace fuel in tank with known good fuel. GO TO 25 NO: GO TO 25 -- -1/1

25 Fuel Pressure Check

- a. With low pressure fuel sensor: Remove low pressure fuel sensor and adaptor fitting from the secondary filter (B).
- b. Without low pressure fuel sensor: Remove plug from secondary filter (B).



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Low Pressure Fuel System Gauge Port

- A—Plug or Sensor Location**
B—Secondary Fuel Filter

2. Install pressure gauge from Universal Pressure Kit JT05412 in location (A) where plug or sensor was removed using an M12 x 1.5 fitting.

NOTE: Some non-OEM engines may use a different secondary filter head which requires standard (SAE) fittings. Verify thread size and pitch before inserting adaptor.

3. Ignition ON, engine OFF.

Is the fuel pressure 30 kPa (4.4 psi) or above with low pressure pump running?

YES: GO TO 28**NO:** GO TO 2604
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26 Temporary Fuel Supply Check

1. Ignition OFF, engine OFF.
2. Disconnect fuel inlet line from the primary fuel filter.
3. Install a hose on filter housing fuel inlet port and place other end of hose in a container of clean fuel.
4. Ignition ON, engine OFF

Is the fuel pressure 30 kPa (4.4 psi) or above with low pressure pump running?

YES: Check for pinched, restricted or loose fittings on fuel lines between the tank and the primary fuel filter. Repair and GO TO 27

NO: Replace low pressure fuel pump. GO TO 27

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Observable Diagnostics and Tests

27 Recheck Fuel Pressure	1. Ignition OFF, engine OFF. 2. Reconnect fuel inlet line from fuel tank. 3. Bleed air from fuel system. 4. Ignition ON, engine OFF. Is the fuel pressure 30 kPa (4.4 psi) or above with low pressure pump running?	YES: GO TO 28 NO: Verify fuel pressure gauge accuracy. Open DTAC case. -- -1/1
28 Check for Restriction	Check for restriction in fuel line between secondary filter outlet and high pressure pump inlet. Was line restricted?	YES: Fix problem. GO TO 29 NO: GO TO 29 -- -1/1
29 Check for Low Pressure Fuel Sensor	Does the engine have a low pressure fuel sensor?	YES: GO TO 30 NO: Remove gauge, bleed fuel system. Low pressure fuel system is operating correctly. -- -1/1
30 Check Sensor Accuracy	1. Ignition ON, engine OFF. 2. Record reading on fuel pressure gauge with low pressure fuel pump running. 3. Ignition OFF, engine OFF. 4. Remove fuel pressure gauge and reinstall low pressure fuel sensor. 5. Monitor Fuel Transfer Pump Pressure data point in Service ADVISOR. 6. Ignition ON, engine OFF. Is the fuel pressure that was indicated by the gauge within 30 kPa (4 psi) of the Fuel Transfer Pump Pressure data point?	YES: Low pressure fuel system is functioning correctly. NO: GO TO 31 -- -1/1
31 Low Pressure Fuel Sensor Atmospheric Pressure Check	1. Ignition OFF, engine OFF. 2. Remove low pressure fuel sensor and reconnect sensor to wire harness. 3. Disconnect low pressure fuel pump 2-wire connector to prevent pump from operating. 4. Ignition ON, engine OFF. 5. Monitor Fuel Transfer Pump Pressure data point. Does the Fuel Transfer Pump Pressure data point indicate 0 kPa (0 psi) within +/- 7 kPa (1 psi)?	YES: GO TO 33 NO: GO TO 32 -- -1/1

Observable Diagnostics and Tests

32 Barometric Pressure Check	Monitor Barometric Pressure and Manifold Absolute Pressure data points. Are the two data points within 10 kPa (1.5 psi) of each other?	YES: GO TO 33 NO: Perform procedure for 000108.02 as though DTC was active. -- -1/1
33 Low Pressure Fuel Sensor Harness Checks	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and low pressure fuel sensor connector. 3. Perform TERMINAL TEST on J3 and low pressure fuel sensor connectors. 4. On the harness, measure the resistance between the ECU fuel pressure signal (J3-C2) and fuel pressure connector signal (P03-3). 5. On the harness, measure the resistance between the ECU fuel pressure return (J3-H3) and fuel pressure connector return (P03-1). 6. On the harness, measure the resistance between the ECU fuel pressure 5V supply (J3-H4) and fuel pressure connector 5V supply (P03-2). Were Terminal Test results good and were all resistance measurements less than 10 ohms?	YES: Replace low pressure fuel sensor. GO TO 34 NO: Fix problem. GO TO 34 -- -1/1
34 Recheck Fuel Pressure	1. Reinstall low pressure fuel sensor, if removed. 2. Monitor Fuel Transfer Pump Pressure data point in Service ADVISOR. 3. Ignition ON, engine cranking or running at low idle. Is the fuel pressure that was indicated by the gauge within 30 kPa (4 psi) of the Fuel Transfer Pump Pressure data point?	YES: Low pressure fuel system is functioning correctly. NO: Verify accuracy of pressure gauge. Open DTAC case if DTC 000094.17 is being generated. -- -1/1

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Observable Diagnostics and Tests

35 Check for Raycor Low Pressure Fuel Pump Operation	<i>NOTE: The low pressure fuel pump should operate when ignition is switched ON to prime and purge air from the fuel system. If engine is not started within a programmable period of time (typically 60 seconds), the ECU switches the low pressure fuel pump OFF.</i> 1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel sensor connector to cause ECU to command pump to 45 percent speed. Ignore DTC 000094.04 which will be set when fuel sensor is disconnected. 3. Ignition ON, engine OFF. 4. Listen and feel for low pressure fuel pump operation during prime cycle after ignition is switched ON. 5. Ignition OFF, engine OFF. 6. Reconnect sensor. Did low pressure fuel pump operate with ignition ON?	YES: GO TO 36 NO: Perform diagnostic procedures for 001075.12 as though the DTC were active. -- -1/1
36 Replace Fuel Filters	1. Ignition OFF, engine OFF. 2. Drain primary and secondary filter into a clean container. 3. Check for water, dirt, or other contaminants in the drained fuel. 4. Replace primary and secondary fuel filter elements. Was an abnormal amount of water or contaminants present in the drained fuel?	YES: Inspect fuel tank for cause of contamination. Drain and replace fuel in tank with known good fuel. GO TO 37 NO: GO TO 37 -- -1/1
37 Check Fuel Transfer Pump Pressure in Service ADVISOR	1. Ignition ON, engine OFF for 60 seconds to prime and purge air. 2. Ignition OFF, engine OFF. 3. Ignition ON, engine OFF. 4. Monitor Fuel Transfer Pump Pressure - Actual data point. Does the Fuel Transfer Pump Pressure - Actual data point indicate 15 kPa (2.2 psi) or above during initial 60 seconds after ignition is ON?	YES: GO TO 43 NO: GO TO 38 -- -1/1

Observable Diagnostics and Tests

38 Temporary Fuel Supply Check	<i>NOTE: Use a clean hose and fuel that has known-good quality in a clean container for this step.</i> 1. Ignition OFF, engine OFF. 2. Disconnect fuel inlet line from the primary fuel filter. 3. Inspect fuel inlet at primary filter header for debris. 4. Install a hose on primary filter housing fuel inlet port and place other end of hose in a container of clean fuel. 5. Ignition ON, engine OFF. 6. Monitor Fuel Transfer Pump Pressure - Actual. Does the Fuel Transfer Pump Pressure - Actual data point indicate 15 kPa (2.2 psi) or above?	YES: Repair restriction or air leak between fuel pick-up line and primary filter. GO TO 43 NO: GO TO 39
39 Check Fuel Flow	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel sensor connector to cause ECU to command pump to 45 percent speed. Ignore DTC 000094.04 which will be set when fuel sensor is disconnected. 3. Disconnect fuel line between secondary filter outlet and high pressure pump inlet. IMPORTANT: Do NOT crank engine with high pressure pump inlet fuel line disconnected. 4. Reposition fuel line and place high pressure pump inlet end in a container suitable for diesel fuel. 5. Reconnect fuel line to secondary filter outlet. 6. Ignition ON, engine OFF for 30 seconds. 7. Ignition OFF, engine OFF. Is fuel flow at least 0.5L (17 oz) in 30 seconds?	YES: GO TO 40 NO: Check for restrictions in fuel filter headers. If none found, GO TO 42

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Observable Diagnostics and Tests

40 Low Pressure Fuel Sensor Harness Checks	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and low pressure fuel sensor connector. 3. Perform TERMINAL TEST on J3 and low pressure fuel sensor connectors. 4. On the harness, measure the resistance between the ECU fuel pressure signal (J3-C2) and fuel pressure connector signal (P03-3). 5. On the harness, measure the resistance between the ECU fuel pressure return (J3-H3) and fuel pressure connector return (P03-1). 6. On the harness, measure the resistance between the ECU fuel pressure 5V supply (J3-H4) and fuel pressure connector 5V supply (P03-2). Were Terminal Test results good and were all resistance measurements less than 10 ohms?	YES: Replace low pressure fuel sensor. GO TO 41 NO: Fix problem. GO TO 43
41 Check Fuel Pressure After Sensor Replacement	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and fuel lines. 3. Ignition ON, engine ON. 4. Monitor Fuel Transfer Pump Pressure - Actual data point. 5. Place engine under load. Does the Fuel Transfer Pump Pressure - Actual data point indicate 15 kPa (2.2 psi) or above with engine running under load and is engine performance restored?	YES: Problem fixed. NO: 42
42 Replace Low Pressure Fuel Pump	1. Ignition OFF, engine OFF. 2. Replace low pressure fuel pump. 3. Reinstall all fuel lines removed for testing. 4. Ignition ON, engine OFF for 60 seconds to purge air from fuel system. 5. Ignition OFF, engine OFF. 6. Ignition ON, engine ON or cranking. 7. Monitor Fuel Transfer Pump Pressure - Actual data point. 8. Place engine under load. Does the Fuel Transfer Pump Pressure - Actual data point indicate 15 kPa (2.2 psi) or above with engine running under load and is engine performance restored?	YES: Problem fixed. NO: Fuel pressure is NOT above 15 kPa (2.2 psi). Verify air is purged from system. Open DTAC case. NO: Fuel pressure is above 15 kPa (2.2 psi) but engine performance is NOT restored or will not start. Low pressure fuel system is operating correctly.

Observable Diagnostics and Tests

43 Verification	1. Ignition OFF, engine OFF. 2. Reconnect fuel inlet line from fuel tank and all electrical connectors, if applicable. 3. Ignition ON, engine ON or cranking. 4. Monitor Fuel Transfer Pump Pressure - Actual data point. 5. Place engine under load if engine started. Does the Fuel Transfer Pump Pressure - Actual data point indicate 15 kPa (2.2 psi) or above with engine running under load and is engine performance restored?	YES: Low pressure fuel system is operating correctly. NO: Pressure is more than 15 kPa (2.2 psi) but engine performance is not restored or engine does not start. GO TO 44 -- -1/1
44 Check Fuel Flow	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel sensor connector to cause ECU to command pump to 45 percent speed. Ignore DTC 000094.04 which will be set when fuel sensor is disconnected. 3. Disconnect fuel line between secondary filter outlet and high pressure pump inlet. 4. Reposition fuel line and place high pressure pump inlet end in a container suitable for diesel fuel. 5. Reconnect fuel line to secondary filter outlet. 6. Ignition ON, engine OFF for 30 seconds. 7. Ignition OFF, engine OFF. Is fuel flow at least 0.5L (17 oz) in 30 seconds?	YES: GO TO 45 NO: Check for restriction between low pressure fuel sensor and high pressure pump. -- -1/1
45 Low Pressure Fuel Sensor Atmospheric Pressure Check	1. Verify fuel line between secondary fuel filter outlet and high pressure fuel pump inlet still disconnected. 2. Disconnect low pressure fuel pump 6-way connector C19 to prevent pump from operating. 3. Ignition ON, engine OFF. 4. Monitor Fuel Transfer Pump Pressure - Actual data point. Does the Fuel Transfer Pump Pressure - Actual data point indicate 0 kPa (0 psi) within +/- 7 kPa (1 psi)?	YES: Low pressure fuel system is functioning correctly. Reinstall fuel lines and electrical connectors. NO: GO TO 46 -- -1/1
46 Barometric Pressure Check	Monitor Barometric Pressure and Manifold Absolute Pressure data points. Are the two data points within 10 kPa (1.5 psi) of each other?	YES: GO TO 47 NO: Perform procedure for 000108.02 as though DTC was active. -- -1/1

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Observable Diagnostics and Tests

**47 Low Pressure Fuel
Sensor Harness
Checks**

1. Ignition OFF, engine OFF.
 2. Disconnect ECU J3 connector and low pressure fuel sensor connector.
 3. Perform TERMINAL TEST on J3 and low pressure fuel sensor connectors.
 4. On the harness, measure the resistance between the ECU fuel pressure signal (J3-C2) and fuel pressure connector signal (P03-3).
 5. On the harness, measure the resistance between the ECU fuel pressure return (J3-H3) and fuel pressure connector return (P03-1).
 6. On the harness, measure the resistance between the ECU fuel pressure 5V supply (J3-H4) and fuel pressure connector 5V supply (P03-2).
- Were Terminal Test results good and were all resistance measurements less than 10 ohms?

YES: Replace low pressure fuel sensor. GO TO 43

NO: Fix problem. GO TO 43

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F2 - High Pressure Fuel Supply System Test

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F2 - High Pressure Fuel Supply System Test Diagnostic Procedure**Additional References:**

For fuel system operation information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

IMPORTANT: Thoroughly clean all fuel lines, fittings, and components prior to making any disconnections or connections to prevent debris from entering the fuel system, which can damage engine and components.

IMPORTANT: Do NOT plug or restrict the fuel leak-off (return) line in an attempt to diagnose the fuel system. This practice will damage the high pressure pump.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Check for Active DTCs	Were you referred to this High Pressure Fuel System Check while performing the diagnostic procedures for a diagnostic trouble code (DTC)?	YES: GO TO 2 NO: Check for and resolve any active DTCs prior to performing this test.

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Observable Diagnostics and Tests

② Preliminary Fuel System Checks	Has test F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST found earlier in this group been performed?	YES: GO TO 3 NO: Perform test F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST prior to performing test F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST. ---1/1
③ Engine Start Status	Does engine start?	YES: GO TO 18 NO: GO TO 4 ---1/1
④ Check Fuel Rail Pressure	1. Monitor Fuel Rail Pressure - Actual data point in Service ADVISOR. 2. Ignition ON, engine cranking. Is the fuel rail pressure - actual 20 MPa (2900 psi) or above with engine cranking?	YES: GO TO 11 NO: With electric low pressure fuel pump and low pressure fuel sensor GO TO 5 NO: All others GO TO 6 ---1/1

⑤ Check High Pressure Fuel Pump	<i>NOTE: This check is used to verify that the high pressure pump is rotating and capable of delivering fuel to the rail when the engine is cranking. The suction at the high pressure pump inlet will draw the low pressure fuel system into a negative pressure (partial vacuum) if the high pressure pump is rotating and low pressure pump is not operating.</i> 1. Ignition OFF, engine OFF. 2. Ignition ON, engine OFF 30 seconds to cause low pressure fuel pump to prime system. 3. Ignition OFF, engine OFF. 4. Disconnect fuel low pressure fuel pump 6-way (Raycor) or 2-way (Stanadyne) connector. With Raycor pump, ignore DTC 001075.12 which will become active due to pump being disconnected. 5. Ignition ON, engine OFF. 6. Monitor Fuel Transfer Pump Pressure - Actual data point in Service ADVISOR. 7. Crank engine for 30 seconds. Does Fuel Transfer Pump Pressure - Actual decrease while cranking engine to a negative pressure value of -2 kPa to -10 kPa (-3 psi to -14 psi)?	YES: Reconnect low pressure fuel pump. GO TO 7 NO: Check for high pressure fuel pump shaft failure, debris at pump inlet, or stuck closed SCV.
⑥ Check High Pressure Fuel Pump	1. Remove secondary fuel filter inlet line and place end of line in a container suitable for diesel fuel. 2. Disconnect fuel leak-off return to tank line at "T" on high pressure pump. 3. Install a hose to "T". 4. Place other end of hose in a container suitable for diesel fuel. 5. Crank engine for 30 seconds. Is fuel flow from leak-off at least 50 mL (2 oz.)?	YES: Reinstall fuel lines and bleed air from system. GO TO 7 NO: Check for high pressure fuel pump shaft failure, debris at pump inlet, or stuck closed SCV.

7 Pressure Limiter Test

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

NOTE: For pressure limiter replacement, see REMOVE AND INSTALL PRESSURE LIMITER in Section 02, Group 090 earlier in this manual.

1. Ignition OFF, engine OFF for at least 5 minutes to permit rail pressure to decrease.
2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
3. Disconnect fuel return line from the pressure limiter valve. DO NOT remove the pressure limiter valve from fuel rail.
4. Cap the return line fitting that was originally connected to the pressure limiter. DO NOT cap the pressure limiter.
5. Connect a temporary fuel line to the pressure limiter outlet and route to a suitable container for diesel fuel.
6. Ignition ON, engine cranking for 20 seconds.
7. Check temporary fuel line for fuel flow through pressure limiter with engine cranking.

Is fuel flow through the pressure limiter present?

YES: Replace pressure limiter valve and retest fuel rail pressure.

NO: Reinstall return line. GO TO 8

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8 Injector Leak-off Check

1. Ignition OFF, engine OFF.
2. Disconnect injector fuel leak-off line at fuel return tee and cap tee.
3. Connect a clear hose to the injector leak off line, routing the other end into a suitable container for diesel fuel.
4. Ignition ON, engine cranking for 20 seconds.

Is fuel flow from injector leak-off line:

- 4045 Engine - greater than 72 mL (2.4 oz.) during 20 seconds of engine cranking?
- 6068 Engine - greater than 111 mL (3.7 oz.) during 20 seconds of engine cranking?

YES: Check for damaged feed tubes or injectors. Verify only one combustion sealing washer on each injector.

NO: GO TO 9

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Observable Diagnostics and Tests

9 Check for Stuck or Leaking Injector	<i>NOTE: For Compression Test information, see ENGINE TEST INSTRUCTIONS - COMPRESSION TEST earlier in this manual. For glow plug removal and replacement instructions, see REMOVE AND INSTALL GLOW PLUGS in Group 02, Section 110.</i> 1. Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR. 2. Compare compression between cylinders. 3. Remove glow plugs. 4. Inspect glow plugs for evidence of a large amount of fuel in combustion chamber. Does one cylinder have 10 percent or higher compression than the other cylinders or does one glow plug indicate presence of a large amount of fuel in combustion chamber?	YES: Replace injector in cylinder with high compression or evidence of fuel and retest fuel rail pressure. NO: Reinstall glow plugs. GO TO 10 -- -1/1
10 Replace High Pressure Fuel Pump	Replace high pressure fuel pump and SCV. Is the fuel rail pressure - actual 20 MPa (2900 psi) or above with engine cranking or running?	YES: Problem fixed. NO: Replace injectors. Open DTAC case if fuel rail pressure is still below 20 MPa (2900 psi). -- -1/1
11 Check Fuel Rail Pressure Sensor	<i>NOTE: High resistance in the fuel rail pressure sensor circuit can cause the ECU to incorrectly determine fuel rail pressure is higher than actual fuel rail pressure.</i> 1. Ignition OFF, engine OFF. 2. Disconnect fuel rail pressure sensor connector P05. 3. Ignition ON, engine cranking. Did engine start?	YES: GO TO 12 NO: GO TO 13 -- -1/1

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Observable Diagnostics and Tests

12 Check Fuel Rail Pressure Sensor Circuit Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector. 3. Perform TERMINAL TEST on rail pressure sensor connector P05 and J3 connector. 4. On the harness, measure the resistance between the rail pressure sensor signal (P05-1) and the ECU rail pressure signal (J3-C1). 5. On the harness, measure the resistance between the rail pressure sensor 5V supply (P05-3) and the ECU 5V supply (J3-G1). 6. On the harness, measure the resistance between the rail pressure sensor return (P05-2) and the ECU return (J3-G2). Were Terminal Test results good and all resistance measurements less than 10 ohms?	YES: Replace fuel rail pressure sensor. NO: Fix problem. Verify engine starts. -- -1/1
13 Check for Fuel Rail Pressure DTC	Verify fuel rail pressure sensor is still disconnected. Is DTC 000157.03 active?	YES: Cause of no-start is not the high pressure fuel system. Reconnect sensor and return to original procedure. NO: GO TO 14 -- -1/1
14 Check Fuel Rail Pressure Sensor Circuit Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector. 3. Perform TERMINAL TEST on rail pressure sensor connector P05 and J3 connector. 4. On the harness, measure the resistance between the rail pressure sensor signal (P05-1) and the ECU rail pressure signal (J3-C1). 5. On the harness, measure the resistance between the rail pressure sensor 5V supply (P05-3) and the ECU 5V supply (J3-G1). 6. On the harness, measure the resistance between the rail pressure sensor return (P05-2) and the ECU return (J3-G2). Were Terminal Test results good and all resistance measurements less than 10 ohms?	YES: GO TO 15 NO: Fix problem. -- -1/1

Observable Diagnostics and Tests

15 Check for Shorted Fuel Rail Pressure Sensor Circuits	1. On the harness, measure the resistance between the ECU rail pressure signal (J3-C1) and single point ground. 2. On the harness, measure the resistance between the ECU 5V supply (J3-G1) and single point ground. 3. On the harness, measure the resistance between the ECU return (J3-G2) and single point ground. Were all resistance measurements greater than 10k ohms?	YES: GO TO 16 NO: Fix problem. -- -1/1
16 Check for Wire to Wire Short	On the harness, measure the resistance between the ECU rail pressure signal (J3-C1) and all other terminals in the J3 connector. Were all resistance measurements greater than 10k ohms?	YES: GO TO 17 NO: Fix problem. -- -1/1
17 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage from the ECU rail pressure signal (J3-C1) to single point ground. 3. On the harness, measure the voltage from the ECU 5V supply (J3-G1) to single point ground. 4. On the harness, measure the voltage from the ECU rail pressure return (J3-G2) to single point ground. 5. Ignition OFF, engine OFF. Were all voltage measurements less than 0.5V?	YES: Replace ECU. NO: Fix problem. -- -1/1

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**18 Suction Control
Valve and Pressure
Limiter Check**


CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

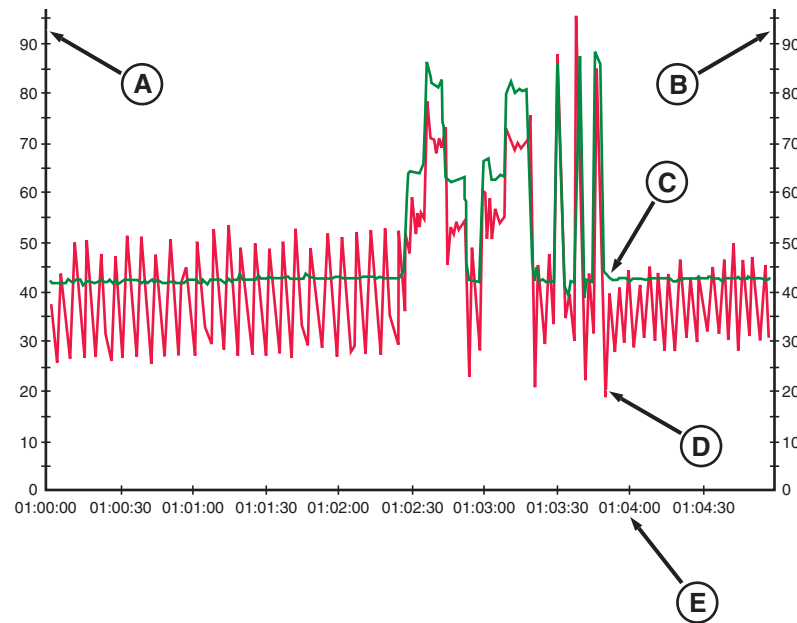
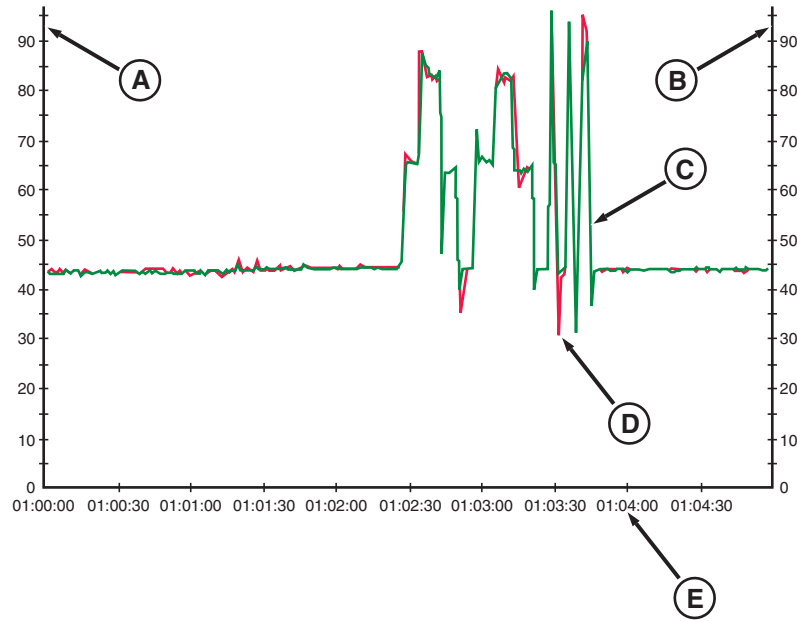
NOTE: For pressure limiter replacement, see REMOVE AND INSTALL PRESSURE LIMITER in Section 02, Group 090 earlier in this manual.

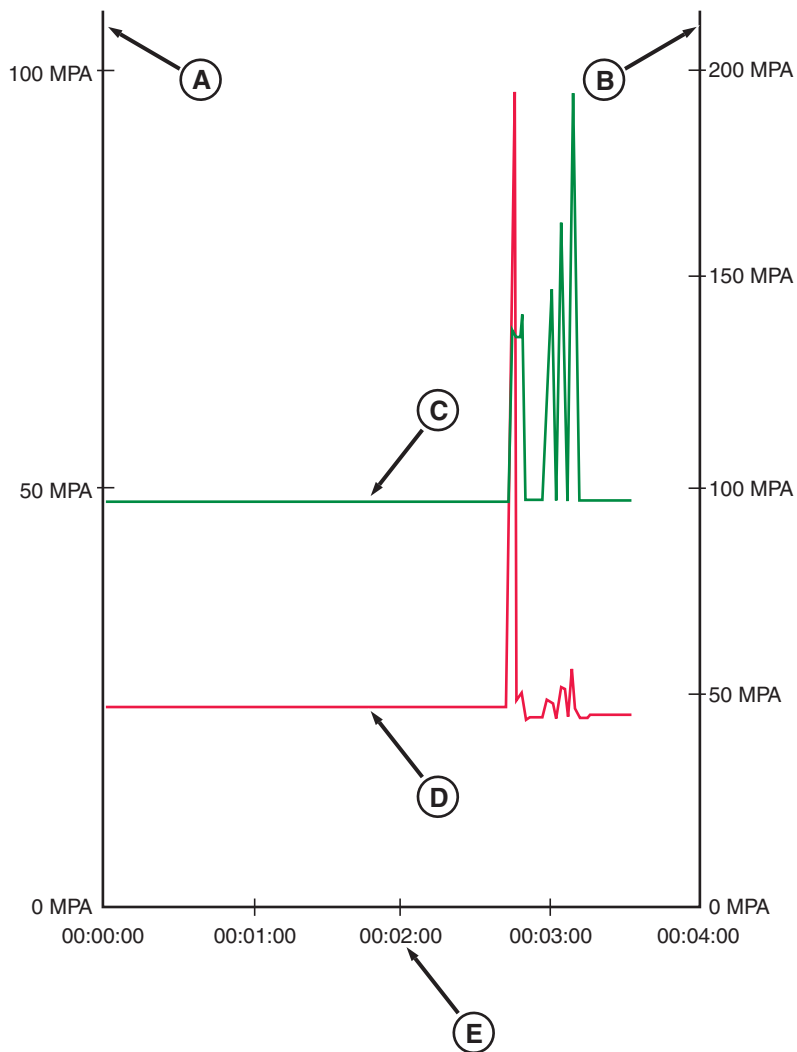
NOTE: A sticking suction control valve (SCV) causes low power, DTC 001347.07, and black smoke. The SCV may only stick intermittently, and usually occurs after the engine is at low idle for a period of time and throttle is then advanced. If the SCV sticks open, the fuel rail pressure will rapidly increase to 220 MPa (32,000 psi) or more, causing the pressure limiter to open. Fuel rail pressure is then limited to approximately 50 MPa (7250 psi) with the pressure limiter open. Shutting the engine down and restarting should reset the pressure limiter and temporarily restore performance. The sticking SCV may also fail such that it causes fuel rail pressure to be erratic resulting in poor performance and possibly generating DTC 001347.07.

1. Ignition OFF, engine OFF for at least 5 minutes to permit rail pressure to decrease.
2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
3. Disconnect fuel return line from the pressure limiter valve. DO NOT remove the pressure limiter valve from fuel rail.
4. Cap the return line fitting that was originally connected to the pressure limiter. DO NOT cap the pressure limiter.
5. Connect a temporary fuel line to the pressure limiter outlet and route to a suitable container for diesel fuel.
6. Ignition ON, engine OFF.
7. Using the graph feature in SERVICE ADVISOR, record the following data points:
 - Fuel Rail Pressure - Actual
 - Fuel Rail Pressure – Desired
8. Start engine and operate at low idle for two minutes.

NOTE: If any fuel flow is present through pressure limiter; discontinue test, replace pressure limiter, and return to this step.
9. Snap throttle several times.
10. Operate engine at speed and load where problem occurs.
11. Compare graph of Fuel Rail Pressure - Actual and Fuel Rail Pressure - Desired to those shown in the examples below.

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Sticking SCV Causing Pressure Limiter to Open. Note Difference in Pressure Scales.

A—Fuel Rail Pressure - Desired scale (MPa)

B—Fuel Rail Pressure - Actual scale (MPa)

C—Fuel Rail Pressure - Desired (Green)

D—Fuel Rail Pressure - Actual (Red)

E—Time Scale (HH:MM:SS)

Is the graph that is generated similar to the examples of a sticking SCV or was any fuel flow present through pressure limiter?

YES: Replace SCV and pressure limiter. Reprogram ECU with latest payload.

NO: GO TO 19

Observable Diagnostics and Tests

19 Injector Leak-off Check	1. Ignition OFF, engine OFF. 2. Disconnect injector fuel leak-off line at tee and cap tee. <i>NOTE: Do NOT cap the injector leak-off line.</i> 3. Connect a clear hose to the injector leak off line, routing the other end into a suitable container for diesel fuel. 4. Start engine and operate at 800 rpm. Is fuel flow from injector leak-off line: • 4045 Engine - greater than 216 mL (7.3 oz.) per minute? • 6068 Engine - greater than 333 mL (11.3 oz.) per minute?	YES: Check for damaged feed tubes or injectors. NO: No fuel flow is present. Check for restrictions in the injector leak off line and galleys. NO: Fuel flow present and within specification. Reinstall fuel return line. GO TO 20
20 High Pressure Fuel Pump Overflow Orifice Test	1. Ignition OFF, engine OFF. 2. Disconnect the fuel leak-off line between the tee coming from the injector and fuel rail leak-off lines, and the high pressure fuel pump overflow orifice fitting. 3. Connect a clear hose to the overflow orifice, routing the other end into a suitable container for diesel fuel. 4. Start engine and operate at 800 rpm. Is fuel flow through overflow orifice greater than 333 mL (11.3 oz.) per minute?	YES: Verify that low pressure fuel system pressure is within specifications. If OK, replace high pressure fuel pump. GO TO 21 NO: No fuel flow is present. Replace high pressure fuel pump. GO TO 21 NO: Fuel flow present and within specification. Reinstall fuel return line. GO TO 21
21 Misfire and Cut-Out Test	1. Perform ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR. 2. Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR with engine at low idle. Is each cylinder's contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?	YES: High pressure fuel system is operating correctly. Return to original procedure. NO: GO TO 22

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Observable Diagnostics and Tests

22 Check Compression

Perform ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in Service ADVISOR.

Is compression in the cylinder(s) with low contribution identified in Step 21 also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder)?

YES: Check compression with mechanical gauge.

NO: Replace injector(s) in cylinder(s) with low contribution.

-- -1/1

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F3 - Excessive Fuel Consumption

Symptom	Problem	Solution
F3 - Excessive Fuel Consumption	Diagnostic trouble codes	Resolve active diagnostic trouble codes.
	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Engine overloaded	Reduce engine load
	Air cleaner restricted or dirty	Replace air cleaner element as required.
	Compression too low	Determine cause of low compression and repair as required.
	Leaks in fuel supply system	Locate source of leak and repair as required.
	Improper valve clearance.	Adjust valves. See CHECK AND ADJUST VALVE CLEARANCE in the base engine manual.
	Fuel injectors defective.	If testing indicates a possible faulty injector, remove and inspect injectors. See REMOVE ELECTRONIC INJECTORS (EIs) INSTALL ELECTRONIC INJECTORS (EIs) in Section 2, Group 100 of this manual.
	Low engine temperature.	Coolant temperature too low. Check thermostat. See INSPECT THERMOSTAT AND TEST OPENING TEMPERATURE in the base engine manual.

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Continued on next page

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Symptom	Problem	Solution
	Incorrect EGR Valve or Restricted EGR Cooler, if equipped.	Replace EGR valve with correct part number or replace EGR cooler.
	<i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1, VGT Actuator (E) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 11 VGT Actuator (D) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	
	<i>NOTE: Calculated low EGR flow causes the ECU to increase exhaust back pressure using VGT position in an attempt to increase EGR flow.</i>	
	Check for ECU Software Updates	Reprogram ECU with latest payload.

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F4 - Fuel in Oil

RG41221,00000FC -19-12OCT07-1/1

F4 - Fuel in Oil Diagnostic Procedure

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① Oil Contamination Test	<i>NOTE: Hydraulic oil leaking into the engine crankcase from a hydraulic pump may be mistaken as fuel in the oil. Laboratory analysis can be used to determine if the contaminate is fuel or hydraulic oil.</i> 1. Check for an increase in engine oil level and a decrease in oil viscosity (oil is too thin). 2. Submit oil sample to laboratory to identify contaminant, if uncertain. Is the contaminant fuel?	YES: GO TO 2 NO: Perform test for identified contaminant.
② Check for Restricted Fuel Return Lines	Perform CHECK FOR RESTRICTED FUEL LEAK-OFF LINE test in this group. Did return fuel system pass test?	YES: GO TO 3 NO: Repair problem. GO TO 3
③ Check High Pressure Pump Front Seal	<i>NOTE: For removal and installation procedures, see REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP, Section 02, Group 090 in this manual.</i> Remove high pressure pump and check for seal damage. Is there evidence of seal damage?	YES: Replace high pressure pump. NO: Reinstall pump. GO TO 4
④ Check for Black Smoke	Does engine emit gray or black exhaust smoke?	YES: Perform E5 - ENGINE EMITS EXCESSIVE BLACK OR GRAY EXHAUST SMOKE. NO: GO TO 5

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Observable Diagnostics and Tests

5 Check Engine Performance	1. Perform ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR. 2. Perform ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR. Do test results indicate low contribution from a single cylinder?	YES: Replace injector for that cylinder. NO: GO TO 6 -- -1/1
6 Check for Loose Injector Clamp	<i>NOTE: For torque specifications, see INSTALL ELECTRONIC INJECTORS (EIs) in section 2, group 090 earlier in this manual.</i> Remove rocker cover and check for loose Electronic Injector (EI) clamps. Were the clamps tight?	YES: GO TO 7 NO: Tighten all loose EI clamps. -- -1/1
7 Check Injectors	1. Remove injectors. 2. Check for damaged injector O-rings. Was any O-ring damage observed?	YES: Replace O-rings and feed tubes. NO: Replace injectors and feed tubes. -- -1/1

D1 - ECU Does Not Communicate with Service ADVISOR

RG41221,00000FD -19-03OCT07-1/1

D1 - ECU Does Not Communicate with Service ADVISOR Diagnostic Procedure

Additional References:

For information on connecting to Service ADVISOR see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 later in this manual.

For information on reprogramming ECU see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in Section 04, Group 160 later in this manual.

For tool identification, see ELECTRONIC SYSTEM DIAGNOSTIC TOOLS in Section 05, Group 180 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 4
 - see 4.5L 24V ECU WIRING DIAGRAM 4
 - see 6.8L 12V ECU WIRING DIAGRAM 4
 - see 6.8L 24V ECU WIRING DIAGRAM 4
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 later in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Observable Diagnostics and Tests

❶ Preliminary Checks	Perform as many of these preliminary checks as possible to help determine if problem is related to the PC, cables, or adaptor: • Verify all connections between diagnostic connector and service tool are properly connected and fully seated. • Verify that the adaptor type shown in the Select Readings Option in Service ADVISOR matches the adaptor being used (PDM or EDL) and the type of communication between PC and adaptor (parallel, USB, or Bluetooth). • Close Service ADVISOR and shut down PC. Restart PC, open Service ADVISOR and attempt to connect to ECU. • Attempt to connect to the ECU on a different application, if one is available. • Try to connect using a different USB port (EDL or PDM with USB adaptor). • Try to connect using a different USB or parallel cable, if available. • Try to connect using Bluetooth, if using EDL and PC has Bluetooth capability. • Try to connect using a different adaptor or different type of adaptor, if available. • Try to connect using a different PC, if available. Does Service ADVISOR now connect to the original ECU?	YES: Determine which cable or adaptor is defective and replace, if applicable. NO: No other application available to verify equipment. GO TO 2 NO: Service ADVISOR connected to ECU on a different application. GO TO 2 NO: Service ADVISOR would not connect to ECU on a different application and you have narrowed down problem to PC. Open DTAC case. -- -1/1
❷ Check Adaptor Type	Are you using an EDL adaptor?	YES: GO TO 3 NO: PDM GO TO 5 -- -1/1
❸ Check for EDL Green Power Light	<i>NOTE: The EDL will NOT operate unless power and ground are present at the 9-pin diagnostic connector (C11). However, the green power indicator light on the EDL will flash or illuminate steady, depending on EDL firmware level, if the EDL is connected to the PC's USB port and power is NOT present at the 9-pin diagnostic connector.</i> 1. If using USB cable, disconnect USB cable from EDL. 2. Attach the 26-pin EDL cable to the EDL and application's 9-pin diagnostic connector. 3. Ignition ON, engine OFF. Is the EDL green power light ON steady?	YES: GO TO 4 NO: GO TO 6 -- -1/1
❹ Check for Red Error Light - EDL	1. For USB connection, attach the USB cable to the EDL and the PC. 2. Open Service ADVISOR and attempt to connect to the ECU. Is the EDL red error indicator light ON?	YES: Replace EDL. GO TO 25 NO: EDL with USB GO TO 8 NO: EDL with Bluetooth GO TO 9 -- -1/1

Observable Diagnostics and Tests

5 Check for Green Power Light - PDM	- If using parallel cable, attach the parallel cable to the PDM and the PC. - If using USB adaptor, connect the adaptor to the PDM and attach the USB cable to the USB adaptor and the PC. - Attach the 26-pin PDM cable to the PDM and application's 9-pin diagnostic connector. - Ignition ON engine OFF. Is the PDM green power indicator light ON?	YES: GO TO 10 NO: GO TO 6 ---1/1
6 Check Diagnostic Connector Voltage Supply	<i>NOTE: Terminal B of the 9-pin diagnostic connector C11 may be supplied by an ignition or unswitched battery source, depending on the application.</i> - Disconnect EDL or PDM cable from 9-pin diagnostic connector. - Ignition ON, engine OFF. - On the harness, measure the voltage from the 9-pin diagnostic connector C11 voltage supply (C11-B) to ground (C11-A). Is the voltage greater than 10V?	YES: GO TO 7 NO: Fix problem. GO TO 25 ---1/1
7 Check Cable	- Disconnect 26-pin cable from EDL or PDM. - Perform TERMINAL TEST on cable. - On the cable, measure the resistance between the 26-pin connector power (terminal 9) and the 9-pin connector power (terminal B). - On the cable, measure the resistance between the 26-pin connector ground (terminal 8) and the 9-pin connector ground (terminal A). Were Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: Replace EDL or PDM. GO TO 25 NO: Replace cable. GO TO 25 ---1/1

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Observable Diagnostics and Tests

⑧ Check for Amber Data Transfer Light - EDL with USB	<i>NOTE: The EDL amber data transfer light will flash ON briefly while Service ADVISOR attempts to connect to ECU if communication between the EDL and PC is good but there is no response from the ECU.</i> 1. Monitor EDL amber data transfer light closely. 2. Reattempt to connect Service ADVISOR to the ECU. Did amber data transfer light flash ON briefly or is the amber light ON continuous?	YES: Amber light flashed ON briefly. GO TO 11 YES: Amber light is ON continuous. Service ADVISOR is now connected to the ECU. If data points are not visible, verify correct model was selected. NO: No communication between PC and EDL. Perform checks listed in Step 1 to isolate problem. -- -1/1
⑨ Check for Amber Data Transfer Light - EDL with Bluetooth	Monitor EDL amber data transfer light closely while attempting to connect Service ADVISOR to the ECU. Did amber data transfer light flash ON briefly or is the amber light ON continuous?	YES: Amber light flashed ON briefly. GO TO 11 YES: Amber light is ON continuous. Service ADVISOR is connected to the ECU. If data points are not visible, verify correct model was selected. NO: No communication between PC and EDL. Use USB cable. GO TO 1 -- -1/1
⑩ Check for Red CAN Light - PDM	1. Monitor PDM red CAN light. 2. Attempt to connect Service ADVISOR to the ECU. Did red CAN light flash several times or is red CAN light ON continuous?	YES: Red CAN light flashed several times. GO TO 11 YES: Red CAN light is ON continuous. Service ADVISOR is connected to the ECU. If data points are not visible, verify correct model was selected. NO: No communication between PC and PDM. Perform checks listed in Step 1 to isolate problem. -- -1/1

Observable Diagnostics and Tests

11 Check Engine Operation	Attempt to start engine. Does engine start?	YES: GO TO 12 NO: GO TO 13 -- -1/1
12 Test ECU Terminals	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on J2-A1, J2-B1, and J2-K2. Were any problems found?	YES: Fix problem. GO TO 25 NO: GO TO 16 -- -1/1
13 Check ECU Fuses and Voltages	1. Ignition ON, engine OFF. 2. Check ECU ignition fuse (F01) and ECU battery supply fuse (F02). 3. Measure voltage from ECU ignition fuse to single point ground. 4. Measure voltage from ECU battery supply fuse to single point ground. Are both fuses good and are both voltage measurements within 1V of battery voltage?	YES: GO TO 14 NO: Fix problem. GO TO 25 -- -1/1
14 Test ECU Terminals	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on J2. Were any problems found?	YES: Fix problem. GO TO 25 NO: GO TO 15 -- -1/1

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Observable Diagnostics and Tests

15 Check ECU Voltages	1. Ignition ON, engine OFF. 2. On the harness, measure voltage from ECU ignition (J2-B2) to ECU ground (J2-L2). 3. On the harness, measure voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2). Are both measurements within 1V of battery voltage?	YES: GO TO 16 NO: Fix problem. GO TO 25 -- -1/1
16 Check CAN Wiring for Open Circuit	1. Ignition OFF, engine OFF. 2. Disconnect application battery negative cable. 3. On the harness, measure the resistance between ECU CAN High (J2-A1) and diagnostic connector C11 CAN High (C11-C). 4. On the harness, measure the resistance between ECU CAN Low (J2-B1) and diagnostic connector C11 CAN Low (C11- D). <i>NOTE: If BOTH readings are approximately 60 ohms or 120 ohms, CAN High and CAN Low are likely swapped between the ECU and the diagnostic connector.</i> Were both measurement less than 10 ohms?	YES: Reconnect ECU J2 connector. GO TO 17 NO: Fix problem. GO TO 25 -- -1/1
17 Check CAN for Short to Ground	1. On the harness, measure the resistance between the diagnostic connector C11 CAN High (C11-C) and single point ground. 2. On the harness, measure the resistance between the diagnostic connector C11 CAN Low (C11- D) and single point ground. Were all measurements greater than 1k ohms?	YES: GO TO 18 NO: Repair short to ground of CAN signal wiring. GO TO 25 -- -1/1
18 Check CAN Terminator(s)	On the harness, measure the resistance between diagnostic connector C11 CAN High (C11-C) and CAN Low (C11- D). Is the resistance between 50 and 130 ohms?	YES: GO TO 19 NO: Resistance is greater than 130 ohms. GO TO 20 NO: Resistance is less than 50 ohms: Repair short between CAN High and CAN Low. GO TO 25 -- -1/1

Observable Diagnostics and Tests

19 Check CAN for Short to Voltage	1. Reconnect application battery negative cable. 2. Ignition ON, engine OFF. 3. On the harness, measure the voltage from the application diagnostic connector C11 CAN High (C11-C) to single point ground. 4. On the harness, measure the voltage from the application diagnostic connector C11 CAN Low (C11- D) to single point ground. Were both measurements less than 4 volts?	YES: GO TO 22 NO: Repair short to power of CAN wiring. GO TO 25 -- -1/1
20 Check CAN Wiring for Open Circuit	1. Locate CAN terminator(s) in application wire harness. One terminator is typically located near the ECU J2 connector (C10). A second terminator may be located near the diagnostic gauge or near some other electronic module on the application. Consult application technical information for the location of the second terminator, if applicable. 2. Disconnect the CAN terminator(s). 3. Perform TERMINAL TEST on CAN terminator(s) and connector(s). 4. On the harness, measure the resistance between diagnostic connector C11 CAN High (C11-C) and terminator connector(s) CAN High. 5. On the harness, measure the resistance between diagnostic connector C11 CAN Low (C11- D) and terminator connector(s) CAN Low. Are all measurements less than 10 ohms and are terminal test results OK?	YES: GO TO 21 NO: Fix problem. GO TO 25 -- -1/1
21 Check Terminator Resistance	Measure resistance of CAN terminator(s). Is the resistance of each terminator between 110 and 130 ohms?	YES: Recheck CAN harness resistance and Terminal Tests. Fix problem. GO TO 25 NO: Replace defective CAN terminator(s). GO TO 25 -- -1/1

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Observable Diagnostics and Tests

22 Disconnect Other Electronic Control Modules	1. Ignition OFF, engine OFF. 2. If applicable, disconnect diagnostic gauge and all other devices that are connected to CAN, except ECU. 3. Ignition ON, engine OFF. 4. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to ECU?	YES: Determine which device is causing CAN communication problem. GO TO 25 NO: GO TO 23 -- -1/1
23 Reprogram ECU	1. Download payload for the ECU. 2. Attempt to reprogram the ECU. Was Service ADVISOR able to reprogram ECU?	YES: GO TO 25 NO: GO TO 24 -- -1/1
24 Replace ECU	<i>NOTE: Verify that Service ADVISOR connects to the ECU on a different application with the equipment you are using prior to replacing ECU.</i> 1. Replace ECU and program with payload. 2. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to ECU?	YES: Problem fixed. NO: Open DTAC case. -- -1/1
25 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors and negative battery cable, if removed 3. Ignition ON, engine OFF. 4. Attempt to connect Service ADVISOR to ECU. Did Service ADVISOR connect to the ECU?	YES: Problem fixed. NO: GO TO 1 -- -1/1

D2 - ECU Does Not Communicate with Diagnostic Gauge or Gauge Displays CAN Bus Error

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D2 - ECU Does Not Communicate with Diagnostic Gauge or Gauge Displays CAN Bus Error Diagnostic Procedure

Additional References:

For information on connecting to Service ADVISOR see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 later in this manual

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 4
 - see 4.5L 24V ECU WIRING DIAGRAM 4
 - see 6.8L 12V ECU WIRING DIAGRAM 4
 - see 6.8L 24V ECU WIRING DIAGRAM 4
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 later in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Check for Blank Diagnostic Gauge	1. Ignition ON, engine OFF. 2. View diagnostic gauge display. Is diagnostic gauge display blank?	YES: GO TO 2 NO: GO TO 3

--1/1

Observable Diagnostics and Tests

② Check Diagnostic Gauge Voltage Supply	<i>NOTE: The diagnostic gauge has two identical 6-way connectors identified as "A" and "B". The diagnostic gauge left-side connector "A", as viewed from the rear of the gauge, should be connected to the wire harness containing the CAN wires, ignition, and ground.</i> 1. Ignition OFF, engine OFF. 2. Disconnect diagnostic gauge left side 6-way connector (as viewed from rear of gauge) identified as "A". 3. Perform TERMINAL TEST on connector. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage from the diagnostic gauge 6-way connector terminal 1 (+) to terminal 6 (-). Are terminal test results good and is voltage within 1V of battery terminal voltage?	YES: Replace diagnostic gauge. GO TO 6 NO: Fix problem. GO TO 6 -- -1/1
③ Check ECU Communication	1. Ignition ON, engine OFF. 2. Attempt to connect Service ADVISOR to ECU. Does Service ADVISOR connect to the ECU?	YES: GO TO 4 NO: Discontinue this test and perform diagnostic procedure D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR. -- -1/1
④ Check for Correct Connection	<i>NOTE: The diagnostic gauge has two identical 6-way connectors identified as "A" and "B". The diagnostic gauge left-side connector "A", as viewed from the rear of the gauge, should be connected to the wire harness containing the CAN wires, ignition, and ground.</i> 1. Ignition OFF, engine OFF. 2. Access view of rear of diagnostic gauge (1) and verify that the wire harness containing the CAN wires (2) is mated to connector "A" (3). Is application wire harness 6-way connector containing the CAN wires connected to the diagnostic gauge left-side connector "A", as viewed from the rear of the gauge?	YES: GO TO 5 NO: Connect to the left-side connector. GO TO 6 -- -1/1

Observable Diagnostics and Tests

5 Check CAN Wiring Continuity to Diagnostic Connector	1. Disconnect diagnostic gauge 6-way connector containing the CAN wires. 2. On the harness, measure the resistance between the diagnostic gauge 6-way connector terminal 2 and 9-pin diagnostic connector C11-C. 3. On the harness, measure the resistance between the diagnostic gauge 6-way connector terminal 3 and 9-pin diagnostic connector C11-D. Are both resistance measurements less than 10 ohms?	YES: Replace diagnostic gauge. GO TO 6 NO: Fix CAN wiring. GO TO 6 ---1/1
6 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. 4. Check diagnostic gauge operation. Does diagnostic gauge display engine information?	YES: Problem fixed. NO: GO TO 1 ---1/1

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D5 - ECU Does Not Program with Service ADVISOR

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D5 - ECU Does Not Program with Service ADVISOR Diagnostic Procedure

Additional References:

For information on connecting to Service ADVISOR see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 later in this manual.

For information on reprogramming ECU see REPROGRAMMING ENGINE CONTROL UNIT (ECU) in Section 04, Group 160 later in this manual.

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1 Preliminary Checks

Perform these checks:

- Verify all connections between diagnostic connector and service tool are properly connected and fully seated.
- Verify that the adaptor type shown in the Available Adapters menu in Service ADVISOR matches the adaptor being used (PDM or EDL) and the type of communication between PC and adaptor (parallel or USB).
- Close Service ADVISOR and shut down PC. Restart PC, open Service ADVISOR and attempt to reprogram the ECU.
- Check engine payload file name for correct engine serial number. Download the correct payload if engine serial number does not match payload file name.
- If replacing the ECU, verify that the new ECU serial number was correctly entered when downloading the payload.

Were you able to reprogram the ECU?

YES: Problem solved.

NO: GO TO 2

-- -1/1

2 Communication Error Message

Does an error message appear in Service ADVISOR indicating "Error Communicating and Programming the ECU"?

YES: GO TO 3

NO: Perform steps indicated in error message. Consult WebHelpR in Service ADVISOR help menu.

-- -1/1

Observable Diagnostics and Tests

3 Check for New ECU	Are you attempting to program a new replacement ECU?	YES: GO TO 4 NO: Attempting to reprogram the original ECU. GO TO 5 -- -1/1
4 Parameters	Were you able to successfully retrieve the parameters from the old ECU when prompted in Service ADVISOR?	YES: Consult WebHelpR in Service ADVISOR help menu. NO: Old ECU is available and operational. GO TO 5 NO: Old ECU is not available or is not operational. Consult WebHelpR in Service ADVISOR help menu. -- -1/1
5 Check for Service Advisor Communication	<i>NOTE: A live connection in Service ADVISOR cannot be obtained with a new ECU until it has been programmed.</i> 1. Ignition OFF, engine OFF. 2. Connect old or original ECU to wire harness. 3. Ignition ON, engine OFF. 4. Attempt to connect to ECU (live connection) using Service ADVISOR. Does Service ADVISOR connect to the old or original ECU?	YES: Attempting to reprogram original ECU. Replace original ECU. YES: Attempting to program a new ECU. Consult WebHelpR in Service ADVISOR help menu. NO: Discontinue test D5 and start test D1. -- -1/1

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A2 - Glow Plug Check

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A2 - Glow Plug Check Diagnostic Procedure**Related Information:**

Glow plugs are electric heating elements located in the combustion chamber of each cylinder. Glow plugs are installed into a threaded hole in the cylinder head.

A relay controlled by the ECU provides the voltage supply to the parallel-connected glow plugs. The glow plugs are internally grounded to the cylinder head.

The ECU supplies a high side output to the glow plug relay coil to energize the relay. The ECU monitors the output of the relay to determine if the relay is energized.

The ECU will generate DTC 000676.05 if the glow plug relay is detected as not being energized when commanded and DTC 000675.03 if the glow plug relay is energized when not commanded.

The ECU uses fuel temperature to determine if the glow plug relay should be energized.

A wait to start lamp controlled by the ECU is illuminated to signal the operator to not crank the engine until the ECU has completed the preheating cycle.

Control Unit Response:

The engine may not start or may require extended crank times in cold weather if glow plugs do not preheat the combustion chamber.

Additional References:

For further glow plug information, see GLOW PLUG OPERATION in Section 03, Group 140 earlier in this manual.

For application specific information on glow plug preheat time versus fuel temperature, see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1, 4.5L 12V ECU WIRING DIAGRAM 3, 4.5L 12V ECU WIRING DIAGRAM 6

- see 4.5L 24V ECU WIRING DIAGRAM 1, 4.5L 24V ECU WIRING DIAGRAM 3, 4.5L 24V ECU WIRING DIAGRAM 6

- see 6.8L 12V ECU WIRING DIAGRAM 1, 6.8L 12V ECU WIRING DIAGRAM 3, 6.8L 12V ECU WIRING DIAGRAM 6

- see 6.8L 24V ECU WIRING DIAGRAM 1, 6.8L 24V ECU WIRING DIAGRAM 3, 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Observable Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. Is 000174.00, 000174.03, 000174.04, or 000174.16 an active DTC?	YES: Discontinue test A2. Perform test for DTC with SPN 000174. NO: GO TO 2 -- -1/1
❷ Check for Glow Plug Relay DTCs	1. Disconnect fuel temperature sensor connector to cause the ECU to attempt to energize the glow plug relay at next key cycle. <i>NOTE: Ignore DTC 000174.03 which will be generated due to fuel temperature sensor being disconnected.</i> 2. Clear DTCs. 3. Ignition OFF, engine OFF for 10 seconds. 4. Ignition ON, engine OFF for 30 seconds. 5. Refresh DTCs. Did 000676.03 or 000676.05 appear as active or stored DTCs?	YES: Discontinue test A2. Perform diagnostic test for DTC 000676.03 or 000676.05. NO: GO TO 3 -- -1/1
❸ Check Wait to Start Lamp (if Applicable)	1. Verify fuel temperature sensor is still disconnected. 2. Ignition OFF, engine OFF for 10 seconds. 3. Ignition ON, engine OFF for 30 seconds. 4. Observe if wait to start lamp is illuminated for several seconds and is then extinguished. Does the wait to start lamp illuminate and then go out?	YES: GO TO 4 NO: Diagnose lamp circuit. GO TO 11 NO: Application does not have a wait to start lamp. GO TO 4 -- -1/1

Observable Diagnostics and Tests

④ Check Glow Plug Wire Harness	1. Ignition OFF, engine OFF. 2. Verify that all glow plug relay terminal connections are tight. 3. Disconnect all of the glow plugs from the glow plug harness by lifting off each push-on connector. 4. On the glow plug harness, measure the resistance between the glow plug relay output terminal and each glow plug connection terminal. Are all resistance measurements less than 10 ohms?	YES: GO TO 5 NO: Replace glow plug wire harness. GO TO 11 -- -1/1
⑤ Check for Open Glow Plugs	<i>NOTE: Normal resistance of each glow plug is less than 1 ohm with the glow plug at room temperature. The resistance increases significantly when the glow plug is heated. For glow plug replacement instructions, see REMOVE AND INSTALL GLOW PLUGS in Section 02, Group 110 earlier in this manual.</i> On each glow plug, measure the resistance between the glow plug terminal and single point ground. Is the resistance of each glow plug less than 10 ohms?	YES: Reconnect glow plugs to harness. GO TO 6 NO: Replace glow plug(s) that have high resistance. GO TO 11 -- -1/1
⑥ Fuel Temperature Accuracy Check	1. Reconnect fuel temperature sensor connector. 2. Permit engine to cool to ambient temperature. 3. Ignition ON, engine OFF 4. Monitor Fuel Temperature data point in Service ADVISOR. Does the Fuel Temperature data point indicate actual fuel temperature within 5°C (9°F)?	YES: GO TO 11 NO: GO TO 7 -- -1/1

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Observable Diagnostics and Tests

7 Check Fuel Temperature Circuit	<i>NOTE: For fuel temperature sensor replacement instructions, see REMOVE AND INSTALL FUEL TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual.</i> 1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and fuel temperature sensor connector. 3. Perform TERMINAL TEST on J3 and fuel temperature sensor connector. 4. On the harness, measure the resistance between the ECU fuel temperature signal (J3-B1) and the fuel temperature sensor connector signal (T05-1). 5. On the harness, measure the resistance between the ECU reference (J3-H3) and the fuel temperature sensor connector reference (T05-2). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: Replace fuel temperature sensor. GO TO 8 NO: Fix problem. GO TO 11 -- -1/1
8 Recheck Fuel Temperature Accuracy	1. Reconnect fuel temperature sensor connector. 2. Ignition ON, engine OFF 3. Monitor Fuel Temperature data point in Service ADVISOR. Does the Fuel Temperature data point indicate actual fuel temperature within 5°C (9°F)?	YES: GO TO 11 NO: GO TO 9 -- -1/1
9 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF 5. Monitor Fuel Temperature data point in Service ADVISOR. Does the Fuel Temperature data point indicate actual fuel temperature within 5°C (9°F)?	YES: GO TO 11 NO: GO TO 10 -- -1/1

Observable Diagnostics and Tests

10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF 4. Monitor Fuel Temperature data point in Service ADVISOR. Does the Fuel Temperature data point indicate actual fuel temperature within 5°C (9°F)?	YES: GO TO 11 NO: Open DTAC case. ---1/1
11 Verification	1. Ignition OFF, engine OFF. 2. Disconnect fuel temperature sensor connector if the actual fuel temperature is above -5°C (23°F). 3. Measure the voltage between the glow plug relay output terminal and single point ground. 4. Ignition ON, engine OFF for 30 seconds. Is the voltage at the glow plug output terminal within 5V of battery voltage for several seconds after ignition is switched ON and then drops to near 0V?	YES: Reconnect fuel temperature sensor if applicable. Glow plug system is operating correctly. NO: GO TO 2 ---1/1

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Check Fuel Supply Quality

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Check Fuel Supply Quality Diagnostic Procedure

Additional References:

Fuel samples can be analyzed in a laboratory for contamination and ratings. See TESTING DIESEL FUEL in Group 01, Section 002, for more information.

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❶ Low Pressure Fuel System Check

Has Low Pressure Fuel System Check been performed?

YES: GO TO 5

NO: GO TO 2

-- -1/1

❷ Check Fuel in Filters

1. Ignition OFF, engine OFF.
 2. Drain primary and secondary filter into a clean container.
 3. Check for water, dirt, or other contaminants in the drained fuel.
- Is an abnormal amount of water or contaminants present in the drained fuel?

YES: GO TO 3

NO: GO TO 4

-- -1/1

❸ Check Fuel Supply

Check fuel in tank for water or contaminants.

Is an abnormal amount of water or contaminants present in the fuel?

YES: Inspect fuel tank for cause of contamination. Drain and replace fuel in tank with known good fuel. GO TO 4

NO: GO TO 4

-- -1/1

Observable Diagnostics and Tests

4 Replace Fuel Filters

NOTE: For fuel filter replacement and priming instructions, see Group 02, Section 90 earlier in this manual.

- 1. Drain fuel from primary filter inlet line.
- 2. Replace primary and secondary fuel filters.
- 3. Bleed air from fuel system. See BLEED THE FUEL SYSTEM later in this section.
- 4. Start engine and check performance.

Does engine start and have good performance?

YES: Problem solved.

NO: Fuel in tank was NOT replaced. GO TO 5

NO: Fuel in tank was replaced. GO TO 6

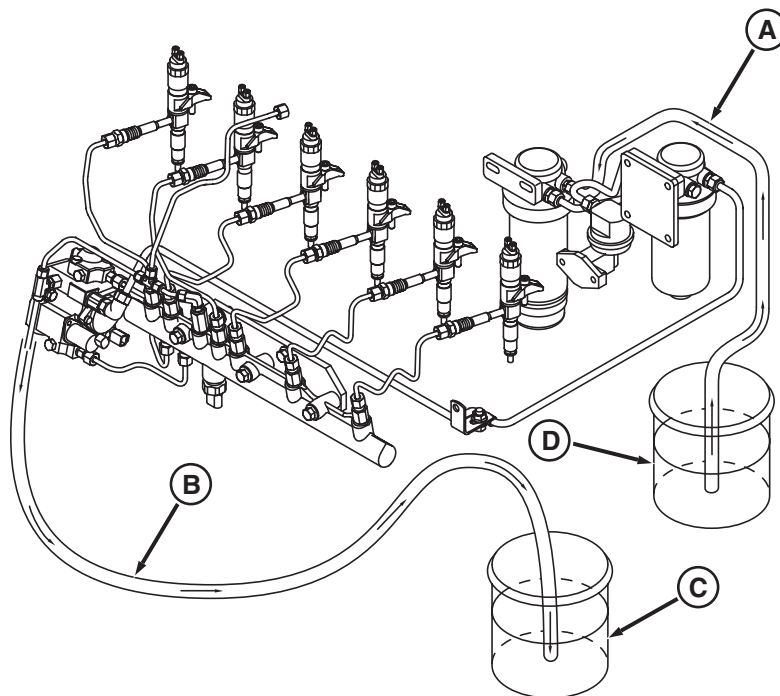
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5 Temporary Known Good Fuel Supply Installation

NOTE: Use a clean hose and fresh fuel that has known-good quality in a clean container for this step. Do not use fuel from the fuel tank.

1. Ignition OFF, engine OFF.
2. Disconnect fuel inlet line from the primary fuel filter.
3. Install a hose on primary filter housing fuel inlet port and place other end of hose in a container of at least 3.8L (1 gal) of clean fuel.



RG15381 -UN-07AUG07

Temporary Fuel Supply

- A—Temporary Fuel Supply Hose at Primary Filter Inlet**
B—Temporary Fuel Return Hose
C—Contaminated Fuel
D—Known Good Fuel

4. Disconnect fuel line between secondary filter outlet and high pressure pump inlet.
5. Reposition fuel line and place high pressure pump inlet end in a 3.8L (1 gal) or larger container suitable for diesel fuel.
6. Reconnect fuel line to secondary filter outlet.
7. Ignition ON, engine OFF for 60 seconds.
8. Ignition OFF, engine OFF.
9. Repeat steps 7-8 until 1.9L (1/2 gal) of new fuel has been pulled into the fuel system.
10. Reinstall fuel line between secondary filter and high pressure pump.

IF OK: GO TO 6

⑥ Purge Fuel System	1. Disconnect fuel return line and place in a 3.8L (1 gal) or larger container suitable for diesel fuel. a. If engine starts, start engine and operate at low idle until at least 1.9L (1/2 gal) of return fuel is present in container. Add additional fuel to the temporary fuel supply container if necessary. b. If engine does not start, crank engine for 20 second intervals with 2 minutes between intervals, cycling ignition OFF between crank intervals. Repeat until at least 1.9L (1/2 gal) of return fuel is present in the container or until engine starts. 3. Ignition OFF, engine OFF. 4. Reconnect fuel lines. 5. Check engine performance. Does engine start and have good performance?	YES: Problem fixed. NO: Fuel quality is not the cause of the problem.

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Test for Air in Fuel

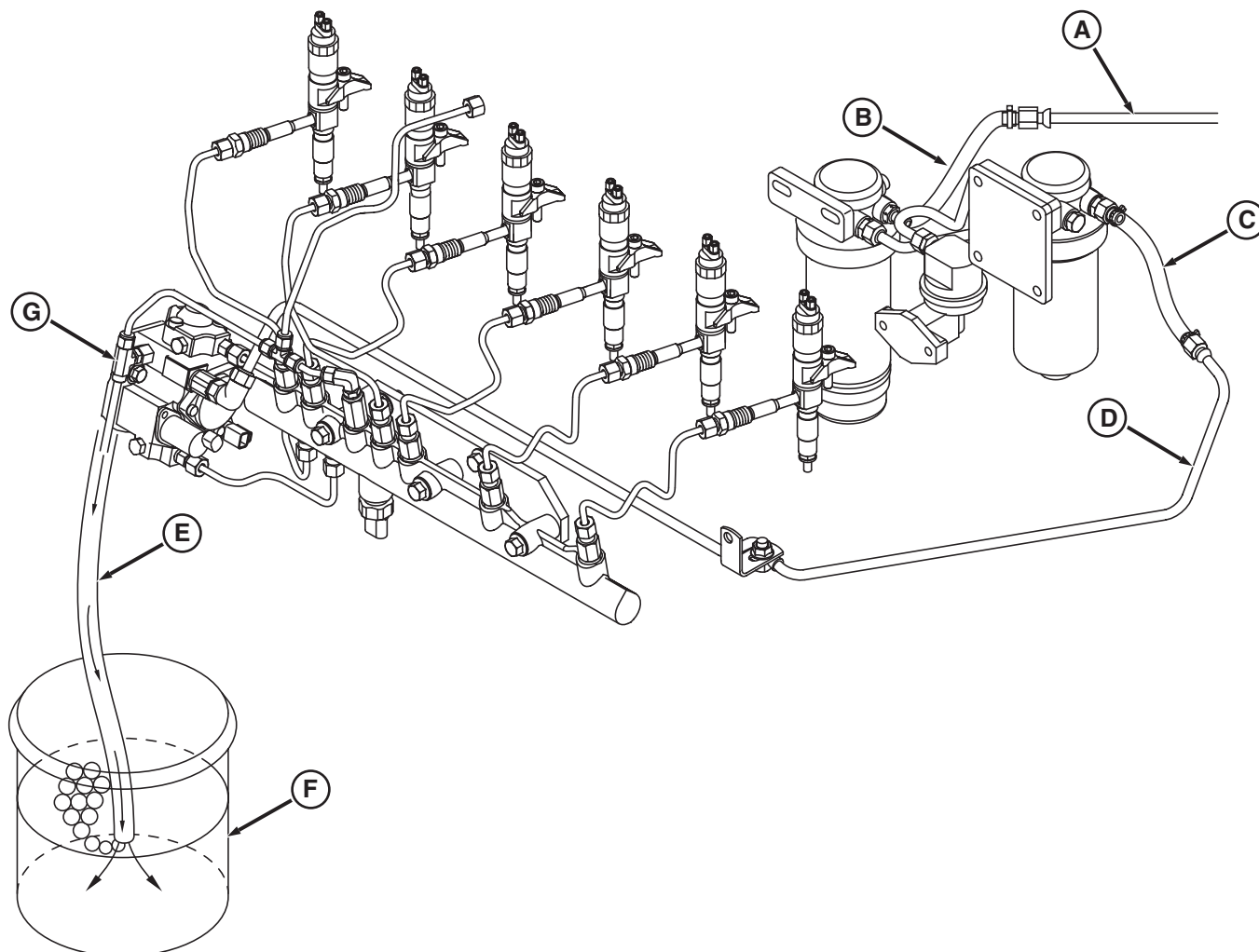
To check for air in the fuel system, follow the procedure below.

1. Preliminary checks:

- Check for loose fittings between fuel tank and fuel supply pump.
- Check for loose fittings on the fuel cooler, if applicable.
- Make sure primary filter element is on tight and gasket is intact.
- Check for damaged fuel pick-up tube in tank.
- Check for low fuel level in tank.
- Check for foaming in tank. Foaming strongly suggests air leaking past injectors. If there is foaming, inspect the injector hold down clamp torque, O-rings and seals. See REMOVE ELECTRONIC INJECTORS (EIs) and INSTALL ELECTRONIC INJECTORS (EIs) in Section 2 of this manual.
- Air may enter system when engine is turned off. Verify lines are properly tightened between the secondary filter and the high pressure fuel pump and between high pressure fuel pump leak-off port and cylinder head.

Continued on next page

DB92450,0000066 -19-12OCT07-1/3



Test for Air in Fuel (Mechanical Pump Shown, Electric Pump is Similar)

A—Fuel Supply Line from Tank
B—Clear Fuel Line at Primary Filter Inlet

C—Clear Fuel Line at Secondary Filter Outlet
D—Fuel Line Between Secondary Filter Outlet and High Pressure Pump Inlet

E—Clear Plastic Hose
F—Container with Clean Fuel

G—Fuel Leak-Off “T”

2. Check for air in fuel system:

- Disconnect the return-to-tank line from the leak-off fuel T-connector (G). The location of the T-connector may vary by application.
- Install a clear plastic hose (E) with proper fittings from JT03513C, Fuel Supply System Test Kit, between the T-connector and the return-to-tank line, OR submerge hose in a container of clean fuel (F), as shown.
- Start engine. Run engine for 1 minute at 1500 rpm. Observe hose and container (if used) for bubbles. Stop engine.

- If bubbles were present in the return fuel, go to the next step to determine source of the air. Reconnect fuel lines.

3. Check for air in fuel tank supply line:

- Disconnect the fuel tank supply line (A) at fuel transfer pump inlet.
- Install a clear plastic hose (B) with proper fittings between the fuel tank supply line and the fuel transfer pump inlet.

Continued on next page

DB92450,0000066 -19-12OCT07-2/3

- c. Operate engine and check for air bubbles in hose. If bubbles are present, check for loose or damaged fuel pickup tube, fuel supply lines or hoses.
- d. If no problem was found, go to the next step. Reconnect fuel lines.

- 4. Check for air in the high pressure pump fuel supply line:



CAUTION: Do NOT disconnect high pressure fuel pump OUTLET line between high pressure pump and fuel rail.

- a. Disconnect the line between the secondary filter outlet and the high pressure fuel pump inlet.
- b. Install a clear plastic hose (C) with proper fittings between the secondary filter outlet and the high pressure pump.

- c. Bleed air from the fuel system. See BLEED THE FUEL SYSTEM later in this section.
- d. Operate engine and check for air bubbles in hose. If bubbles are present, check for damaged primary filter head or gasket, and for loose or damaged primary filter.

- 5. Check for other causes of air in return line:
 - a. Check fuel cooler for air leaks, if applicable.
 - b. If source of air was not found, combustion gas may be leaking into the fuel return of one or more injectors. Inspect the injector hold down clamp torque, O-rings and seals. See REMOVE ELECTRONIC INJECTORS (EIs) and INSTALL ELECTRONIC INJECTORS (EIs) in Section 2 of this manual. Reconnect fuel lines.

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Check for Restricted Fuel Leak-off Line

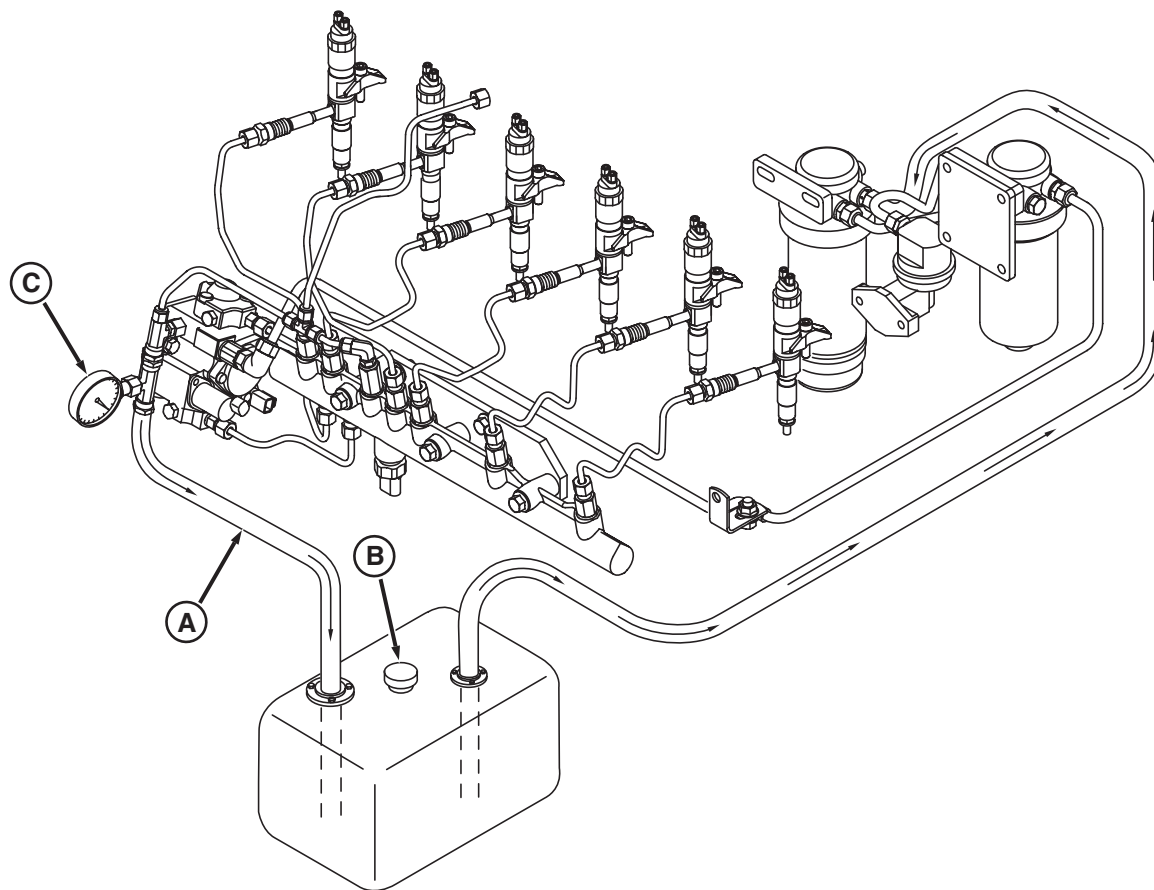
This check will determine if the fuel leak-off line is restricted or not designed correctly for the application.

1. Check all leak-off lines and ensure there are no kinked or pinched lines.
2. Install ("T"-in) pressure gauge (C) capable of accurately reading 20 kPa (2.9 psi) in fuel leak-off line (A) using 1/2 in. - 24 UNS fittings at fuel leak-off "T" as shown.

Continued on next page

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Measuring Fuel Leak-Off Pressure

A—Fuel Leak-Off Line to Tank

B—Fuel Tank Cap

C—Pressure Gauge

3. Do NOT remove fuel tank cap (B) at this time.
4. Operate engine under various conditions from low idle to governed rpm under load.
5. Determine if pressure gauge exceeds 20 kPa (2.9 psi) at any time.
6. Remove fuel tank cap (B) if pressure gauge exceeds 20 kPa (2.9 psi) and recheck leak-off system pressure.
7. If leak-off pressure is now less than 20 kPa (2.9 psi) with fuel cap removed, inspect tank vent. If pressure does not decrease with fuel cap removed, locate source of restriction in fuel leak-off line.

RG15383 -UN-07AUG07

RG41221,0000106 -19-12OCT07-2/2

Bleed the Fuel System



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles that eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If ANY fluid is injected into the skin, a doctor familiar with this type of injury must surgically remove it within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



CAUTION: If the engine has been run out of fuel, or after you have serviced the fuel filters, **DO NOT PRESSURIZE THE FUEL TANK** to prime the fuel system! Doing this causes the seal on the front of the high pressure pump to rupture. When such a

rupture occurs, fuel passes around the seal, and fills the engine crankcase. This condition causes severe damage to the engine and requires replacement of the high pressure pump.

NOTE: Any time the fuel system has been opened for service (lines disconnected or filters removed), it will be necessary to bleed air from the system.

NOTE: This procedure is only necessary for fuel systems without a constant air bleed. There are three different low pressure fuel pump options: mechanical pump, Stanadyne 2-wire electric pump, and Raycor 5-wire electric pump. For system identification, see test F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST. The Raycor system is a constant bleed type system which should purge any air from the low pressure fuel system with pump running. The Stanadyne pump system may also have an optional constant air bleed line. The mechanical pump does not have a constant air bleed system.

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RG41221,0000107 -19-12OCT07-1/1

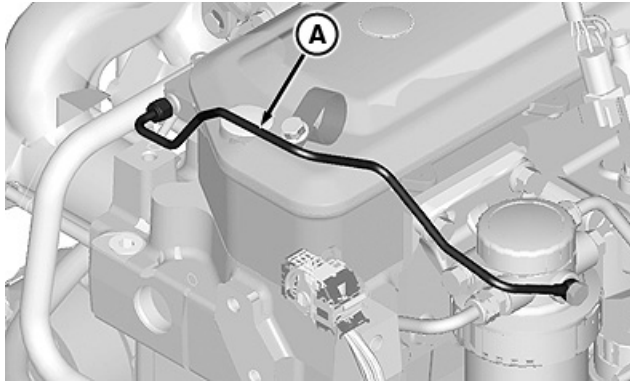
Bleed the Fuel System

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1 Determine Fuel Bleed System

Determine if the engine has a Stanadyne fuel system with a constant air bleed line.

- Constant Air Bleed - A steel line connects the final fuel filter base to the rocker arm carrier.



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Constant Air Bleed

A—Bleed Line

- Manual Air Bleed - An air bleed vent screw is located on the final fuel filter base.

Does the engine have a Constant Air Bleed system?

YES: Return to previous diagnostic procedure.

NO: GO TO 2

2 Bleed the Fuel System



RG12220 -UN-24MAY02

A—Bleed Vent Screw

1. Loosen the air bleed vent screw (A) two full turns by hand on the final fuel filter base.
 - a. With mechanical fuel pump - Operate fuel transfer pump primer lever, or primer button on fuel filter base (if equipped), until fuel flows out of bleed vent screw.
 - b. With Stanadyne electric fuel pump - Ignition ON, engine OFF until fuel flows out of bleed vent screw.

NOTE: Stanadyne electric pump voltage supply may be ignition or a from relay controlled by the ECU. If pump stops running after 60 seconds and air is not yet purged, cycle ignition OFF and back ON to cause ECU to energize fuel pump relay for an additional 60 seconds.

3. Tighten bleed vent screw securely. With mechanical pump, continue operating primer until pumping action is not felt.
4. Start engine and check for leaks.

Did the engine start?

YES: Return to previous diagnostic procedure.

NO: Repeat step 2

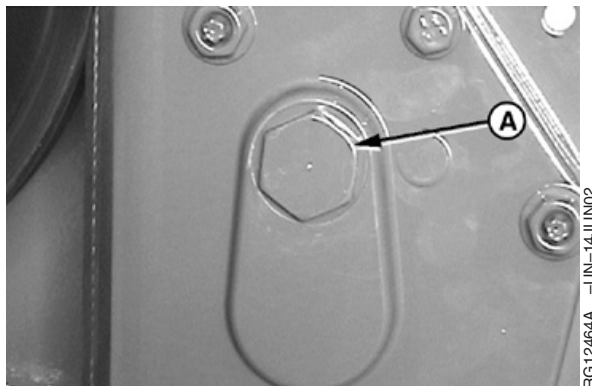
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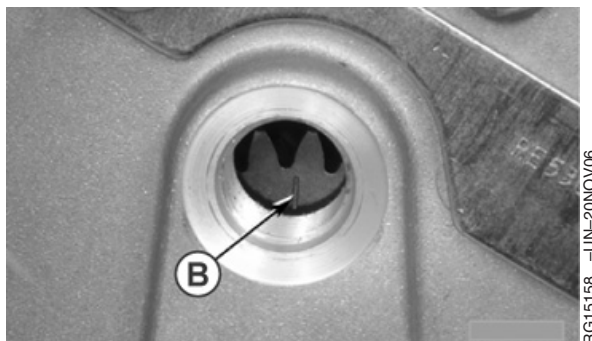
Check and Adjust High Pressure Fuel Pump Static Timing

1. Rotate engine to #1 cylinder top dead center with JDG820 Flywheel Turning Tool until JDE81-4 Timing Pin engages timing hole in flywheel.
2. Remove screw (A) for window on high pressure pump gear. A marked line on the gear (B) should be visible through the window.
3. If pump timing is incorrect, see REMOVE AND INSTALL HIGH PRESSURE FUEL PUMP in Group 02, Section 090 earlier in this manual.

A—High Pressure Pump Gear Window Screw
B—High Pressure Pump Gear Timing Mark



High Pressure pump window screw



high pressure pump gear timing mark

RG41221,0000108 -19-12OCT07-1/1

Charge Air System

DB92450,000003A -19-12OCT07-1/1

Charge Air System Diagnostic

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① Visual Inspection	1. Check for loose hose clamps. 2. Inspect air filter for damage or blockage that would restrict air flow or permit unfiltered air to flow into the engine. 3. Remove inlet air pipes and check for dirt tracks from unfiltered air. 4. Check for soft inlet air hoses which may collapse between air cleaner and turbo compressor inlet. 5. Inspect charge air cooler for debris or other blockage which would reduce the external cooling air flow through the cooling fins. 6. Check engine cooling fan and fan drive. Was a problem found?	YES: Fix problem. GO TO 2. NO: GO TO 2.
② Check for Internal Air Flow Restriction	Check for evidence of oil or other or other contamination in charge air cooler which would reduce internal air flow through the cooler's tubes. Is oil or other contamination present in the charge air cooler?	YES: GO TO 3 NO: GO TO 4
③ Clean Charge Air Cooler	1. Remove charge air cooler. 2. Use John Deere Coolant System Cleaner PMCC2638, or equivalent, per the cleaner instructions to clean the oil residue from the CAC. 3. Use compressed air to completely dry the inside of the CAC. Could oil or other contamination be removed from the charge air cooler?	YES: Reinstall charge air cooler. GO TO 4. NO: Replace charge air cooler. GO TO 4.

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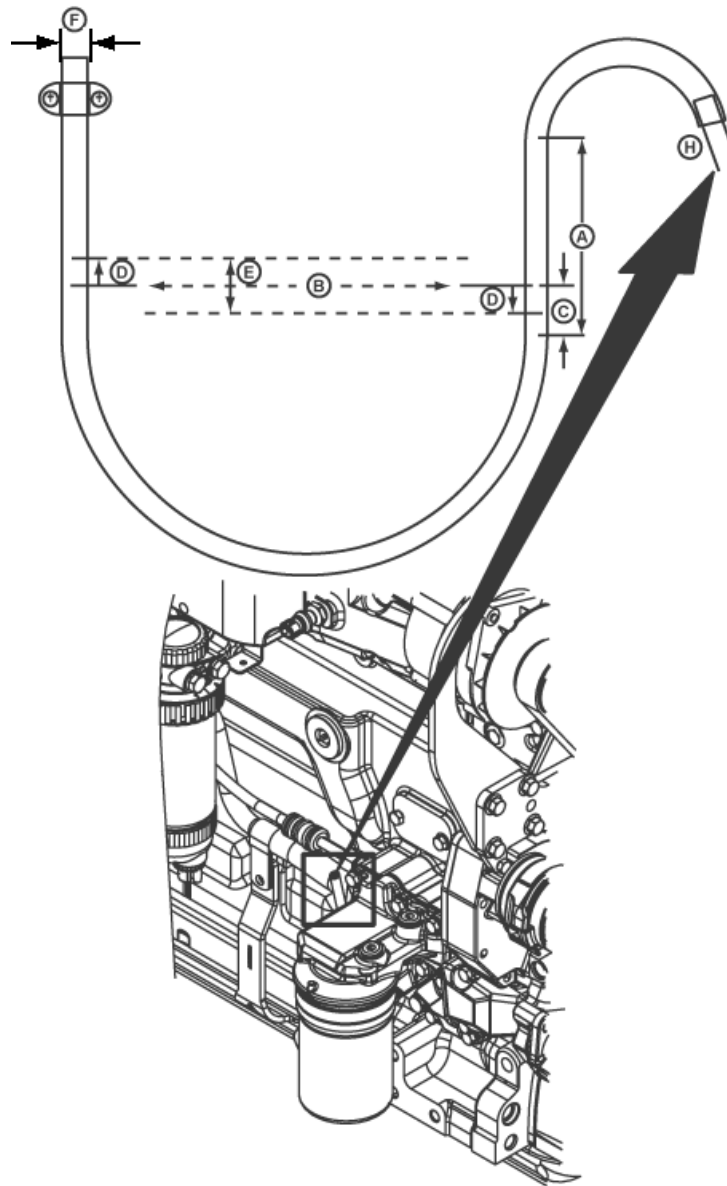
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Observable Diagnostics and Tests

④ Turbo Compressor—Side Evaluation	- Without removing turbocharger, examine compressor housing and blades for damage. (See TURBOCHARGER INSPECTION, Section 02, Group 080 in base engine manual.) - Remove the compressor outlet tube to the charge air cooler. Check for debris from the compressor housing and blades, and for oil leaking from the seal of compressor housing shaft. - Spin turbine. Turbine should spin freely without noise or binding. Was damage, debris, or leaking oil found or does turbine bind or scrape when spinning?	YES: GO TO 5 NO: GO TO 6 -- -1/1
⑤ Remove and Inspect Turbo	- Remove turbocharger. (See REMOVE TURBOCHARGER in section 02, Group 080 of base engine manual.) - Inspect for debris or oil. (See TURBOCHARGER INSPECTION in Section 02, Group 080 of base engine manual.) Was there debris or oil in the compressor outlet to the charge air cooler?	YES: Replace turbocharger. (See INSTALL TURBOCHARGER in section 02, Group 080 of base engine manual.) Then remove, clean, and reinstall charge air cooler, and GO TO 6. NO: GO TO 6. -- -1/1
⑥ Charge Air Cooling System Check	<i>NOTE: This procedure requires fabrication of caps for the inlet and outlet of charge air cooler outlet. Construction of one of the caps requires the ability to receive and seal a supply air line,</i> - At the intake manifold, remove charge air cooler outlet tube, and cap outlet tube. - At the turbocharger, remove charge air cooler inlet tube, and cap inlet tube. - Install a supply air line to the charge air system. - Slowly pressurize the charge air system to 206.85 kPa (30 psi), and maintain this pressure. - Using soapy water, check the charge air system joints for air leaks. Were any joint leaks found?	YES: Repair or replace leaking components. GO TO 7. NO: Keep air supply line connected. GO TO 7. -- -1/1
⑦ Charge Air Cooler Check	- With air supply line to charge air cooler still connected, shut off the air supply. - Measure how much time elapses for air pressure to reach 0 kPa (0 psi). Was the time to reach 0 kPa (0 psi) greater than 60 seconds?	YES: Charge air system is operating correctly. NO: Replace charge air cooler. -- -1/1

Excessive Engine Crankcase Pressure (Blow-By)



Blow-by Test Setup

RG15141 -UN-19DEC06

A—30.5 cm (12 in.) Vertical Tubing, Both Sides
B—Fluid Level Prior to Start of Test
C—Minimum 76.2 mm (3 in.) Vertical Fluid Prior to Start of Test

D—Maximum Allowable Vertical Fluid Travel 25.4mm (1.0 in.) Each Side
E—Max. Allow. Total Vertical Fluid Travel 50.8 mm (2.0 in.) Both Sides

F—9.5 mm (0.375 in.) o.d. (outer dimension) 6.35 mm (1/4 in) i.d. (inner dimension) Tubing (minimum length 91.4 cm (3 ft))

G—Oil Dipstick Tube

Continued on next page

DB92450,0000036 -19-12OCT07-1/2

Most blow-by comes from combustion gas leakage past any of three places: 1. piston rings, 2. valve guides, or sealing ring in the turbocharger. As blow-by increases, crankcase pressure also increases.

Measuring crankcase pressure is the best way to determine whether or not there is excess leakage past the piston rings, valve guides, or turbocharger seal.

NOTE: the following items are required

- A small amount of antifreeze or colored water.
- Minimum 91.44 cm (3 ft) clear, flexible, plastic tubing 6.35 mm (1/4 in) inner dimension (id) diameter.
- Marking pen, pencil, or crayon.

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Excessive Engine Crankcase Pressure (Blow-By) Diagnostic Procedure

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① Measure Crankcase Pressure Test

Before doing the test:

1. Ensure that crankcase vent tube is open to the atmosphere.
2. Remove dipstick and attach tubing (F) to dipstick tube (H).
3. Attach other end of tubing to a fixed panel, brace, or other firm surface, forming a "U", as shown above. On both sides, and opposite each other, the tubing must be vertical (A) for 30.5 cm (12 in.). Ensure that tubing is completely open, with no kinks or pinches in it.
4. Pour enough liquid into tube to allow a level of from 76.2 mm (3 in.) to 152.4 mm (6 in.) up both vertical sides of the tube (C). Mark the fluid level. Measure down 25.4 mm (1 in.) from fluid level in tube side nearest to the dipstick tube, and mark it. Measure up 25.4 mm (1 in.) from fluid level in tube side farthest from the dipstick tube, and mark it (D).

NOTE: If at any time during this test, prior to the end, fluid travel exceeds the total (50.8 mm (2.0 in.) both sides) maximum allowable travel, it is not necessary to continue this test

Perform crankcase pressure test, as follows:

1. Ignition ON, engine ON. Let engine stabilize, at low idle, and observe total fluid travel for both sides (E).
2. If possible, slowly load the engine. If not possible, slowly advance idle. Stop at 25% load, or approximate idle increase, and allow engine to stabilize. When engine is stabilized, observe total fluid travel for both sides.
3. Increase load, or advance idle and stop every, additional 25%. When engine is stabilized, observe total fluid travel for both sides.
4. Continue to as near as possible to full load, or to high idle. When engine is stabilized, and observe total fluid travel for both sides.

At any time during test, did total fluid travel exceed 50.8 mm (2 in.)?

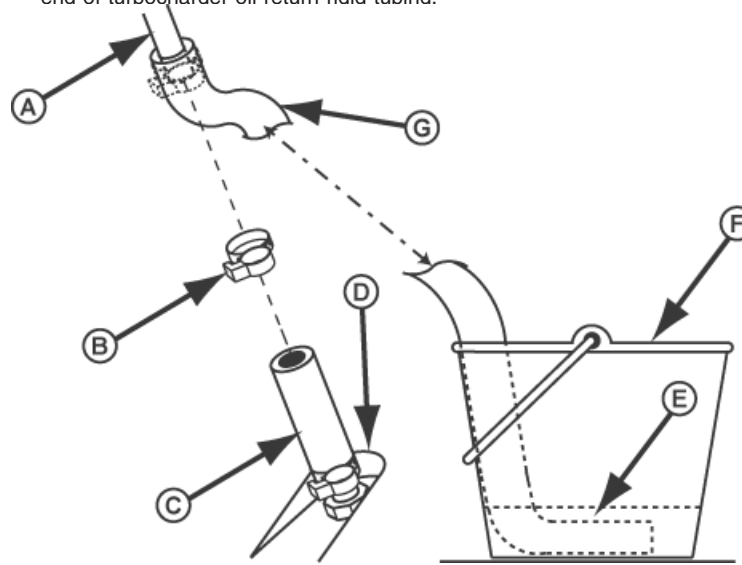
YES: GO TO 2

NO: The crankcase pressure meets John Deere application guidelines. Either return to original diagnostic procedure, or return to customer.

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2 Turbocharger Test

1. On turbocharger oil return rigid tubing (A) side of turbocharger oil return flexible tubing (C), remove and retain clamp (B), and remove end of flexible tubing from end of turbocharger oil return rigid tubing.



RG15142 -UN-09OCT06

Remove Turbocharger Oil Return Flexible Hose

- A—Turbocharger Oil Return Rigid Tubing**
B—Clamp
C—Turbocharger Oil Return Flexible Tubing
D—Crankcase
E—Water, 3.8 Liters (1.0 gallon)
F—19 Liter (5-gallon) Bucket
G—Test Flexible Tubing

2. Plug or cap open end of turbocharger oil return flexible tubing (C).
3. Obtain 19-liter (5-gallon) bucket (F), and place on ground or floor, near turbocharger oil drain line.
4. Measure outer dimension of rigid tubing (A), and obtain length of flexible tubing (G), of same inner dimension as rigid tubing outer dimension, and of sufficient length to place between rigid tubing and bucket as follows:
 - a. Attach one end of flexible tubing to open end of rigid tubing.
 - b. Secure flexible tubing to rigid tubing using clamp, from step 1.
 - c. Place other end of flexible tubing in bucket.
5. Pour approximately 3.8 liters (1.0 gallons) of water (E) into bucket. Bucket-end of flexible tubing must be completely submerged.
6. Check that crankcase engine oil level is full.
7. Using John-Deere-approved oil test kit, obtain an engine oil sample, and send off for oil scan analysis.

NOTE: This test should not exceed 3 minutes without shutting engine down. Then check engine oil level, and refill if necessary. Pour out bucket contents, and refill with 3.8 liters (1.0 gallons) of water.

8. Perform crankcase pressure test, as follows:

Observable Diagnostics and Tests

- a. Ignition ON, engine ON. Let engine stabilize, at low idle, and observe total fluid travel for both sides (E).
 - b. If possible, slowly load the engine. If not possible, slowly advance idle. Stop at 25% load, or approximate idle increase, and allow engine to stabilize. When engine is stabilized, observe total fluid travel for both sides.
 - c. Increase load, or advance idle and stop every, additional 25%. When engine is stabilized, observe total fluid travel for both sides.
 - d. Continue to as near as possible to full load, or to high idle. When engine is stabilized, and observe total fluid travel for both sides.
9. Monitor oil level in bucket to avoid oil spills.
 10. Check for bubbles appearing in bucket.
 11. When test is completed:

NOTE: If engine blow-by is found, to determine area of engine, remove head, and examine rings and valve guides, see REMOVE CYLINDER HEAD in base engine manual.

- a. Remove cap or plug from end of turbocharger oil return flexible tubing.
- b. Loosen clamp, remove flexible tubing drain line from rigid tubing, and remove clamp from test flexible tubing.
- c. Reattach turbocharger oil return flexible tubing and clamp to turbocharger oil return rigid tubing. Tighten clamp. For torque specification, see Section 6, Group 200 ELECTRONIC FUEL SYSTEM REPAIR AND ADJUSTMENT SPECIFICATIONS in this CTM.

Did bubbles appear in the bucket water?

YES: Remove and replace turbocharger, see AIR INTAKE AND EXHAUST SYSTEM OPERATION in base engine manual. GO TO 1

NO: To locate engine blow-by, see TEST ENGINE COMPRESSION PRESSURE in base engine CTM. (If possible, do compression test with digital gauge.)

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Exhaust Gas Recirculation (EGR) System Diagnostic

IMPORTANT: Be sure to run coolant in specified operating levels at all times. Running the engine low on coolant could cause an EGR cooler failure.

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Exhaust Gas Recirculation (EGR) System Diagnostic

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❶ EGR Temperature Sensors (In Place) Temperature Comparison

NOTE: If the engine has been run recently, GO TO 2

1. Ignition ON, engine OFF.
2. With the engine cold (engine has not been run for last 12 hrs), using Service ADVISOR™, compare the following ECU EGR temperatures.
 - Fresh Air
 - Mixed Air
 - EGR

Were the temperatures of the three sensors within $\pm 2^{\circ}$ Celsius (4° F) of one another?

YES: GO TO 3

NO: GO TO 2

SERVICE ADVISOR is a trademark of Deere & Company

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❷ EGR Temperature Sensors (Removed) Temperature Comparison

1. Ignition OFF, engine OFF.
2. Individually remove Fresh Air, Mixed Air, and EGR temperature sensors from the engine.

NOTE: If while removing a sensor it was necessary to disconnect the harness assembly connector, reconnect it.
3. Hold each sensor tightly inside your fist for an equal amount of time.
4. Using Service ADVISOR, monitor temperatures of each sensor.

Were the temperatures of the three sensors within $\pm 2^{\circ}$ Celsius (4° F) of one another?

YES: GO TO 3

NO: GO TO 10

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❸ Intake Manifold Pressure Sensor

1. Key ON, engine OFF.
2. Using Service ADVISOR, compare Barometric Air Pressure (Absolute) and Manifold Absolute Pressure.

Were they within ± 14 kPa (2 psi) of each other?

YES: GO TO 4

NO: GO TO 10

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Observable Diagnostics and Tests

④ EGR Valve Travel	1. Start and, if possible, load engine. 2. Use chart feature of Service ADVISOR to monitor EGR Valve Position - Actual and EGR Valve Position - Desired, ECU values. 3. Look for points where the EGR Valve Position - Actual value may hang up for brief periods, and then break loose and again match the EGR Valve Position - Desired value. Did the actual valve position values always smoothly, closely follow the desired values?	YES: GO TO 5 NO: GO TO 10 -- -1/1
⑤ Harness Test	<i>NOTE: Anytime a new EGR valve is installed, valve recalibration using Service ADVISOR, must be done.</i> 1. Engine OFF, ignition OFF. 2. Remove EGR valve. (See REMOVE, INSPECT, AND INSTALL EGR VALVE (TIER 3/STAGE IIIA) in Section 02, Group 080 of the base engine manual.) Do not remove electrical connections to EGR valve. 3. Cover cavity in engine from which EGR valve was removed. 4. Ignition ON, engine OFF. 5. Using Service ADVISOR, perform a HARNESS DIAGNOSTIC MODE TEST. Did the valve move freely, without hesitation or setting fault codes?	YES: GO TO 6 NO: Replace EGR Valve. See REMOVE, INSPECT, AND INSTALL EGR VALVE (TIER 3/STAGE IIIA) in Section 02, Group 080 of the base engine manual. -- -1/1
⑥ Coolant Leakage In The EGR Cavity	1. Ignition OFF. 2. (EGR Valve still removed, and cavity still covered.) Check for moisture/coolant in the cavity. Was moisture/coolant present?	YES: GO TO 7 NO: Reinstall the EGR valve, see REMOVE, INSPECT, AND INSTALL EGR VALVE (TIER 3/STAGE IIIA) in Section 02, Group 080 of the base engine manual and GO TO 8 -- -1/1

Observable Diagnostics and Tests

7 Coolant Leakage In EGR Cavity (Continued)	1. Engine ON, and run at slow idle. (EGR Valve still removed, and cavity still covered.) 2. Periodically remove the cover, and check for coolant in the EGR cavity. Could coolant be seen leaking into the EGR chamber?	YES: See REMOVE AND INSTALL EGR COOLER (TIER 3/STAGE IIIA) Section 02, Group 080 of the base engine manual. NO: Reinstall the EGR valve (See REMOVE, INSPECT, AND INSTALL EGR VALVE (TIER 3/STAGE IIIA) in Section 02, Group 080 of the base engine manual) and GO TO 9 -- -1/1
8 EGR Cooler Leak To Cooling System	1. Run the engine at slow idle, and no load, for 20 minutes. 2. After 20 minutes, load the engine until the EGR valve opens. 3. Watch for the following conditions: • White smoke • Engine misfire • Hydraulic engine lock or knocking Were any of these conditions present?	YES: See REMOVE AND INSTALL EGR COOLER (TIER 3/STAGE IIIA) Section 02, Group 080 of the base engine manual. NO: GO TO 9 -- -1/1
9 EGR Cooler Leak Test	1. Run a hose from the radiator cap overflow to a container with clear water in it. 2. Monitor Manifold Absolute Pressure while loading the engine, until the manifold pressure exceeds 96.5 kPa (14 psi). 3. Using Service ADVISOR to monitor Manifold Absolute Pressure, load the engine until the manifold pressure exceeds radiator cap pressure. Were gas bubbles visible in the container?	YES: See REMOVE AND INSTALL EGR COOLER (TIER 3/STAGE IIIA) in Section 02, Group 080 of the base engine manual. NO: GO TO 11 -- -1/1
10 Connector Test	Disconnect the suspect connector and check for corrosion and fit. Was the connector in good condition, and did it fit tightly?	YES: GO TO 11 NO: Clean, repair, or replace the defective connector (See CONNECTOR REPAIR in Section 02, Group 110, earlier in this manual) and GO TO 1 -- -1/1

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Observable Diagnostics and Tests

**11 Problem
Resolved/Not
Resolved**

If problem persists:

1. Create a DTAC case.
2. Select the parameters listed in EXHAUST GAS RECIRCULATION in the CONNECTION-READINGS section of Service ADVISOR.
3. Engine ON.
4. Record a minimum of 5 minutes of engine performance, and if possible, while engine is experiencing problems.
5. Attach recording to DTAC case.

Was problem resolved?

YES: Return to previous diagnostic procedure.

NO: Submit DTAC case.

--1/1

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**Variable Geometry Turbocharger (VGT)
Component Test**

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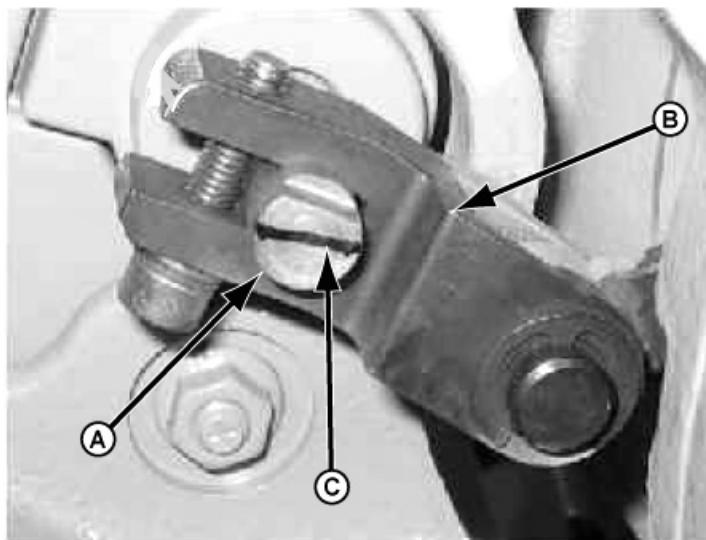
Variable Geometry Turbocharger (VGT) Component Test Diagnostic Procedure

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❶ VGT Linkage Test

NOTE: If the temperature is below freezing, run the engine for several minutes to melt away any ice that may be binding the linkage.

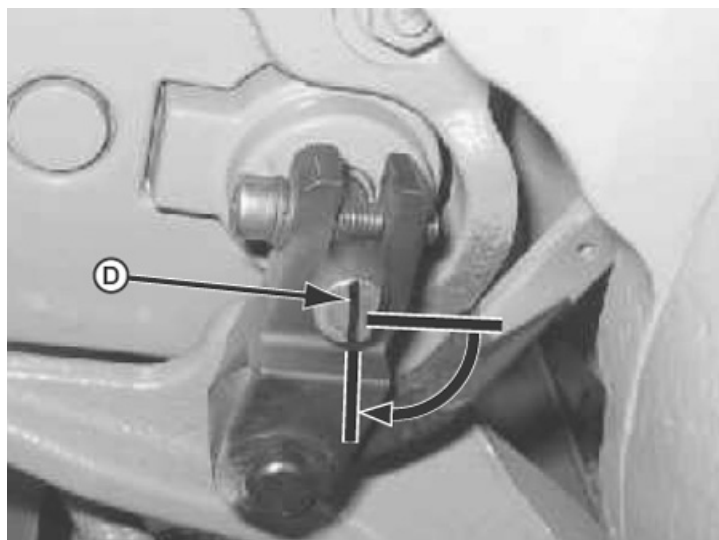


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Actuator Shaft at Rest

- A—Actuator Shaft**
- B—VGT-Actuator Linkage**
- C—Mark Made at End of Shaft**

1. Ignition OFF, Engine OFF.
2. With the actuator at rest, mark the end of the actuator shaft (A) with a horizontal line, as shown (C).
3. Rotate the actuator linkage (B) clockwise, until it stops. The line should be vertical, approximately 90° from the original position, as shown (D).



RG15153 -UN-08NOV06

Actuator Shaft Rotated

- D—Actuator Shaft Rotated 90°**

Release the linkage and allow it to spring back on its own.

Observable Diagnostics and Tests

	Did the linkage move freely from the resting position to full travel and back without stopping or binding?	YES: Return to the previous diagnostic procedure. NO: GO TO 2. -19- -2/2
2 Check Linkage for Excessive Binding	Using minimum force, try to manually rotate the linkage back to its return position. Continue to cycle the linkage back and fourth through its full rotation. Does the linkage travel the full rotation with minimum force?	YES: Return to the previous diagnostic procedure. NO: GO TO 3 -- -1/1
3 Isolate Binding	1. Remove VGT-actuator linkage (B) only from actuator shaft (A). See REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in the base engine manual. 2. Rotate linkage in both directions, and from stop to stop (approximately 90°). Did the turbine vanes move freely, through the full rotation and in both directions, without sticking?	YES: GO TO 4. NO: GO TO TURBOCHARGER FAILURE ANALYSIS in the base engine manual. -- -1/1
4 Actuator Movement Check	Using an appropriate-size wrench, rotate actuator shaft, approximately 90° clockwise (D). Did the actuator shaft move freely between stops?	YES: GO TO 5. NO: Replace actuator. See REMOVE AND INSTALL VARIABLE GEOMETRY TURBOCHARGER ACTUATOR (4 CYLINDER ENGINE - IF EQUIPPED) in the base engine manual. -- -1/1
5 Linkage Adjustment	1. Adjust the VGT-actuator linkage (B), See REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in the base engine manual. 2. Rotate the actuator linkage (B) clockwise, until it stops (D). Did the linkage move freely without binding?	YES: Return to original diagnostic procedure. Or, trouble resolved - return to customer. NO: Replace linkage. See REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE), in the base engine manual. -- -1/1

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Temperature Sensor Validity Test

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Temperature Sensor Validity Test Diagnostic Procedure

-- -1/1

① Check Recorded Difference Between Sensors Placed in Hot Water

NOTE: For sensor removal and installation procedures, see applicable procedure in Section 2, Group 110 earlier in this manual.

1. Ignition OFF, engine OFF.
2. Remove the temperature sensors indicated in the applicable diagnostic procedure from the engine and reconnect the sensors to the corresponding wire harness connectors.
3. Ignition ON, engine OFF.
4. Record the data points in Service ADVISOR that are associated with each of the temperature sensors as defined in the diagnostic procedure.
5. Fill a cup size or larger container with the hottest water available. Use an insulated container, if available.
6. Place each of the applicable sensor probes in the water for 15 seconds and quickly go to the next sensor to minimize the change in water temperature. Sensors can be placed in the water at the same time if the wire harness length permits. Do not submerge the sensor electrical connectors.
7. Place the first sensor that was tested back into the water for 15 seconds to determine the decrease in water temperature that occurred during the test.
8. Stop the data point recording and save the recording.
9. Replay the data point recording and monitor the maximum temperature reported when the first sensor tested was initially placed in the water and the maximum temperature reported when the same sensor was placed back in the water at the conclusion of the test.

Did the recorded information indicate that the change in water temperature was less than 2°C (4°F) during the test?

YES: Test complete. Return to the diagnostic procedure.

NO: Repeat the TEMPERATURE SENSOR VALIDITY TEST. Use a larger container of hot water, if available.

-- -1/1

EGR-VGT System Temperature and Flow
Test

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EGR-VGT System Temperature and Flow Test

-- -1/1

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1 Check System Response

1. Engine not operated for the past eight hours (preferred).
2. Ambient air temperature above 10°C (50°F) (preferred). In lower ambient temperatures, additional running time may be necessary before the EGR valve will be commanded open. In very low ambient temperatures, the EGR valve may not be commanded open.
3. Ignition ON, engine OFF.
4. Monitor and record the following data points in Service ADVISOR:
 - a. Turbo Compressor Inlet Air Temperature
 - b. EGR Fresh Air Temperature (charge air cooler outlet temperature)
 - c. Manifold Air Temperature
 - d. EGR Temperature
 - e. Engine Coolant Temperature
 - f. EGR Valve Position - Actual
 - g. Manifold Absolute Pressure
 - h. Barometric Pressure
5. Data points should indicate the following on a cold engine with engine not running:
 - a. Turbo Compressor Inlet Air Temperature - Approximately the same as actual ambient temperature.
 - b. EGR Fresh Air Temperature - Within 5°C (9°F) of Manifold Air Temperature and approximately the same as actual ambient temperature.
 - c. Manifold Air Temperature - Within 5°C (9°F) of EGR Fresh Air Temperature and approximately the same as actual ambient temperature.
 - d. EGR Temperature - Approximately the same as ambient temperature or coolant temperature, if temperature is above 10°C (50°F). EGR Temperature sensor is not designed to accurately indicate temperatures below 10°C (50°F).
 - e. Engine Coolant Temperature - Approximately the same as actual engine coolant temperature.
 - f. EGR Valve Position - Actual - 0% (closed).
 - g. Manifold Absolute Pressure - Within 10 kPa (1.5 psi) of Barometric Pressure data point.
 - h. Barometric Pressure - Within 10 kPa (1.5 psi) of actual barometric pressure.
6. Start engine and operate at 1200 rpm.
7. Data points should indicate the following as the engine warms up:
 - a. Turbo Compressor Inlet Air Temperature - Initially approximately the same as actual ambient temperature, but increasing to not more than 15°C (27°F) above actual ambient air temperature.
 - b. EGR Fresh Air Temperature - Within 5°C (9°F) of Manifold Air Temperature and not more than 15°C (27°F) above Turbo Compressor Inlet Air Temperature.
 - c. Manifold Air Temperature - Within 5°C (9°F) of EGR Fresh Air Temperature.

Observable Diagnostics and Tests

- d. EGR Temperature - Within 12°C (22°F) of Engine Coolant Temperature when coolant temperatures are between 30°C (86°F) and 79°C (174°F).
 - e. Engine Coolant Temperature - Approximately the same as actual engine coolant temperature.
 - f. EGR Valve Position - Actual - 0% (closed).
 - g. Manifold Absolute Pressure - Increased above the Ignition ON, engine OFF value.
 - h. Barometric Pressure - Within 10 kPa (1.5 psi) of actual barometric pressure.
8. Place engine under load when coolant temperature reaches 79°C (174°F), the minimum coolant temperature for EGR valve opening. The EGR valve should begin opening as shown by an increase in the EGR Valve Position - Actual data point after several minutes, if ambient temperatures are greater than 10°C (50°F).
9. Data points should indicate the following several minutes after the EGR valve opens:
- a. Turbo Compressor Inlet Air Temperature - Not more than 15°C (27°F) above actual ambient air temperature.
 - b. EGR Fresh Air Temperature - Typically higher than Turbo Compressor Inlet Air Temperature, but not more than 15°C (27°F) above Turbo Compressor Inlet Air Temperature.
 - c. Manifold Air Temperature - Typically 10-15°C (18-21°F) higher than the EGR Fresh Air Temperature due to the hot exhaust gas being supplied by the EGR valve.
 - d. EGR Temperature - Higher than Engine Coolant Temperature, typically a value near 150°C (302°F).
 - e. Engine Coolant Temperature - Approximately the same as actual engine coolant temperature.
 - f. EGR Valve Position - Actual - Greater than 0%, typically at the full open position of approximately 90%.
 - g. Manifold Absolute Pressure - Increases as engine speed and load are increased. Value may fluctuate as the ECU controls the VGT actuator.
 - h. Barometric Pressure - Within 10 kPa (1.5 psi) of actual barometric pressure.
- Did the temperatures and pressures respond as described without erratic changes?

YES: System is operating correctly. Return to diagnostic procedure.

NO: System is not operating correctly. Return to diagnostic procedure.

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About This Group

This section of the manual contains information for observable diagnostics and fuel-related test procedures. Use this information in conjunction with the 6.8L/4.5L Diesel Engines base engine manual. Group 150 is divided into two areas: 1) diagnosis of observed malfunctions and 2) test procedures. The observed malfunctions area is further divided into the following headings, containing the following observable symptoms:

NOTE: Follow the diagnostic procedure of an active or stored DTC before pursuing any observable diagnostic procedure.

- E1 - Engine Cranks/Won't Start
- E2 - Engine Misfires/Runs Irregularly
- E3 - Engine Does Not Develop Full Power
- E4 - Engine Emits Excessive White Exhaust Smoke
- E5 - Engine Emits Excessive Black or Gray Exhaust Smoke
- E6 - Engine Will Not Crank
- E7 - Engine Idles Poorly
- E8 - Abnormal Engine Noise
- E9 - Analog Throttle (A) Will Not Respond
- E10 - Analog Throttle (B) Will Not Respond

- F1 - Low Pressure Fuel System Check
- F2 - High Pressure Fuel System Check
- F3 - Excessive Fuel Consumption
- F4 - Fuel in Oil

- D1 - ECU Does Not Communicate with Service ADVISOR

- D2 - Diagnostic Gauge Does Not Communicate with ECU
- D3 - ECU Does Not Program with Service ADVISOR

- A2 - Glow Plug Check

Procedures for diagnosing some of the above symptoms are formatted such that a test or repair is recommended, then based on the results another test or repair is recommended. Other symptoms are formatted in a symptom - problem - solution format. In these symptoms, the problems are arranged in the most likely or easiest to check first. Symptoms arranged in both formats refer to test procedures in the second part of this section. The second part of this section manual contains the following test procedures:

- Test Procedures:
 - Check Fuel Supply Quality
 - Test for Air in Fuel
 - Check for Restricted Fuel Leak-off Line
 - Bleed the Fuel System
 - Check and Adjust High Pressure Fuel Pump Static Timing
 - Charge Air System Diagnostic
 - Excessive Engine Crankcase Pressure (Blow-By)
 - Variable Geometry Turbocharger (VGT) Component Test
 - Temperature Sensor Validity Test
 - EGR-VGT System Temperature and Flow Test
 - Bleed Coolant System

Electrical Concepts

Tests will include making measurements of voltage and resistance and making checks for open circuits and short circuits. An understanding of the following concepts is required to use the diagnostic procedures:

- Voltage (volts)
- Current (amps)
- Resistance (ohms)
- Open Circuit
- Short Circuit

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Using a Digital Multimeter

It is recommended that a digital multimeter (JT07306 or equivalent with an analog display) be used to make the required measurements in the diagnostic procedures. A knowledge of the operation of the particular meter used is assumed.

Instructions for measuring voltages take the following form:

- Measure voltage from Point A (+) to Point (B) (-)

Select 'V' with the selector knob. The display indicates the selected function. In this example, the positive test lead from the volt-ohm input of the meter should be connected to Point A and the negative test lead from the common input of the meter should be connected to Point B.

Unless otherwise stated, all voltage measurements are direct current (D.C.).

When making a resistance measurement, make sure the circuit is not powered on. Select Ω with the selector knob. Disconnect appropriate connectors or turn off key switch, as directed by diagnostic procedures. Some procedures may require the meter leads to be reversed to get the proper measurement.



Digital Multimeter

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Electrical Circuit Malfunctions

Circuit Malfunctions

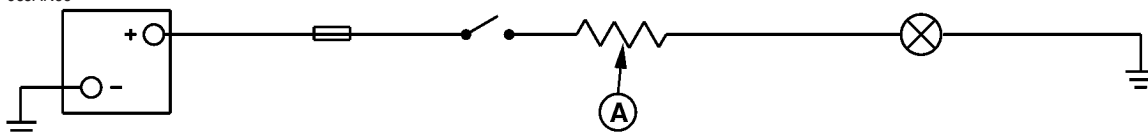
There are four major circuit malfunctions. They are:

1. High-resistance circuit
2. Open circuit
3. Grounded circuit
4. Shorted circuit

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High Resistance Circuit

A—Unwanted Resistance

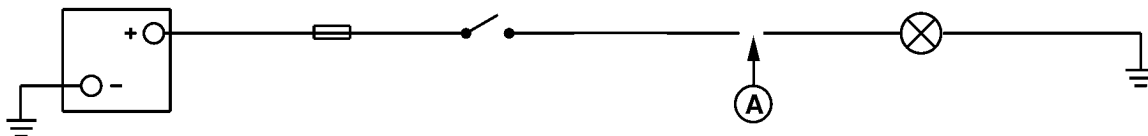
Definition of Circuit Malfunctions

A circuit having unwanted resistance (A) that causes a voltage drop and reduces current flow.

1. High Resistance Circuit:

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Open Circuit

A—Break or Separation in Circuit

2. Open Circuit:

A circuit having a break or a separation (A) that prevents current from flowing in the circuit.

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RG9893 -UN-06JAN99



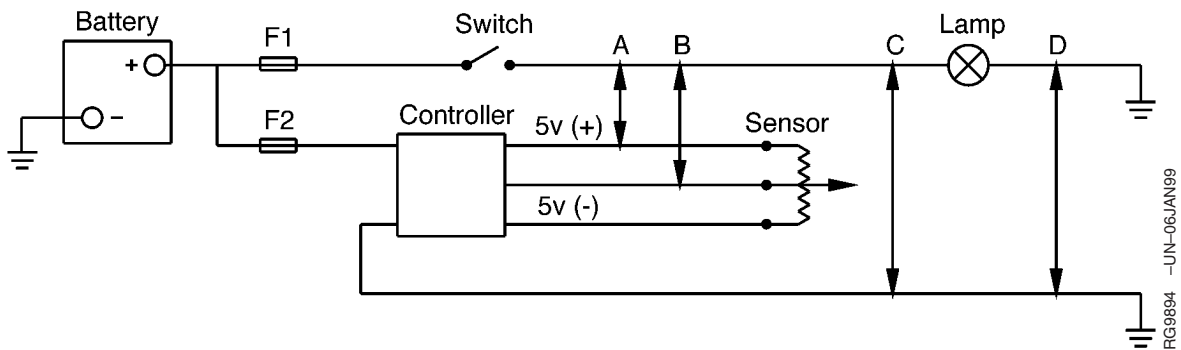
Grounded Circuit

A—Voltage Wire in Contact with Machine Frame

3. Grounded Circuit:

A voltage wire in contact with the machine frame (A), providing continuity with the battery ground terminal.

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Shorted Circuit

4. Shorted Circuit:

A wire-to-wire contact of two adjacent wires that provides unwanted continuity between the two wires. The following are types of short circuits:

- (A) Voltage wire shorted to another voltage wire (wires of equal or unequal voltage).
- (B) Voltage wire shorted to a sensor signal wire (wires of unequal voltage).
- (C) Voltage wire shorted to a ground wire (wires of battery voltage or regulated voltage, shorted to

a ground wire connecting a component to the battery negative terminal).

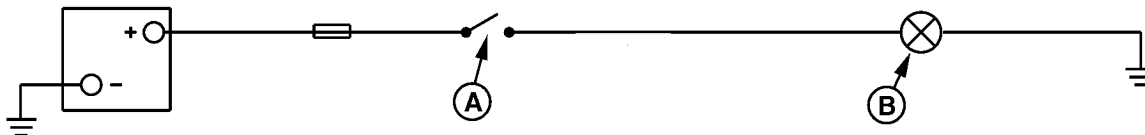
- (D) Ground wire shorted to another ground wire (wires of zero voltage).

NOTE: This type of short does not create an observable malfunction. Therefore, no further explanation for trouble shooting is necessary.

Continued on next page

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Locations of Circuit Malfunctions

A—Controlling Switch

B—Load

Locations of Circuit Malfunctions:

In a “Simple Electrical Circuit” the circuit malfunctions occur at only three locations. They are:

1. Before the controlling switch (A).
2. Between the controlling switch (A) and the load (B).
3. After the load (B).

Electrical components can become faulty with the same three circuit malfunctions. Sometimes component malfunctions can easily be confused with

circuit malfunctions. Therefore, care must be exercised when isolating the cause of the problem.

Example: A component may not operate before disconnecting an electrical connection, but it operates after reconnecting the connector.

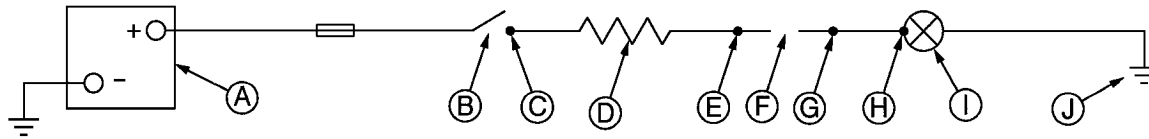
Reason: Oxidation of the terminals created “High Resistance” and a voltage drop that prevents the proper amount of current flow to the component. Disconnecting and reconnecting the connector, removed some oxidation and reestablished good continuity through the connector.

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Troubleshooting Circuit Malfunctions

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Troubleshooting Circuit Malfunctions

A—Battery	D—Unwanted Resistance	G—Circuit Connector	I—Load (Lamp)
B—Switch	E—Circuit Connector	H—Component Terminal	J—Ground
C—Component Terminal	F—Open Circuit		

1. High Resistance Circuit:

A "High Resistance" circuit can result in slow, dim or no component operation (for example: loose, corroded, dirty or oily terminals, gauge of wire too small or broken strands of wire).

proper voltage at a location easily accessible between (C) and (H).

- If voltage is low, move toward the voltage source (A) to locate the point of voltage drop.
- If voltage is correct, move toward the load (I) and ground terminal (J) to locate the voltage drop.

2. Open Circuit:

An "Open" circuit results in no component operation because the circuit is incomplete (for example: broken wire, terminals disconnected, open protective device or open switch).

NOTE: The example shows high resistance (D) between (C) and (E) and the open circuit (F) between (E) and (G).

Do the following to isolate the location of a "High Resistance" or "Open" circuit:

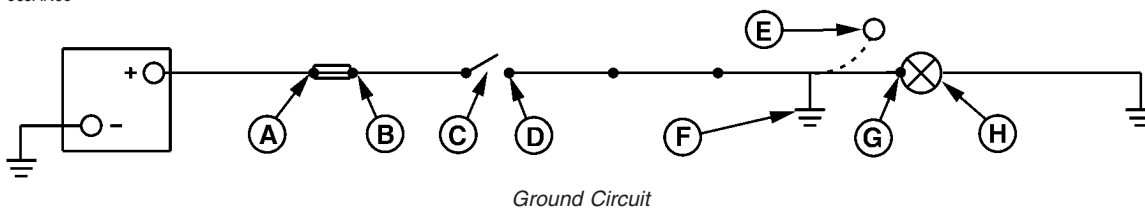
- With the controlling switch (B) closed (on) and the load (I) connected into the circuit, check for

- Repair the circuit as required.
- Perform an operational check-out on the component after completing the repair.

Continued on next page

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A—Fuse “A” Terminal
B—Fuse “B” Terminal

C—Switch
D—Component Terminal

E—Wire Terminal
F—Grounded Circuit

G—Component Terminal
H—Load (Lamp)

3. Ground Circuit:

A “Grounded” circuit (F) results in no component operation and the fuse or circuit breaker opens (for example: a power wire contacting the machine frame, chassis or component housing).

Do the following to isolate the location of a “Grounded” circuit:

- a. Switch (C) must be open (off). Check for continuity to ground between (B) and (C).
 - If there is continuity, there is a grounded circuit between (B) and (C). Repair the circuit.
 - No continuity, go to step b.

- b. Disconnect the load (H) at component terminal (G).
- c. With the controlling switch (C) open (off), check for continuity to ground between (D) and (E).
 - If there is continuity, there is a grounded circuit between (D) and (E). Repair the circuit.

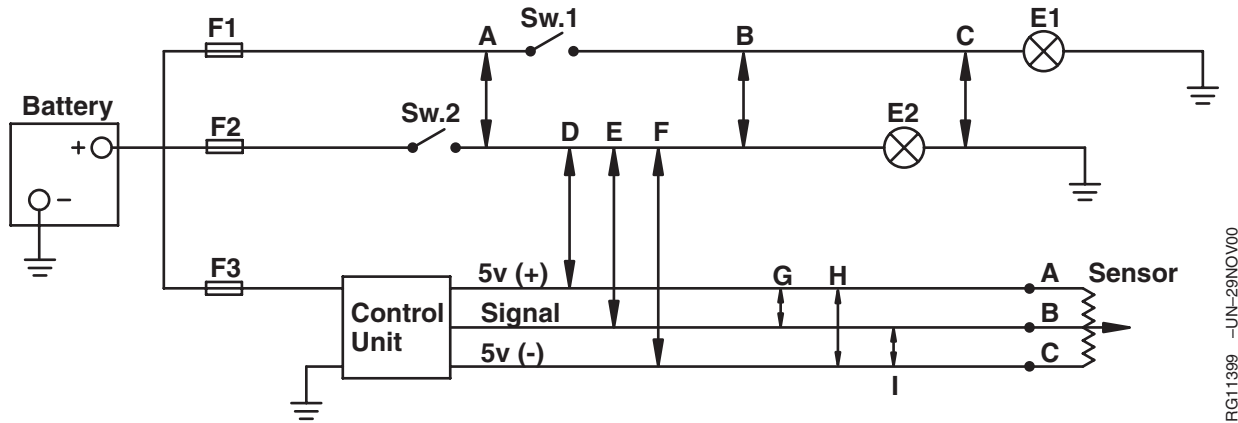
NOTE: The example is grounded between (D) and (E) at (F).

- Perform an operational check-out on the component after completing the repair.

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4. Shorted Circuit:

Machines equipped with several electronic control devices contain wiring harnesses that can become shorted by one of the following ways shown above.

1. Battery wire from fuse (F1) is shorted at (A) to another battery wire after switch (Sw.2).
 - Result: Lamp (E2) is on all of the time.
2. Battery wire from fuse (F1) is shorted at (B) to another battery wire after switches (Sw.1 & 2).
 - Result: Both lamps (E1 & E2) operate on either switch (Sw. 1 or 2).
3. Battery wire from fuse (F1) is shorted at (C) to a ground wire.
 - Result: Fuse (F1) opens after closing switch (Sw. 1)
4. Battery wire from switch (Sw. 2) is shorted at (D) to a regulated voltage wire.
 - Result: The sensor signal voltage is distorted.¹
5. Battery wire from switch (Sw. 2) is shorted at (E) to the sensor signal voltage wire.
 - Result: The sensor signal is distorted.¹
6. Battery wire from switch (Sw. 2) is shorted at (F) to the sensor ground wire.

- Result: Fuse (F2) opens after closing switch (Sw. 2) and the sensor signal is distorted.¹

7. Controller regulated voltage wire is shorted at (G) to the sensor signal voltage wire.
 - Result: The sensor signal is distorted.
8. Controller regulated voltage wire is shorted at (H) to the sensor ground wire.
 - Result: The sensor signal is distorted.¹
9. Sensor voltage wire is shorted at (I) to the sensor ground wire.
 - Result: The sensor signal is distorted.¹

Do the following to isolate a “Shorted Circuit:”

- a. Review the machine electrical schematic to identify the circuits for the component that does not operate.
- b. Disconnect the components at each end of the circuits, to single out the affected wires.
- c. To prevent damage to connector terminals, obtain mating connector terminals from repair parts. DO NOT force meter probes into connector terminals.

¹The sensor signal voltage goes out of range and a fault code may be restored. The controller may shut down or provide limited operation for its function.

d. Connect the meter leads across two of the affected circuits. The meter should show no continuity between the two circuits. Repeat the check across another combination of two circuits until all affected circuits have been checked.

e. Then, connect a meter lead to each affected circuit one at a time and touch the other meter leads to all terminals in the connector. The meter should show no continuity between any two circuits.

Example: A 37 pin connector contains three wires to a sensor. With one meter probe attached to each of the three wires, one at a time, touch the other meter probe to the remaining 36 wires. If there is continuity between any two wires, the circuit is shorted. Repair the circuit.

f. Alternate Method to Check for Shorted Circuit.

With the components disconnected at each end of the suspected circuits, turn the key switch on.

Connect one meter lead to a good frame ground. With the other meter probe, touch each of the suspected circuits one at a time. If there is a voltage reading, the circuit is shorted to another voltage wire. Repair the circuit.

g. Repair the "Shorted Circuit" as follows:

- Wires not in a loom: Wrap individual wires with electrical tape or replace the damaged wire and band as required.
- Wires in a loom: If hot spots exist in shorted area of the harness, replace the harness. If hot spots are not noticeable, install a new wire of proper gauge between the last two connections. Use tie bands to secure the wire to outside of the harness.

h. Perform an operational check-out on the component after completing the repair.

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Connecting to Service ADVISOR

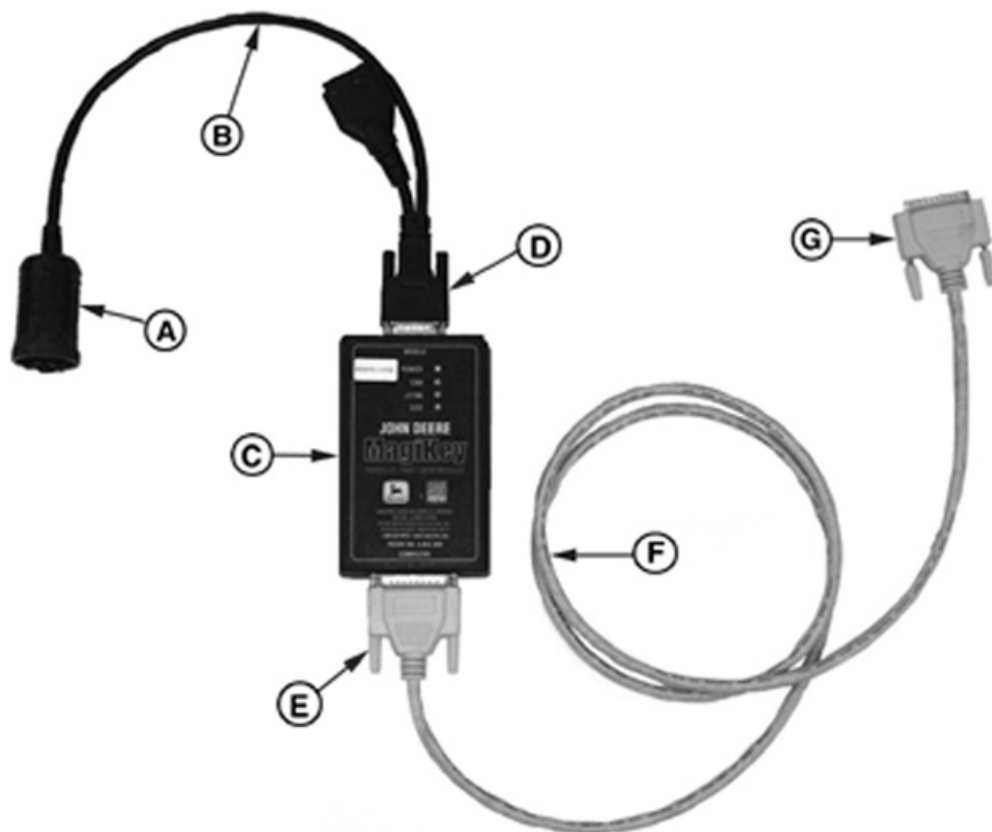
Refer to the appropriate section below for instructions on connecting Service Advisor to your application.

Connecting to Service ADVISOR with PDM Adaptor

The Parallel Data Module (PDM) adapter is used to provide communication between the PC and the ECU.

Continued on next page

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Connecting to Service ADVISOR

A—Diagnostic Connector Mate C—PDM (Parallel Data Module) E—25 Pin PDM Connector G—PC Connector
 B—John Deere Controller Cable D—26 Pin PDM Connector F—Parallel Cable

The PDM is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10023 ECU Communication Hardware Kit or JDIS121 ECU Communication Hardware Kit is required to connect Service ADVISOR to the ECU.

Instructions for connecting to Service ADVISOR with PDM:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness using the diagnostic connector mate (A).
3. Connect the other end of the John Deere Controller Cable to the PDM (C) module at the 26 pin PDM connector (D).
4. Connect the parallel cable (F) to the PDM module at the 25 pin PDM connector (E).
5. Connect the other end of the parallel cable to the PC with Service ADVISOR installed.
6. Key ON, engine off or running.

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7. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
8. Select Parallel Data Module (PDM) as the current adapter in the Select Readings Adapter box.
9. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
10. Press the Connect button after selecting the engine model.
11. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
12. If power to the PDM is lost while cranking the engine for the ENGINE TEST INSTRUCTIONS - COMPRESSION TEST, use the Power Adapter. The Power Adapter connects between the PDM and the 26 pin PDM connector.
13. When finished, replace the dust cap on the diagnostic connector.



Power Adapter

RG12277 -UN-22APR02

Connecting to Service ADVISOR with PDM Adaptor and USB Adaptor

The Parallel Data Module (PDM) adapter is used to provide communication between the PC and the ECU. The USB adapter is used to permit the PDM to connect to a USB port on the PC.

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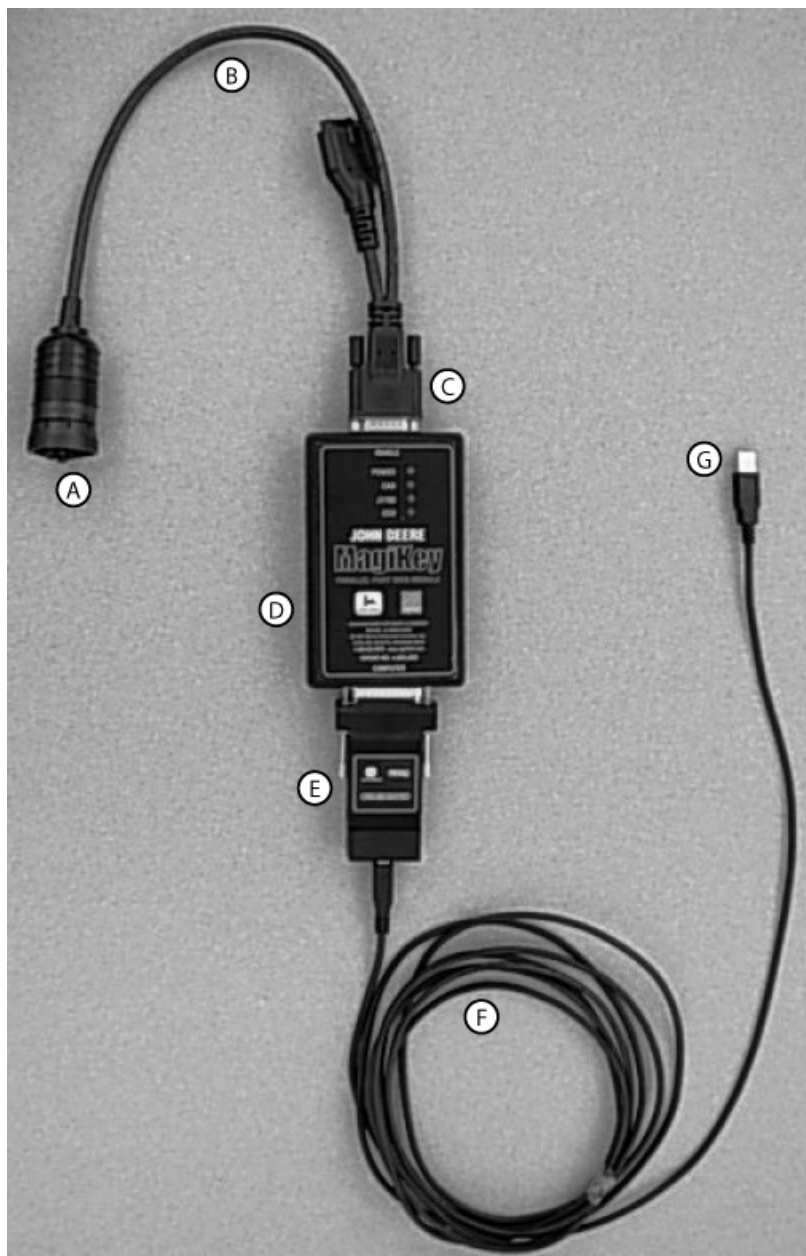


FIG15119A -UN-30MAY07

A—Diagnostic Connector Mate
B—John Deere Controller
Cable

C—26 Pin PDM Connector
D—Parallel Data Module (PDM)

E—USB Adapter
F—USB Cable

G—PC Connector

The PDM is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10023 ECU Communication Hardware Kit or JDIS121 ECU Communication Hardware Kit is required to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR:

Continued on next page

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1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness using the diagnostic connector mate (A).
3. Connect the other end of the John Deere Controller Cable to the PDM (D) module at the 26 pin PDM connector (C).
4. Connect the USB adaptor (E) to the PDM module.
5. Connect the USB cable (F) to the USB adapter.
6. Connect the USB cable PC connector (G) to the USB port on the PC.
7. Key ON, engine off or running.
8. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
9. Select Parallel Data Module (PDM) with USB Adapter as the current adapter in the Select Readings Adapter box.

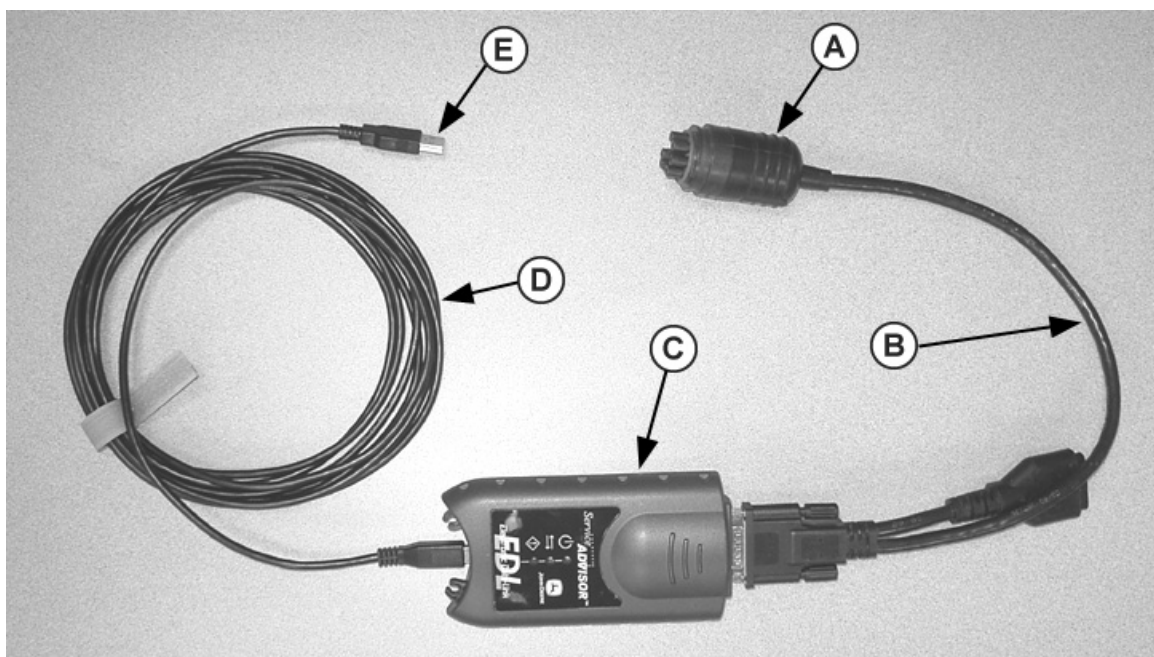
10. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
11. Press the Connect button after selecting the engine model.
12. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
13. When finished, replace the dust cap on the diagnostic connector.

Connecting to Service ADVISOR with EDL Adaptor using USB Cable

The Electronic Data Link (EDL) adapter is used to provide communication between the PC and the ECU.

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Connecting to Service ADVISOR

A—to 9-Pin Diagnostic Connector on Engine

B—John Deere Controller Cable

**C—EDL (Electronic Data Link)
D—USB Cable**

E—to PC with Service ADVISOR

The EDL is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10117 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR to the ECU:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness.
3. Connect the other end of the John Deere Controller Cable to the EDL (C).

4. Connect the USB cable (D) to the EDL.
5. Connect the other end of the USB cable to the PC with Service ADVISOR installed.
6. Key ON, engine off or running.
7. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
8. Select Electronic Data Link (EDL) Stand-alone USB Device as the current adapter in the Select Readings Adapter box.
9. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
10. Press the Connect button after selecting the engine model.
11. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
12. When finished, replace the dust cap on the diagnostic connector.

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Connecting to Service ADVISOR with EDL Adaptor using Bluetooth

The Electronic Data Link (EDL) adapter is used to provide communication between the PC and the ECU using Bluetooth wireless communications. The PC must have a Bluetooth adaptor or be Bluetooth capable for this feature to work.

The EDL is connected to the engine ECU through the diagnostic connector. The diagnostic connector is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

DS10117 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

Instructions for connecting Service ADVISOR to the ECU using Bluetooth wireless:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable to the diagnostic connector on the engine harness.
3. Connect the other end of the John Deere Controller Cable to the EDL.
4. Key ON, engine off or running.
5. Start Service ADVISOR and select Connect to Model(s) from the Readings menu, or press the connect icon on the toolbar.
6. Select Electronic Data Link (EDL) using Bluetooth as the current adapter in the Select Readings Adapter box.
7. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
8. Press the Connect button after selecting the engine model.
9. If Service ADVISOR does not connect, see D1 - ECU DOES NOT COMMUNICATE WITH SERVICE ADVISOR diagnostic procedure in Group 150 of this manual.
10. When finished, replace the dust cap on the diagnostic connector.

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Diagnostic Gauge Data Parameters Viewing Instructions

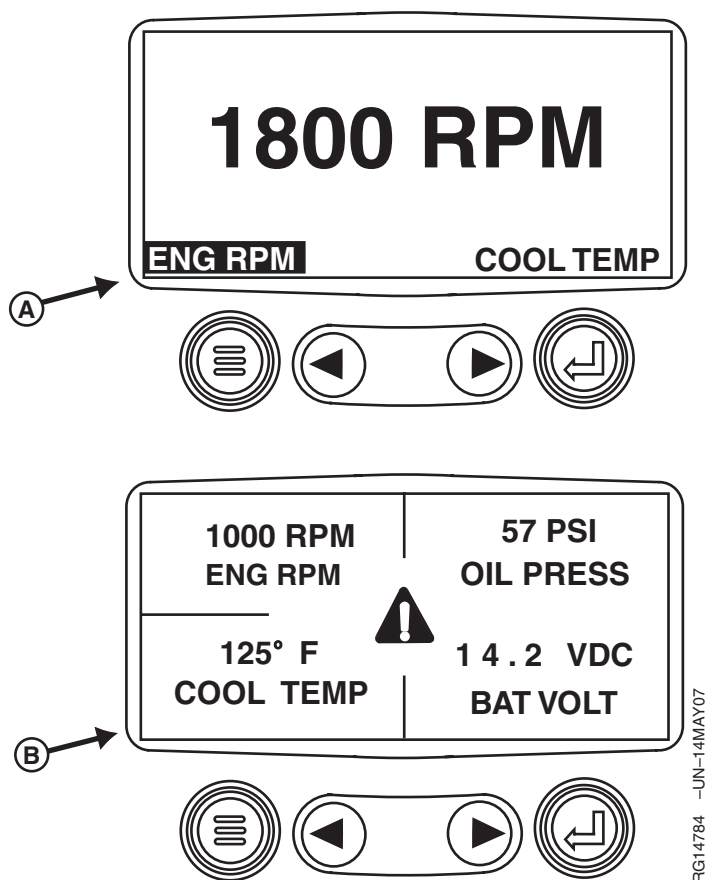


Figure 1. One and Four Parameter Displays

A—1-Up Display

B—4-Up Display

NOTE: For complete Power View operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

be selected, one showing a single parameter, called 1-Up Display (A), and the other showing 4 selectable parameters, called 4-Up Display (B). At power up, the gauge defaults to the mode that was last used. Examples of both are shown in figure 1.

The Power View diagnostic gauge can be used for displaying engine parameters. Two display modes can

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NOTE: When the one-parameter display is selected, main menu shows "GO TO 4-UP DISPLAY", and when the four-parameter display is selected, main menu shows "GO TO 1-UP DISPLAY" in the top line.

1. Changing to the 4 parameter display. See figure 2.

- a. Press the MENU KEY (F). Main Menu is displayed.
- b. With the SCROLL KEYS (G,H), select "GO TO 4-UP DISPLAY" (B).
- c. Press the ENTER KEY (I).
- d. The 4-Up Display will be shown.

2. Selecting engine parameters for 4-UP Display.

- a. Press the MENU KEY (F). Main menu is displayed.
- b. Using the SCROLL KEYS (G,H), select SETUP 4-UP DISPLAY (B). Press ENTER KEY (I).
- c. In the next screen, select CUSTOM SETUP and press ENTER KEY (I). The 4-Up Display appears.
- d. With the SCROLL KEYS (G,H), select the window on the display you want to change. Press ENTER KEY (I).
- e. Scroll through the parameter list and select the parameter you want to display. Press ENTER KEY (I).
- f. The number of the display window will appear next to the selected parameter.
- g. Press MENU KEY (F) to return to the 4-Up Display. The new parameter should be displayed on the screen.

NOTE: The same method is used for selecting the default parameter for the 1-UP Display.

3. Changing units of measure.

- a. Press the MENU KEY (F). Main menu is displayed.

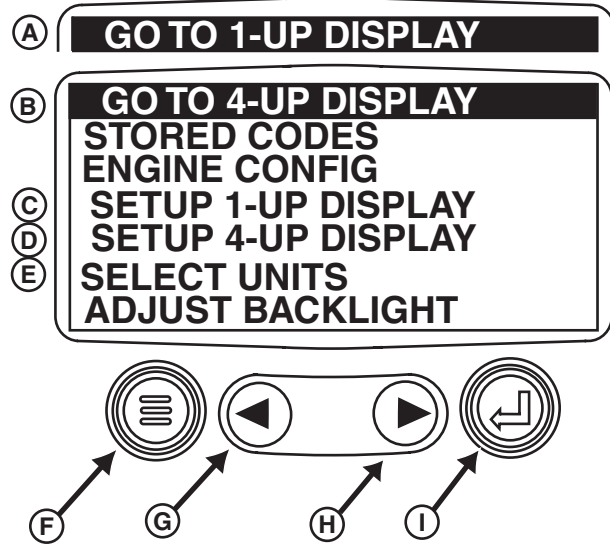


Figure 2. Main Menu.

- A—Go To 1-Up Display
- B—Go To 4-Up Display
- C—Setup 1-Up Display
- D—Setup 4-Up Display
- E—Select Units
- F—Menu Key
- G—Left/Up Scroll Key
- H—Right/Down Scroll Key
- I—Enter Key

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- b. Scroll through the menu to SELECT UNITS (E).
Press ENTER KEY (I).
- c. With the SCROLL KEYS (G,H), select the desired unit of measure. Press ENTER KEY (I).
- d. Press MENU KEY (F) to return to the parameter display.

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Diagnostic Gauge Active DTC Viewing Instructions

NOTE: For complete Power View operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information fault codes, see **DIAGNOSTIC TROUBLE CODES LIST** later in this section of the manual.

IMPORTANT: Ignoring active trouble codes can result in severe engine damage.

Refer to the trouble shooting procedures later in this section for fixing active DTCs.

A Diagnostic Trouble Code (DTCs) is set when an operating condition is not within a specified range. This is an indicator to the operator that a problem area needs to be corrected. The diagnostic gauge alerts the operator when a DTC is active by turning on a warning light and changing to the WARNING screen showing information about the DTC. The warning screen is described below.

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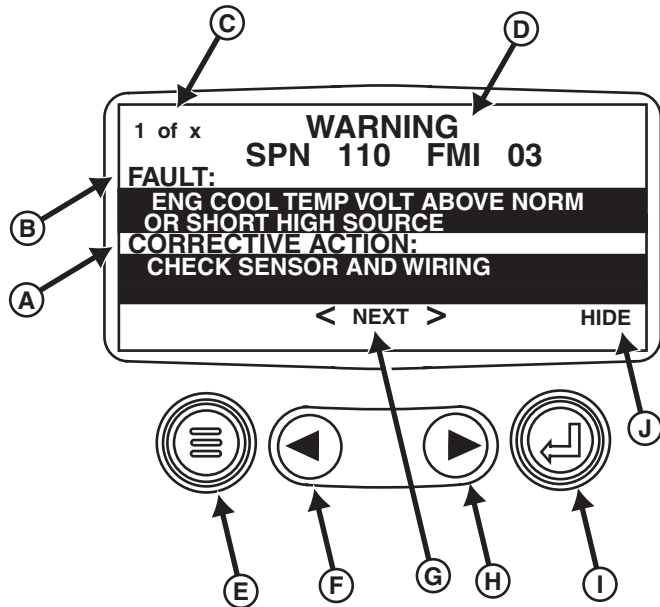


Figure 1. Active Code Diagnostic Screen

A—Corrective Action
B—Diagnostic Code Description
C—Current and Total number of Active Codes

D—SPN (Suspect Parameter Number) FMI (Failure Mode Identifier) Diagnostic Code
E—Menu Key
F—Left/Up Scroll Key
G—Next

H—Right/Down Scroll Key
I—Enter Key
J—Hide

1. When the diagnostic gauge receives a diagnostic trouble code, the engine parameter screen is replaced with the "Warning" screen. See figure 1.

2. Display features for the Active Codes Diagnostic Screen are described below:

- SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
- Name of diagnostic code (B) referenced in manual.
- A brief description for corrective action (A).
- The word "NEXT" (G) indicates there are more fault codes to be viewed.

- Two SCROLL KEYS (F,H) are used to cycle through the codes.
- "1 of x" (C) indicates the current diagnostic code displayed of the total number.
- To hide (J) this screen and return to the parameter display screen, press the "Enter" Key (I). Pressing the Enter Key again returns to the warning screen.

NOTE: To refresh active DTCs, you must return to the 1-UP or 4-UP screen.

3. To return to the Main Menu screen, press the menu button (E), shown in figure 4.

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4. The parameter display screen displays one of the following icons when a DTC is active. See figure 2. An amber light sets when a DTC becomes active and a red light sets when the engine has derated or shutdown.

A—Warning
B—Engine Derate or Shutdown

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Figure 2. Icons Indicates a Fault Warning, Engine Derate, or Shutdown

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Diagnostic Gauge Stored DTC Viewing Instructions

NOTE: For complete Power View operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information fault codes, see **DIAGNOSTIC TROUBLE CODES LIST** later in this section of the manual.

Stored Diagnostic Trouble Codes (DTCs) are a history of DTCs that were once active. When a DTC becomes

inactive, it is saved as a 'STORED' code. Stored codes can be reviewed and used as a trouble shooting aid in diagnosing intermittent problems and in range operating conditions. A count is kept of how many times a code has been active. Stored codes can be cleared from the diagnostic gauge. See **DIAGNOSTIC GAUGE STORED DTC CLEARING INSTRUCTIONS** later in this section of the manual. Instructions for viewing stored codes are described below.

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1. Press MENU KEY (B). Main menu is displayed. See figure 1.
2. Using the SCROLL KEYS (C,D), navigate the menu until STORED CODES (A) is highlighted. Press the ENTER KEY (E).
3. REQUESTING FAULT CODES will momentarily be displayed on the display screen.
4. A new screen showing stored code information appears. See figure 2. If there are no stored fault codes, "No Stored Fault Codes" screen is momentarily displayed. Power View then returns to main menu display. Press the MENU KEY (E) to get back to the parameter display screen.

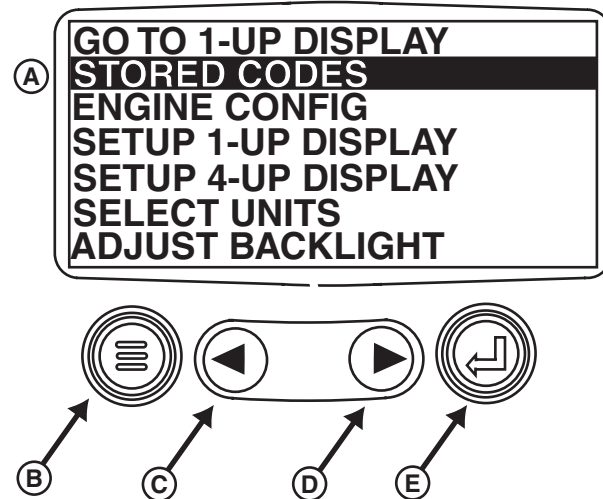


Figure 1. Main Menu

- A—Stored Codes
- B—Menu Key
- C—Left/Up Scroll Key
- D—Right/Down Scroll Key
- E—Enter Key

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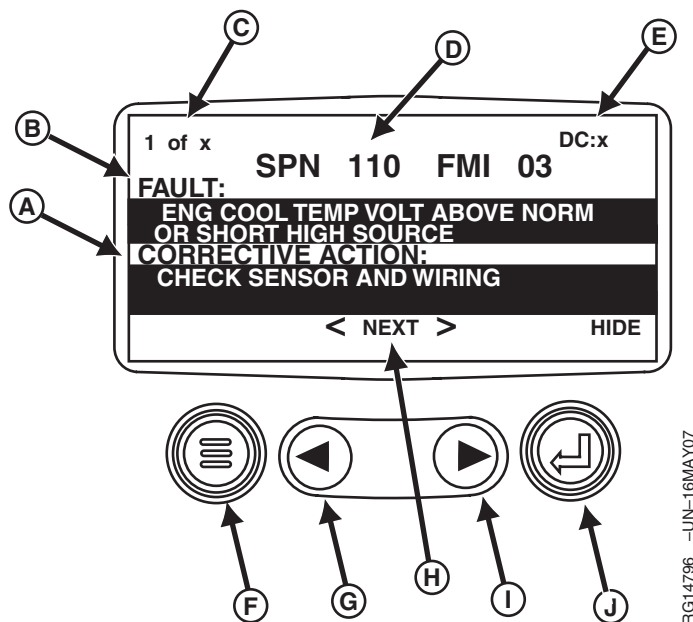


Figure 2. Stored Code Diagnostic Screen

A—Corrective Action
B—Diagnostic Code Description
C—Current and Total number of Stored Codes

D—SPN (Suspect Parameter Number) FMI (Failure Mode Identifier) Diagnostic Code

E—Diagnostic Count
F—Menu Key
G—Left/Up Scroll Key

H—Next
I—Right/Down Scroll Key
J—Enter Key

5. Display features for the Stored Codes Diagnostic Screen are described below:

- SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
- Name of diagnostic code (B) referenced in manual.
- A brief corrective action (A).
- The word “NEXT” (H) indicates there are more stored codes to can be viewed.
- The two ARROW KEYS (G,I) are used to cycle through the codes.

- “1 of x” (C) indicates the current diagnostic code displayed of the total number.
- Diagnostic Count (E) indicates how many times the code has been active since it was last cleared.

6. Press the MENU KEY (F) to return to the main menu. Press the MENU KEY (E) again to return to the parameter screen.

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Diagnostic Gauge Stored DTC Clearing Instructions

NOTE: For complete Power View operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information fault codes, see **DIAGNOSTIC TROUBLE CODES LIST** later in this section of the manual.

Procedure for clearing stored diagnostic codes on Power View diagnostic gauge.

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1. Turn power to diagnostic gauge OFF.
2. Turn power to diagnostic gauge ON. As soon as screen backlight comes on, simultaneously press and hold MENU (C) and ENTER (F) keys. See figure 1.
3. If successful, the screen shown in figure 1 will appear.

NOTE: If the screen in figure 1 does not appear, repeat step 2. This may take several attempts due to the short timing window.

4. Select CLEAR FAULT CODES (A). Press ENTER (F) key.

A—Clear Fault Codes
B—Restore All Defaults
C—Menu Key
D—Left/Up Scroll Key
E—Right/Down Scroll Key
F—Enter Key

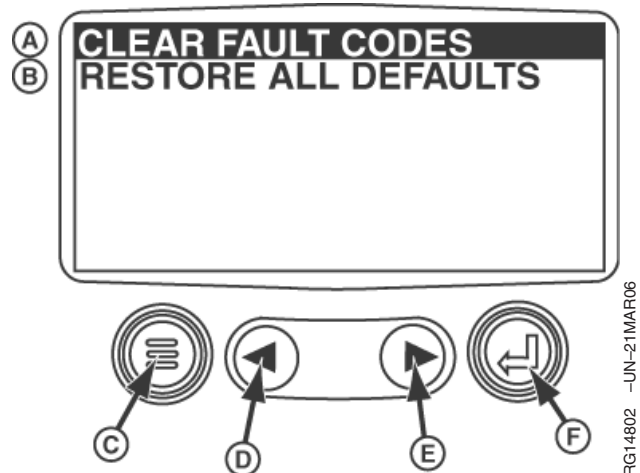


Figure 1. Clear Stored Fault Codes Screen

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5. Screen shows stored fault codes have been cleared.
See figure 2.
6. Cycle power to the diagnostic gauge again for normal operation.

A—Cleared All Fault Codes

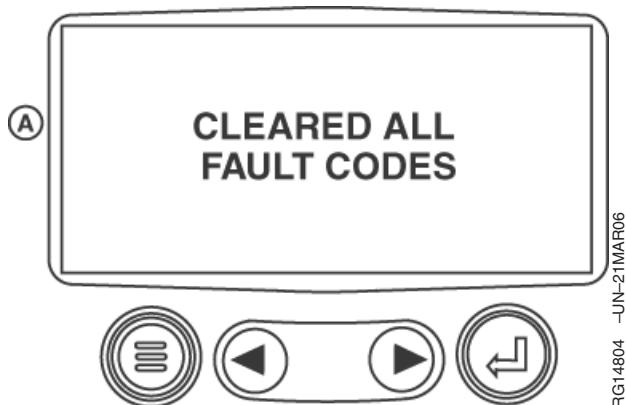


Figure 2. Clear All Fault Codes Screen

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Service ADVISOR Data Parameter Description

Following is a list of the data parameters that can be read in Service ADVISOR. Included in the list is a brief description of each parameter and each parameter's unit of measurement.

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Trouble Code Diagnostics and Tests

Parameter	Units Metric (Eng)	Description
Analog Throttle A Input Voltage	Volts	Voltage from analog throttle (A) position sensor.
Analog Throttle B Input Voltage	Volts	Voltage from analog throttle (B) position sensor.
Analog Throttle C Input Voltage	Volts	Voltage from analog throttle (C) position sensor.
Barometric Air Pressure (Absolute)	kPa (psi)	Barometric Air Pressure (BAP) sensor value. Sensor is located inside of ECU.
Battery Voltage	Volts	Unswitched battery voltage to ECU.
Charge Air Cooler Outlet Temperature	degC (degF)	Charge air cooler outlet temperature sensor value.
Charge Air Cooler Outlet Temperature Input Voltage	Volts	Charge air cooler outlet temperature sensor voltage to ECU.
Crank Position Sensor Improper Pattern Indicator		Value of 0 indicates proper operation.
Crank Position Sensor Input Noise Indicator		Value of 0 indicates proper operation.
Crank Position Sensor Speed	rev/m	The speed the crank sensor detects the crank timing wheel to be rotating.
Crank Position Sensor Status		Value of 16 (engine off) or 47 (engine on) indicates proper operation. Value of 63 indicates engine cranking.
Cruise Accelerate		Indicates the status of the cruise accelerator switch.
Cruise Brake Switch		Indicates the status of the cruise brake switch.
Cruise Clutch Switch		Indicates the status of the cruise clutch switch.
Cruise Coast Switch		Indicates the status of the cruise coast switch.
Cruise Control Active		Indicates if the cruise control is active.
Cruise Control On/Off		Indicates if the cruise control is ON or OFF.
Cruise Control State		
Cruise Resume Switch		Indicates the status of the cruise resume switch.
Cruise Set Switch		Indicates the status of the cruise set switch.
Desired Speed Governor Curve		The mode selected is dependent on the application.
ECU Boot Block Part Number		File name of the Engine Control Unit (ECU) boot block.
ECU Configuration File Part Number		File name of the configuration file in the ECU.
ECU EOL Data Part Number		File name of the data programmed into the ECU at the End of the Assembly Line (EOL).
ECU Part Number		Part number for the Engine Control Unit (ECU) hardware.
ECU Serial Number		Serial number of the Engine Control Unit (ECU).
ECU Software Assembly Part Number		Revision number of the Engine Control Unit (ECU) software.
ECU Software Part Number		File name of the Engine Control Unit (ECU) software.
ECU Temperature	degC (degF)	The internal temperature of the ECU. Sensor is located inside of ECU.
EGR Temperature	degC (degF)	Exhaust gas temperature between EGR cooler and EGR valve.
EGR Temperature Input Voltage	Volts	EGR temperature sensor voltage to ECU.
EGR Valve Control Position	%	Position of EGR valve.
EGR Valve Learned Closed Position	%	EGR valve closed position from current learn cycle.
EGR Valve Learned Open Position	%	EGR valve full open position from current learn cycle.
EGR Valve Measured Position	%	Position of EGR valve.

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Trouble Code Diagnostics and Tests

Parameter	Units Metric (Eng)	Description
EGR Valve Original Learned Closed Position	%	Closed position value of EGR valve after calibration. Updates after key cycle.
EGR Valve Original Learned Open Position	%	Open position value of EGR valve after calibration. Updates after key cycle.
EGR Valve Stored Closed Position	%	Stored value from last learn cycle of EGR valve closed position.
EGR Valve Stored Open Position	%	Stored value from last learn cycle of EGR valve open position.
EGR Valve Successful Learn Cycles	Count	Number of learn cycles after a calibration. Increments after harness diagnostic is run.
EGR Valve Position - Actual	%	Actual position ECU is able to drive EGR valve to.
EGR Valve Position - Desired	%	Position the ECU wants to drive the EGR valve to. (May be off by two decimal places).
EGR Valve Position Input Voltage	Volts	EGR valve position voltage to ECU.
Engine Coolant Temperature	degC (degF)	Engine coolant temperature value.
Engine Coolant Temperature Input Voltage	Volts	Engine coolant temperature sensor voltage to ECU.
Engine Hours	hr	Total hours run with this ECU.
Engine Load at Current Speed	%	Percentage of load on the engine at a given speed.
Engine Model Number		The model number for the engine.
Engine Oil Pressure	kPa (psi)	Engine oil pressure value.
Engine Oil Pressure Input Voltage	Volts	Engine oil pressure sensor voltage to the ECU.
Engine Serial Number		Serial number of the engine.
Engine Speed	rev/m	The speed the crank sensor detects the crank timing wheel to be rotating.
Fan Speed - Actual	rev/m	Actual fan speed.
Fan Speed - Desired	rev/m	Desired fan speed.
Fuel Mode		
Fan State		
Fuel Rail Pressure (Absolute) - Actual	MPa (psi)	The fuel rail pressure value.
Fuel Rail Pressure (Absolute) - Desired	MPa (psi)	The desired fuel rail pressure calculated by the ECU.
Fuel Rail Pressure Input Voltage	Volts	Fuel rail pressure sensor voltage to the ECU.
Fuel System Part Number		The part number for the fuel system used on the engine.
Fuel System Serial Number		The serial number for the fuel system used on the engine.
Fuel Temperature	degC (degF)	Fuel temperature value.
Fuel Temperature Input Voltage	Volts	Fuel temperature sensor voltage to the ECU.
Fuel Usage Rate	L/hr (gal/hr)	Rate of fuel used calculated by the ECU.
Ignition Voltage	Volts	Switched voltage from ignition switch to ECU.
Inject Start Time	microseconds	
Inject ion Pulse Time	Count	
Intake Manifold Absolute Pressure	kPa (psi)	Intake manifold absolute pressure value.
Intake Manifold Absolute Pressure Input Voltage	Volts	Intake manifold pressure sensor voltage to the ECU.
Intake Manifold Air Temperature	degC (degF)	Intake manifold air temperature value.

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Parameter	Units Metric (Eng)	Description
Low Fuel Pressure Fuel Transfer Pump Current	Amps	Not implemented.
Low Fuel Pressure Fuel Transfer Pump Duty Cycle	%	Duty cycle of PWM signal to low pressure fuel pump.
Low Pressure Fuel Transfer Pump Enable	%	Indicates if low pressure fuel pump is enabled by ECU.
Low Pressure Fuel Transfer Pump Priming Time	Sec	Length of fuel priming time.
Low Fuel Pressure Fuel Transfer Pump Status		Indicates if low pressure fuel pump is on or off.
Low Pressure Fuel Transfer Pump Pressure - (Absolute) - Actual	kPa (psi)	Measured fuel transfer pump pressure. The actual pressure reading is displayed in gauge.
Low Pressure Fuel Transfer Pump Pressure - (Absolute) - Desired	kPa (psi)	The desired fuel transfer pump pressure calculated by the ECU. The actual pressure reading is displayed in gauge.
Intake Manifold Air Temperature Input Voltage	Volts	Intake manifold air temperature sensor voltage to the ECU.
Maximum Speed Governor Curve		The mode selected is dependent on the application. See APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual.
Option Assembly Part Number		Part number of application options programmed into the ECU.
Performance Option Part Number		Part number relating to engine performance.
Pump Position Sensor Improper Pattern Indicator	%	Value of 0 indicates proper operation.
Pump Position Sensor Input Noise Indicator		Value of 0 indicates proper operation.
Pump Position Sensor Speed	rev/m	Engine RPM.
Pump Position Sensor Status		Value of 16 (engine off) or 47 (engine on) indicates proper operation. Value of 63 indicates engine cranking.
Sensor Supply #1 Voltage	Volts	Voltage of ECU 5 volt power supply #1.
Sensor Supply #2 Voltage	Volts	Voltage of ECU 5 volt power supply #2.
Sensor Supply #3 Voltage	Volts	Voltage of ECU 5 volt power supply #3.
Sensor Supply #4 Voltage	Volts	Voltage of ECU 5 volt power supply #4.
Sensor Supply #5 Voltage	Volts	Voltage of ECU 5 volt power supply #5.
Start of Injection Position	DEG	Position of crank when ECU sends signal to injector to fire.
Throttle Position	%	Percent of the throttle being used.
Throttle Type		Type of throttle being used on this application.
Torque Curve Number		Torque curve the ECU is currently using to limit fuel. For definition of the possible torque curves, see APPLICATION SPECIFICATIONS in Section 06, Group 210 of this manual.
Total Fuel Consumption	L gal	The amount of fuel consumed calculated by the ECU.
Turbo Compressor Inlet Air Temperature	degC (degF)	Turbo Compressor Inlet Air Temperature value.
Turbo Compressor Inlet Air Temperature Input Voltage	Volts	Turbo compressor inlet air temperature sensor voltage to the ECU.
Vehicle Driveshaft Speed	rev/m	The speed of the vehicle drive shaft.

Trouble Code Diagnostics and Tests

Parameter	Units Metric (Eng)	Description
Vehicle Option Part Number		Part number of payload options programmed into the ECU.
Vehicle Serial Number		The serial number of the vehicle that this engine is located in.
Vehicle Speed - Calculated	km/h (mph)	Vehicle speed calculated by ECU from wheel speed PWM signal.
Vehicle Speed - CAN	km/h (mph)	Vehicle speed ECU detects over CAN.
Water In Fuel Sensor		Indicates if water level in fuel is too high.
Water In Fuel Sensor Input Voltage	Volts	Water in fuel sensor voltage to the ECU.

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Snapshot Instructions

NOTE: To view Snapshot information Service ADVISOR is required.

Snapshot information is categorized in two types, Snapshot Capture, and Snapshot Recording. Snapshot information is generated when an engine DTC is set.

- **Snapshot Capture** - Is a snapshot of specific parameters at the exact instant in time that the DTC was set. All engine DTCs will have a Snapshot Capture associated with it. This information will also contain the engine hours for the first and latest occurrence of the DTC.
- **Snapshot Recording** - Is a short recording of specific parameters when certain DTCs are set. The recording will include parameter readings for a short period before and after the DTC was set. These are normally two to five seconds long, depending on the DTC that was set. Only specific DTCs will have a Snapshot Recordings associated with it when the DTC is set. If the DTC Count is greater than one then the snapshot recording could contain playbacks of the first and latest occurrences and can be played back by selecting the occurrence to be viewed.

IMPORTANT: It is important to save all Snapshot information before clearing DTCs or running the HARNESS DIAGNOSTIC MODE TEST. Once codes have been cleared then the Snapshot information is also cleared. For help in troubleshooting engine DTCs it is recommended not to clear codes until the problem has been resolved.

Viewing a Snapshot Capture

1. With a live connection already established with Service ADVISOR, click on the icon to get codes.

2. The window will display all active and stored codes. In this window there is a column for Snapshot Capture. If there is a "Yes" in the Snapshot Capture column then there is Snapshot Capture data available for that DTC.
3. Click once on the DTC to highlight that row and then click on the "Snapshot Capture" button below to view the information. At the same time the information is being displayed in the Service ADVISOR window it is downloading this information for viewing off-line.

Viewing a Snapshot Recordings

1. With a live connection already established with Service ADVISOR, click on the icon to get codes.
2. The window will display all active and stored codes. In this window there is a column for Snapshot Recordings. If there is a "Yes" in the Snapshot Recording column then there is Snapshot Recording available for that DTC.
3. Click once on the DTC to highlight that row and then click on the "Snapshot Recording" button below to view the information. At the same time the information is being displayed in the Service ADVISOR window it is downloading this information for viewing off-line.
4. Click on the play button to start the playback of the recording. Refer to the online help in Service ADVISOR for more information about playing a recording and other options available.

Importing a Snapshot Recording for playback when off-line can be found in "C:\Program Files\Service ADVISOR\lxvds\TierIII\recs".

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Internal Data Monitor Instructions

Internal Data Monitor (IDM) is a feature in Service ADVISOR that is for recording multiple data points monitored by the Engine Control Unit (ECU) at a selectable sample rate. Depending on the number of data points selected to record and the sample rate that is selected determines the length of the recording in memory. These recording are completed internally in the ECU and then uploaded to Service ADVISOR.

Configuration Options:

- **One Time** - This recording method will record the data points selected until the memory buffer in the ECU is full and then end the recording. To select more than one data point hold down the Ctrl key on the keyboard and click on the data points to be recorded.
- **Continuous** - This recording method will record the selected data points until the user stops the recording session. The memory space for this data is limited and depending on the number of data points selected to record, determines the length of the recording. This uses the first in first out (FIFO) method with the data in memory.
- **Internal** – This recording method will record the selected data points based on selected data point value as a trigger. There are three options for setting the trigger and they are equal too, greater than, and less than the entered threshold value. It allows up to two different data points to be triggered off of. Example is that trigger one is Engine RPM greater than 1000 rpm and engine load greater than 50%. The recording will begin when both data points are greater than the specified value.

NOTE: To select more than one data point hold down the Ctrl key on the keyboard and click on the data points to be recorded.

Recordings made with IDM are created in the ECU memory, so if there is a power interruption while the recording is being made or downloaded to Service ADVISOR, the recording will be lost.

1. Make a live connection with Service ADVISOR to the ECU.
2. Go to Interactive Tests and select Internal Data Monitor.
3. Select the data points that are to be recorded. Hold the Ctrl key down when selecting more than one data point.
4. Select the sample rate that the data points are to be recorded at. The number of data points selected and the sample rate will determine the length of the recording.
5. Select the Start Trigger mode. There are three options, One Time, Continuous, and Internal. For rest of the procedure refer to the option that was selected.

One Time

1. Validate the IDM setup Information for the correct number of parameters selected and sample rate. Note that it will estimate the length of the recording. Click “Next”.
2. Validate that the correct Start Trigger Mode has been selected and click “Next”.
3. Click “Start” when you want the recording to begin. The recording will automatically stop when completed and begin to upload the information from the ECU to the PC.
4. Once Service ADVISOR has completed the upload of the recording select “Yes” or “No” to create another recording.

See “RECORDING PLAYBACK” later in this procedure to play recording.

Continuous

1. Validate the IDM setup Information for the correct number of parameters selected and sample rate. Note that it will estimate the length of the recording. Click "Next".
2. Validate that the correct Start Trigger Mode has been selected and click "Next".
3. Click "Start" when you want the recording to begin.
4. The recording will continue to record until the "Abort" button is selected. Once the recording is stopped then Service ADVISOR will begin to upload the information from the ECU to the PC.
5. Once Service ADVISOR has completed the upload of the recording select "Yes" or "No" to create another recording.

See "RECORDING PLAYBACK" later in this procedure to play recording.

Internal

1. In the pull down menu select Data Point for Start Trigger.
2. In the Data Point pull down menu select the data point that is to be designated as trigger 1.
3. Select the Comparison Operator for this trigger. Note: When triggering off of engine speed it is recommended to use ">" or "<" for a comparison operator.
4. Enter the comparison value for this trigger.
5. Set up Trigger 2. If a second start trigger is not required then select "None" and click on "Next". If a second start trigger is desired then in the pull down menu select "Data Point".
6. In the Data Point pull down menu select the data point that is to be designated as trigger 2.

7. Select the Comparison Operator for this trigger.
8. Enter the comparison value for this trigger. Click "Next".
9. If a stop trigger is not desired then click "Next". If the stop trigger is desired select the type of stop trigger in the pull down menu. If the stop trigger is with a data point then setup is similar to start trigger setup. A second stop trigger can be used. If a second stop trigger is desired then repeat this step to setup Stop Trigger 2.
10. Confirm recording setup and click "Back" to make changes or "Next".
11. When ready to arm the recording triggers click "Start". When all triggers that were configured are met then the recording will begin and it will record until the stop trigger setting is met.
12. Once the recording is complete, Service ADVISOR will automatically begin to upload the recording from the ECU to the PC.
13. Once Service ADVISOR has completed the upload of the recording select "Yes" or "No" to create another recording.

See "RECORDING PLAYBACK" later in this procedure to play recording.

Recording Playback

The IDM recording is stored in c: program files Service ADVISOR xvds tierIII recs. The folder name for the recording is created using a date and time format. The IDM extension means that it is an IDM recording.

Example:

"Rec_01252007_113025.IDM" was created on January 25, 2007 at 11:30:25 AM.

To playback recording disconnect “Live” connection to the ECU. In the menu bar, click on Readings, Recordings, and Open / Manage Recordings. The Open / Manage Recordings window will appear, select Import. Go to c: program files Service

ADVISOR xvds tierIII recs and select the recording that is to be imported into the available recordings window. The recording can be played immediately or at a later time.

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Terminal Test

The purpose of this test is to check for electrical terminal and connector problems.

Terminal Basics

Terminals are typically made from a base metal that is plated with tin or an alloy. The plating material helps protect the base metal of the terminal from corroding. There are two main varieties of terminals; pins (male) and sockets (female). The male pins are inserted into the female sockets to provide the electrical connection between wires or electrical devices. The female socket terminals typically contain one or more contact springs which provide firm contact points with the male pin terminal.

Terminal Problems

The five main types of terminal problems are corrosion, loose fit, bent terminals, pushed out terminals, and crimp problems.

Corrosion or foreign material on terminals acts as a series resistance between the contact spring and the mating terminal. This series resistance can decrease the voltage measured by the ECU at its inputs. Corrosion, liquids, or other foreign material in a connector may also provide a parallel resistance that permits current to flow between other terminals in the connector. This parallel path can increase or decrease the voltage measured by the ECU at its inputs. Once terminals are corroded, they must be replaced. Scraping the layer of corrosion from the terminal will also remove any remaining plating material resulting in a rapid reappearance of the corrosion.

A loose fit between the pin and the socket terminals may result in an intermittent open circuit. The loose fit is usually due to a damaged or worn contact spring inside the female socket terminal. Loose fitting terminals may be caused by misaligned terminals or by previous troubleshooting procedures where a probe was inserted into the female socket terminal to obtain a measurement.

Bent male pin terminals may cause an open circuit and possibly a short circuit with adjacent pins in the connector. Bent terminals are often caused by connector alignment or improper terminal crimping techniques.

Terminals that are partially pushed out of the connector may cause an open circuit or an intermittent connection if the tip of the partially pushed out terminal makes electrical contact with the tip of the mating terminal. Pushed out terminals are caused by misaligned terminals or by terminals that were not fully seated in the connector during assembly.

Terminals are crimped to wire ends to provide electrical and mechanical connection to the wire. The wire end may pull out of the terminal if not crimped correctly or if the wire has been pulled on with too much force. This results in an open circuit or an intermittent open circuit if the wire end makes contact with the terminal.

Terminal Test Visual Inspection

Inspect the terminals on both sides of the connection including the ECU or sensor for the following problems:

- Corrosion on the terminals or in the connector.
- Water or other foreign material in the connector.
- Bent terminals.
- Pushed out terminals.

Replace or reinsert terminals. Replace connector if damaged.

Terminal Test Loose Fit Check

- Select the proper terminal adapter, Flex Probe, from JDG10466 that matches the terminal you are testing.
- Gently insert the male pin terminal fully into the female socket terminal without twisting or bending.

- Slowly pull the male pin terminal out of the female socket terminal. There should be a noticeable tension as terminal probe is withdrawn.

Replace terminals that have a loose fit.

Terminal Test Crimp Check

- Remove connector back shell to gain access to wire insertion end of connector, if applicable.
- Gently pull on each wire in the connector.

Replace terminal if wire end pulls out of the terminal.

Terminal Tips

- Use the specified extraction tools to remove terminals.
- Always use the specified terminal as a replacement. The plating on mating terminals must be compatible or corrosion could occur.
- Always use the specified seals for those connectors that require them.
- Always use the correct crimping tool to attach replacement terminals.
- After crimping a terminal to the wire end, pull gently on the terminal to make sure it is securely crimped.

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Cylinder Misfire Test Instructions

For instructions on connecting to Service ADVISOR, see earlier in this Group.

The Cylinder Misfire Test is used to compare the performance of each cylinder relative to each of the other cylinders. The test will help identify problems such as an engine misfire or irregularly running engine. During the test, the Engine Control Unit (ECU) will disable a cylinder, then accelerate the engine with a fixed amount of fuel and measure the time taken to accelerate the engine from one speed to the next with that cylinder disabled. The ECU will then repeat the procedure for the remaining cylinders.

The Cylinder Misfire Test cannot determine if an engine is delivering low power. The test results are only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Compression Test, Cylinder Cutout Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of an engine problem.

Before executing the Cylinder Misfire Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), an active engine position error code (any 636 code), coolant temperature is below 40° C (104° F) or above 110° C (230° F). If the engine goes into an overspeed condition while running test, the test will stop.

- Remove any load to the engine that may change during the test. For example, turn the air conditioner off.

Performing the Cylinder Misfire Test

1. Engine idling.
2. Select ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST in Service ADVISOR.
3. Follow instruction given by the diagnostic software. The software will instruct users that the throttle lever be moved from low idle position to wide open throttle position, then back to low idle position once for each cylinder tested.

The diagnostic software will inform the test operator if the test was not successfully completed. If the test was successfully completed, the results will be displayed on the screen.

Results shown will represent each cylinders' performance as a percentage in relation to the average of all cylinders. If any cylinder is above or below the average by more than 10%, it indicates the cylinder is contributing either too much (above average) or not enough (below average) in relation to the average engine performance.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

The ENGINE TEST INSTRUCTIONS - COMPRESSION TEST and ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST should also be performed to help determine that there is a problem in a specific cylinder.

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Cylinder Electronic Compression Test Instructions

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The Compression Test is used to compare the compression of each cylinder to the average compression of all cylinders. The test will help determine if a cylinder has low compression compared to all other cylinders. During the test, the Engine Control Unit (ECU) will disable the engine from starting, then measure the time it takes the piston of each cylinder to accelerate through and past TDC. A piston that accelerated faster than the rest would indicate that cylinder has lower compression than the other cylinders.

The Compression Test cannot determine the true compression pressure of any cylinder, it can only compare each cylinder to the average. The test results are only a guide to help determine if a cylinder has low average compression. The results alone should not be used as a conclusive reason for performing any major engine work. Other information such as the results of the Cylinder Misfire Test, Cylinder Cutout Test, and other engine diagnostic procedures should be used to accurately determine the source of an engine problem.

Before executing the Compression Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), the engine cranking speed is below 100 rpm, coolant temperature is below -30° C (-22° F) or above 200° C (392° F).

- Ensure that the battery and starter are in good working condition

Performing the Engine Test Instructions - Compression Test

1. Engine OFF.
2. Select ENGINE TEST INSTRUCTIONS - COMPRESSION TEST in the Service ADVISOR.
3. Follow instruction given by the diagnostic software. The software will instruct that the engine be cranked for up to 15 seconds. Typically, it should take less than 5 seconds. Service ADVISOR should be observed carefully for instructions during the test.

Error messages and test results will be displayed on the Service ADVISOR screen.

Results shown will represent each cylinders' compression as a percentage in relation to the average of all cylinders.

Any cylinder reading that is more than 10% below the rest indicates the cylinder's compression is possibly low.

Any cylinder reading that is more than 10% greater than the rest indicates a possible injector leaking fuel into the cylinder.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

Further engine diagnostics should be performed to determine the cause of low compression.

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Engine Test Instructions - Cylinder Cutout Test

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The Cylinder Cutout Test is used to aid in identifying a cylinder that is having a problem or to help in diagnosing mechanical or intermittent problems. During the test, the Engine Control Unit (ECU) will disable the cylinder that the technician selects. The test can be performed while operating the vehicle under the conditions that the problem occurs.

The Cylinder Cutout Test can not determine if an engine is developing low power. The test is only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Engine Test Instructions - Compression Test, Cylinder Misfire Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of the engine problem.

Before executing the Cylinder Cutout Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU will not allow the test to run if there is an active engine timing error code (any 637 code), an active engine position error code (any 636 code), coolant temperature is below 40° C (104° F) or above 110° C (230° F). If the engine goes into an overspeed condition while running test, the test will stop.

- Ensure that the battery and starter are in good working condition

Performing the Cylinder Cutout Test

1. Engine idling or under the conditions that the problem occurred.

2. Select ENGINE TEST INSTRUCTIONS - CYLINDER CUTOUT TEST in Service ADVISOR.
3. Follow instructions given by Service ADVISOR.
4. Observe engine operation and the parameters displayed on the Service ADVISOR screen. These parameters include: engine load at current speed, engine speed, and manifold air pressure.
5. Use this data and observations to help in the diagnosis of the problem.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

Analysis

A contribution below 70% means that the cylinder is probably not working at all. If a switched-off cylinder does not make any difference to the engine sound, this cylinder is probably not working at all.

A contribution between 70%-90% means that the cylinder does not give its full potential. If the sound slightly changes when the cylinder is cutout the cylinder is working but not to the full potential. To confirm this diagnostic, perform a ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST and ENGINE TEST INSTRUCTIONS - COMPRESSION TEST to help confirm the cylinder has a problem.

If the sound is better with a cylinder cutoff, this cylinder is probably firing at the wrong time. This may be due to a damaged injector or a bad electrical connection between ECU and injector. If the results of the Cylinder Cutout Test and Cylinder Misfire Test lead to the same cylinder, and the Engine Test Instructions - Compression Test checks good for that cylinder, then the injector wiring or injector is probably bad. First check the electrical connections, looking for shorts to the chassis especially, then if no problems are found, replace faulty injector.

Harness Diagnostic Mode Test

NOTE: Before running this test, ensure you have saved all Snapshot Captures and Recordings. For more information see **SNAPSHOT INSTRUCTIONS** earlier in this group.

Purpose:

This procedure is designed to test the engine wiring harness and associated components for numerous types of errors. Including opens, shorts, actuator communication, and cycling.

Test Conditions:

This test can only be run when the engine is not running. Cylinder fueling is disabled for all cylinders when the test is initiated. If the ECU senses an engine start request, the Harness Diagnostic Mode Test will be aborted and the engine will start. Test Operation: The ECU continuously monitors all the sensors for normal operation while power is applied to the ECU. During the Harness Diagnostic Mode Test, the ECU will set up and trigger some special tests, also. These are tests that the ECU can not perform while the engine is running. When the test starts, all codes and related Snapshot information is erased from the ECU memory. The test starts and checks are made of various components. You may hear various actuators move, as the actuators do a learn cycle. The ECU compares these new learned values with the original values that were created when the part was new. If the ECU determines the values are good, it will store them as the last good values, but not change the original values. The ECU gathers test information as it runs the various tests. If it finds any problems during the test, it will store the code and display it at the end of the test.

Test Procedures:

1. Select HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. A screen appears with a list of all the ECU codes (active and stored).
2. Press "Next" to start the test, "Cancel" to exit the test, or "Print" to print a list of the codes. After pressing "Next" follow the directions on the screen.
3. At the end of the test, another list of codes will be presented. **Currently this screen does not update properly.** Do NOT compare this list with the initial list to see if there are any additional codes.
4. Go the Diagnostic Trouble Codes tab in Service ADVISOR and select the "Refresh" button. Compare these codes to the original list going into the Harness Diagnostic Mode Test.
5. Go to those DTC(s) displayed and troubleshoot them to fix the problem(s), starting with the active codes.

NOTE: If a stored code does not show back up after the test, it may be a bad or intermittent connection. You may want to run the test again and manipulate the wiring harness to see if the code reappears. If it does, check the harness and connector for problems.

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Exhaust Gas Recirculation Valve Calibration

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

The EXHAUST GAS RECIRCULATION VALVE CALIBRATION procedure resets all stored valve positions data. For more information see EXHAUST GAS RECIRCULATION VALVE in Section 3 Group 135.

NOTE: This procedure is only ran if you replace the EGR valve with a new valve.

NOTE: Replacing a valve to test for a bad valve (part swapping) is not recommended. It will cause several error codes to be generated because the stored values the ECU is using to compare to will be out of tolerance of the new valve.

1. Ignition ON, engine OFF.
2. Select EXHAUST GAS RECIRCULATION VALVE CALIBRATION in Service ADVISOR.
3. Follow the instructions on the screens.

NOTE: The screen will ask to select EGR 1 or EGR 2. On 4.5L, 6.8L and 9.0L there is only 1 (one) valve so select EGR 1.

4. When successful, click "OK".
5. Turn ignition OFF for thirty seconds.
6. Ignition ON, engine OFF for thirty seconds minimum. The EGR valve performs a learn process for minimum and maximum travel.
7. Start and run engine to normal operating temperature to ensure engine is operating correctly.

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Turbo Learn Value Reset Test

For instructions on connecting to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

This procedure resets all stored actuator end points position data. For more information see TURBOCHARGER ACTUATOR in Section 3, Group 135.

1. Ignition ON, engine OFF.
2. Select TURBO LEARN VALUE RESET TEST under the CALIBRATIONS Tab of Service ADVISOR.
3. Follow the instructions on the screens.
4. When successful, click "OK".

NOTE: Some VGT Actuators will start the learn process immediately, be sure the process has not started before going to the next step. If the processes started immediately go to the last step to proceed.

5. Turn ignition OFF for thirty seconds.
6. Ignition ON, engine OFF for thirty seconds. The VGT performs a learn process for minimum and maximum travel.
7. Start and run engine to normal operating temperature to ensure engine is operating correctly.

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Downloading Electronic Injector Calibration Files

NOTE: This procedure requires an internet connection.

Electronic injectors in this engine have specific settings for optimum performance. To maintain this performance when any of the electronic injectors are replaced or swapped the ECU will need to be reprogrammed with the correct setting for each cylinder. This is done by using the Injector Calibration Tool in Service ADVISOR.

1. Connect to the John Deere Custom Performance web site.
2. On the Fuel System Search page, enter in the Sequence number from the parts label or from the

sheet included with the part. If there is no sequence number available, then enter in the part number and serial number of the injector and click on submit.

3. Verify the information about the injector and click in the check box if the information matches the injector. If the information does not match then go back to step 2 and re-enter the injector information.
4. When the search is complete click in the check box to select the injector to be downloaded.
5. Click on Download Selected button and the injector payload will be copied to the local computer.

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Electronic Injector Calibration

A connection with must be made with Service ADVISOR. In the Calibrations tab select Injector Calibration.

The screen will show a table of the existing injector information that is stored in the ECU.

Options to perform:

- Swap Injectors
- Change Injectors
- View Calibration History

Swapping Injectors:

Swapping injectors is used for testing suspected injector problems only. This is used for moving injectors from one cylinder to another to see if the symptom moves cylinders with the injector. Information in the ECU is specific for each injector and the cylinder that it is installed in. When injectors are moved to different cylinders, then the ECU needs to be updated with this information also. Since the information for the existing injectors is already in the ECU and just needs to be moved to a different cylinder number, there are pull down menus that allow the injector information to be transferred from one cylinder to the other. Service ADVISOR will display the original injector information, and the new injector information and ask for confirmation before actually moving the injector information.

Changing Injectors

If an injector is being replaced, then the information for that injector must be loaded into the ECU. This is done by selecting the Change Injector button in Service ADVISOR. The screen will display a table showing the existing information that is stored in the ECU and will have pull down menus available in the serial number field if there are injector calibration files available on the Service ADVISOR computer. For downloading injector calibration files, see **DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES** earlier in this group. If the injector calibration file is available, then selecting the file that corresponds with the injector serial number installed in the cylinder will automatically populate all information fields for that cylinder. If there are no calibration files available on the Service ADVISOR computer, then the information for each field can be entered manually. If the specific calibration file for the injector was not downloaded then select Unlisted and the data fields will allow the information to be entered manually. Once all the injector information has been updated, click the Next button, verify that the data entered is correct, and then click on the Submit button.

View Calibration History

Anytime an injector calibration is performed with Service ADVISOR a history is kept for reviewing any injector changes in the past. This information is only kept on the computer that performed the injector calibration procedure. So if multiple computers are used, not all information will be in one history report.

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Payload File Downloading Instructions

NOTE: An Internet connection will be needed.

See E-LEARNING under the Service ADVISOR help section. Also, refer to the training material provided with your Service ADVISOR training course. All

authorized Service ADVISOR users have received this training. On-line training is available at John Deere University, which is an internet-based distance-learning application.

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Engine Control Unit (ECU) Reprogramming Instructions

The ECU may be reprogrammed using Service ADVISOR. See E-LEARNING under the Service ADVISOR help section. Also, refer to the training material provided with your Service ADVISOR training course. All authorized Service ADVISOR users have received this training. On-line training is available at John Deere University, which is an internet-based distance-learning application.

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Diagnostic Trouble Codes List

SPN/FMI CODES

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Trouble Code Diagnostics and Tests

SPN.FMI	Description
000028.03	Throttle #3 Signal Out of Range High
000028.04	Throttle #3 Signal Out of Range Low
000029.03	Throttle #2 Signal Out of Range High
000029.04	Throttle #2 Signal Out of Range Low
000091.03	Throttle #1 Signal Out of Range High
000091.04	Throttle #1 Signal Out of Range Low
000091.09	Throttle #1 Signal Erratic
000094.03	Low Pressure Fuel Signal Out of Range High
000094.04	Low Pressure Fuel Signal Out of Range Low
000094.17	Low Pressure Fuel System--Pressure Slightly Low
000097.03	Water-in-Fuel Signal Out of Range High
000097.04	Water-in-Fuel Signal Out of Range Low
000097.16	Water in Fuel Detected
000100.01	Engine Oil Pressure Signal Extremely Low
000100.03	Engine Oil Pressure Signal Out of Range High
000100.04	Engine Oil Pressure Signal Out of Range Low
000100.18	Engine Oil Pressure Signal Moderately Low
000100.31	Oil Pressure is not Zero with Engine Stopped
000102.02	Intake Manifold Pressure Signal Invalid
000102.03	Intake Manifold Pressure Signal Out of Range High
000102.04	Intake Manifold Pressure Signal Out of Range Low
000103.00	Turbo Speed Signal Extremely High
000103.05	Turbo Speed Sensor Circuit has High Resistance
000103.06	Turbo Speed Sensor Circuit has Low Resistance
000103.08	Turbo Speed Signal Incorrect
000103.31	Turbo Speed Signal Missing
000105.00	Intake Manifold Air Temperature Signal Extremely High
000105.03	Intake Manifold Air Temperature Signal Out of Range High
000105.04	Intake Manifold Air Temperature Signal Out of Range Low
000105.15	Intake Manifold Air Temperature Signal Slightly High
000105.16	Intake Manifold Air Temperature Signal Moderately High
000107.00	Air Filter Pressure Differential Extremely High
000107.31	Air Filter Restriction Switch Activated
000108.02	Barometric Pressure Signal Invalid
000110.00	Engine Coolant Temperature Signal Extremely High
000110.03	Engine Coolant Temperature Signal Out of Range High
000110.04	Engine Coolant Temperature Signal Out of Range Low
000110.15	Engine Coolant Temperature Signal Slightly High
000110.16	Engine Coolant Temperature Signal Moderately High
000110.17	Engine Coolant Temperature Signal Slightly Low

Continued on next page

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Trouble Code Diagnostics and Tests

000111.01	Coolant Level Extremely Low
000157.03	Fuel Rail Pressure Signal Out of Range High
000157.04	Fuel Rail Pressure Signal Out of Range Low
000157.10	Fuel Rail Pressure Rate of Change Abnormal
000157.17	Fuel Rail Pressure Not Developed
000158.17	ECU Power Down Error
000174.00	Fuel Temperature Signal Extremely High
000174.03	Fuel Temperature Signal Out of Range High
000174.04	Fuel Temperature Signal Out of Range Low
000174.16	Fuel Temperature Signal Moderately High
000183.00	Extreme Over Fueling
000183.16	Moderate Over Fueling
000189.00	Engine Speed Derate Condition Exists
000190.00	Engine Speed Extremely High
000190.16	Engine Speed Moderately High
000237.02	VIN Security Data Invalid
000237.13	VIN Option Code Security Data Conflict
000237.31	VIN Security Data Missing
000412.00	EGR Temperature Signal Extremely High
000412.03	EGR Temperature Signal Out of Range High
000412.04	EGR Temperature Signal Out of Range Low
000412.15	EGR Temperature Signal Slightly High
000412.16	EGR Temperature Signal Moderately High
000611.03	Injector Shorted to Power
000611.04	Injector Shorted to Ground
000627.01	All Injector Circuits Have High Resistance
000627.18	Battery Voltage Moderately Low
000629.12	ECU EEPROM Error
000629.13	ECU Boot Block Error
000636.02	Engine Position Sensor Signal Invalid
000636.05	Engine Position Sensor Circuit Has High Resistance
000636.06	Engine Position Sensor Circuit Has Low Resistance
000636.08	Engine Position Sensor Signal Missing
000636.10	Engine Position Signal Rate of Change Abnormal
000637.02	Engine Timing Sensor Signal Invalid
000637.05	Engine Position Sensor Circuit Has High Resistance
000637.06	Engine Position Sensor Circuit Has Low Resistance
000637.07	Engine Timing and Position Signals Out of Sync
000637.08	Engine Timing Sensor Signal Missing
000637.10	Engine Timing Signal Rate of Change Abnormal
000641.04	VGT Actuator Supply Voltage Out of Range Low

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Trouble Code Diagnostics and Tests

000641.12	VGT Actuator Communication Error
000641.13	VGT Actuator Learn Error
000641.16	Turbo Actuator Temperature Moderately High
000647.05	Engine Fan Drive Circuit Has High Resistance
000647.31	Engine Fan Drive Manual Purge Switch active too long
000651.02	Injector #1 Part Number Data Invalid
000651.05	Injector #1 Circuit Has High Resistance
000651.06	Injector #1 Circuit Has Low Resistance
000651.07	Injector #1 Not Responding
000651.13	Injector #1 Calibration Fault
000652.02	Injector #2 Part Number Data Invalid
000652.05	Injector #2 Circuit Has High Resistance
000652.06	Injector #2 Circuit Has Low Resistance
000652.07	Injector #2 Not Responding
000652.13	Injector #2 Calibration Fault
000653.02	Injector #3 Part Number Data Invalid
000653.05	Injector #3 Circuit Has High Resistance
000653.06	Injector #3 Circuit Has Low Resistance
000653.07	Injector #3 Not Responding
000653.13	Injector #3 Calibration Fault
000654.02	Injector #4 Part Number Data Invalid
000654.05	Injector #4 Circuit Has High Resistance
000654.06	Injector #4 Circuit Has Low Resistance
000654.07	Injector #4 Not Responding
000654.13	Injector #4 Calibration Fault
000655.02	Injector #5 Part Number Data Invalid
000655.05	Injector #5 Circuit Has High Resistance
000655.06	Injector #5 Circuit Has Low Resistance
000655.07	Injector #5 Not Responding
000655.13	Injector #5 Calibration Fault
000656.02	Injector #6 Part Number Data Invalid
000656.05	Injector #6 Circuit Has High Resistance
000656.06	Injector #6 Circuit Has Low Resistance
000656.07	Injector #6 Not Responding
000656.13	Injector #6 Calibration Fault
000676.03	Glow Plugs Signal Received When Not Expected
000676.05	Glow Plugs Signal Not Received When Expected
000898.09	Requested Engine Speed Signal Invalid
000970.31	External Shutdown Commanded
000971.31	External Derate Commanded
001075.05	Low Pressure Fuel Pump Circuit Has High Resistance

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Trouble Code Diagnostics and Tests

001075.06	Low Pressure Fuel Pump Error Detected
001075.12	Low Pressure Fuel Pump Status Error
001109.31	Engine Protection Approaching Shutdown
001110.31	Engine Protection Shutdown
001136.00	ECU Temperature Signal Extremely High
001136.16	ECU Temperature Signal Moderately High
001172.03	Compressor Inlet Temperature Signal Out of Range High
001172.04	Compressor Inlet Temperature Signal Out of Range Low
001180.00	Turbine Inlet Temperature Signal Extremely High
001180.16	Turbine Inlet Temperature Signal Moderately High
001347.03	High Pressure Fuel Pump Control Valve Signal Out of Range High
001347.05	High Pressure Fuel Pump Solenoid Circuit Has High Resistance
001347.07	High Pressure Fuel Pump Not Able to Meet Required Rail Pressure
001347.10	High Pressure Fuel Pump Pressurizing Assembly Rate of Change Abnormal
001569.31	Engine in Derate Condition
001638.00	Hydraulic Oil Temperature Signal Extremely High
001638.03	Hydraulic Oil Temperature Signal Out of Range High
001638.04	Hydraulic Oil Temperature Signal Out of Range Low
001638.09	Hydraulic Oil Temperature Signal Erratic
001638.16	Hydraulic Oil Temperature Signal Moderately High
001639.01	Fan Speed Signal Extremely Low
001639.16	Fan Speed Signal Moderately High
001639.18	Fan Speed Signal Moderately Low
002005.14	Incorrect ACU Message Received
002030.09	A/C Clutch Status Signal Missing
002071.09	CCU Message Missing
002580.03	Brake Pressure Signal Out of Range High
002580.04	Brake Pressure Signal Out of Range Low
002630.00	Charge Air Cooler Outlet Temperature Signal Extremely High
002630.03	Charge Air Cooler Outlet Temperature Signal Out of Range High
002630.04	Charge Air Cooler Outlet Temperature Signal Out of Range Low
002630.15	Charge Air Cooler Outlet Temperature Signal Slightly High
002630.16	Charge Air Cooler Outlet Temperature Signal Moderately High
002659.02	EGR Mass Flow Rate Data Invalid
002659.15	EGR Mass Flow Rate Data Slightly High
002659.17	EGR Mass Flow Rate Data Slightly Low
002790.16	Calculated Compressor Outlet Temperature Moderately High
002791.02	EGR Valve Position Signal Invalid
002791.03	EGR Valve Position Signal Out of Range High
002791.04	EGR Valve Position Signal Out of Range Low
002791.07	EGR Valve Not Reaching Expected Position

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002791.13	EGR Valve Calibration Change Error
002791.31	EGR Valve Calibration Change over a Long Time
002795.07	VGT Actuator Not Reaching Expected Position
003509.03	Sensor Supply #1 Voltage Out of Range High
003509.04	Sensor Supply #1 Voltage Out of Range Low
003510.03	Sensor Supply #2 Voltage Out of Range High
003510.04	Sensor Supply #2 Voltage Out of Range Low
003511.03	Sensor Supply #3 Voltage Out of Range High
003511.04	Sensor Supply #3 Voltage Out of Range Low
003512.03	Sensor Supply #4 Voltage Out of Range High
003512.04	Sensor Supply #4 Voltage Out of Range Low
003513.03	Sensor Supply #5 Voltage Out of Range High
003513.04	Sensor Supply #5 Voltage Out of Range Low

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Diagnostic Trouble Code Designations

SPN/FMI CODES

SPN/FMI codes are written as a two-part code derived from the SAE J1939 standard. The first part is called the Suspect Parameter Number (SPN). The SPN can contain up to 6 digits. The SPN identifies the system or the component that has the failure; for example SPN 110 indicates a failure in the engine coolant temperature circuit. The second part of the code is called the Failure Mode Identifier (FMI) code. The FMI contains 2 digits and identifies the type of failure that has occurred. For example, FMI 03 indicates value Out of Range High (OORH). In order to determine the

exact failure, both the SPN and FMI are required. Combining SPN 110 with FMI 03 yields "engine coolant temperature input voltage out of range high."

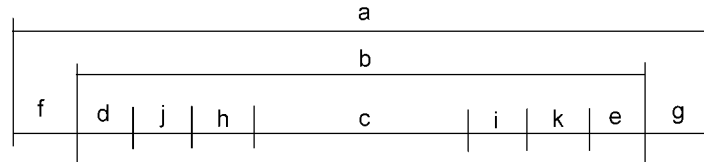
On these applications the ECU transmits SPN/FMI codes over the Controller Area Network (CAN). This allows for service tools such as Service ADVISOR to display active and stored DTCs. When using Service ADVISOR, the codes will be displayed in a 000000.00 format. For example, code 110.03 will be displayed as 000110.03.

FMI Designators

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Relationship of FMI Designations and Range of Sensor Input

Region a: Total signal input range possible that can be seen by an electronic module.

Region k: Range defined as Moderately above normal, of what is considered normal for a given real-world measurement. Associated with FMI 16.

Region b: Total signal range physically possible as defined by an application.

Region c: Range defined as normal for a given real world measurement.

Region d: Range defined as Extremely below normal, of what is considered normal for the given real world measurement. Associated with FMI 01.

Region e: Range defined as Extremely above normal, of what is considered normal for the given real world measurement. Associated with FMI 00.

Region f: Range which is low outside the range of what is considered physically possible for a given system. Associated with FMI 04 (Out Of Range Low, OORL).

Region g: Range which is high outside the range of what is considered physically possible for a given system. Associated with FMI 03 (Out Of Range High, OORH), 05, 06.

Region h: Range defined as Slightly below normal, of what is considered normal for a given real-world measurement. Associated with FMI 17.

Region i: Range defined as Slightly above normal, of what is considered normal for a given real-world measurement. Associated with FMI 15.

Region j: Range defined as Moderately below normal, of what is considered normal for a given real-world measurement. Associated with FMI 18.

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FMI

Description

- 00 Data Valid but Above Normal Operational Range—Extreme Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
- 01 Data Valid but Below Normal Operational Range—Extreme Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
- 02 Data Erratic, Intermittent or Incorrect** Measurements that change at a rate that is not considered possible in the real world condition and caused by improper operation of the measuring device or its connection to the module. Broadcast of data value is substituted with the "error indicator" value. Incorrect data includes any data not received and any data that is exclusive of the situations covered by FMIs 3, 4, 5 and 6 below. Data may also be considered incorrect if it is inconsistent with other information collected or known about the system.
- 03 Value Out of Range High (OORH)** A voltage signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a high level when the controller commands it to low. Broadcast of data value is substituted with the "error indicator" value.
- 04 Value Out of Range Low (OORL)** A voltage signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a low level when the controller commands it to high. Broadcast of data value is substituted with the "error indicator" value.
- 05 Current Below Normal** A current signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains off when the controller commands it on. Broadcast of data value is substituted with the "error indicator" value.
- 06 Current Above Normal** A current signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains on when the controller commands it off. Broadcast of data value is substituted with the "error indicator" value.
- 07 Mechanical System not Responding or Out of Adjustment** Any fault that is detected as the result of an improper mechanical adjustment or an improper response or action of a mechanical system that, with a reasonable confidence level, is not caused by an electronic or electrical system failure. This type of fault may or may not be directly associated with the value of general broadcast information.
- 08 Abnormal Frequency or Pulse Width or Period** To be considered in cases of FMI 4 and 5. Any frequency or PWM signal that is outside the predefined limits which bound the signal range for frequency or duty cycle (outside region b of the signal range). Also if the signal is an controller output, any signal whose frequency or duty cycle is not consistent with the signal which is emitted. Broadcast of data value is substituted with the "error indicator" value.
- 09 Abnormal Update Rate** Any failure that is detected when receipt of data via the data link or as input from a smart actuator or smart sensor is not at the update rate expected or required by the controller (outside region c of the signal range). Also any error that causes the controller not to send information at the rate required by the system. This type of fault may or may not be directly associated with the value of general broadcast information.
- 10 Abnormal Rate of Change** Any data, exclusive of the abnormalities covered by FMI 2, that is considered valid but whose data is changing at a rate that is outside the predefined limits that bound the rate of change for a properly functioning system (outside region c of the signal range). Broadcast of data values is continued as normal.
- 11 Root Cause Not Known** It has been detected that a failure has occurred in a particular subsystem but the exact nature of the fault is not known. Broadcast of data value is substituted with the "error indicator" value.
- 12 Bad Intelligent Device or Component** Inconsistency of data indicates that a device with some internal intelligence, such as a controller, module, smart sensor or smart actuator, is not properly functioning. This data may be internal to a module or external from a data link message or from various system responses. Broadcast of data value is substituted with the "error indicator" value. This error is to include all internal controller trouble codes that cannot be caused by connections or systems external to the controller.

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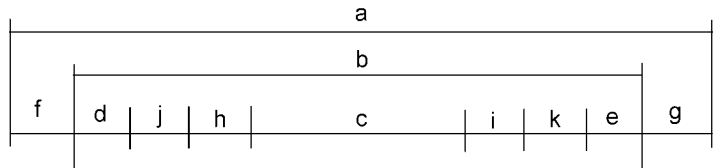
- 13 Out of Calibration** A failure that can be identified to be the result of not being properly calibrated. This may be the case for a subsystem which can identify that the calibration attempting to be used by the controller is out of date. Or it may be the case that the mechanical subsystem is determined to be out of calibration. This failure mode does not relate to a signal range.
- 14 Special Instructions** SPNs 611 through 615 are defined as "System Diagnostic Codes" and are used to identify failures that cannot be tied to a specific field-replaceable component. Specific subsystem fault isolation is the goal of any diagnostic system, but for various reasons this cannot always be accomplished. These SPNs allow the manufacturer some flexibility to communicate non-"specific component" diagnostic information. Because SPN 611-615 use the standard SPN/FMI format, it allows the use of standard diagnostic tools, electronic dashboards, satellite systems and other advanced devices that scan Parameter Groups containing the SPN/FMI formats. Because manufacturer-defined codes are not desirable in terms of standardization, the use of these codes should only occur when diagnostic information cannot be communicated as a specific component and failure mode. This failure mode does not relate to the signal range, and may or may not be directly associated with the value of general broadcast information.
- 15 Data Valid but Above Normal Operating Range—Slight Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 16 Data Valid but Above Normal Operating Range—Moderate Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 17 Data Valid but Below Normal Operating Range—Slight Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 18 Data Valid but Below Normal Operating Range—Moderate Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 19 Received Network Data In Error** Any failure that is detected when the data received via the network is found substituted with the "error indicator" value (i.e. FE (16), see J1939/71). This type of failure is associated with received network data. The component used to measure the real world signal is wired directly to the module sourcing the data to the network and not to the module receiving the data via the network. This type of fault may or may not be directly associated with the value of general broadcast information.
- 20-30 Reserved for SAE Assignment**
- 31 Not Available or Condition Exists** Used to indicate that the FMI is not available or that the condition that is identified by the SPN exists. When no applicable FMI exists for the reported SPN, FMI 31 can be used. Also in cases when the reported SPN name has the failure information in it, FMI 31 can be used to indicated that the condition reported by the SPN exists. This type of fault may or may not be directly associated with the value of general broadcast information.

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Failure Mode Indicator Designations

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Relationship of FMI Designations and Range of Sensor Input

Region a: Total signal input range possible that can be seen by an electronic module.

Region b: Total signal range physically possible as defined by an application.

Region c: Range defined as normal for a given real world measurement.

Region d: Range defined as Extremely below normal, of what is considered normal for the given real world measurement. Associated with FMI 01.

Region e: Range defined as Extremely above normal, of what is considered normal for the given real world measurement. Associated with FMI 00.

Region f: Range which is low outside the range of what is considered physically possible for a given system. Associated with FMI 04 (Out Of Range Low, OORL).

Region g: Range which is high outside the range of what is considered physically possible for a given system. Associated with FMI 03 (Out Of Range High, OORH), 05, 06.

Region h: Range defined as Slightly below normal, of what is considered normal for a given real-world measurement. Associated with FMI 17.

Region i: Range defined as Slightly above normal, of what is considered normal for a given real-world measurement. Associated with FMI 15.

Region j: Range defined as Moderately below normal, of what is considered normal for a given real-world measurement. Associated with FMI 18.

Region k: Range defined as Moderately above normal, of what is considered normal for a given real-world measurement. Associated with FMI 16.

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FMI

Description

- 00 **Data Valid but Above Normal Operational Range—Extreme Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
- 01 **Data Valid but Below Normal Operational Range—Extreme Level** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition. Broadcast of data values is continued as normal.
- 02 **Data Erratic, Intermittent or Incorrect** Measurements that change at a rate that is not considered possible in the real world condition and caused by improper operation of the measuring device or its connection to the module. Broadcast of data value is substituted with the "error indicator" value. Incorrect data includes any data not received and any data that is exclusive of the situations covered by FMIs 3, 4, 5 and 6 below. Data may also be considered incorrect if it is inconsistent with other information collected or known about the system.
- 03 **Value Out of Range High (OORH)** A voltage signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a high level when the ECM commands it to low. Broadcast of data value is substituted with the "error indicator" value.
- 04 **Value Out of Range Low (OORL)** A voltage signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a low level when the ECM commands it to high. Broadcast of data value is substituted with the "error indicator" value.
- 05 **Current Below Normal** A current signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains off when the ECM commands it on. Broadcast of data value is substituted with the "error indicator" value.
- 06 **Current Above Normal** A current signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains on when the ECM commands it off. Broadcast of data value is substituted with the "error indicator" value.
- 07 **Mechanical System not Responding or Out of Adjustment** Any fault that is detected as the result of an improper mechanical adjustment or an improper response or action of a mechanical system that, with a reasonable confidence level, is not caused by an electronic or electrical system failure. This type of fault may or may not be directly associated with the value of general broadcast information.
- 08 **Abnormal Frequency or Pulse Width or Period** To be considered in cases of FMI 4 and 5. Any frequency or PWM signal that is outside the predefined limits which bound the signal range for frequency or duty cycle (outside region b of the signal range). Also if the signal is an ECM output, any signal whose frequency or duty cycle is not consistent with the signal which is emitted. Broadcast of data value is substituted with the "error indicator" value.
- 09 **Abnormal Update Rate** Any failure that is detected when receipt of data via the data link or as input from a smart actuator or smart sensor is not at the update rate expected or required by the ECM (outside region c of the signal range). Also any error that causes the ECM not to send information at the rate required by the system. This type of fault may or may not be directly associated with the value of general broadcast information.
- 10 **Abnormal Rate of Change** Any data, exclusive of the abnormalities covered by FMI 2, that is considered valid but whose data is changing at a rate that is outside the predefined limits that bound the rate of change for a properly functioning system (outside region c of the signal range). Broadcast of data values is continued as normal.
- 11 **Root Cause Not Known** It has been detected that a failure has occurred in a particular subsystem but the exact nature of the fault is not known. Broadcast of data value is substituted with the "error indicator" value.
- 12 **Bad Intelligent Device or Component** Inconsistency of data indicates that a device with some internal intelligence, such as a controller, module, smart sensor or smart actuator, is not properly functioning. This data may be internal to a module or external from a data link message or from various system responses. Broadcast of data value is substituted with the "error indicator" value. This error is to include all internal controller trouble codes that cannot be caused by connections or systems external to the controller.

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- 13 Out of Calibration**A failure that can be identified to be the result of not being properly calibrated. This may be the case for a subsystem which can identify that the calibration attempting to be used by the controller is out of date. Or it may be the case that the mechanical subsystem is determined to be out of calibration. This failure mode does not relate to a signal range.
- 14 Special Instructions**SPNs 611 through 615 are defined as "System Diagnostic Codes" and are used to identify failures that cannot be tied to a specific field-replaceable component. Specific subsystem fault isolation is the goal of any diagnostic system, but for various reasons this cannot always be accomplished. These SPNs allow the manufacturer some flexibility to communicate non-"specific component" diagnostic information. Because SPN 611-615 use the standard SPN/FMI format, it allows the use of standard diagnostic tools, electronic dashboards, satellite systems and other advanced devices that scan Parameter Groups containing the SPN/FMI formats. Because manufacturer-defined codes are not desirable in terms of standardization, the use of these codes should only occur when diagnostic information cannot be communicated as a specific component and failure mode. This failure mode does not relate to the signal range, and may or may not be directly associated with the value of general broadcast information.
- 15 Data Valid but Above Normal Operating Range—Slight Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 16 Data Valid but Above Normal Operating Range—Moderate Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 17 Data Valid but Below Normal Operating Range—Slight Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 18 Data Valid but Below Normal Operating Range—Moderate Level**The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition. Broadcast of data values is continued as normal.
- 19 Received Network Data In Error**Any failure that is detected when the data received via the network is found substituted with the "error indicator" value (i.e. FE (16), see J1939/71). This type of failure is associated with received network data. The component used to measure the real world signal is wired directly to the module sourcing the data to the network and not to the module receiving the data via the network. This type of fault may or may not be directly associated with the value of general broadcast information.
- 20-30 Reserved for SAE Assignment**
- 31 Not Available or Condition Exists**Used to indicate that the FMI is not available or that the condition that is identified by the SPN exists. When no applicable FMI exists for the reported SPN, FMI 31 can be used. Also in cases when the reported SPN name has the failure information in it, FMI 31 can be used to indicated that the condition reported by the SPN exists. This type of fault may or may not be directly associated with the value of general broadcast information.

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Intermittent DTC Diagnostics

Intermittent DTCs are problems that periodically “go away”. A problem such as a loose terminal that intermittently does not make contact with its mating terminal is a likely cause of an intermittent fault. Other intermittent DTCs may only be set only under certain operating conditions such as heavy load, extended idle, etc. When diagnosing intermittent DTCs, take special note of the condition of wiring and connectors since a high percentage of intermittent problems originate here. Check for loose, dirty, or partially disconnected connectors. Inspect the wiring routing looking for possible intermittent shorts to ground caused by contact with external parts (for example, rubbing against sharp sheet metal edges). Inspect the connector vicinity looking for wires that are partially pulled out of connector terminals, damaged connectors, poorly positioned terminals, and corroded or damaged terminals. Look for broken wires, damaged splices, and wire-to-wire shorts.

NOTE: *The ECU is the component LEAST likely to fail. Only replace the ECU if the diagnostic procedure indicates that ECU replacement is necessary.*

Suggestions for diagnosing intermittent DTCs:

- If the diagnostic procedure indicates that the problem is intermittent, try to reproduce the operating conditions that were present when the DTC set. Service ADVISOR can be used to help locate intermittent problems, as it includes a function called Recording. The Recording function permits the recording of data parameter values during a

diagnostic session. If a DTC sets during a certain diagnostic session, the parameters can be played back and observed to see what each applicable parameter’s value was when the DTC occurred.

- If a faulty connection or wire is suspected to be the cause of the intermittent problem: clear DTCs, then check the connection or wire by wiggling it while watching Service ADVISOR to see if the fault resets.
- The voltage measured at the ECU input for most sensors can be monitored in Service ADVISOR as a data point. The minimum and maximum value of voltage measured since the data point was selected is displayed along with the current value of voltage. An intermittent open or shorted circuit will cause the voltage value to momentarily become approximately 5V or 0V, depending on the circuit and the type of failure. If computer screen cannot be seen while performing the test, have an assistant monitor the voltage while the harness is wiggled to help determine where the intermittent connection is located. If an assistant is not available, check the minimum and maximum voltage columns in the data points screen after each section of the harness is wiggled to help isolate the problem location.

Possible Causes of Intermittent DTCs:

- Faulty connection between sensor or actuator and harness.
- Faulty contact between terminals in connector.
- Faulty terminal/wire connection.
- Electromagnetic interference (EMI) from an improperly installed 2-way radio, etc. can cause erroneous signals to be sent to the ECU.

Trim Options Information

Trimable options are features that can be turned ON or Off during an ECU programming cycle. These features will customize an engine for each individual customer. Not all engines have the trim feature.

To update trimmable features, download the software payload file and start the programming sequence

through the service tool. The trim page automatically appears if the payload has trim incorporated.

For more information to help select the correct option, use the help documentation available in each section of the trim page.

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Interactive Tests and Calibration Results Printing Instructions

In Service ADVISOR to print the result screen of interactive tests and calibrations the printer preferences need to be changed. The following steps show you how to do this while performing the test or how to print this information later from a saved Job.

NOTE: Note: If these instructions are not followed, the print out of this information may not include all information from the test or calibration.

From a live connection:

Perform your selected test or calibration then after it has completed perform the steps below.

1. Click on the "Print" button in the lower frame.
2. On the Print popup window:
 - a. Click on the "Options" tab of the popup window.
 - b. From the Menu bar click on the drop down menu and select "All frames individually".

NOTE: This will display the entire report with multiple pages if needed.

- c. Click "Print".

From a saved Job:

1. From the "Menu" bar click on "File":
 - a. Select "Job" from the drop down list.
 - b. From the Job drop down menu select "Open / Manage Jobs".
2. From the Open / Manage Jobs popup window:
 - a. Select the Job ID that corresponds to the one you want to print.
 - b. Click on the "Open Job" button.
3. In the Session Logs popup window:
 - a. Select the "Session ID" you wan to open.
 - b. Click on the "Reading Logs" button.
4. In the Reading Events window:

- a. Click on the “Started Procedure” event for the interactive tests or calibration you are trying to print.
 - b. Click on the “Details” button.
5. From the Service ADVISOR main screen Menu bar:
 - a. Click on File and select “Print Preview”.
 6. In the Print Preview popup window:
 - a. From the Menu bar click on the drop down list and select “All frames individually”.

NOTE: This will display the entire report with multiple pages if needed.

- b. Click Print to print the report.

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Control Unit Information Gathering Interactive Test

This test gathers specific information from the ECU and puts into a printable format. The test will automatically start and gather all information listed below. When all the information has been gathered it will be displayed on the screen. You will at that time have the option to print the data. To print the data see INTERACTIVE TESTS AND CALIBRATION RESULTS PRINTING INSTRUCTIONS earlier in this section.

The information gathered is:

- Date tested
- Engine Serial number
- Engine Hourmeter
- ECU serial number
- ECU software assembly part number
- Engine model number
- ECU configuration file part number
- ECU software part number
- Vehicle option part number
- Performance option part number
- Operating code compatibility code
- EOL compatibility code
- Option assembly part number
- ECU part number
- Electronic unit pump part number
- Electronic unit pump serial number
- Electronic unit pump calibration code
- Trouble codes at the time test data is taken

To perform the test:

1. Select Interactive Tests from the Short Cut bar.
2. Select Control Unit Information and Overview.
3. The test will automatically start to gather information.
4. At the end of the test you will be able to select Print.

Engine Hour Updating Instructions Using Service ADVISOR

This procedure will explain how to update the engine hours in the ECU. The screen will show you the current engine hours and ask for you to input the new hour's value.

NOTE: *The new hours can not be less than the current hours displayed.*

You can use whole and tenths of hours. You can change the value before you save it to the ECU if you have made a mistake or you can change it after you save it but if you wanted it lower than you put in it will not accept it. To actually write the hours to the ECU the key needs to be turned off for 30 seconds then back on.

NOTE: *If you do not cycle the key the screen will display "Calibration was successfully completed" even though it was not. Note: Be sure to select "OK" before cycling the key.*

You can run the calibration if you select "Yes" on the last screen. You can also select "Print" if you want to save the information. To print the information see, INTERACTIVE TESTS AND CALIBRATION RESULTS PRINTING INSTRUCTIONS earlier in this section.

1. From the Short Cut bar select "Calibrations".
2. From the list select "ECU – Engine Hourmeter Calibration".
3. Next enter the new engine hours.
4. Select the "Send" button.
5. The next screen asks if you want to proceed. Select the "Yes" button.
6. The next screen displays the value you entered if it is correct select the "OK" button. If not select the "Not OK" button.
7. Next screen says to turn the Ignition OFF for 30 seconds then back ON.
 - Be sure to cycle the key before selecting OK.
8. 9. Last screen says "Calibration was successfully completed". Select "No" to complete the test. If you want to run it again select "Yes".

000028.03 — Throttle #3 Signal Out of Range High

Throttle voltage is above the high voltage specification.

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000028.03 — Throttle #3 Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

000028.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #3 input voltage increases above its high voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope if there are more than one throttle set up in the Trim Options.

Additional References:

For more Throttle #3 information, see DIGITAL MULTI-STATE THROTTLE, see DUAL-STATE THROTTLE, see TRI-STATE THROTTLE, or see RAMP THROTTLE in Section 03, Group 140 earlier in this manual, depending on the type of multi-state throttle employed on the application.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 6
- see 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000028.03 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Terminal Test	1. Ignition OFF, Engine OFF. 2. Check wiring connections on throttle #3. 3. Disconnect connector C09 on the control panel. 4. Perform TERMINAL TEST on C09 harness connector and panel connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Harness Resistance Check	On the harness C09 connector, measure the resistance between signal (terminal B4) and return (terminal G3). Is resistance greater than 4k ohms?	YES: GO TO 4 NO: GO TO 5 -- -1/1
❹ Return Wire Check	On the harness C09 connector, measure the resistance between return (terminal G3) and application single point ground. Is resistance less than 10 ohms?	YES: Repair open signal wire terminal B4 on C09. NO: GO TO 6 -- -1/1
❺ Control Panel Resistance Check	1. Set the multi-state throttle switch to the rabbit position. 2. On the control panel C09 connector, measure the resistance between signal (terminal B4) and return (terminal G3). Is resistance greater than 10k ohms?	YES: GO TO 6 NO: GO TO 8 -- -1/1

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Trouble Code Diagnostics and Tests

6 Signal Wire Check	On the control panel C09 connector, measure the resistance between signal (terminal B4) and the corresponding wire on the switch. Is resistance greater than 10 ohms?	YES: Repair open signal wire. NO: GO TO 7 -- -1/1
7 Return Wire Check	On the control panel C09 connector, measure the resistance between return (terminal G3) and the corresponding wire on the switch. Is resistance greater than 10 ohms?	YES: Repair open return wire. NO: GO TO 13 -- -1/1
8 Occurrence Count Check	Review stored information and look at occurrence count for 000028.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 8 NO: GO TO 9 -- -1/1
9 Terminal Test	- Ignition OFF, Engine OFF - Perform TERMINAL TEST on the Throttle #3 harness connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 Further Review of Snapshot Information	- Ignition ON, Engine OFF - Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	- Ignition ON, Engine ON - Set engine to operating point of failure and refresh codes. Did 000028.03 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 10 and confirm operating point. -- -1/1

Trouble Code Diagnostics and Tests

12 Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect throttle #3 connector and ECU connector J2. 3. Perform TERMINAL TEST on the Throttle #3 harness connector and ECU J2 connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 --1/1
13 Software Updates	1. Download latest ECU payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000028.03 active?	YES: Replace throttle #3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem fixed, bad ECU program. --1/1

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000028.04 — Throttle #3 Signal Out of Range Low

Throttle voltage is below the low voltage specification.

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000028.04 — Throttle #3 Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000028.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #3 input voltage decreases below its low voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope if there is more than one throttle set up in the Trim Options.

Additional References:

For more Throttle #3 information, see DIGITAL MULTI-STATE THROTTLE, see DUAL-STATE THROTTLE, see TRI-STATE THROTTLE, or see RAMP THROTTLE in Section 03, Group 140 earlier in this manual, depending on the type of multi-state throttle employed on the application.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 6
- see 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- Panel connector terminal - Yellow/Purple

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000028.04 reappear active?	YES: GO TO 2 NO: GO TO 12 -- -1/1
❷ Check Throttle #3 Wiring	1. Ignition OFF, engine OFF. 2. Check wiring connections on throttle #3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect connector C09 on the control panel. 3. Perform TERMINAL TEST on C09 harness connector and panel connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
❹ Check for DTC 00028.04	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 00028.04 still an active DTC?	YES: GO TO 7 NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Check for DTC 00028.03	Is DTC 00028.03 now an active DTC with harness connector C09 still disconnected?	YES: Replace throttle switch. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 ---1/1
6 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor DTCs in Service ADVISOR while gently wiggling the wiring harness between harness connector C09 and ECU J02 connector. Did the 000028.04 code toggle between active and stored?	YES: Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace throttle switch. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
7 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J02 connector. 3. Perform TERMINAL TEST on J02-B4 and J02-G3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 8 ---1/1
8 Check Throttle #3 Circuit Continuity	1. On the harness, measure the resistance between ECU J02-G3 and harness connector C09-S. 2. On the harness, measure the resistance between ECU J02-B4 and harness connector C09-R. Were both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1

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Trouble Code Diagnostics and Tests

9 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J02-B4 and single point ground. Was the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Measure the resistance between ECU J02-B4 and all other terminals in the ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor DTCs in Service ADVISOR while gently wiggling the wiring harness between harness connector C09 and ECU J02 connector. Did the 000028.04 code toggle between active and stored?	YES: Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace ECU. Recheck for DTC. -- -1/1
12 Check for Intermittent Short to Ground	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling the wiring harness between harness connector C09 and ECU J02 connector. Did the 000028.04 code toggle between active and stored?	YES: Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check Snapshot Information	- Review snapshot information stored in step 1. - Operate engine under conditions where DTC became active. Is DTC 00028.04 now active?	YES: GO TO 2 NO: GO TO 14 -- -1/1
14 Terminal Test	- Ignition OFF, engine OFF. - Disconnect harness connector C09. - Perform TERMINAL TEST on C09. - Disconnect ECU J02 connector. - Perform TERMINAL TEST on J02-G3 and J02-B4. Were Terminal Test results good?	YES: GO TO 15 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
15 Get More Information	- Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. - Operate the engine under the conditions specified by the operator. Is DTC 00028.04 now active?	YES: GO TO 2 NO: GO TO 16 -- -1/1
16 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 00028.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 17 -- -1/1
17 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000029.03 — Throttle #2 Signal Out of Range High

Throttle voltage is above the high voltage specification.

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000029.03 — Throttle #2 Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003510.03

000029.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #2 input voltage increases above its high voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For more Throttle #2 information, see ANALOG THROTTLE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000029.03 reappear active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
❷ Throttle Linkage Check	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. <i>NOTE: Use application manual for linkage and alignment procedures.</i> Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Device Disconnected Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C08. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is DTC 000029.04 now an active DTC?	YES: GO TO 4 NO: GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

4 Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C08-A, C08-C, and C08-F. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 -- -1/1
5 Check Throttle #2 Return Circuit Continuity	On the harness, measure the resistance between C08-C and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 6 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
6 Check Throttle #2 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between C08-A (+) and C08-C (-). Is the voltage greater than 5.5V?	YES: Discontinue this test and perform tests for DTC 003510.03 as though DTC was active. NO: GO TO 7 -- -1/1
7 Check for DTC 000102.03 with Throttle Reconnected	1. Ignition OFF, engine OFF. 2. Reconnect C08. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Is DTC 000029.03 still active?	YES: GO TO 8 NO: GO TO 15 -- -1/1
8 Check Throttle #2 Wiring	Check the wiring between the throttle #2 potentiometer and C08 harness connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace throttle #2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

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Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C08-A, C08-C, and C08-F. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J02. 3. Perform TERMINAL TEST on J02-G2, J02-G3, and J02-F3.. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check Throttle #2 Circuit Continuity	1. On the harness, measure the resistance between ECU J02-G2 and harness connector C08-A. 2. On the harness, measure the resistance between ECU J02-G3 and harness connector C08-C. 3. On the harness, measure the resistance between ECU J02-F3 and harness connector C08-F. Were all resistance measurements less than 10 ohms?	YES: GO TO 12 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
12 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between ECU J02-F3 and single point ground. Is the voltage greater than 0.5V?	YES: Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J03. 3. Measure the resistance between J02-F3 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Locate and repair wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.03 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
15 Check for Intermittent Short to Voltage	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.03 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 16 -- -1/1
16 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000029.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1

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Trouble Code Diagnostics and Tests

17 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C08. 3. Perform a TERMINAL TEST on C08-A, C08-C, and C08-F. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 18 -- -1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J02. 3. Perform TERMINAL TEST on J02-G2, J02-G3, and J02-F3.. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 19 -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000029.03 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000029.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000029.04 — Throttle #2 Signal Out of Range Low

Throttle voltage is below the low voltage specification.

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000029.04 — Throttle #2 Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003510.04

000029.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #2 input voltage decreases below its low voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For more Throttle #2 information, see ANALOG THROTTLE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000029.04 reappear active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
❷ Throttle Linkage Check	1. Ignition OFF, engine OFF. 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. <i>NOTE: Use application manual for linkage and alignment procedures</i> Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C08. 3. Perform a TERMINAL TEST on C08-A, C08-C, and C08-F. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
❹ Check Throttle #2 Return Circuit Continuity	On the harness, measure the resistance between C08-C and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 5 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

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Trouble Code Diagnostics and Tests

5 Check for Shorted Signal Circuit	On the harness, measure the resistance between Throttle #2 signal C08-B and return C08-C. Is resistance less than 10k ohms?	YES: Repair short to ground or wire-wire short of signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Check Throttle #2 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between C08-A (+) and C08-C (-). Is the voltage between 4.5V and 5.5V?	YES: GO TO 7 NO: Voltage is less than 4.5V, GO TO 11 NO: Voltage is greater than 5.5V, discontinue this test and perform tests for DTC 003510.03 as though DTC were active. -- -1/1
7 Check for DTC 000029.03 with Signal Shorted to 5V	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on harness connector terminals C08-A and C08-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000029.03 now an active DTC?	YES: GO TO 8 NO: GO TO 12 -- -1/1
8 Reconnect Throttle and Check for DTC 000029.04	1. Ignition OFF, engine OFF. 2. Remove flex probes from C08. 3. Reconnect harness connector C08. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000029.04 an active DTC?	YES: GO TO 8 NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

9 Check Wiring to Throttle #2	Check wiring between harness connector C08 and throttle #2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace throttle switch. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR -- -1/1
10 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.04 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR NO: GO TO 9 -- -1/1
11 Check for DTC 003510.04	Is DTC 003510.04 active?	YES: Discontinue this test. Perform test for DTC 003510.04. NO: GO TO 12 -- -1/1
12 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J02. 3. Perform a TERMINAL TEST on terminals J02-G2, J02-G3, and J02-F3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Check Circuit Continuity	On the harness, measure the resistance between the following ECU J02 connector terminals and harness connector C08 terminals: • J02-G2 to C08-A • J02-F3 to C08-F • J02-G3 to C08-C Were all resistance measurements less than 10 ohms?	YES: GO TO 14 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
14 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J02-F3 and single point ground. Is the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 15
15 Check for Wire-Wire Short	1. Disconnect ECU J01 and J03 connectors. 2. Verify harness connector C08 is still disconnected. 3. On the harness, measure the resistance between J02-F3 and all other terminals in the J01 , J02, and J03 connectors. Were all resistance measurements greater than 100k ohms?	YES: GO TO 16 NO: Fix wire-wire short in harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
16 Reconnect and Check for DTC 000029.04	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is DTC 000029.04 still active?	YES: Recheck procedure. GO TO 2 NO: Problem is intermittent. GO TO 17

Trouble Code Diagnostics and Tests

17 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling wiring harness between harness connector C08 and ECU connector J02. Does the status of DTC 000029.04 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR NO: GO TO 18 -- -1/1
18 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000029.04 now active?	YES: GO TO 2 NO: GO TO 19 -- -1/1
19 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect harness connector C08. 3. Perform TERMINAL TEST on terminals C08-A, C08-C, and C08-F. 4. Disconnect ECU J02 connector. 5. Perform TERMINAL TEST on J02-G2, J02-G3, and J02-F3. Were Terminal Test results good?	YES: GO TO 20 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
20 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000029.04 now active?	YES: GO TO 2 NO: GO TO 21 -- -1/1
21 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000029.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 22 -- -1/1
22 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000091.03 — Throttle #1 Signal Out of Range High

Throttle voltage is above the high voltage specification.

RG41221,0000203 -19-04FEB08-1/1

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000091.03 — Throttle #1 Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003511.03

000091.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #1 input voltage increases above its high voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For more Throttle #1 information, see ANALOG THROTTLE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 6
- see 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000091.03 reappear active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
❷ Throttle Linkage Check	1. Ignition OFF, Engine OFF 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. <i>NOTE: Use application manual for linkage and alignment procedures.</i> Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Device Disconnected Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C09. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is DTC 000091.04 now an active DTC?	YES: GO TO 4 NO: GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

4 Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C09-M, C09-C, and C09-L. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 -- -1/1
5 Check Throttle #1 Return Circuit Continuity	On the harness, measure the resistance between C09-C and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 6 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
6 Check Throttle #1 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between C09-M(+) and C09-C (-). Is the voltage greater than 5.5V?	YES: Discontinue this test and perform tests for DTC 003511.03 as though DTC was active. NO: GO TO 7 -- -1/1
7 Check for DTC 000091.03 with Throttle Reconnected	1. Ignition OFF, engine OFF. 2. Reconnect C09. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Is DTC 000091.03 still active?	YES: GO TO 8 NO: GO TO 15 -- -1/1
8 Check Throttle #1 Wiring	Check the wiring between the throttle #1 potentiometer and C09 harness connector. Were any problems found.	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace throttle #1. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

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Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on C09-M, C09-C, and C09-L. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J02. 3. Perform TERMINAL TEST on J02-A3, J02-A4, and J02-C3.. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check Throttle #1 Circuit Continuity	1. On the harness, measure the resistance between ECU J02-A3 and harness connector C09-M. 2. On the harness, measure the resistance between ECU J02-A4 and harness connector C09-L. 3. On the harness, measure the resistance between ECU J02-C3 and harness connector C09-C. Were all resistance measurements less than 10 ohms?	YES: GO TO 12 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
12 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between ECU J02-A4 and single point ground. Is the voltage greater than 0.5V?	YES: Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J03. 3. Measure the resistance between J02-A4 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Locate and repair wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C09 and ECU connector J02. Does the status of DTC 000091.03 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
15 Check for Intermittent Short to Voltage	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling on the wiring harness between harness connector C09 and ECU connector J02. Does the status of DTC 000091.03 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 16 -- -1/1
16 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000091.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1

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Trouble Code Diagnostics and Tests

17 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C09. 3. Perform a TERMINAL TEST on C09-M, C09-C, and C09-L. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 18 -- -1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU connector J02. 3. Perform TERMINAL TEST on J02-A3, J02-A4, and J02-C3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 19 -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000091.03 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000091.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000091.04 — Throttle #1 Signal Out of Range Low

Throttle voltage is below the low voltage specification.

RG41221,0000204 -19-04FEB08-1/1

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000091.04 — Throttle #1 Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003511.04

000091.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The throttle #1 input voltage decreases below its low voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For more Throttle #1 information, see ANALOG THROTTLE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 6
- see 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000091.04 reappear active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
❷ Throttle Linkage Check	1. Ignition OFF, engine OFF. 2. Check throttle linkage for any slipping. 3. Check throttle linkage for misalignment. <i>NOTE: Use application manual for linkage and alignment procedures</i> Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect harness connector C09. 3. Perform a TERMINAL TEST on C09-L, C09-C, and C09-M. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
❹ Check Throttle #1 Return Circuit Continuity	On the harness, measure the resistance between C09-C and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 5 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

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Trouble Code Diagnostics and Tests

5 Check for Shorted Signal Circuit	On the harness, measure the resistance between Throttle #1 signal C09-L and return C09-C. Is resistance less than 10k ohms?	YES: Repair short to ground or wire-wire short of signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Check Throttle #1 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between C09-M (+) and C09-C (-). Is the voltage between 4.5V and 5.5V?	YES: GO TO 7 NO: Voltage is less than 4.5V, GO TO 11 NO: Voltage is greater than 5.5V, discontinue this test and perform tests for DTC 003511.03 as though DTC were active. -- -1/1
7 Check for DTC 000091.03 with Signal Shorted to 5V	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on harness connector terminals C09-M and C09-L. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000091.03 now an active DTC?	YES: GO TO 8 NO: GO TO 12 -- -1/1
8 Reconnect Throttle and Check for DTC 000091.04	1. Ignition OFF, engine OFF. 2. Remove flex probes from C09. 3. Reconnect harness connector C09. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000091.04 an active DTC?	YES: GO TO 8 NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

9 Check Wiring to Throttle #1	Check wiring between harness connector C09 and Throttle #1. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace throttle switch. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR -- -1/1
10 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling wiring harness between harness connector C09 and ECU connector J02. Does the status of DTC 000091.04 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR NO: GO TO 9 -- -1/1
11 Check for DTC 003511.04	Is DTC 003511.04 active?	YES: Discontinue this test. Perform test for DTC 003511.04. NO: GO TO 12 -- -1/1
12 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J02. 3. Perform a TERMINAL TEST on terminals J02-A3, J02-C3, and J02-A4. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Check Circuit Continuity	On the harness, measure the resistance between the following ECU J02 connector terminals and harness connector C08 terminals: • J02-A3 to C09-M • J02-A4 to C09-L • J02-C3 to C09-C Were all resistance measurements less than 10 ohms?	YES: GO TO 14 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
14 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J02-A4 and single point ground. Is the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 15 -- -1/1
15 Check for Wire-Wire Short	1. Disconnect ECU J01 and J03 connectors. 2. Verify harness connector C09 is still disconnected. 3. On the harness, measure the resistance between J02-A4 and all other terminals in the J01 , J02, and J03 connectors. Were all resistance measurements greater than 100k ohms?	YES: GO TO 16 NO: Fix wire-wire short in harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
16 Reconnect and Check for DTC 000091.04	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is DTC 000091.04 still active?	YES: Recheck procedure. GO TO 2 NO: Problem is intermittent. GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor DTCs in Service ADVISOR while gently wiggling wiring harness between harness connector C09 and ECU connector J02. Does the status of DTC 000091.04 toggle between active and stored?	YES: There is an intermittent wiring problem. Locate and repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR NO: GO TO 18 -- -1/1
18 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000091.04 now active?	YES: GO TO 2 NO: GO TO 19 -- -1/1
19 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect harness connector C09. 3. Perform TERMINAL TEST on terminals C09-M, C09-C, and C09-L. 4. Disconnect ECU J02 connector. 5. Perform TERMINAL TEST on J02-A3, J02-C3, and J02-A4. Were Terminal Test results good?	YES: GO TO 20 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
20 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000091.04 now active?	YES: GO TO 2 NO: GO TO 21 -- -1/1
21 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000091.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 22 -- -1/1
22 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000091.09 — Throttle #1 Communication Signal Erratic

ECU received invalid or missing throttle information from the CAN buss. See application manual for troubleshooting procedures.

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000094.03 — Low Pressure Fuel Signal Out of Range High

The fuel transfer pump pressure input voltage exceeds the sensor's high voltage specification.

RG41221,0000206 –19–04FEB08–1/1

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000094.03 — Low Pressure Fuel Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000094.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The low pressure fuel signal input voltage rises above the sensor's high voltage specification. The voltage corresponds to a pressure that is higher than what is physically possible for the low pressure fuel pressure signal.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For sensor location see COMPONENT LOCATION in Section 3 Group 140.

For more engine low pressure fuel sensor information, see FUEL TRANSFER PUMP PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

Continued on next page

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IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JDG10466
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- ECU small terminal - Orange/Green

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000094.03 reappear active?	YES: GO TO 2 NO: GO TO 15 ---1/1

❷ Sensor Disconnected Test	1. Ignition OFF, Engine OFF 2. Disconnect fuel transfer pump pressure sensor connector P03. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000094.03 go to stored and 000094.04 become active?	YES: GO TO 3 NO: GO TO 7 ---1/1

Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform a TERMINAL TEST on the fuel transfer pump pressure sensor and harness connector P03. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
④ Check Sensor Return Circuit Continuity	On the harness, measure the resistance between P03-1 and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 5 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
⑤ Check Sensor 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between P03-2 (+) and P03-1 (-). Is the voltage greater than 5.5V?	YES: Discontinue this test and perform tests for DTC 003510.03 as though DTC was active. NO: GO TO 6 -- -1/1
⑥ Check for DTC 000094.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Reconnect P03. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Is DTC 000094.03 still active?	YES: Replace fuel transfer pump pressure sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1
⑦ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform Terminal Test on J03-H4, J03-H3, and J03-C2. Were Terminal Test results good?	YES: GO TO 8 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

Trouble Code Diagnostics and Tests

8 Check fuel transfer pump pressure sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-H3 and fuel transfer pump pressure sensor connector P03-1. 2. On the harness, measure the resistance between ECU J03-H4 and fuel transfer pump pressure sensor connector P03-2. 3. On the harness, measure the resistance between ECU J03-C2 and fuel transfer pump pressure sensor connector P03-3. Were all resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
9 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. Measure the voltage between ECU J03-C2 and single point ground. Is the voltage greater than 0.5V?	YES: Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 ECU J03 Disconnected Code Change Test	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 0000094.03.</i> 1. ECU connector J03 still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000094.03 still active?	YES: GO TO 14 NO: GO TO 11 -- -1/1
11 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between J03-C2 and all other terminals in ECU harness connectors J01, J02 and J03. Were any measurements less than 100k ohms?	YES: Locate wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1

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Trouble Code Diagnostics and Tests

12 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor Fuel Transfer Pump Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The Fuel Transfer Pump Pressure Input Voltage will increase to approximately 5V when the sensor circuit is shorted to a voltage source.</i> Was the source of the intermittent short to voltage found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1
13 Check for Active DTC 000094.03	Refresh DTCs Is DTC 000094.03 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Reconnect all connectors. 4. Ignition ON, engine OFF. Is DTC 000094.03 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
15 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor Fuel Transfer Pump Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The Fuel Transfer Pump Pressure Input Voltage will increase to approximately 5V when the sensor circuit is shorted to a voltage source.</i> Was the source of the intermittent short to voltage found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 16 -- -1/1
16 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000094.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect fuel transfer pump pressure sensor connector P03. 3. Perform Terminal Test on P03. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-H3, J03-H4, and J03-C2. Were Terminal Test results good?	YES: GO TO 18 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
18 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000094.03 now active?	YES: GO TO 2 NO: GO TO 19 -- -1/1
19 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000094.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 20 -- -1/1
20 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000094.04 — Low Pressure Fuel Signal Out of Range Low

The fuel transfer pump pressure input voltage drops below the sensor's low voltage specification.

RG41221,0000207 -19-04FEB08-1/1

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000094.04 — Low Pressure Fuel Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000094.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The low pressure fuel signal input voltage drops below the sensor's low voltage specification. The voltage corresponds to a pressure that is lower than what is physically possible for the low pressure fuel signal.

Alarm Level:

Warning

Control Unit Response:

ECU's will operate normally.

Additional References:

For sensor location see COMPONENT LOCATION in Section 3 Group 140.

For more engine low pressure fuel signal sensor information, see FUEL TRANSFER PUMP PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- ECU large terminal - Orange/Green
- Low Fuel Pressure Sensor P03 - Purple/Gray

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000094.04 reappear active?

YES: GO TO 2
NO: GO TO 16

-- -1/1

② Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel transfer pump pressure sensor connector P03.
3. Perform a TERMINAL TEST on connector P03.

Were any problems found?

YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Check Sensor Return Circuit Continuity	On the harness, measure the resistance between P03-1 and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
④ Check for Shorted Signal Circuit	On the harness, measure the resistance between fuel transfer pump pressure sensor signal P03-3 and return P03-1. Is resistance less than 10k ohms?	YES: Repair short to ground or wire-wire short of signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 -- -1/1
⑤ Check Sensor 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between P03-2 (+) and P03-1 (-). Is the voltage between 4.5V and 5.5V?	YES: GO TO 6 NO: Voltage is less than 4.5V, GO TO 10 NO: Voltage is greater than 5.5V, discontinue this test and perform tests for DTC 003510.03 as though DTC were active. -- -1/1
⑥ Check for DTC 000094.03 with Signal Shorted to 5V	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on fuel transfer pump pressure sensor connector terminals P03-2 and P03-3. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000094.03 now an active DTC?	YES: GO TO 7 NO: GO TO 11 -- -1/1

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Trouble Code Diagnostics and Tests

7 Reconnect Sensor and Check for DTC 000094.04	1. Ignition OFF, engine OFF. 2. Remove flex probes from P03. 3. Reconnect fuel transfer pump pressure sensor connector P03. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000094.04 an active DTC?	YES: Replace fuel transfer pump pressure sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 8 -- -1/1
8 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor Fuel Transfer Pump Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between fuel transfer pump pressure sensor and ECU J03 connector. <i>NOTE: The fuel transfer pump pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1
9 Replace Sensor and Terminals	1. Ignition OFF, engine OFF. 2. Replace terminals in fuel transfer pump pressure sensor connector P03. 3. Replace fuel transfer pump pressure sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000094.04 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
10 Check for DTC 003510.04	Is DTC 003510.04 active?	YES: Discontinue this test. Perform test for DTC 003510.04. NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J03. 3. Perform a TERMINAL TEST on terminals J03-H4, J03-H3, and J03-C2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 ---1/1
12 Check Circuit Continuity	On the harness, measure the resistance between the following ECU J01 connector terminals and fuel transfer pump pressure sensor P03 connector terminals: • J03-H3 to P03-1 • J03-H4 to P03-2 • J03-C2 to P03-3 Were all resistance measurements less than 10 ohms?	YES: GO TO 13 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
13 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-C2 and single point ground. Is the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 ---1/1
14 Check for Wire-Wire Short	1. Disconnect ECU connectors J01 and J02. 2. Verify fuel transfer pump pressure sensor connector P03 is still disconnected. 3. On the harness, measure the resistance between J03-C2 and all other terminals in ECU connectors J01, J02, and J03. Were all resistance measurements greater than 100k ohms?	YES: GO TO 15 NO: Fix wire-wire short in harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1

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Trouble Code Diagnostics and Tests

15 Reconnect and Check for DTC 000094.04	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is DTC 000094.04 still active?	YES: Recheck procedure. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
16 Check for Intermittent Wiring Problem	1. Ignition ON, engine OFF. 2. Monitor Fuel Transfer Pump Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between fuel transfer pump pressure sensor and ECU J03 connector. <i>NOTE: The fuel transfer pump pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000094.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect fuel transfer pump pressure sensor connector P03. 3. Perform TERMINAL TEST on P03. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-C2, J03-H3, and J03-H4. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000094.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1

Trouble Code Diagnostics and Tests

20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000094.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000094.17 — Low Pressure Fuel Signal Slightly Low

The ECU senses a fuel transfer pump pressure below specification.

DN22556,000054B –19–20DEC07–1/1

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000094.17 — Fuel Transfer Pump Pressure Slightly Low Procedure

Troubleshooting Sequence:

003510.04

000094.04

001075.12

000094.17

When DTC is Displayed:

When the engine is running or cranking for prolonged periods and the error is active.

Related Information

The ECU detects a fuel transfer pump pressure specification below -5 kPa (-0.5 psi).

Alarm Level:

Warning

Control Unit Response:

The ECU does not derate the engine. The engine may feel like it has a loss of power.

Additional References:

For more fuel transfer pump pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more two wire fuel transfer pump information, see ELECTRIC FUEL TRANSFER PUMP OPERATION (STANADYNE) in Section 03, Group 130 earlier in this manual.

For more 5 wire fuel transfer pump information, see ELECTRIC FUEL TRANSFER PUMP OPERATION (RACOR) in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See **TERMINAL TEST** for information on use.

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① Read DTCs and Store Snapshot Information

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

1. Ignition ON, Engine OFF.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group
 3. Write down all DTCs and their occurrence count. If any DTCs have Snapshot Capture or Snapshot Recording information save the information. For instructions on saving and using Snapshot Information, see SNAPSHOT INSTRUCTIONS earlier in this group.
 4. Ignition ON, Engine ON.
 5. Refresh DTC list.
- Is 000094.17 active?

YES: GO TO 2

NO: GO TO 4

– – –1/1

② Low Pressure Fuel System Check

Check fuel system, see F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this Section.

Did test pass?

YES: GO TO 3

NO: See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this Section.

– – –1/1

Trouble Code Diagnostics and Tests

③ Diagnostic Code Check	1. Ignition OFF, Engine OFF. 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group 3. Ignition ON, Engine CRANKING or ON. 4. Refresh codes. Is 000094.17 active?	YES: Start a DATC case. NO: Problem fixed. Return to service. -- -1/1
④ Occurrence Count Check	1. Ignition ON, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 5 NO: GO TO 6 -- -1/1
⑤ Low Pressure Fuel Sensor Connector Test	1. Disconnect low pressure fuel sensor connector. 2. Perform TERMINAL TEST on low pressure fuel sensor connector. Were any problems found?	YES: Repair problem. GO TO 1 NO: GO TO 6 -- -1/1
⑥ Engine Hours Between Failures Check	1. Ignition ON, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter value. Is the difference greater than 50 hours?	YES: Clear codes and return to service. NO: GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

7 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. GO TO 1 YES: Found operating point at which the code becomes active. GO TO 8 NO: GO TO 9 -- -1/1
8 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 000094.17 reappear active?	YES: GO TO 2 NO: GO TO 7 and review the data again. -- -1/1
9 Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect low pressure fuel sensor connector and ECU J1 connector. 3. Perform TERMINAL TEST on low pressure fuel sensor connector and ECU J1 connector. Were any problems found?	YES: Repair problem. GO TO 1 NO: GO TO 10 -- -1/1
10 ECU Reprogram	1. Using Service ADVISOR download the latest software payload for your application. 2. Reprogram the ECU with the payload just downloaded. 3. Ignition ON, Engine ON. 4. Refresh DTC list. Is 000094.17 active?	YES: Start a DTAC case. NO: Problem fixed. Return to service. -- -1/1

000097.03 — Water-in-Fuel Signal Out of Range High

The Water in Fuel input voltage exceeds the sensor's high voltage specification.

RG41221,0000208 –19–04FEB08–1/1

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000097.03 — Water-in-Fuel Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

000097.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The Water-in-Fuel input voltage increases above the sensor's high voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to operate in a normal manner.

Additional References:

For more Water-in-Fuel sensor information, see WATER IN FUEL (WIF) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- ECU large terminal - Orange/Green
- Water in Fuel Sensor D01 - Purple/Red

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000097.03 reappear active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on WIF sensor connector D01 and WIF sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check WIF Sensor Return Circuit Resistance	On the harness, measure the resistance between WIF sensor connector D01-B and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Check For WIF Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between coolant temperature sensor connector D01-A (+) and D01-B (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

5 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on J03-D2 and J03-H3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-D2 and all other terminals in the ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 -- -1/1
7 Check for DTC Change with Coolant Temperature Sensor Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on WIF sensor connector terminals D01-A and D01-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 000097.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 -- -1/1
8 Check for DTC 000097.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from D01. 3. Reconnect D01 to WIF sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000097.03 now an active DTC?	YES: Replace WIF sensor. Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform Terminal Test on J03-D2 and J03-H3. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. --1/1
10 Check WIF Sensor Circuit Continuity	1. Disconnect WIF sensor connector D01. 2. On the harness, measure the resistance between ECU J03-D2 and WIF sensor connector D01-A. 3. On the harness, measure the resistance between ECU J03-H3 and WIF sensor connector D01-B. Were both resistance measurements less than 10 ohms?	YES: Replace ECU. Recheck for DTC. NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. --1/1
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Water in Fuel Sensor Input Voltage data point in Service ADVISOR while gently wiggle wire harness between WIF sensor and ECU J03 connector. <i>NOTE: The water in fuel sensor input voltage will increase to approximately 5V when the sensor circuit is open or shorted to a voltage source.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 --1/1
12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in WIF sensor connector D01. 3. Replace WIF sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000097.03 active?	YES: Contact DTAC for support. NO: Problem fixed. --1/1

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Trouble Code Diagnostics and Tests

13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Water in Fuel Sensor Input Voltage data point in Service ADVISOR while gently wiggling wire harness between WIF sensor and ECU J03 connector. <i>NOTE: The water in fuel sensor input voltage will increase to approximately 5V when the sensor circuit is open or shorted to a voltage source.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000097.03 now active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect WIF sensor connector D01. 3. Perform Terminal Test on D01. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-D2 and J03-H3. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000097.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000097.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 -- -1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000097.04 — Water-in-Fuel Signal Out of Range Low

The Water in Fuel input voltage drops below the sensor's low voltage specification.

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000097.04 — Water-in-Fuel Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000097.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The water-in-fuel voltage drops below the minimum threshold. The voltage is lower than what is physically possible for the water-in-fuel sensor to achieve.

Alarm Level:

Warning

Control Unit Response:

The ECU's will continue to work normally.

Additional References:

For further water-in-fuel sensor information, see WATER IN FUEL (WIF) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- ECU large terminal - Orange/Green
- Water in Fuel Sensor D01 - Purple/Red

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000097.04 reappear active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the WIF sensor connector D01. 3. Perform TERMINAL TEST on WIF sensor connector D01 and WIF sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check for DTC 000097.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 000097.04 still an active DTC?	YES: GO TO 9 NO: GO TO 4 -- -1/1
❹ Check for DTC 000097.03	Is DTC 000097.03 now an active DTC with WIF sensor connector D01 still disconnected?	YES: GO TO 5 NO: GO TO 9 -- -1/1

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5 Sensor Shorted to Ground Test	On the WIF sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 100k ohms?	YES: Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Sensor Internal Short Test	On the WIF sensor, measure the resistance between terminal A and terminal B. Is the resistance between 200K and 240K ohms?	YES: GO TO 7. NO: Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
7 Fuel Quality Check	Perform a fuel quality analysis. Is the fuel quality OK?	YES: GO TO 8 NO: Fix fuel supply problem. Recheck for DTC. -- -1/1
8 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Water in Fuel Input Voltage data point in Service ADVISOR while gently wiggle wire harness between WIF sensor and ECU J03 connector. <i>NOTE: The water in fuel input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D2 and J03-H3.. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 ---1/1
10 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-D2 and WIF sensor D01-A. 2. On the harness, measure the resistance between ECU J03-H3 and WIF sensor D01-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
11 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-D2 and single point ground. Was the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 ---1/1
12 Check for DTC Active Status Change with J03 Disconnected	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 000097.04.</i> 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000097.04 still active with J03 disconnected?	YES: GO TO 16 NO: GO TO 13 ---1/1

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Trouble Code Diagnostics and Tests

13 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-D2 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Water in Fuel Sensor Input Voltage data point in Service ADVISOR while gently wiggle wire harness between WIF sensor and ECU J03 connector. <i>NOTE: The water in fuel sensor input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 15 -- -1/1
15 Check for Active DTC 000097.04	Refresh DTCs Is DTC 000097.04 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
16 Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 000097.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

17 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Water in Fuel Input Voltage data point in Service ADVISOR while gently wiggle wire harness between WIF sensor and ECU J03 connector. <i>NOTE: The water in fuel input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 18 ---1/1
18 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000097.04 now active?	YES: GO TO 2 NO: GO TO 19 ---1/1
19 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect WIF sensor connector D01. 3. Perform TERMINAL TEST on D01. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-D2 and J03-H3. Were Terminal Test results good?	YES: GO TO 20 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
20 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000097.04 now active?	YES: GO TO 2 NO: GO TO 21 ---1/1
21 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000097.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 22 ---1/1
22 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. ---1/1

000097.16 — Water in Fuel Detected

The ECU detects water in fuel.

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000097.16 — Water In Fuel Detected Diagnostic Procedure

Troubleshooting Sequence: 000097.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The water-in-fuel voltage drops below the minimum threshold. The voltage is lower than what is physically possible for the water-in-fuel sensor to achieve.

Alarm Level:

Warning

Control Unit Response:

The ECU's will continue to work normally.

Additional References:

For further water-in-fuel sensor information, see WATER IN FUEL (WIF) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
 - see 4.5L 24V ECU WIRING DIAGRAM 2
 - see 6.8L 12V ECU WIRING DIAGRAM 2
 - see 6.8L 24V ECU WIRING DIAGRAM 2
- located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000097.16 reappear active?	YES: GO TO 2 NO: GO TO 5 -- -1/1
❷ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on water-in-fuel sensor and harness connector. 3. Inspect harness for melted or pinched areas near the water-in-fuel sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ WIF Sensor Resistance Check	On the water-in-fuel sensor measure the resistance between signal (terminal A) and return (terminal B). Was either resistance value between 200k and 240k ohms?	YES: GO TO 4 NO: Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Fuel Quality Check	Perform fuel quality check, see CHECK FUEL SUPPLY QUALITY in Section 4 Group 150 earlier in this manual. Did test pass?	YES: GO TO 2 and confirm terminal test results. NO: Fix fuel supply quality problem. GO TO 1 -- -1/1

Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000097.16. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 04 160 ,141 --- -1/1
6 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the water-in-fuel sensor harness connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 --- -1/1
7 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 8 NO: GO TO 9 --- -1/1
8 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000097.04 reappear when engine operating point was reached?	YES: Replace WIF sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 and confirm operating point. --- -1/1

Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the water-in-fuel sensor harness connector and ECU J1 connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 ---1/1

10 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000097.04 active?	YES: Replace WIF sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem fixed, bad ECU program. ---1/1

000100.01 — Engine Oil Pressure Signal Extremely Low

The ECU senses the Engine Oil Pressure to be extremely low.

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000100.01 — Engine Oil Pressure Signal Extremely Low Diagnostic Procedure

Trouble Shooting Sequence:

000100.01

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU, the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses a lower than expected engine oil pressure.

The engine must be running for the code to be set.

The warning value set point is dependent on engine speed.

001569.31 is set when this code is active and engine has not shut down.

001110.31 is set if the shutdown feature is enabled.

001109.31 code is set 30 seconds before the ECU shuts down the engine.

Alarm Level:

STOP

Control Unit Response:

Maximum engine power is derated up to 60 percent.

Additional references:

For further oil pressure sensor information, see OIL PRESSURE SENSOR in Section 03, Group 140, earlier in this manual.

For further pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2

- see 4.5L 24V ECU WIRING DIAGRAM 2

- see 6.8L 12V ECU WIRING DIAGRAM 2

- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JT07328
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000100.01 reappear active?	YES: GO TO 2 NO: GO TO 6

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❷ Measure Engine Oil Pressure With External Gauge	1. Ignition OFF, Engine OFF. 2. Attach a pressure gauge to an available gallery hole on the engine. See CHECK ENGINE OIL PRESSURE in base engine manual, Section 04, Group 150. 3. Ignition ON, Engine ON. 4. Record pressure reading from pressure gauge. 5. Monitor the Engine Oil Pressure using Service ADVISOR. <i>NOTE: Pressure readings can be indicated in Atmosphere or Absolute. To convert from Atmosphere to Absolute, add 14 PSI (100kPa)</i> Is the pressure gauge value approximately the same as the Service ADVISOR value?	YES: Engine oil pressure sensor is OK. Diagnose problem why engine has low oil pressure. Refer to ENGINE OIL PRESSURE LOW in the base engine manual, Section 04, Group 150 for further assistance. NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 8 NO: GO TO 4 -- -1/1
④ Check Oil Pressure Sensor	1. Remove engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 8 NO: GO TO 5 -- -1/1
⑤ Oil Pressure Sensor Operation	1. Ignition OFF, Engine OFF. 2. With engine oil pressure sensor still removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Monitor the Engine Oil Pressure Input Voltage using Service ADVISOR. Is the voltage between 0.3 and 0.7 volts?	YES: Wire harness and sensor OK. Retest application for cause of low engine oil pressure. GO TO 1 NO: Engine oil pressure sensor already been replaced. GO TO 6 NO: Replace engine oil pressure sensor. GO TO 8 -- -1/1
⑥ Check Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000100.04 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 8 NO: Problem with ECU. GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

7 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Ignition ON, Engine ON. Is 000100.01 still active?	YES: Replace ECU. GO TO 8 NO: Verify problem is fixed. GO TO 8 -- -1/1
8 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000100.01 reappear as active with engine running?	YES: Problem not found. Recheck wiring, connectors, and engine operation. GO TO 1 NO: Problem fixed. -- -1/1
9 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000100.04 — Engine Oil Pressure Signal Out of Range Low

The engine oil pressure input voltage drops below the sensor's low voltage specification.

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000100.04 — Engine Oil Pressure Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000100.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The oil pressure input voltage drops below the sensor's low voltage specification. The voltage corresponds to a pressure that is lower than what is physically possible for oil pressure.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For more engine oil pressure sensor information, see OIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

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- ECU large terminal - Orange/Green
- Oil Pressure Sensor P04 - Purple/Gray

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000100.04 reappear active?

YES: GO TO 2

NO: GO TO 16

-- -1/1

② Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect oil pressure sensor connector P04.
3. Perform a TERMINAL TEST on connector P04.

Were any problems found?

YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

NO: GO TO 3

-- -1/1

③ Check Sensor Return Circuit Continuity

On the harness, measure the resistance between P04-1 and single point ground.

Is the resistance less than 5 ohms?

YES: GO TO 4

NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

-- -1/1

Trouble Code Diagnostics and Tests

4 Check for Shorted Signal Circuit	On the harness, measure the resistance between oil pressure sensor signal P04-3 and return P04-1. Is resistance less than 10k ohms?	YES: Repair short to ground or wire-wire short of signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 ---1/1
5 Check Sensor 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between P04-2 (+) and P04-1 (-). Is the voltage between 4.5V and 5.5V?	YES: GO TO 6 NO: Voltage is less than 4.5V, GO TO 10 NO: Voltage is greater than 5.5V, discontinue this test and perform tests for DTC 003510.03 as though DTC were active. ---1/1
6 Monitor voltage with Signal Shorted to 5V	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on oil pressure sensor connector terminals P04-2 and P04-3. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Monitor oil pressure input voltage in Service ADVISOR. Is the voltage 4.8 volts or greater?	YES: GO TO 7 NO: GO TO 11 ---1/1
7 Reconnect Sensor and Check for DTC 000100.04	1. Ignition OFF, engine OFF. 2. Remove flex probes from P04. 3. Reconnect oil pressure sensor connector P04. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000100.04 an active DTC?	YES: Replace oil pressure sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 8 ---1/1

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Trouble Code Diagnostics and Tests

8 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor Oil Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between oil pressure sensor and ECU J03 connector. <i>NOTE: The oil pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1
9 Replace Sensor and Terminals	1. Ignition OFF, engine OFF. 2. Replace terminals in oil pressure sensor connector P04. 3. Replace oil pressure sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000100.04 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
10 Check for DTC 003510.04	Is DTC 003510.04 active?	YES: Discontinue this test. Perform test for DTC 003510.04. NO: GO TO 11 -- -1/1
11 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J03. 3. Perform a TERMINAL TEST on terminals J03-H4, J03-H3, and J03-C3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1

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12 Check Circuit Continuity	On the harness, measure the resistance between the following ECU J01 connector terminals and Manifold Absolute pressure sensor P04 connector terminals: • J03-H3 to P04-1 • J03-H4 to P04-2 • J03-C3 to P04-3 Were all resistance measurements less than 10 ohms?	YES: GO TO 13 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
13 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-C3 and single point ground. Is the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Wire-Wire Short	1. Disconnect ECU connectors J01 and J02. 2. Verify oil pressure sensor connector P04 is still disconnected. 3. On the harness, measure the resistance between J03-C3 and all other terminals in ECU connectors J01, J02, and J03. Were all resistance measurements greater than 100k ohms?	YES: GO TO 15 NO: Fix wire-wire short in harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
15 Reconnect and Check for DTC 000100.04	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is DTC 000100.04 still active?	YES: Recheck procedure. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1

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Trouble Code Diagnostics and Tests

16 Check for Intermittent Wiring Problem	1. Ignition ON, engine OFF. 2. Monitor Oil Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between oil pressure sensor and ECU J03 connector. <i>NOTE: The oil pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000100.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect oil pressure sensor connector P04. 3. Perform TERMINAL TEST on P04. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-C3, J03-H3, and J03-H4. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000100.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000100.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000100.18 — Engine Oil Pressure Signal Moderately Low

The ECU senses an oil pressure below the warning value set point in the ECU.

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000100.18 — Engine Oil Pressure Signal Moderately Low Diagnostic Procedure

Trouble Shooting Sequence:

000100.18

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

The ECU senses a lower than expected engine oil pressure.

The engine must be running for the code to be set.

The warning value set point is dependent on engine speed.

001569.31 is also set when this code is active.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional references:

For further oil pressure sensor information, see OIL PRESSURE SENSOR in Section 03, Group 140, earlier in this manual.

For further pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2

- see 4.5L 24V ECU WIRING DIAGRAM 2

- see 6.8L 12V ECU WIRING DIAGRAM 2

- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JT07328
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000100.18 reappear active?	YES: GO TO 2 NO: GO TO 9

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❷ Measure Engine Oil Pressure With External Gauge	1. Ignition OFF, Engine OFF. 2. Attach a pressure gauge to an available gallery hole on the engine. See CHECK ENGINE OIL PRESSURE in base engine manual, Section 04, Group 150. 3. Ignition ON, Engine ON. 4. Record pressure reading from pressure gauge. 5. Monitor the Engine Oil Pressure using Service ADVISOR. <i>NOTE: Pressure readings can be indicated in Atmosphere or Absolute. To convert from Atmosphere to Absolute, add 14 PSI (100kPa)</i> Is the pressure gauge value approximately the same as the Service ADVISOR value?	YES: Engine oil pressure sensor is OK. Diagnose problem why engine has low oil pressure. Refer to ENGINE OIL PRESSURE LOW in the base engine manual, Section 04, Group 150 for further assistance. NO: GO TO 3

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Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 8 NO: GO TO 4 -- -1/1
④ Check Oil Pressure Sensor	1. Remove engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 8 NO: GO TO 5 -- -1/1
⑤ Oil Pressure Sensor Operation	1. Ignition OFF, Engine OFF. 2. With engine oil pressure sensor still removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Monitor the Engine Oil Pressure Input Voltage using Service ADVISOR. Is the voltage between 0.3 and 0.7 volts?	YES: Wire harness and sensor OK. Retest application for cause of low engine oil pressure. GO TO 1 NO: Engine oil pressure sensor already been replaced. GO TO 6 NO: Replace engine oil pressure sensor. GO TO 8 -- -1/1
⑥ Check Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000100.04 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 8 NO: Problem with ECU. GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

7 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Ignition ON, Engine ON. Is 000100.18 still active?	YES: Replace ECU. GO TO 8 NO: Verify problem is fixed. GO TO 8 -- -1/1
8 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000100.18 reappear as active with engine running?	YES: Problem not found. Recheck wiring, connectors, and engine operation. GO TO 1 NO: Problem fixed. -- -1/1
9 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000100.31 — Engine Oil Pressure Invalid

The ECU receives an engine oil pressure when engine speed is zero.

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000100.31 — Engine Oil Pressure Invalid Diagnostic Procedure

Trouble Shooting Sequence:

000100.04

000100.31

When DTC is Displayed:

When the ignition is on, engine off, and the error is active.

Related Information:

The ECU senses an engine oil pressure when engine is not running.
Code is not set with engine running.

Alarm Level:

Warning

Control Unit Response:

The ECU continues to operate normally.

Additional references:

For further oil pressure sensor information, see OIL PRESSURE SENSOR in Section 03, Group 140, earlier in this manual.

For further pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000100.31 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine oil sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 7 NO: GO TO 3 -- -1/1
❸ Check Oil Pressure Sensor Ground Wire	1. Ignition OFF, Engine OFF. 2. Measure the resistance from sensor harness connector terminal A to single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Open wire in harness or corrosion in connector terminals. Perform TERMINAL TEST on ECU connector J1. Look for loose wire crimps or terminal connections within mating connectors. GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

④ Check Oil Pressure Sensor Signal Wire	1. Ignition ON, Engine OFF. 2. In harness, measure voltage between signal (terminal C) and ground (terminal A) of engine oil pressure sensor connector. Is the voltage greater than 0.5 volts?	YES: GO TO 5 NO: Replace engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. GO TO 7 -- -1/1
⑤ Check Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000100.04</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J1. 3. Ignition ON, engine OFF. 4. Refresh Codes from within Service ADVISOR. 5. Monitor DTCs from within Service ADVISOR. Did DTC 100.04 become active?	YES: Recheck harness for open ground wire or a short to signal wire between engine oil pressure sensor connector and ECU. GO TO 7 YES: If engine oil sensor has not been replaced, replace engine oil sensor. See REMOVE and INSTALL OIL PRESSURE SENSOR in Section 02, Group 110 earlier in this section. GO TO 7 NO: Problem with ECU. GO TO 6 -- -1/1
⑥ Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Ignition ON, Engine OFF. Is 000100.31 still active?	YES: Replace ECU. GO TO 7 NO: Verify problem is fixed. GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

7 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors. 3. Ignition ON, Engine OFF. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. Did DTC 000100.31 reappear as active?	YES: Problem not found. Recheck wiring and connectors. GO TO 1 NO: Problem fixed. ---1/1
8 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. ---1/1

000102.02 — Intake Manifold Pressure Signal Invalid

The ECU receives and invalid pressure from the manifold air pressure sensor.

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000102.02 — Intake Manifold Pressure Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with an SPN of 001172

Any DTC with an SPN of 000103

000102.02

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The manifold air pressure sensor is invalid compared to the expected pressure for the current engine operating conditions.

There are many sensors and calculated values that interact with this code. It is important to insure all sensors are operating properly to correctly diagnose this code.

Alarm Level:

Warning

Control Unit Response:

The ECU will use a default manifold air pressure model to run the engine.

Additional References:

For more manifold air pressure sensor information, see MANIFOLD AIR PRESSURE (MAP) SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000102.02 reappear active?	YES: GO TO 2 NO: GO TO 6 ---1/1
❷ Sensors Test	1. Ignition OFF, Engine OFF. 2. Test the sensors in an controlled operating environment. See EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Group 150 earlier in this Section. Did test pass?	YES: GO TO 4 NO: GO TO 3 ---1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the sensor(s) that did not pass the EGR-VGT system temperature and flow test. Were any problems found?	YES: Repair problems. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 ---1/1

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Trouble Code Diagnostics and Tests

④ VGT Compressor Test	1. Ignition OFF, Engine OFF. 2. Inspect VGT compressor, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Group 150 earlier in this Section. Did test pass?	YES: GO TO 5 Repair problems. Run HARNESS DIAGNOSTIC MODE TEST. NO: Perform VGT component test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Group 150 earlier in this Section. -- -1/1
⑤ Air Pressure Problems Checks	1. Ignition OFF, Engine OFF. 2. Test for air leaks, see TEST FOR INTAKE AIR LEAKS in base engine manual. Did test pass?	YES: GO TO 6 NO: Test for air leaks, see TEST FOR INTAKE AIR LEAKS in base engine manual. -- -1/1
⑥ Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. YES: Found operating point at which the code becomes active. Try to determine cause and repair or GO TO 2. NO: Contact dealer or DTAC. -- -1/1

000102.03 — Intake Manifold Pressure Signal Out of Range High

The manifold air pressure input voltage exceeds the sensor's high voltage specification.

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000102.03 — Intake Manifold Pressure Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003510.03

000102.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The manifold ail pressure input voltage exceeds the sensor's high voltage specification. The voltage corresponds to a pressure that is higher than what is physically possible for manifold air pressure.

Alarm Level:

Warning

Control Unit Response:

The ECU will use a default manifold air pressure model to run the engine and try to maintain the engine operating envelope.

Additional References:

For sensor location see COMPONENT LOCATION in Section 3 Group 140.

For more intake manifold air pressure sensor information, see MANIFOLD AIR PRESSURE (MAP) SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JDG10466
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

Flex probe information:

- Intake Manifold Air Pressure Sensor P01 - Purple/Gray

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000102.03 reappear active?	YES: GO TO 2 NO: GO TO 15 ---1/1

❷ Sensor Disconnected Test	1. Ignition OFF, Engine OFF 2. Disconnect MAP sensor connector P01. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000102.03 go to stored and 000102.04 become active?	YES: GO TO 3 NO: GO TO 7 ---1/1

Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform a TERMINAL TEST on MAP sensor connector P01. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
④ Check Sensor Return Circuit Continuity	On the harness, measure the resistance between P01-1 and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 5 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
⑤ Check Sensor 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between P01-2 (+) and P01-1 (-). Is the voltage greater than 5.5V?	YES: Discontinue this test and perform tests for DTC 003510.03 as though DTC was active. NO: GO TO 6 -- -1/1
⑥ Check for DTC 000102.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Reconnect P01. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Is DTC 000102.03 still active?	YES: Replace MAP sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1
⑦ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform Terminal Test on J03-H4, J03-H3, and J03-C4. Were Terminal Test results good?	YES: GO TO 8 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

Trouble Code Diagnostics and Tests

8 Check MAP Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-H3 and MAP sensor connector P01-1. 2. On the harness, measure the resistance between ECU J03-H4 and MAP sensor connector P01-2. 3. On the harness, measure the resistance between ECU J03-C4 and MAP sensor connector P01-3. Were all resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
9 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. Measure the voltage between ECU J03-C4 and single point ground. Is the voltage greater than 0.5V?	YES: Locate and repair short to voltage in sensor signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
10 ECU J03 Disconnected Code Change Test	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 0000102.03.</i> 1. ECU connector J03 still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000102.03 still active?	YES: GO TO 14 NO: GO TO 11 -- -1/1
11 Check Signal Circuit for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between J03-C4 and all other terminals in ECU harness connectors J01, J02 and J03. Were any measurements less than 100k ohms?	YES: Locate wire-wire short. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1

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Trouble Code Diagnostics and Tests

12 Check for Intermittent Short to Voltage	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Monitor Intake Manifold Absolute Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The intake manifold absolute pressure input voltage will increase to approximately 5V when the sensor circuit is shorted to a voltage source.</i> Was the source of the intermittent short to voltage found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1
13 Check for Active DTC 000102.03	Refresh DTCs Is DTC 000102.03 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Reconnect all connectors. 4. Ignition ON, engine OFF. Is DTC 000102.03 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
15 Check for Intermittent Short to Voltage	1. Ignition ON, engine OFF. 2. Monitor Intake Manifold Absolute Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The intake manifold absolute pressure input voltage will increase to approximately 5V when the sensor circuit is shorted to a voltage source.</i> Was the source of the intermittent short to voltage found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 16 -- -1/1
16 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000102.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect MAP sensor connector P01. 3. Perform Terminal Test on P01. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-H3, J03-H4, and J03-C4. Were Terminal Test results good?	YES: GO TO 18 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
18 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000102.03 now active?	YES: GO TO 2 NO: GO TO 19 -- -1/1
19 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000102.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 20 -- -1/1
20 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000102.04 — Intake Manifold Pressure Signal Out of Range Low

The manifold air pressure input voltage drops below the sensor's low voltage specification.

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000102.04 — Intake Manifold Pressure Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000102.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The intake manifold pressure signal input voltage drops below the sensor's low voltage specification. The voltage corresponds to a pressure that is lower than what is physically possible for the intake manifold pressure signal.

Alarm Level:

Warning

Control Unit Response:

ECU's will continue to operate normally.

Additional References:

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more engine intake manifold pressure signal sensor information, see MANIFOLD AIR PRESSURE (MAP) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

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Trouble Code Diagnostics and Tests

- ECU large terminal - Orange/Green
- Engine intake manifold pressure signal sensor P01-
Purple/Gray

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000102.04 reappear active?

YES: GO TO 2

NO: GO TO 16

-- -1/1

② Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect MAP sensor connector P01.
3. Perform a TERMINAL TEST on connector P01.

Were any problems found?

YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

NO: GO TO 3

-- -1/1

③ Check Sensor Return Circuit Continuity

On the harness, measure the resistance between P01-1 and single point ground.

Is the resistance less than 5 ohms?

YES: GO TO 4

NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

-- -1/1

Trouble Code Diagnostics and Tests

4 Check for Shorted Signal Circuit	On the harness, measure the resistance between MAP sensor signal P01-3 and return P01-1. Is resistance less than 10k ohms?	YES: Repair short to ground or wire-wire short of signal circuit. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 ---1/1
5 Check Sensor 5V Supply	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between P01-2 (+) and P01-1 (-). Is the voltage between 4.5V and 5.5V?	YES: GO TO 6 NO: Voltage is less than 4.5V, GO TO 10 NO: Voltage is greater than 5.5V, discontinue this test and perform tests for DTC 003510.03 as though DTC were active. ---1/1
6 Check for DTC 000102.03 with Signal Shorted to 5V	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on MAP sensor connector terminals P01-2 and P01-3. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000102.03 now an active DTC?	YES: GO TO 7 NO: GO TO 11 ---1/1
7 Reconnect Sensor and Check for DTC 000102.04	1. Ignition OFF, engine OFF. 2. Remove flex probes from P01. 3. Reconnect MAP sensor connector P01. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000102.04 an active DTC?	YES: Replace MAP sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 8 ---1/1

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Trouble Code Diagnostics and Tests

8 Check for Intermittent Problem	1. Ignition ON, engine OFF. 2. Monitor Intake Manifold Absolute Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The intake manifold absolute pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1
9 Replace Sensor and Terminals	1. Ignition OFF, engine OFF. 2. Replace terminals in MAP sensor connector P01. 3. Replace MAP sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000102.04 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
10 Check for DTC 003510.04	Is DTC 003510.04 active?	YES: Discontinue this test. Perform test for DTC 003510.04. NO: GO TO 11 -- -1/1
11 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J03. 3. Perform a TERMINAL TEST on terminals J03-H4, J03-H3, and J03-C4. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1

Trouble Code Diagnostics and Tests

12 Check Circuit Continuity	On the harness, measure the resistance between the following ECU J01 connector terminals and MAP sensor P01 connector terminals: • J03-H3 to P01-1 • J03-H4 to P01-2 • J03-C4 to P01-3 Were all resistance measurements less than 10 ohms?	YES: GO TO 13 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
13 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-C4 and single point ground. Is the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Wire-Wire Short	1. Disconnect ECU connectors J01 and J02. 2. Verify MAP sensor connector P01 is still disconnected. 3. On the harness, measure the resistance between J03-C4 and all other terminals in ECU connectors J01, J02, and J03. Were all resistance measurements greater than 100k ohms?	YES: GO TO 15 NO: Fix wire-wire short in harness. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
15 Reconnect and Check for DTC 000102.04	1. Reconnect all electrical connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is DTC 000102.04 still active?	YES: Recheck procedure. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1

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Trouble Code Diagnostics and Tests

16 Check for Intermittent Wiring Problem	1. Ignition ON, engine OFF. 2. Monitor Intake Manifold Absolute Pressure Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAP sensor and ECU J03 connector. <i>NOTE: The intake manifold absolute pressure input voltage will decrease to approximately 0V when the sensor circuit is open or shorted to ground.</i> Was the source of the intermittent problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000102.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1
18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect MAP sensor connector P01. 3. Perform TERMINAL TEST on P01. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-C4, J03-H3, and J03-H4. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000102.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000102.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000103.00 — Turbo Speed Signal Extremely High

The ECU detects a turbo speed above the specification.

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000103.00 — Turbo Speed Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

000107.00 or 000107.31

002795.07

000641.04 or 000641.12 or 000641.13

000102.03 or 000102.04

000103.00

Related Information:

The ECU detects that turbo speed is above 155,000 rpm or some other programmed value.

This DTC may be caused by intake air (boost) leaks or turbo problems.

This DTC may also be caused by high altitude operation combined with high engine loads.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 50 percent.

Additional References:

For more turbo speed sensor information, see TURBO SPEED SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7

- see 4.5L 24V ECU WIRING DIAGRAM 7

- see 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Is 000103.00 an active or stored DTC?	YES: GO TO 2 NO: GO TO 16 04 160 ,185 ---1/1
❷ Check for Turbo Actuator Problem	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000641.13 active?	YES: Discontinue test for 000103.00 and perform test for 000641.13. NO: GO TO 3 ---1/1
❸ Check Intake and Turbo	1. Ignition OFF, engine OFF. 2. Perform CHARGE AIR SYSTEM test. 3. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. Did you find a problem?	YES: Fix problem. GO TO 15 NO: GO TO 4 ---1/1

Trouble Code Diagnostics and Tests

④ Test Sensor Terminals	1. Disconnect turbo speed sensor 3-way connector X05. 2. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	YES: Fix problem. GO TO 15 NO: GO TO 5 -- -1/1
⑤ Check Sensor Resistance	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). <i>NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.</i> Is the resistance between 600 ohms and 1300 ohms?	YES: Do not reconnect sensor to harness. GO TO 6 NO: GO TO 14 -- -1/1
⑥ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 15 NO: GO TO 7 -- -1/1
⑦ Check Wire Harness Continuity	<i>NOTE: Verify that turbo speed sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 15 -- -1/1
⑧ Check for Sensor Return Shorted to Ground	On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and single point ground. Is the resistance greater than 10k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 15 -- -1/1
⑨ Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 10k ohms?	YES: GO TO 10 NO: Fix problem. GO TO 15 -- -1/1

Trouble Code Diagnostics and Tests

10 Check for Twisted Pair	Inspect turbo speed signal and return wires between the turbo speed sensor connector and ECU J1 connector. Are the turbo speed signal and return wires twisted together throughout the wire harness?	YES: GO TO 11 NO: Replace wires with twisted pair. GO TO 15 -- -1/1
11 Inspect Turbo Speed Sensor and Target	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> 1. Remove turbo speed sensor. 2. Remove turbo compressor air inlet hose. 3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which sensor may detect as another target. 4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft. Were any problems found?	YES: Replace turbo speed sensor and other damaged parts. GO TO 15 NO: Replace turbo speed sensor. GO TO 12 -- -1/1
12 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and reinstall turbo air inlet hose. 3. Download latest ECU payload and reprogram ECU. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did 000103.00 reappear active or stored with engine running?	YES: GO TO 13 NO: Problem fixed. -- -1/1
13 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did DTC 000103.00 reappear active or stored with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

14 Inspect Turbo Speed Sensor and Target	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> 1. Remove turbo speed sensor. 2. Remove turbo compressor air inlet hose. 3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which sensor may detect as another target. 4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft. Were any problems found?	YES: Replace turbo speed sensor and other damaged parts. GO TO 15 NO: Replace turbo speed sensor. GO TO 15 -- -1/1
15 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and reinstall turbo air inlet hose, if removed. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did 000103.00 reappear active with engine running?	YES: GO TO 2 NO: Problem fixed. -- -1/1
16 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review the snapshot recording to determine the barometric pressure when 000103.00 became active. Operation under high loads at high altitudes may cause 000103.00 to become active as part of the engine protection strategy. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. YES: DTC becomes active only at high altitude. Open DTAC case. NO: GO TO 2 -- -1/1

000103.05 — Turbo Speed Sensor Circuit has High Resistance

The ECU detects low current on the turbo speed sensor wiring.

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000103.05 — Turbo Speed Sensor Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000103.05

Related Information:

The ECU detects high resistance or an open circuit in the turbo speed sensor circuit during the HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For more turbo speed sensor information, see TURBO SPEED SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

-- -1/1

Trouble Code Diagnostics and Tests

① Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect turbo speed sensor 3-way connector X05. 3. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 2 ---1/1
② Check Sensor Resistance	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). <i>NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.</i> Is the resistance between 600 ohms and 1300 ohms?	YES: With 4.5L - GO TO 4 YES: With 6.8L - GO TO 3 NO: Remove turbo speed sensor. GO TO 12 ---1/1
③ Check VGT Interconnect (With 6.8L Only)	1. Disconnect VGT interconnect 8-way connector C23. 2. Perform TERMINAL TEST on C23. 3. On the VGT harness, measure the resistance between the 8-way connector signal (C23-1) and the turbo speed sensor connector signal (1). 4. On the VGT harness, measure the resistance between the 8-way connector return (C23-2) and the turbo speed sensor connector return (2). Are terminal test results good and are both resistance measurements less than 10 ohms?	YES: Reconnect C23. GO TO 4 NO: Fix problem. GO TO 13 ---1/1
④ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 5 ---1/1

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Trouble Code Diagnostics and Tests

5 Check Wire Harness Continuity	1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 13 ---1/1
6 Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 13 ---1/1
7 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU turbo speed sensor signal (J1-B4) and single point ground. Is voltage less than 0.5V?	YES: GO TO 8 NO: Fix problem. GO TO 13 ---1/1
8 Check for Intermittent Open Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 9 NO: Recheck for intermittent open circuit. GO TO 1 ---1/1
9 Replace Turbo Speed Sensor	Has turbo speed sensor been replaced during this diagnostic procedure?	YES: GO TO 10 NO: Remove turbo speed sensor. GO TO 12 ---1/1

Trouble Code Diagnostics and Tests

10 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 11 NO: Problem fixed. -- -1/1
11 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
12 Inspect Turbo Speed Sensor	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> Examine tip of turbo speed sensor for damage due to contact with turbocharger shaft. Does sensor appear damaged due to contact with shaft?	YES: Replace turbo speed sensor. Determine cause if replacement sensor also becomes damaged. GO TO 13 NO: Replace turbo speed sensor. GO TO 13 -- -1/1
13 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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000103.08 — Turbo Speed Signal Incorrect

The ECU detects that turbo speed is not valid.

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000103.08 — Turbo Speed Signal Incorrect Diagnostic Procedure

Troubleshooting Sequence:

000103.05
000103.31
000103.00
000103.08

Related Information:

This DTC may be caused by electrical noise which causes the turbo speed to appear to be too high.
This DTC is also caused by a missing turbo speed signal.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For more turbo speed sensor information, see TURBO SPEED SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. Is 000103.00, 000103.05, or 000103.31 an active or stored DTC?	YES: Discontinue test for 00103.08 and perform test for 000103.00, 000103.05, or 000103.31. NO: GO TO 2 -- -1/1
❷ Check for Active DTC	1. Clear DTCs. 2. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Is 000103.08 an active or stored DTC?	YES: GO TO 3 NO: GO TO 15 -- -1/1
❸ Test Sensor Terminals	1. Disconnect turbo speed sensor 3-way connector X05. 2. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 4 -- -1/1
❹ Check Sensor Resistance	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). <i>NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.</i> Is the resistance between 600 ohms and 1300 ohms?	YES: Do not reconnect sensor to harness. GO TO 5 NO: GO TO 13 -- -1/1
❺ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 6 -- -1/1

Trouble Code Diagnostics and Tests

6 Check Wire Harness Continuity	<i>NOTE: Verify that turbo speed sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 14 -- -1/1
7 Check for Sensor Return Shorted to Ground	On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and single point ground. Is the resistance greater than 10k ohms?	YES: GO TO 8 NO: Fix problem. GO TO 14 -- -1/1
8 Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 10k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 14 -- -1/1
9 Check for Twisted Pair	Inspect turbo speed signal and return wires between the turbo speed sensor connector and ECU J1 connector. Are the turbo speed signal and return wires twisted together throughout the wire harness?	YES: GO TO 10 NO: Replace wires with twisted pair. GO TO 14 -- -1/1
10 Inspect Turbo Speed Sensor and Target	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> 1. Remove turbo speed sensor. 2. Remove turbo compressor air inlet hose. 3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which sensor may detect as another target. 4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft. Were any problems found?	YES: Replace turbo speed sensor and other damaged parts. GO TO 14 NO: Replace turbo speed sensor. GO TO 11 -- -1/1

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Trouble Code Diagnostics and Tests

11 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and reinstall turbo air inlet hose. 3. Download latest ECU payload and reprogram ECU. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did 000103.08 reappear active or stored with engine running?	YES: GO TO 12 NO: Problem fixed. -- -1/1
12 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did DTC 000103.08 reappear active or stored with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
13 Inspect Turbo Speed Sensor and Target	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> 1. Remove turbo speed sensor. 2. Remove turbo compressor air inlet hose. 3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which sensor may detect as another target. 4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft. Were any problems found?	YES: Replace turbo speed sensor and other damaged parts. GO TO 14 NO: Replace turbo speed sensor. GO TO 14 -- -1/1
14 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and reinstall turbo air inlet hose, if removed. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Start engine and increase speed to 1500 rpm. Place engine under load, if possible. Did 000103.08 reappear active with engine running?	YES: GO TO 2 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

15 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 3 --1/1

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000103.31 — Turbo Speed Signal Missing

The ECU does not detect a signal coming from the turbo speed sensor.

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000103.31 — Turbo Speed Signal Missing Diagnostic Procedure

Troubleshooting Sequence:

000103.05

000103.31

Related Information:

This DTC may be caused by an open or shorted turbo speed sensor circuit.

This DTC may also be caused by a seized or broken turbo shaft or other turbo damage.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For more turbo speed sensor information, see TURBO SPEED SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start engine. 5. Refresh DTCs. Did 000103.31 reappear active with engine running?	YES: GO TO 2 NO: GO TO 18 -- -1/1
2 Check for Open Speed Sensor Circuit	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000103.05 active?	YES: Discontinue test for 000103.31 and perform test for 000103.05. NO: GO TO 3 -- -1/1
3 Check for Damaged Turbo	1. Monitor the Manifold Absolute Pressure data point in Service ADVISOR with engine not running. 2. Start engine and increase speed to 1500 rpm. Did Manifold Absolute Pressure increase by at least 2.1 kPa (0.3 psi) as engine speed was increased?	YES: GO TO 4 NO: Check for damaged turbo. Fix problem. GO TO 17 -- -1/1
4 Check for Loose Sensor	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.</i> 1. Ignition OFF, engine OFF. 2. Verify turbo speed sensor installation torque. Was turbo speed sensor fully threaded into mounting hole?	YES: GO TO 5 NO: Torque sensor to specified value. GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

5 Test Sensor Terminals	1. Disconnect turbo speed sensor 3-way connector X05. 2. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	YES: Fix problem. GO TO 17 NO: GO TO 6 -- -1/1
6 Check Sensor Resistance	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). <i>NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.</i> Is the resistance between 600 ohms and 1300 ohms?	YES: Do not reconnect sensor to harness. GO TO 7 NO: GO TO 16 -- -1/1
7 Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 17 NO: GO TO 8 -- -1/1
8 Check Wire Harness Continuity	<i>NOTE: Verify that turbo speed sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 17 -- -1/1
9 Check for Signal to Return Short	1. Verify turbo speed sensor is disconnected. 2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and return (J1-B3). Is the resistance greater than 1k ohms?	YES: GO TO 10 NO: Fix problem. GO TO 17 -- -1/1
10 Check for Short to Ground	On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 17 -- -1/1

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Trouble Code Diagnostics and Tests

11 Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 17 -- -1/1
12 Check for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between ECU turbo speed sensor signal (J1-B4) and single point ground. Is the voltage less than 0.5V?	YES: GO TO 13 NO: Fix problem. GO TO 17 -- -1/1
13 Replace Turbo Speed Sensor	Has turbo speed sensor been replaced during this diagnostic procedure?	YES: GO TO 14 NO: GO TO 16 -- -1/1
14 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. Did 000103.31 reappear active with engine running?	YES: GO TO 15 NO: Problem fixed. -- -1/1
15 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000103.31 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
16 Inspect Turbo Speed Sensor and Target	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> 1. Remove turbo speed sensor. 2. Remove turbo compressor air inlet hose. 3. Spin turbo compressor and look for sensor target (one flat spot on turbo shaft) through sensor mounting hole. Examine shaft for damage which cause sensor to not detect the target. 4. Examine tip of turbo speed sensor for damage due to contact with turbo shaft. Were any problems found?	YES: Replace turbo speed sensor and other damaged parts. GO TO 17 NO: Replace turbo speed sensor. GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors and reinstall turbo air inlet hose, if removed. 3. Ignition ON, engine ON. Did 000103.31 reappear active with engine running?	YES: GO TO 2 NO: Problem fixed. --1/1
18 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: Problem is intermittent. GO TO 4 --1/1

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000105.00 — Intake Manifold Air Temperature Signal Extremely High

The ECU senses an intake manifold air temperature above specification.

RG41221,0000219 –19–22FEB08–1/1

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000105.00 — Intake Manifold Air Temperature Signal Extremely High Diagnostic Procedure

Trouble Shooting Sequence:

000110.00 or 000110.15 or 000110.16
000105.15

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU, the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses an intake manifold air temperature at or above 123° C (253° F) on OEM engines.

The engine has to be running for the code to be set.

001569.31 is set when this code is active and engine has not shut down.

001110.31 is set if the shutdown feature is enabled. The engine has to be running for 3 minutes before the code is set.

001109.31 is set 30 seconds before the ECU shuts down the engine.

Alarm Level:

STOP

Control Unit Response:

Maximum engine power is derated up to 60 percent.

Additional References:

For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

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For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000105.00 reappear active?

YES: GO TO 2
NO: GO TO 13

-- -1/1

Trouble Code Diagnostics and Tests

2 Check EGR Temperature	Part 1 Is engine equipped with an EGR temperature sensor? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1 component (B) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 7 component (B) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i>	YES: GO TO Part 2 NO: GO TO 4
	Part 2 1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high EGR temperature active (412.15, 412.16, or 412.00)?	YES: GO TO 3 NO: GO TO 4
3 Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 12 NO: Reinstall EGR valve. GO TO 4
4 Preliminary Check of Air Intake System	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in base engine manual, Section 04, Group 150 and REMOVE AND INSTALL AIR INTAKE PIPE in base engine manual, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 12 NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Terminal Test	<i>NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 12 NO: GO TO 6 -- -1/1
6 Check Intake Manifold Air Temperature Sensor	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 12 NO: GO TO 7 -- -1/1
7 Check Intake Manifold Air Temperature Sensor Wiring	1. With MAT sensor removed from engine, reconnect MAT sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the intake manifold air temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: MAT sensor is OK. Diagnose engine air intake cooling system. GO TO 10 NO: MAT sensor has already been replaced. GO TO 8 NO: Replace MAT sensor. GO TO 12 -- -1/1
8 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000105.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 105.03 become active?	YES: Wire harness is OK. Problem not fixed. Recheck air intake system. GO TO 1 NO: GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

9 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000105.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 12 NO: Replace ECU. GO TO 12 ---1/1
10 Check for Engine Related Causes	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE AIR LEAKS in base engine manual, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in base engine manual, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	YES: Repair problem. GO TO 12 NO: GO TO 11 ---1/1
11 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000105.00 still active?	YES: Problem not fixed. Verify air intake system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 12 ---1/1

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Trouble Code Diagnostics and Tests

12 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000105.00 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and air intake system. GO TO 1 NO: Problem fixed. ---1/1
13 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. ---1/1

000105.03 — Intake Manifold Air Temperature Signal Out of Range High

The intake manifold air temperature input voltage exceeds the sensor's high voltage specification.

RG41221,000021A -19-04FEB08-1/1

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000105.03 — Intake Manifold Air Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

000105.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The intake manifold air temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for intake manifold air temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default intake manifold air temperature of 60° C (140° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- Turbo speed sensor connector X05 - Blue/Green
- ECU large terminal - Orange/Green
- Turbo system interconnect C23 - Yellow/Purple

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1 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect turbo speed sensor 3-way connector X05. 3. Perform TERMINAL TEST on turbo speed sensor connector. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 2

-- -1/1

2 Check Sensor Resistance	On the turbo speed sensor, measure the resistance between the signal (1) and return (2). <i>NOTE: Turbo speed sensor resistance will increase significantly when turbo is at operating temperature. Permit a hot turbo to cool and recheck sensor resistance before replacing sensor, if hot resistance is greater than 1300 ohms.</i> Is the resistance between 600 ohms and 1300 ohms?	YES: GO TO 3 NO: Remove turbo speed sensor. GO TO 12

-- -1/1

Trouble Code Diagnostics and Tests

③ Check VGT Interconnect	1. Disconnect VGT interconnect 8-way connector C23. 2. Perform TERMINAL TEST on C23. 3. On the VGT harness, measure the resistance between the 8-way connector signal (C23-1) and the turbo speed sensor connector signal (1). 4. On the VGT harness, measure the resistance between the 8-way connector return (C23-2) and the turbo speed sensor connector return (2). Are terminal test results good and are both resistance measurements less than 10 ohms?	YES: Reconnect C23. GO TO 4 NO: Fix problem. GO TO 13 -- -1/1
④ Test ECU Terminals	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 5 -- -1/1
⑤ Check Wire Harness Continuity	1. On the harness, measure the resistance between ECU turbo speed sensor signal (J1-B4) and the turbo speed sensor connector signal (1). 2. On the harness, measure the resistance between ECU turbo speed sensor return (J1-B3) and the turbo speed sensor connector return (2). Are both resistance measurements less than 10 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 13 -- -1/1
⑥ Check for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU turbo speed sensor signal (J1-B4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 13 -- -1/1
⑦ Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU turbo speed sensor signal (J1-B4) and single point ground. Is voltage less than 0.5V?	YES: GO TO 8 NO: Fix problem. GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

8 Check for Intermittent Open Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 9 NO: Recheck for intermittent open circuit. GO TO 1 -- -1/1
9 Replace Turbo Speed Sensor	Has turbo speed sensor been replaced during this diagnostic procedure?	YES: GO TO 10 NO: Remove turbo speed sensor. GO TO 12 -- -1/1
10 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 11 NO: Problem fixed. -- -1/1
11 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

12 Inspect Turbo Speed Sensor	<i>NOTE: See REMOVE AND INSTALL TURBO SPEED SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> Examine tip of turbo speed sensor for damage due to contact with turbocharger shaft. Does sensor appear damaged due to contact with shaft?	YES: Replace turbo speed sensor. Determine cause if replacement sensor also becomes damaged. GO TO 13 NO: Replace turbo speed sensor. GO TO 13 -- -1/1
13 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000103.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

000105.04 — Intake Manifold Air Temperature Signal Out of Range Low

The intake manifold air temperature input voltage drops below the sensor's low voltage specification.

RG41221,000021B -19-04FEB08-1/1

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000105.04 — Intake Manifold Air Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000105.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The intake manifold air temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for intake manifold air temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default intake manifold air temperature of 60° C (140° F).

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue

- ECU large terminal - Orange/Green
- Intake Manifold Air Temperature sensor T02 - Purple/Gray

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 000105.04 reappear active?	YES: GO TO 2 NO: GO TO 16
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the MAT sensor connector T02. 3. Perform TERMINAL TEST on MAT sensor connector T02 and MAT sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3
❸ Check for DTC 000105.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 000105.04 still an active DTC?	YES: GO TO 8 NO: GO TO 4
❹ Check for DTC 000105.03	Is DTC 000105.03 now an active DTC with MAT sensor connector T02 still disconnected?	YES: GO TO 5 NO: GO TO 8

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Trouble Code Diagnostics and Tests

5 Sensor Shorted to Ground Test	On the MAT sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 1k ohms?	YES: Replace MAT sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Sensor Internal Short Test	On the MAT sensor, measure the resistance between terminal A and terminal B. Is the resistance less than 60 ohms?	YES: Replace MAT sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 -- -1/1
7 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Intake Manifold Air Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAT sensor and ECU J03 connector. <i>NOTE: The intake manifold air temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace MAT sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
8 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-F1 and J03-B2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-F1 and MAT sensor T02-A. 2. On the harness, measure the resistance between ECU J03-B2 and MAT sensor T02-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
10 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-F1 and single point ground. Was the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 ---1/1
11 Check for DTC Active Status Change with J03 Disconnected	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 000105.04.</i> 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000105.04 still active with J03 disconnected?	YES: GO TO 15 NO: GO TO 12 ---1/1
12 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-F1 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 ---1/1

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Trouble Code Diagnostics and Tests

13 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Intake Manifold Air Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAT sensor and ECU J03 connector. <i>NOTE: The intake manifold air temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Active DTC 000105.04	Refresh DTCs Is DTC 000105.04 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
15 Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 000105.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
16 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Intake Manifold Air Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between MAT sensor and ECU J03 connector. <i>NOTE: The intake manifold air temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000105.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect MAT sensor connector T02. 3. Perform TERMINAL TEST on T02. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-F1 and J03-B2. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000105.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000105.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000105.15 — Intake Manifold Air Temperature Signal Slightly High

The ECU senses a intake manifold air temperature above specification.

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000105.15 — Intake Manifold Air Temperature Signal Slightly High Diagnostic Procedure

Trouble Shooting Sequence:

000110.00 or 000110.15 or 000110.16
000105.15

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

The ECU senses an intake manifold air temperature of 120° C (248° F) on OEM engines.
The engine has to be running for the code to be set.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to run normally.

Additional References:

For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000105.15 reappear active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
❷ Check EGR Temperature	Part 1 Is engine equipped with an EGR temperature sensor? <i>NOTE: For component location see COMPONENT LOCATION DIAGRAM 1 component (B) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 7 component (B) for the 6.8L engine in Section 03, Group 140 earlier in this manual.</i> 1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high EGR temperature active. (412.15, 412.16, or 412.00)?	YES: GO TO Part 2 NO: GO TO 4 YES: GO TO 3 NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

③ Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 12 NO: Reinstall EGR valve. GO TO 4
④ Preliminary Check of Air Intake System	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in base engine manual, Section 04, Group 150 and REMOVE AND INSTALL AIR INTAKE PIPE in base engine manual, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 12 NO: GO TO 5
⑤ Terminal Test	<i>NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 12 NO: GO TO 6
⑥ Check Intake Manifold Air Temperature Sensor	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 12 NO: GO TO 7

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Trouble Code Diagnostics and Tests

7 Check Intake Manifold Air Temperature Sensor Operation	1. With MAT sensor removed from engine, reconnect MAT sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the intake manifold air temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: MAT sensor is OK. Diagnose engine air intake cooling system. GO TO 10 NO: MAT sensor has already been replaced. GO TO 8 NO: Replace MAT sensor. GO TO 12 -- -1/1
8 Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 105.03 become active?	YES: Wire harness is OK. Problem not fixed. Recheck connectors and air intake system. GO TO 12 NO: GO TO 9 -- -1/1
9 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000105.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000105.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 12 NO: Replace ECU. GO TO 12 -- -1/1
10 Check for Engine Related Causes	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE AIR LEAKS in base engine manual, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in base engine manual, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	YES: Repair problem. GO TO 12 NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000105.15 still active?	YES: Problem not fixed. Verify air intake system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 12 -- -1/1
12 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000105.15 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and air intake system. GO TO 1 NO: Problem fixed. -- -1/1
13 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000105.16 — Intake Manifold Air Temperature Signal Moderately High

The ECU senses an intake manifold air temperature above specification.

RG41221,000021D -19-18OCT07-1/1

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000105.16 — Intake Manifold Air Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

000110.00 or 000110.15 or 000110.16
000105.16

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

The ECU senses an intake manifold air temperature of 121° C (250° F) on OEM engines.
The engine has to be running for the code to be set.
001569.31 is set when this code is active.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For further intake manifold air temperature sensor information, see INTAKE MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh Codes.

Did 000105.16 reappear active?

YES: GO TO 2

NO: GO TO 13

-- -1/1

② Check EGR Temperature

Part 1

Is engine equipped with an EGR temperature sensor?

NOTE: For component location see COMPONENT LOCATION DIAGRAM 1 component (B) for the 4.5L engine or COMPONENT LOCATION DIAGRAM 7component (B) for the 6.8L engine in Section 03, Group 140 earlier in this manual.

YES: GO TO Part 2

NO: GO TO 4

1. Ignition ON, Engine ON.

2. Let engine run for 3 minutes.

3. Refresh codes from within Service Advisor.

Are any DTCs related to EGR temperature active (412.15, 412.16, or 412.00)?

YES: GO TO 3

NO: GO TO 4

-- -1/1

Trouble Code Diagnostics and Tests

③ Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 12 NO: Reinstall EGR valve. GO TO 4
④ Preliminary Check of Air Intake System	Visually inspect components related to air intake system. • Restricted air intake plumbing. See CHECK AIR INTAKE SYSTEM in base engine manual, Section 04, Group 150 and REMOVE AND INSTALL AIR INTAKE PIPE in base engine manual, Section 02, Group 080. • Restricted, dirty, or damaged charge air cooler. Refer to VEHICLE MAINTENANCE MANUAL for more information. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Damaged cooling fan shroud. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 12 NO: GO TO 5
⑤ Terminal Test	<i>NOTE: From here on through the manual, the intake manifold air temperature will be referred to as MAT</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 12 NO: GO TO 6
⑥ Check Intake Manifold Air Temperature Sensor	1. Remove MAT sensor. See REMOVE and INSTALL MANIFOLD AIR TEMPERATURE (MAT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 12 NO: GO TO 7

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Trouble Code Diagnostics and Tests

7 Check Intake Manifold Air Temperature Sensor Wiring	1. With MAT sensor removed from engine, reconnect MAT sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the intake manifold air temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: MAT sensor is OK. Diagnose engine air intake cooling system. GO TO 10 NO: MAT sensor has already been replaced. GO TO 8 NO: Replace MAT sensor. GO TO 12 -- -1/1
8 Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the MAT sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 105.03 become active?	YES: Wire harness is OK. Problem not fixed. Recheck air intake system. GO TO 11 NO: GO TO 9 -- -1/1
9 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000105.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000105.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 12 NO: Replace ECU. GO TO 12 -- -1/1
10 Check for Engine Related Causes	Check the following items that can cause high intake manifold air temperature: • Test for leaks. See TEST FOR INTAKE AIR LEAKS in base engine manual, Section 04, Group 150. • Malfunctioning turbocharger compressor. See TURBOCHARGER INSPECTION in base engine manual, Section 02, Group 080. Was cause of high intake manifold air temperature determined?	YES: Repair problem. GO TO 12 NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000105.16 still active?	YES: Problem not fixed. Verify air intake system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 12 -- -1/1
12 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000105.16 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and air intake system. GO TO 1 NO: Problem fixed. -- -1/1
13 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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**000107.00 — Air Filter Pressure Differential
Extremely High**

*For troubleshooting procedures please see the application
troubleshooting manual.*

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000107.31 — Air Filter Restriction Switch Activated

The ECU detects restriction in the air filter.

*NOTE: For additional information refer to the application
troubleshooting manual.*

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000107.31 — Air Filter Restriction Diagnostic Procedure

Troubleshooting Sequence:

000107.31

When DTC is Displayed:

When ever the engine is on and the error is active.

Related Information:

OEM applications can be programmed with trim options. The customer has the option to have an air filter restriction detection switch. When this feature is programmed into the ECU, the ECU will derate the engine when the switch is activated.

The air filter restriction switch is located on the clean side of the air filter. The switch is activated when the air is restricted through the air filter.

Alarm Level:

Warning

Control Unit Response:

If the code is set, the ECU will derate the engine by 50% full power.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on engine derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000107.31 reappear active?	YES: GO TO 2 NO: GO TO 16 -- -1/1
❷ Check Air Filter	Check air filter and dust valve. Check for any restrictions in inlet tube and filter system. See AIR CLEANER OPERATION in base engine manual, Section 03, Group 120. Was the air filter dirty or were any restrictions found?	YES: Fix problem. GO TO 15 NO: GO TO 3 -- -1/1
❸ Check for Intake Restrictions	Inspect air intake system on suction side of turbo for any source of blockage. See CHECK AIR INTAKE SYSTEM in base engine manual, Section 04, Group 150. Were any problems found?	YES: Fix problem. GO TO 15 NO: GO TO 4 -- -1/1
❹ Terminal Test	1. Ignition OFF, Engine OFF. 2. Remove wires or connector from air filter restriction switch. 3. Perform TERMINAL TEST on connector and air filter restriction switch. 4. Inspect surrounding area for pinched or melted wires. Were any problems found with the wiring or connectors?	YES: Fix problem. GO TO 15 NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check Switch Operation	1. Ignition OFF, Engine OFF. 2. Test air filter restriction switch for proper operation. See TEST AIR FILTER RESTRICTION INDICATOR SWITCH in base engine manual, Section 04, Group 150. 3. Measure the resistance across the air filter restriction switch terminals as the switch opens and closes in step 2 (Or manually open and close switch contacts). Does the switch operate properly and the resistance change as the contacts open and close?	YES: Switch operates properly. GO TO 6 NO: Replace switch. GO TO 15 ---1/1
6 Check Harness	Step 1. 1. Ignition ON, Engine ON. 2. Refresh codes from within Service ADVISOR. 3. Record if 000107.31 is active. 4. GO TO step 2. Step 2. 1. Ignition OFF, Engine OFF. 2. On the harness, connect the two wires from the air filter restriction switch together. 3. Ignition ON, Engine OFF. 4. Refresh codes from within Service ADVISOR. Did 000107.31 change state from step 1?	YES: Problem with air filter restriction switch or air filter system. GO TO 2 NO: Problem in harness. GO TO 7 ---1/1
7 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the two wires to the air filter restriction switch from each other. 3. Disconnect C08 auxiliary connector in harness. 4. Perform TERMINAL TEST on both C08 connectors. 5. Inspect harness for pinched or melted wires near both C08 connectors. Are there any problems with the wiring or connectors	YES: Fix problem. GO TO 15 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Check Auxiliary Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal N to each individual wire of the air filter restriction switch. 3. On auxiliary harness connector C08, measure resistance from terminal Q to each individual wire of the air filter restriction switch. Does each terminal, N and Q measure less than 5 ohms to one of the wires?	YES: GO TO 9 NO: Fix open wire in auxiliary harness. GO TO 15 ---1/1
9 Check Auxiliary Harness for Shorted Wire	<i>NOTE: Make sure the wires to the air filter restriction switch are disconnected from the switch and not touching each other.</i> 1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal N to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in auxiliary harness. GO TO 15 NO: Problem in main harness. GO TO 8 ---1/1
10 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on ECU harness connector J2. 4. Inspect harness for pinched or melted wires near J2 ECU connector. Are there any problems with the wiring or connector?	YES: Fix problem. GO TO 15 NO: GO TO 11 ---1/1
11 Check ECU Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness, measure resistance from connector C08, terminal N to ECU connector J2, terminal D3. 3. On ECU harness, measure resistance from connector C08, terminal Q to ECU connector J2, terminal G3. Was either measurements greater than 5 ohms?	YES: GO TO 12 NO: Fix open wire in harness cable. GO TO 15 ---1/1

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Trouble Code Diagnostics and Tests

12 Check ECU Harness for Shorted Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness connector C08, measure resistance from terminal N to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in ECU harness. GO TO 15 NO: ECU has not been reprogrammed. GO TO 13 NO: ECU has been reprogrammed. GO TO 14 -- -1/1
13 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS earlier in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000107.31 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 15 -- -1/1
14 Check ECU	<i>NOTE: For ECU connector pinouts, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 earlier in this manual.</i> On ECU, measure resistance from terminal J2-D3 to terminal J2-G3. Is the measurement between 700 ohms and 2000 ohms?	YES: Problem not found. GO TO 1 Confirm findings looking closely at connectors, wiring, and terminal numbers used for measurements. NO: Replace ECU. GO TO 15 -- -1/1

Trouble Code Diagnostics and Tests

15 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all wiring, connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load ranges if possible. Did DTC 000107.31 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
16 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active? 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000108.02 — Barometric Pressure Signal Invalid

The ECU receives an invalid pressure from the barometric air pressure sensor.

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000108.02 — Barometric Pressure Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:

000108.02

Related Information:

The barometric air pressure sensor is an internal ECU sensor and cannot be repaired.

Alarm Level:

Warning

Control Unit Response:

If this code sets, the ECU uses intake manifold air pressure for the barometric pressure value. If the intake manifold air pressure is invalid, a default value of 101 kPA (14.6PSI) is used as barometric air pressure to run the engine.

Additional References:

For further barometric air pressure sensor information, see BAROMETRIC AIR PRESSURE (BAP) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAMS
- see 4.5L 24V ECU WIRING DIAGRAMS
- see 6.8L 12V ECU WIRING DIAGRAMS
- see 6.8L 24V ECU WIRING DIAGRAMS

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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-- 1/1

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTC list. Is 000108.02 error code active?	YES: GO TO 2 NO: GO TO 4 -- -1/1
❷ Preliminary Check	Inspect the air vent located on the side of the ECU. Clear any debris blocking the passage. Is vent free of debris?	YES: GO TO 3 NO: Clear debris from air vent. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❸ Reprogram ECU	Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. Is 000110.00 still active?	YES: Problem not fixed. Replace ECU. NO: Verify problem is fixed. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1

4 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: If no other active or stored codes exists, clear codes. Return to service and monitor further. --1/1

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000110.00 — Engine Coolant Temperature Signal Extremely High

The ECU senses a coolant temperature above the 3rd threshold specification.

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,250

000110.00 — Engine Coolant Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

000110.00

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU, the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

NOTE: For information on temperature values that trigger this fault, see OEM ENGINES - DERATE SPECIFICATIONS in Section 210, later in this manual.

The engine has to be running for 3 minutes before the code is set.
001569.31 is set when this code is active and engine has not shut down.
001109.31 is set 30 seconds before the ECU shuts down the engine.
001110.31 is set if the shutdown feature is enabled.

Alarm Level:

STOP

Control Unit Response:

Maximum engine power is derated up to 60 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Ignition ON, Engine ON.

4. Let engine idle for 3 minutes before proceeding.

5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

6. Refresh Codes.

Did 000110.00 reappear active?

YES: GO TO 2

NO: GO TO 11

-- -1/1

② Preliminary Check of Cooling System

Visually inspect cooling system components.

- Remove any blockage on or near radiator.
- Inspect radiator hoses for signs of leakage or cracks.
- Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070.
- Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070.
- Inspect radiator cap for failure.
- Check radiator coolant is filled to proper level.
- Inspect cooling fan shroud for damage.
- Excessively high ambient air temperature.

Were any problems found?

YES: Fix problem(s). GO TO 10

NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connectors. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 10 NO: GO TO 4 -- -1/1
④ Check Coolant Temperature Sensor	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 5 -- -1/1
⑤ Check Coolant Temperature Sensor Operation	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO 8 NO: Coolant temperature sensor has already been replaced. GO TO 6 NO: Replace coolant temperature sensor. GO TO 10 -- -1/1
⑥ Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	YES: Wire harness is OK. GO TO 8 NO: GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

7 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: Replace ECU. GO TO 10 -- -1/1
8 Check for Engine Related Causes	Check the following items that can cause high coolant temperature: • Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Inspect cooling system components. See 4.5L/6.8L - C1 - ENGINE COOLANT TEMPERATURE ABOVE NORMAL in base engine manual, Section 04, Group 150. Was cause of high coolant temperature determined?	YES: Repair problem. GO TO 10 NO: GO TO 9 -- -1/1
9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000110.00 still active?	YES: Problem not fixed. Verify cooling system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000110.00 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000110.03 — Engine Coolant Temperature Signal Out of Range High

The engine coolant temperature input voltage exceeds the sensor's high voltage specification.

RG41221,0000221 -19-04FEB08-1/1

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000110.03 — Engine Coolant Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

000110.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The engine coolant temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for engine coolant temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default engine coolant temperature of 90° C (194° F).
The ECU will try to maintain the engine operating envelope.

Additional References:

For more engine coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JDG10466
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

Flex probe information:

- ECU small terminal - Orange/Blue
- ECU large terminal - Orange/Green
- Coolant temperature sensor T04 - Purple/Gray

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**① Read DTCs and Store
Snapshot Information**

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000110.03 reappear active?

YES: GO TO 2

NO: GO TO 13

– – –1/1

② Terminal Test

1. Ignition OFF, engine OFF.
2. Perform TERMINAL TEST on coolant temperature sensor connector T04 and coolant temperature sensor.

Were any problems found?

YES: Repair problem.
Run HARNES
DIAGNOSTIC MODE
TEST in Service
ADVISOR.

NO: GO TO 3

– – –1/1

Trouble Code Diagnostics and Tests

③ Check Coolant Temperature Return Circuit Resistance	On the harness, measure the resistance between coolant temperature sensor connector T04-B and single point ground. Is the resistance less than 10 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
④ Check For Coolant Temperature Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between coolant temperature sensor connector T04-A (+) and T04-B (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1
⑤ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D3 and J03-H3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
⑥ Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-D3 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 -- -1/1
⑦ Check for DTC Change with Coolant Temperature Sensor Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on coolant temperature sensor connector terminals T04-A and T04-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 000110.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

8 Check for DTC 000110.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T04. 3. Reconnect T04 to coolant temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000110.03 now an active DTC?	YES: Replace coolant temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D3 and J03-H3. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check Coolant Temperature Sensor Circuit Continuity	1. Disconnect coolant temperature sensor connector T04. 2. On the harness, measure the resistance between ECU J03-D3 and coolant temperature sensor connector T04-A. 3. On the harness, measure the resistance between ECU J03-H3 and coolant temperature sensor connector T04-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the Engine Coolant Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the coolant temperature sensor and ECU J03 connector. <i>NOTE: The engine coolant temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1

Trouble Code Diagnostics and Tests

12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in coolant temperature sensor connector T04. 3. Replace coolant temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000110.03 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor the Engine Coolant Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the coolant temperature sensor and ECU J03 connector. <i>NOTE: The engine coolant temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000110.03 now active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect coolant temperature sensor connector T04. 3. Perform TERMINAL TEST on T04. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on terminals J03-D3 and J03-H3. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000110.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1

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Trouble Code Diagnostics and Tests

17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000110.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 -- -1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000110.04 — Engine Coolant Temperature Signal Out of Range Low

The engine coolant temperature input voltage drops below the sensor's low voltage specification.

RG41221,0000222 -19-04FEB08-1/1

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000110.04 — Engine Coolant Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000110.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The engine coolant temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for engine coolant temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default engine coolant temperature of 90° C (194° F).

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further engine coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000110.04 reappear active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
❷ Monitor Code Test	1. Ignition OFF, Engine OFF. 2. Disconnect the engine coolant temperature sensor connector. 3. Ignition ON, Engine OFF 4. Refresh codes. Did 000110.03 become active and 000110.04 move to stored?	YES: GO TO 3 NO: GO TO 5 -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on engine coolant temperature sensor harness connector. 3. Inspect harness for melted or pinched areas near the engine coolant temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1

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Trouble Code Diagnostics and Tests

④ Sensor Short Internally or to Ground Test	Measure the resistance from each terminal on the sensor to chassis ground. Specification Check for short to ground—Resistance..... Greater than 1k ohm Measure the resistance between the two sensor terminals. Specification Check for internal short—Resistance Greater than 50 ohms Is either measurement out of specification?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. -- -1/1
⑤ Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the engine coolant temperature sensor harness connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
⑥ Harness Resistance Check	Measure the resistance between the return (terminal B) and signal (terminal A) in the engine coolant temperature sensor harness connector. Was the resistance less than 100 ohms?	YES: GO TO 7 NO: Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. -- -1/1
⑦ Harness Resistance Check ECU Disconnected	1. Disconnect ECU connector J3. 2. Measure the resistance between the return (terminal B) and signal (terminal A) in the engine coolant temperature sensor harness connector. Was the resistance less than 100 ohms?	YES: GO TO 8 NO: GO TO 9. -- -1/1

Trouble Code Diagnostics and Tests

8 Harness Physical Check	Terminal A has low resistance to ground, check for: • Melted harness and wiring • Pinched harness and wiring. Was the problem found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem not found, reconnect all connectors. GO TO 5 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made.
9 ECU Resistance Check	Measure the resistance between the return (terminal J3-H3) and signal (terminal J3-D3) in the ECU connector. Was the resistance less than 100 ohms?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made.
10 Occurrence Count Check	Review stored information and look at occurrence count for 000110.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 11 NO: GO TO 12
11 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the engine coolant temperature sensor harness connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12

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Trouble Code Diagnostics and Tests

12 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 13 NO: GO TO 15 -- -1/1
13 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000110.04 reappear when engine operating point was reached?	YES: GO TO 14 NO: GO TO 12 and confirm operating point. -- -1/1
14 Sensor Temperature Test	1. Ignition OFF, Engine OFF 2. Check temperature of the engine coolant temperature sensor and surrounding area. Is everything hot?	YES: Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 15 -- -1/1
15 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the engine coolant temperature sensor harness connector and ECU J3 connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 16 -- -1/1

Trouble Code Diagnostics and Tests

16 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 4. Refresh codes. Is 000110.04 active?	YES: GO TO 17. NO: GO TO 15. ---1/1
17 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000110.04 active?	YES: Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Problem fixed, bad ECU program. ---1/1

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000110.15 — Engine Coolant Temperature Signal Slightly High

The ECU senses a engine coolant temperature above specification.

RG41221,0000223 -19-04OCT07-1/1

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000110.15 — Engine Coolant Temperature Signal Slightly High Diagnostic Procedure

Troubleshooting Sequence:

000110.15

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an engine coolant temperature of 110° C (230° F) on OEM engines.

The engine has to be running for 3 minutes before the code is set.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Ignition ON, Engine ON. 4. Let engine idle for 3 minutes before proceeding. 5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 6. Refresh Codes. Did 000110.15 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Preliminary Check of Cooling System	Visually inspect cooling system components. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 10 NO: GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connectors. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 10 NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Check Coolant Temperature Sensor	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 5 ---1/1
5 Check Coolant Temperature Sensor Operation	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO 8 NO: Coolant temperature sensor has already been replaced. GO TO 6 NO: Replace coolant temperature sensor. GO TO 10 ---1/1
6 Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	YES: Wire harness is OK. GO TO 8 NO: GO TO 7 ---1/1
7 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: Replace ECU. GO TO 10 ---1/1

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Trouble Code Diagnostics and Tests

8 Check for Engine Related Causes	Check the following items that can cause high coolant temperature: - Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. - Inspect cooling system components. See 4.5L/6.8L - C1 - ENGINE COOLANT TEMPERATURE ABOVE NORMAL in base engine manual, Section 04, Group 150. Was cause of high coolant temperature determined?	YES: Repair problem. GO TO 10 NO: GO TO 9 -- -1/1
9 Reprogram ECU	- Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. - Reconnect all connectors and sensors. - Monitor DTCs in Service ADVISOR. - Let engine run for 3 minutes and refresh codes. Is 000110.15 still active?	YES: Problem not fixed. Verify cooling system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1
10 Verification	- Ignition OFF, Engine OFF. - Reconnect all connectors, hoses, sensors, etc. - Ignition ON, Engine ON. - Monitor DTCs in Service ADVISOR. - Let engine run for 3 minutes. - Refresh DTCs. - Operate engine through normal speed and load. Did DTC 000110.15 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. --1/1

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000110.16 — Engine Coolant Temperature Signal Moderately High

The ECU senses a engine coolant temperature above the 2nd threshold specification.

RG41221,0000224 -19-04OCT07-1/1

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000110.16 — Engine Coolant Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

00110.16

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active

Related Information:

NOTE: For information on temperature values that trigger this fault, see OEM ENGINES - DERATE SPECIFICATIONS in Section 210, later in this manual.

The engine has to be running for 3 minutes before the code is set.
001569.31 is set when this code is active.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Ignition ON, Engine ON.

4. Let engine idle for 3 minutes before proceeding.

5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

6. Refresh Codes.

Did 000110.16 reappear active?

YES: GO TO 2

NO: GO TO 11

-- -1/1

② Preliminary Check of Cooling System

Visually inspect cooling system components.

- Remove any blockage on or near radiator.
- Inspect radiator hoses for signs of leakage or cracks.
- Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070.
- Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070.
- Inspect radiator cap for failure.
- Check radiator coolant is filled to proper level.
- Inspect cooling fan shroud for damage.
- Excessively high ambient air temperature.

Were any problems found?

YES: Fix problem(s). GO TO 10

NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connectors. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 10 NO: GO TO 4 -- -1/1
④ Check Coolant Temperature Sensor	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 5 -- -1/1
⑤ Check Coolant Temperature Sensor Operation	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Coolant temperature sensor is OK. Diagnose engine cooling system. GO TO 8 NO: Coolant temperature sensor has already been replaced. GO TO 6 NO: Replace coolant temperature sensor. GO TO 10 -- -1/1
⑥ Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the coolant temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 110.03 become active?	YES: Wire harness is OK. GO TO 8 NO: GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

7 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: Replace ECU. GO TO 10 -- -1/1
8 Check for Engine Related Causes	Check the following items that can cause high coolant temperature: • Inspect cooling system. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Inspect cooling system components. See 4.5L/6.8L - C1 - ENGINE COOLANT TEMPERATURE ABOVE NORMAL in base engine manual, Section 04, Group 150. Was cause of high coolant temperature determined?	YES: Repair problem. GO TO 10 NO: GO TO 9 -- -1/1
9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000110.16 still active?	YES: Problem not fixed. Verify cooling system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000110.16 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000110.17 — Engine Coolant Temperature Signal Slightly Low

The ECU senses a engine coolant temperature is not rising to normal operating temperatures.

RG41221,00002C4 -19-03OCT07-1/1

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000110.17 — Engine Coolant Temperature Signal Slightly Low Diagnostic Procedure

Troubleshooting Sequence:

00110.17

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses the engine coolant temperature is lower than expected.

NOTE: Running an engine with low coolant temperatures will eventually cause the EGR valve to stick. After 000110.17 has been resolved, verify proper EGR operation. Run Service ADVISOR and verify EGR desired position matches EGR actual position.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further coolant temperature sensor information, see ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 03, Group 140 earlier in this manual

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Ignition ON, Engine ON.

4. Let engine idle for 3 minutes before proceeding.

5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

6. Refresh Codes.

Did 000110.17 reappear active?

YES: GO TO 2

NO: GO TO 11

-- -1/1

② Check Thermostats

Test thermostats for proper function. See INSPECT THERMOSTAT AND TEST OPENING TEMPERATURE in base engine manual, Section 04, Group 150.

Are all thermostats functioning properly?

YES: GO TO 3

NO: Replace thermostats. GO TO 10

-- -1/1

③ Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect the coolant temperature sensor connector.

3. Perform TERMINAL TEST on the harness and sensor connectors. Check for corrosion on connector and sensor terminals.

4. Inspect surrounding area for pinched or melted wires.

Are there any problems with the wiring or connectors?

YES: Repair problem. GO TO 10

NO: GO TO 4

-- -1/1

Trouble Code Diagnostics and Tests

4 Check Coolant Temperature Sensor	1. Remove coolant temperature sensor. See REMOVE AND INSTALL ENGINE COOLANT TEMPERATURE (ECT) SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 5 ---1/1
5 Check Coolant Temperature Sensor Operation	1. With coolant sensor removed from engine, reconnect coolant temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the engine coolant temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Coolant temperature sensor and harness OK. Problem not found. GO TO 1 NO: Coolant temperature sensor has already been replaced. GO TO 6 NO: Replace coolant temperature sensor. GO TO 10 ---1/1
6 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Perform TERMINAL TEST on both J3 connectors. Check for corrosion and loose fit on connector terminals. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 10 NO: GO TO 7 ---1/1
7 Check Harness	1. On harness, measure the resistance between ECU harness connector J3, terminal D3 to engine coolant sensor connector terminal A. 2. On harness, measure the resistance between ECU harness connector J3, terminal H3 to engine coolant sensor connector terminal B. Were both measurements less than 5 ohms?	YES: GO TO 8 NO: Look for high resistance connection in harness. Fix problem. GO TO 10 ---1/1

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Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000110.17 still active?	YES: GO TO 9 NO: Verify problem is fixed. GO TO 10 -- -1/1
9 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000110.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000110.03 become active?	YES: ECU OK. Problem not found. Recheck thermostat, wires and connections. GO TO 1 NO: Replace ECU. GO TO 10 -- -1/1
10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. 8. Run Service ADVISOR and verify EGR desired position matches EGR actual position. Did DTC 000110.17 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. --1/1

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000111.01 — Engine Coolant Level Extremely Low

The ECU detects low engine coolant level.

RG41221,0000225 –19–20DEC07–1/1

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000111.01 — Engine Coolant Level Low Diagnostic Procedure

Troubleshooting Sequence:

000111.01

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

OEM applications can be programmed with trim options. The customer has the option to have an engine coolant level low detection switch. When this feature is programmed into the ECU, the ECU will derate the engine when the switch is activated.

When the coolant level drops below a certain level, the switch will change states and the DTC is set.

Alarm Level:

Warning

Control Unit Response:

The ECU will derate the engine by 50% of full power.

Additional References:

For theory of operation, see ENGINE COOLANT LEVEL SWITCH in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on engine derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
 - see 4.5L 24V ECU WIRING DIAGRAM 5
 - see 6.8L 12V ECU WIRING DIAGRAM 5
 - see 6.8L 24V ECU WIRING DIAGRAM 5
- located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000111.01 reappear active?

YES: GO TO 2

NO: GO TO 16

– – –1/1

② Coolant Level Check



CAUTION: Release of fluids from pressurized cooling system can cause serious burns. Before removing radiator cap, shut off engine and let cool. Use dry towel over radiator cap and slowly loosen cap to first stop to relieve pressure before removing completely.

1. Ignition OFF, Engine OFF.
2. Remove radiator cap and check cooling system for proper level.

Is coolant at proper level?

YES: GO TO 4

NO: Coolant level is low. GO TO 3

– – –1/1

Trouble Code Diagnostics and Tests

③ Check Cooling System	Visually inspect cooling system. • Inspect hoses for leaks and cracks. • Inspect radiator for cracks or leakage. • Inspect radiator cap. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Other engine related items causing loss of coolant temperature. See 4.5L-6.8L - C1 ENGINE COOLANT TEMPERATURE ABOVE NORMAL in base engine manual, Section 04, Group 150. Were any problems found?	YES: Repair problem with cooling system. GO TO 15 NO: GO TO 4 -- -1/1
④ Terminal Test	1. Ignition OFF, Engine OFF. 2. Remove wires or connector from engine coolant level switch. 3. Perform TERMINAL TEST on connector and engine coolant level switch. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 15 NO: GO TO 5 -- -1/1
⑤ Check Coolant Switch	1. Ignition OFF, Engine OFF. 2. Verify the linkage moves freely to activate/deactivate the switch. 3. Verify the switch is mounted properly and not stuck in one position. 4. Measure the resistance across the engine coolant level switch terminals as the switch opens and closes in step 2. Does the switch operate properly and the resistance change as the contacts open and close?	YES: Switch operates properly. GO TO 6 NO: Fix linkage or physical obstruction to switch. GO TO 15 NO: Switch does not change state. Replace switch. GO TO 15 -- -1/1

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Trouble Code Diagnostics and Tests

⑥ Check Harness	Step 1. 1. Ignition ON, Engine OFF. 2. Refresh codes from within Service ADVISOR. 3. Record if 000111.01 is active. 4. GO TO step 2. Step 2. 1. Ignition OFF, Engine OFF. 2. On the harness, connect the two wires from the engine coolant level switch together. 3. Ignition ON, Engine OFF. 4. Refresh codes from within Service ADVISOR. Did 000111.01 change state from step 1?	YES: Problem with engine coolant level switch or linkage. GO TO 2 NO: Problem in harness. GO TO 7 -- -1/1
⑦ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the two wires to the engine coolant levelswitch from each other. 3. Disconnect C08 auxiliary connector in harness. 4. Perform TERMINAL TEST on C08 connectors. 5. Inspect harness for pinched or melted wires near both C08 connectors. Are there any problems with the wiring or connectors	YES: Fix problem. GO TO 15 NO: GO TO 8 -- -1/1
⑧ Check Auxiliary Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal M to each individual wire of the engine coolant level switch. 3. On auxiliary harness connector C08, measure resistance from terminal Q to each individual wire of the engine coolant level switch. Does each terminal M and Q measure less than 5 ohms to one of the wires?	YES: GO TO 9 NO: Fix open wire in auxiliary harness. GO TO 15 -- -1/1

Trouble Code Diagnostics and Tests

9 Check Auxiliary Harness for Shorted Wire	<i>NOTE: Make sure the wires to the engine coolant level switch are disconnected from the switch and not touching each other.</i> 1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal M to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in auxiliary harness. GO TO 15 NO: Problem in main harness. GO TO 10 ---1/1
10 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on ECU harness connector J2. 4. Inspect harness for pinched or melted wires near J2 ECU connector. Are there any problems with the wiring or connector.	YES: Fix problem. GO TO 15 NO: GO TO 11 ---1/1
11 Check ECU Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness, measure resistance from connector C08, terminal M to ECU connector J2, terminal G4. 3. On ECU harness, measure resistance from connector C08, terminal Q to ECU connector J2, terminal G3. Was either measurements greater than 5 ohms?	YES: Fix open wire in ECU harness. GO TO 15 NO: GO TO 12 ---1/1
12 Check ECU Harness for Shorted Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness connector C08, measure resistance from terminal M to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in ECU harness. GO TO 15 NO: ECU has not been reprogrammed. GO TO 13 NO: ECU has been reprogrammed. GO TO 14 ---1/1

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Trouble Code Diagnostics and Tests

13 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000111.01 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 15 -- -1/1
14 Check ECU	<i>NOTE: For ECU connector pinouts, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 earlier in this manual.</i> On ECU, measure resistance from terminal J2-G4 to terminal J2-G3. Is the measurement between 700 ohms and 2000 ohms?	YES: Problem not found. GO TO 1 Confirm findings looking closely at connectors, wiring, and terminal numbers used for measurements. NO: Replace ECU. GO TO 15 -- -1/1
15 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all wires, connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load ranges if possible. Did DTC 000111.01 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

16 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active? 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. --1/1

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000157.03 — Fuel Rail Pressure Signal Out of Range High

The rail pressure input voltage exceeds the sensor's high voltage specification.

RG41221,0000226 –19–04OCT07–1/1

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000157.03 — Fuel Rail Pressure Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003509.03

000157.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The fuel rail pressure input voltage corresponds to a pressure that is higher than what is physically possible for fuel rail pressure.

Alarm Level:

STOP

Control Unit Response:

The ECU will derate the engine until it is running at 50% of full power.

The ECU will command the high pressure fuel pump to a default pressure of 200 MPa (29,000 psi).

Additional References:

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
 - see 4.5L 24V ECU WIRING DIAGRAM 2
 - see 6.8L 12V ECU WIRING DIAGRAM 2
 - see 6.8L 24V ECU WIRING DIAGRAM 2
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh Codes.

Did 000157.03 reappear active?

YES: GO TO 2

NO: GO TO 23

-- -1/1

② Terminal Test

1. Ignition OFF, Engine OFF

2. Perform TERMINAL TEST on fuel rail pressure sensor connector.

Were any problems found?

YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1

NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Measure and Record Sensor Resistances	1. Ignition OFF, Engine OFF 2. Measure the following resistances on the sensor to verify they are within range. 3. Between signal (terminal 1) and ground (terminal 2) on the sensor (should be between 8k ohms and 17k ohms). 4. Between signal (terminal 1) and power (terminal 3) on the sensor (should be between 1k ohm and 3k ohms). 5. Between ground (terminal 2) and power (terminal 3) on the sensor (should be between 10k ohms and 15k ohms) Are all resistances within range?	YES: GO TO 4 NO: Remove and replace sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor, and GO TO 1 -- -1/1
④ Fuel Rail Pressure Input To Ground Test	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor harness connector. Is the resistance between 250k and 270k ohms?	YES: GO TO 5 NO: GO TO 8 -- -1/1
⑤ Fuel Rail Pressure Input To Supply Test	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and power (terminal 3) on the sensor harness connector. Is the resistance between 140k and 160k ohms?	YES: GO TO 6 NO: GO TO 12 -- -1/1
⑥ Fuel Rail Pressure Ground To Supply Test	1. Ignition OFF, Engine OFF 2. Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor harness connector. Is the resistance between 90k and 120k ohms?	YES: GO TO 7 NO: GO TO 16 -- -1/1
⑦ Fuel Rail Pressure Ground To Supply Voltage Test	1. Ignition ON, Engine OFF 2. Measure the voltage between ground (terminal 2) and input signal (terminal 3) on the sensor harness connector. Is the voltage below 5.5 volt	YES: Problem not found, reconnect all connectors. GO TO 1 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. NO: GO TO 20 -- -1/1

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Trouble Code Diagnostics and Tests

8 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J3), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 9 -- -1/1
9 Fuel Rail Pressure Ground Wire Test	1. Disconnect ECU connector J3 2. Measure the resistance between ECU J3-G2 and sensor connector ground (terminal 2). Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 10 -- -1/1
10 Fuel Rail Input Wire Test	Measure the resistance between J3-C1 and sensor connector signal (terminal 1). Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 11 -- -1/1
11 ECU Input To Ground Test	Measure the resistance between ECU J3- G2 to J3-C1 Is the resistance between 250k to 270k ohms?	YES: Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: Remove and Replace ECU -- -1/1

Trouble Code Diagnostics and Tests

12 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J3), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 13 ---1/1
13 Fuel Rail Pressure Power Wire Test	1. Disconnect ECU connector J3 2. Measure the resistance between J3-G1 and sensor connector power (terminal 3). Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 14 ---1/1
14 Fuel Rail Input Wire Test	Measure the resistance between J3-C1 and sensor connector signal (terminal 1) on the sensor harness connector. Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 15 ---1/1
15 ECU Input To Supply Test	Measure the resistance between ECU J3- C1 to J3-G1 Is the resistance between 140k to 160k ohms?	YES: Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: Remove and replace ECU ---1/1

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Trouble Code Diagnostics and Tests

16 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J3), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 17 ---1/1
17 Fuel Rail Pressure Power Wire Test	1. Disconnect ECU connector J3 2. Measure the resistance between J3-G1 and sensor connector power (terminal 3). Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 18 ---1/1
18 Fuel Rail Ground Wire Test	Measure the resistance between J3-G2 and sensor connector ground (terminal 2). Is the resistance greater than 5 ohms	YES: Repair open wire, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 19 ---1/1
19 ECU Ground To Supply Test	Measure the resistance between ECU J3- G1 to J3-G2 Is the resistance between 90k to 120k ohms?	YES: Reconnect connectors, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: Remove and replace ECU ---1/1

Trouble Code Diagnostics and Tests

20 ECU and ECU Connector Terminal Test	Perform a terminal test on ECU connectors (J3), and ECU terminals. Are there any problems with the connector terminals or ECU terminals?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 21 ---1/1
21 Fuel Rail Pressure Input Shorted To High Voltage	1. Ignition OFF Engine OFF 2. Disconnect all ECU connectors. 3. Measure the resistance between J3-C1 and all other terminals in the other ECU connectors. Were any readings less than 5 ohms?	YES: Repair short in wiring and GO TO 1 NO: GO TO 22 ---1/1
22 Wiring Harness Check	Look for pinched or melted wiring Was a wiring problem found?	YES: Repair wiring, and GO TO 1 NO: Remove and replace ECU ---1/1
23 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	YES: GO TO 24 NO: GO TO 25 ---1/1
24 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 25 ---1/1

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Trouble Code Diagnostics and Tests

25 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. If a certain operating point exists when error occurs then GO TO 26 NO: GO TO 28 -- -1/1
26 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.03 reappear when engine operating point was reached?	YES: GO TO 27 NO: GO TO 25 and confirm operating point. -- -1/1
27 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J3. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: Remove and replace Sensor -- -1/1
28 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J3. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: GO TO 29 -- -1/1

Trouble Code Diagnostics and Tests

29 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service Advisor. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. Is 000157.03 active?	YES: Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor and GO TO 1 NO: Problem fixed, bad ECU program. --1/1
30 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: Contact dealer or DTAC. --1/1

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000157.04 — Fuel Rail Pressure Signal Out of Range Low

The rail pressure input voltage drops below the sensor's low voltage specification.

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000157.04 — Fuel Rail Pressure Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003509.04

000157.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The fuel rail pressure input voltage corresponds to a pressure that is lower than what is physically possible for fuel rail pressure.

Alarm Level:

STOP

Control Unit Response:

The ECU will derate the engine until it is running at 50% of full power.

The ECU will command the high pressure fuel pump to a default pressure of 200 MPa (29,000 psi).

Additional References:

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

For more rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Refresh Codes.

Did 000157.04 reappear active?

YES: GO TO 2

NO: GO TO 13

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② Supply Voltage Test

1. Ignition ON, Engine OFF
2. Monitor Power Supply #1 Voltage using Service ADVISOR

Is the voltage above 4.5 volts?

YES: GO TO 3

NO: GO TO 9

– – –1/1

③ Terminal Test

1. Ignition OFF, Engine OFF
2. Perform TERMINAL TEST on fuel rail pressure sensor connector.

Were any problems found?

YES: Repair problem, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1

NO: GO TO 4

– – –1/1

Trouble Code Diagnostics and Tests

4 Measure and Record Sensor Resistances	1. Ignition OFF, Engine OFF 2. Measure the following resistances on the sensor to verify they are within range. 3. Between signal (terminal 1) and ground (terminal 2), (between 8k ohms and 17k ohms). 4. Between signal (terminal 1) and power (terminal 3), (between 1k ohms and 3k ohms). 5. Between ground (terminal 2) and power (terminal 3), (between 10k ohms and 15k ohms) Are all resistances within range?	YES: GO TO 5 NO: Remove and replace sensor, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR, and GO TO 1 -- -1/1
5 Fuel Rail Pressure Input to Ground Test	1. Ignition OFF, Engine OFF 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor harness connector. Is the resistance between 240k and 270k ohms?	YES: GO TO 6 NO: GO TO 8 -- -1/1
6 Fuel Rail Pressure Power to Ground Test	Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor harness connector. Is the resistance between 90k and 120k?	YES: Problem not found, reconnect all connectors. GO TO 1 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. NO: GO TO 7 -- -1/1
7 Fuel Rail Pressure Power to Ground Short Test	1. Disconnect ECU connector J3. 2. Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor connector. Is the resistance 5 ohms or less?	YES: Repair shorted wire, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1. NO: Check for pinched or melted wiring, repair, and reconnect all connectors and GO TO 1. -- -1/1

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Trouble Code Diagnostics and Tests

8 Fuel Rail Pressure Signal to Ground Short Test	1. Disconnect ECU connector J3. 2. Measure the resistance between signal (terminal 1) and ground (terminal 2) on the sensor connector. Is the resistance 5 ohms or less?	YES: Repair shorted wire, run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1 NO: Check for pinched or melted wiring, repair, and reconnect all connectors and GO TO 1. -- -1/1
9 Fuel Rail Pressure Sensor Open and Short Test	Measure the resistance between ground (terminal 2) and power (terminal 3) on the sensor connector. Is the resistance near 0 ohms (shorted)? Is the resistance near infinity (open)?	YES: If (shorted) GO TO 10 YES: If (open) GO TO 11 NO: Problem not found, reconnect all connectors. GO TO 1 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. -- -1/1
10 Wiring Harness Short Test	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. Measure the resistance between J3-G1 and all other terminals in the other ECU connectors Were any readings less than 5 ohms?	YES: Repair wiring (short) and GO TO 1 NO: Check for pinched or melted wiring and repair then GO TO 1 -- -1/1
11 Wiring Harness Power Wire Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Measure the resistance between J3-G1 and the power (terminal 3) in the Rail Pressure Sensor connector Was the reading less than 5 ohms?	YES: GO TO 12 NO: Repair wiring and GO TO 1. -- -1/1

Trouble Code Diagnostics and Tests

12 Wiring Harness Ground Wire Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Measure the resistance between J3-G2 and the ground (terminal 2) in the Rail Pressure Sensor connector. Was the reading less than 5 ohms?	YES: Problem not found, reconnect all connectors. GO TO 1 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. NO: Repair wiring and GO TO 1. -- -1/1
13 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	YES: GO TO 14 NO: GO TO 15 -- -1/1
14 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1 NO: GO TO 15 -- -1/1
15 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. If a certain operating point exists when error occurs then GO TO 16 NO: GO TO 18 -- -1/1
16 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.04 reappear when engine operating point was reached?	YES: GO TO 17 NO: GO TO 15 and confirm operating point. -- -1/1

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Trouble Code Diagnostics and Tests

17 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J3. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1 NO: Remove and replace Sensor -- -1/1
18 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J3. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1 NO: GO TO 19 -- -1/1
19 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000157.04 active?	YES: Replace Sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR and GO TO 1 NO: Problem fixed, bad ECU program. -- -1/1
20 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. GO TO 1. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and GO TO 1. NO: Contact dealer or DTAC. -- -1/1

000157.10 — Fuel Rail Pressure Rate of Change Abnormal

The ECU detects a sudden decrease in fuel pressure while the engine is not injecting fuel.

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000157.10 — Fuel Rail Pressure Rate of Change Abnormal Diagnostic Procedure

Troubleshooting Sequence:

000157.10

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a sudden decrease in fuel rail pressure while engine is not injecting fuel.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope. The engine may run normal when no load is applied.

Additional References:

For more fuel rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



CAUTION: Fuel in the high pressure common rail is under extremely high pressure. Do NOT start this procedure until the engine has been turned OFF for at least 5 minutes.

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh Codes.

Did 000157.10 reappear active?

YES: GO TO 2

NO: GO TO 7

-- -1/1

Trouble Code Diagnostics and Tests

② Fuel Lines/Fittings Leakage Test	1. Ignition ON, Engine ON. 2. Set engine speed and load to maximum point, if possible. 3. Inspect all fuel lines and fittings for leakage. Is there any fuel leakage present?	YES: Tighten loose fitting to proper specification or replace faulty fuel line, repeat this step. NO: GO TO 3 -- -1/1
③ Injector Fuel Leak-off Test	1. Ignition OFF, Engine OFF. 2. Let engine sit 5 minutes to relieve fuel pressure. 3. Disconnect the injector fuel return line from the fuel return line "T" connector. 4. Cap off the fuel return "T" where the injector fuel return line was removed. 5. Connect a flexible hose to the injector fuel return line. 6. Place the hose into a container suitable for fuel. 7. Ignition ON, Engine ON. 8. Set engine to low idle. Is fuel flow less than specification? • 4045 Engine - 216 mL (7.3 oz.) per minute? • 6068 Engine - 333 mL (11.3 oz.) per minute?	YES: Flow is within specifications. GO TO 5 NO: GO TO 4 -- -1/1
④ Faulty Electronic Injector Test	1. Ignition OFF, Engine OFF. 2. Reconnect all leak-off lines. 3. Ignition ON, Engine OFF. 4. Using the ECU diagnostic software, perform the Cylinder Cutout Test, Cylinder Misfire Test and the Cylinder Compression Test. For instructions, see ENGINE TEST INSTRUCTIONS - CYLINDER CUTOFF TEST, see ENGINE TEST INSTRUCTIONS - CYLINDER MISFIRE TEST and see ENGINE TEST INSTRUCTIONS - CYLINDER COMPRESSION TEST earlier in this Group. Do all tests lead to the same results?	YES: Repair faults. NO: Start a DTAC case. -- -1/1

Trouble Code Diagnostics and Tests

5 High Pressure Pump Fuel Leak-off Test	1. Ignition OFF, Engine OFF. 2. Let engine sit 5 minutes to relieve fuel pressure. 3. Reconnect injector fuel return line to "T" connector. 4. Disconnect the high pressure fuel pump over flow line from the "T" connector. 5. Connect a flexible hose to the high pressure fuel pump over flow valve fuel return line. 6. Cap off the fuel return "T" where the high pressure fuel pump overflow valve fuel return line was removed. 7. Place the hose into a container suitable for fuel. 8. Ignition ON, Engine ON. 9. Set engine to low idle. Is fuel flow less than 333 mL (11.3 oz.) per minute?	YES: Flow is within specifications. GO TO 6 NO: Replace high pressure fuel pump, repeat this step.
6 Pressure Limiter Fuel Leak-off Test	1. Ignition OFF, Engine OFF. 2. Let engine sit 5 minutes to relieve fuel pressure. 3. Reconnect high pressure fuel pump overflow valve fuel return line to "T" connector. 4. Disconnect fuel line from pressure limiter valve from the "T" connector. 5. Cap off the fuel return "T" where the pressure limiter fuel return line was removed. 6. Connect a flexible hose to the pressure limiter fuel return line. 7. Place the hose into a container suitable for fuel. 8. Ignition ON, Engine On. Is fuel flow present at the pressure limiter valve?	YES: Faulty fuel pressure limiter valve. Replace pressure limiter valve. See REMOVE AND INSTALL PRESSURE LIMITER in Section 2 Group 090 earlier in this manual. NO: GO TO 12
7 Occurrence Count Check	Review stored information and look at occurrence count Is occurrence recorded in step 1 greater than 5?	YES: GO TO 8 NO: GO TO 9
8 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. NO: GO TO 9

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Trouble Code Diagnostics and Tests

9 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. If a certain operating point exists when error occurs then GO TO 10 NO: GO TO 11 -- -1/1
10 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 157.10 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 9 and confirm operating point. -- -1/1
11 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on fuel rail pressure sensor connector and ECU connector J1. Were any problems found?	YES: Repair problem, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. NO: GO TO 12 -- -1/1
12 Software Updates	1. Download latest ECU software payload. 2. Ignition ON, Engine OFF. 3. Reprogram ECU using Service Advisor. 4. Ignition ON, Engine ON. 5. Warm up engine then set throttle to high idle. 6. Rapidly return to low idle. Is 000157.10 active?	YES: Replace rail pressure sensor, Run HARNESS DIAGNOSTIC MODE TEST in Service Advisor. NO: Problem fixed, bad ECU program. -- -1/1

000157.17 — Fuel Rail Pressure Not Developed

The ECU does not detect 10 MPa (1450 psi) of fuel rail pressure after cranking the engine for approximately 5 seconds.

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000157.17 — Fuel Rail Pressure Not Developed Diagnostic Procedure

Troubleshooting Sequence:

000157.10

When DTC is Displayed:

When ever the engine is cranking and the error is active.

Related Information:

The ECU does not detect 10 MPa (1450 psi) of fuel rail pressure after cranking the engine for approximately 5 seconds.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to try to start the engine.

Additional References:

For more fuel rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

For more pressure sensor information, see MEASURING PRESSURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

 **CAUTION:** Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

 **CAUTION:** Fuel in the high pressure common rail is under extremely high pressure. Do NOT start this procedure until the engine has been turned OFF for at least 5 minutes.

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 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. Has all snapshot information been stored?	YES: GO TO 2 NO: Store all snapshot information then GO TO 2 -- -1/1

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Trouble Code Diagnostics and Tests

② Bleed Fuel System	Bleed the fuel system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 earlier in this manual. Has fuel system been bled?	YES: GO TO 3 NO: Bleed the fuel system. See BLEED THE FUEL SYSTEM in Section 04, Group 150 earlier in this manual. -- -1/1
③ Low Pressure Fuel System Test	Check low pressure fuel system, see F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this manual. Did low pressure fuel system check good?	YES: GO TO 4 NO: Check low pressure fuel system, see F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this manual. -- -1/1
④ Engine Start Test	1. Ignition ON. 2. Try starting the engine. Does the engine start?	YES: GO TO 8 NO: GO TO 5 -- -1/1
⑤ High Pressure Fuel System Test	Check high pressure fuel system, see F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this manual. Did high pressure fuel system check good?	YES: GO TO 6 NO: Check high pressure fuel system, see F2 - HIGH PRESSURE FUEL SUPPLY SYSTEM TEST in Group 150 earlier in this manual. -- -1/1
⑥ Engine Start Test	1. Ignition ON. 2. Try starting the engine. Does the engine start?	YES: GO TO 8 NO: GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

7 Test For Air In Fuel	Check for air in fuel system, see TEST FOR AIR IN FUEL in Group 150 earlier in this manual. Did test for air in fuel test pass?	YES: GO TO 8 NO: Check for air in fuel system, see TEST FOR AIR IN FUEL in Group 150 earlier in this manual. -- -1/1
8 DTC Code Check	Refresh codes. Is 000157.17 active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Software Updates	1. Ignition ON, Engine OFF. 2. Download latest ECU software payload. 3. Program ECU using Service Advisor. 4. Ignition ON, Engine ON. 5. Refresh codes. Is 000157.17 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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000158.17 — ECU Power Down Error

The ECU is unable to complete proper power down procedures after detecting a key off condition.

RG41221,000022A -19-13SEP07-1/1

000158.17 — ECU Power Down Error Diagnostic Procedure

Troubleshooting Sequence: 000158.17

When DTC is Displayed:

DTC is active 164 seconds after ECU commands an internal electronic switch OFF.

Related Information:

The ECU contains an electronic switch which is commanded OFF several seconds after the ECU detects ignition as being OFF to reduce the amount of current drawn by the ECU.

This DTC is generated if the ECU commands the internal electronic switch OFF but the switch does not respond within 164 seconds.

This DTC is only active when ignition is OFF.

Alarm Level:

Warning

Control Unit Response:

The application battery may be discharged because the ECU will not power down.

Additional References:

For further ECU information, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 earlier in this manual.

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Trouble Code Diagnostics and Tests

❶ Reprogram ECU and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Download latest ECU payload and reprogram ECU. 5. Clear DTCs. 6. Disconnect Service ADVISOR. 7. Ignition OFF, engine OFF for 5 minutes. 8. Ignition ON, engine OFF. 9. Connect Service ADVISOR and check for stored or active DTCs Did 000158.17 reappear as an active or stored DTC?	YES: GO TO 2 NO: Problem fixed. -- --1/1
❷ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Clear DTCs. 4. Disconnect Service ADVISOR. 5. Ignition OFF, engine OFF for 5 minutes. 6. Ignition ON, engine OFF. 7. Connect Service ADVISOR and check for stored or active DTCs Did 000158.17 reappear as an active or stored DTC?	YES: Open DTAC case. NO: Problem fixed. -- --1/1

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000174.00 — Fuel Temperature Signal Extremely High

The ECU senses a fuel temperature above specification.

RG41221,000022B -19-22FEB08-1/1

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000174.00 — Fuel Temperature Signal Extremely High Diagnostic Procedure

Trouble Shooting Sequence:

000110.00

000105.00 or 000105.16

000174.00

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

NOTE: OEM engines are programmed using trimmable features. The customer had the option to choose an engine shutdown feature. If this feature was programmed into the ECU, the ECU will shut the engine down if this code sets. If the shutdown feature was not selected, a standard derate will be activated.

The ECU senses a fuel temperature of 100° C (212° F) on OEM engines.

The engine has to running for 3 minutes for the code to set. 001569.31 is set when this code is active and engine has not shut down.

001110.31 is set if the shutdown feature is enabled.

The engine has to be running for 3 minutes before the code is set.

001109.31 is set 30 seconds before the ECU shuts down the engine.

Alarm Level:

Stop

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For further fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 3

- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

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For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000174.00 reappear active?	YES: GO TO 2 NO: GO TO 8 ---1/1
② Fuel Level	Is the fuel level less than a quarter full?	YES: Add more fuel. GO TO 13 NO: GO TO 3 ---1/1

Trouble Code Diagnostics and Tests

③ Fuel Cooler Check	Perform this step if engine has a fuel cooler. If no fuel cooler exists, GO TO 4 1. Remove the fuel cooler. 2. Inspect the fuel cooler for damage or restrictions. 3. Check that the cooler fan is operational. Is the fuel cooler operational and free of damage or restrictions?	YES: GO TO 4 NO: Repair problem. GO TO 13 -- -1/1
④ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connectors. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 5 -- -1/1
⑤ Check Fuel Temperature Sensor	1. Remove fuel temperature sensor. See REMOVE AND INSTALL FUEL TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 13 NO: GO TO 6 -- -1/1
⑥ Check Fuel Temperature Sensor Operation	1. With fuel sensor removed from engine, reconnect fuel temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the fuel temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Fuel temperature sensor is OK. Diagnose engine fuel system. GO TO 9 NO: Fuel temperature sensor has already been replaced. GO TO 7 NO: Replace fuel temperature sensor. GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

7 Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 174.03 become active?	YES: Wire harness is OK. Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 NO: GO TO 8 -- -1/1
8 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000174.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 174.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 NO: Replace ECU. GO TO 13 -- -1/1
9 Restricted Fuel Leak-off Line Test	Check for restricted fuel leak-off line. See CHECK FOR RESTRICTED FUEL LEAK-OFF LINE in Section 04, Group 150 earlier in this manual. Is fuel restriction found?	YES: Determine cause of restriction. Fix problem. GO TO 13 NO: GO TO 10 -- -1/1
10 Fuel Supply Pressure Test	Determine the fuel supply pressure. See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Section 04, Group 150 earlier in this manual. Is the fuel pressure below specification?	YES: Determine cause of low supply pressure. See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Section 04, Group 150 earlier in this manual. Fix problem. GO TO 13 NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 Overflow Valve Test	1. Ignition OFF, Engine OFF. 2. Remove the fuel line from the high pressure fuel pump overflow valve. 3. Connect one end of a clear line to the high pressure fuel pump overflow valve and direct the other end to a suitable container for diesel fuel. 4. Ignition ON, Engine ON. Is fuel flow present from the overflow valve?	YES: GO TO 12 NO: Faulty high pressure fuel pump overflow valve. Fix problem. GO TO 13 -- -1/1
12 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000105.00 still active?	YES: Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1
13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000105.00 reappear as active with engine running?	YES: Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

14 Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: Contact dealer or DTAC.

-- -1/1

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000174.03 — Fuel Temperature Signal Out of Range High

The fuel temperature input voltage exceeds the sensor's high voltage specification.

RG41221.000022C -19-05FEB08-1/1

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000174.03 — Fuel Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

000174.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The fuel temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for fuel temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default fuel temperature of 40° C (104° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000174.03 reappear active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on fuel temperature sensor connector T05 and fuel temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check Fuel Temperature Return Circuit Resistance	On the harness, measure the resistance between fuel temperature sensor connector T05-2 and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Check For Fuel Temperature Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between fuel temperature sensor connector T05-1 (+) and T05-2 (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

5 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-B1 and J03-H3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-B1 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 -- -1/1
7 Check for DTC Change with Fuel Temperature Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on fuel temperature sensor connector terminals T05-1 and T05-2. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 000174.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 -- -1/1
8 Check for DTC 000174.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T05. 3. Reconnect T05 to fuel temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000174.03 now an active DTC?	YES: Replace fuel temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-B1 and J03-H3. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check Fuel Temperature Sensor Circuit Continuity	1. Disconnect fuel temperature sensor connector T05. 2. On the harness, measure the resistance between ECU J03-B1 and fuel temperature sensor connector T05-1. 3. On the harness, measure the resistance between ECU J03-H3 and fuel temperature sensor connector T05-2. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the Fuel Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the fuel temperature sensor and ECU J03 connector. <i>NOTE: The fuel temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1
12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in fuel temperature sensor connector T05. 3. Replace fuel temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000174.03 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor the Fuel Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the fuel temperature sensor and ECU J03 connector. <i>NOTE: The fuel temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000174.03 now active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect fuel temperature sensor connector T05. 3. Perform TERMINAL TEST on T05. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-B1 and J03-H3. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000174.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000174.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 -- -1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000174.04 — Fuel Temperature Signal Out of Range Low

The fuel temperature input voltage drops below the sensor's low voltage specification.

RG41221.000022D -19-05FEB08-1/1

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000174.04 — Fuel Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000174.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The fuel temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for fuel temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default fuel temperature of 40° C (104° F).

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

Trouble Code Diagnostics and Tests

❶ Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 000174.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
❷ Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Fuel Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between fuel temperature sensor and ECU J03 connector. <i>NOTE: The fuel temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
❸ Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000174.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1
❹ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect fuel temperature sensor connector T05. 3. Perform TERMINAL TEST on T05. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-B1 and J03-H3. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❺ Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000174.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1

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Trouble Code Diagnostics and Tests

6 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000174.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
7 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000174.16 — Fuel Temperature Signal Moderately High

The ECU senses a fuel temperature above specification.

RG41221,000022E -19-04OCT07-1/1

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000174.16 — Fuel Temperature Signal Moderately High Diagnostic Procedure

Trouble Shooting Sequence:

000110.00 or 000110.16

000105.00 or 000105.16

000174.16

When DTC is Displayed:

When the engine is on and the error is active.

Related Information:

The ECU senses a fuel temperature of 95° C (203° F) on OEM engines.

Alarm Level:

Warning

Control Unit Response:

The ECU will control the engine to run under normal operation.

Additional References:

For further fuel temperature sensor information, see FUEL TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 3

- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000174.16 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Fuel Level	Is the fuel level less than a quarter full?	YES: Add more fuel. GO TO 13 NO: GO TO 3 -- -1/1
❸ Fuel Cooler Check	Perform this step if engine has a fuel cooler. If no fuel cooler exists, GO TO 4 1. Remove the fuel cooler. 2. Inspect the fuel cooler for damage or restrictions. 3. Check that the cooler fan is operational. Is the fuel cooler operational and free of damage or restrictions?	YES: GO TO 4 NO: Repair problem. GO TO 13 -- -1/1
❹ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connectors. 4. Inspect surrounding area for pinched or melted wires. Are there any problems with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check Fuel Temperature Sensor	1. Remove fuel temperature sensor. See REMOVE AND INSTALL FUEL TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 13 NO: GO TO 6 -- -1/1
6 Check Fuel Temperature Sensor Operation	1. With fuel sensor removed from engine, reconnect fuel temperature sensor to its harness connector. 2. Ignition ON, Engine OFF. 3. Monitor the fuel temperature from within Service ADVISOR. 4. If necessary, let the sensor cool down to the ambient temperature. Does the sensor reading closely match the ambient temperature?	YES: Fuel temperature sensor is OK. Diagnose engine fuel system. GO TO 9 NO: Fuel temperature sensor has already been replaced. GO TO 7 NO: Replace fuel temperature sensor. GO TO 13 -- -1/1
7 Check Signal Wire In Harness	1. Ignition OFF, Engine OFF. 2. Disconnect the fuel temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 174.03 become active?	YES: Wire harness is OK. Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 NO: GO TO 8 -- -1/1
8 Check ECU	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000174.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 174.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 NO: Replace ECU. GO TO 13 -- -1/1
9 Restricted Fuel Leak-off Line Test	Check for restricted fuel leak-off line. See CHECK FOR RESTRICTED FUEL LEAK-OFF LINE in Section 04, Group 150 earlier in this manual. Is fuel restriction found?	YES: Determine cause of restriction. Fix problem. GO TO 13 NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

10 Fuel Supply Pressure Test	Determine the fuel supply pressure. See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Section 04, Group 150 earlier in this manual. Is the fuel pressure below specification?	YES: Determine cause of low supply pressure. See F1 - LOW PRESSURE FUEL SUPPLY SYSTEM TEST in Section 04, Group 150 earlier in this manual. Fix problem. GO TO 13 NO: GO TO 11 -- -1/1
11 Overflow Valve Test	1. Ignition OFF, Engine OFF. 2. Remove the fuel line from the high pressure fuel pump overflow valve. 3. Connect one end of a clear line to the high pressure fuel pump overflow valve and direct the other end to a suitable container for diesel fuel. 4. Ignition ON, Engine ON. Is fuel flow present from the overflow valve?	YES: GO TO 12 NO: Faulty high pressure fuel pump overflow valve. Fix problem. GO TO 13 -- -1/1
12 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000105.00 still active?	YES: Problem not fixed. Verify cooling and fuel system and related parameters are functioning properly. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Verification

1. Ignition OFF, Engine OFF.
 2. Reconnect all connectors, hoses, sensors, etc.
 3. Ignition ON, Engine ON.
 4. Monitor DTCs in Service ADVISOR.
 5. Let engine run for 3 minutes.
 6. Refresh DTCs.
 7. Operate engine through normal speed and load.
- Did DTC 000105.16 reappear as active with engine running?

YES: Problem not fixed.
Verify cooling and fuel system and related parameters are functioning properly. GO TO 1

NO: Problem fixed.

--1/1

14 Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: Contact dealer or DTAC.

--1/1

000189.00 — Engine Speed Derate Condition Exists

The ECU detects a condition that requires an engine speed derate.

Related Information:

The engine speed derate diagnostic trouble code is information to the operator that the ECU has detected a condition and is derating the engine by limiting the maximum amount of engine speed available to the engine. This code will only set as a result of another DTC setting.

Alarm Level:

Warning

Control Unit Response:

The ECU will limit the amount of engine speed in an attempt to protect the engine.

Additional References:

For more information on derates see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 3 Group 140 earlier in this manual.

RG41221,000022F -19-03OCT07-1/1

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000190.00 — Engine Speed Extremely High

The ECU detects that engine speed exceeds the maximum rpm.

RG41221,0000230 -19-04OCT07-1/1

000190.00 — Engine Speed Extremely High Diagnostic Procedure

Troubleshooting Sequence:
000190.00

When DTC is Displayed:
When ever the ignition is on and the error is active.

Related Information:
The ECU detects that engine speed exceeds the maximum rpm allowed.

Alarm Level:
Warning

Control Unit Response:
The ECU stops fuel flow to the high pressure common rail (HPCR), by turning off the suction control valve on the high pressure fuel pump.

Additional References:
For more fuel system information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000190.00 reappear active?	YES: GO TO 2 NO: GO TO 7 -- -1/1
❷ Application Check	For the engine to exceed the maximum allowed engine speed at this level, the application must be mechanically pushing the engine. Check the application for anything that could be pushing the engine to an overspeed condition such as trying to use the engine as a break when going down hill. Problem found to be application related?	YES: Repair application problem. NO: GO TO 3 -- -1/1
❸ Oil Level Check	Check application oil level Is oil level low?	YES: GO TO 4 NO: GO TO 5 -- -1/1
❹ Turbo Oil Seal Leak Test	1. Check for leaking oil seal on turbocharger, see 4.5L/6.8L - L1 - EXCESSIVE OIL CONSUMPTION in Section 4 Group 150 of the Base Engine manual. 2. Fill oil to proper level. 3. Ignition ON, Engine ON. 4. Reconnect Service ADVISOR, if disconnected. 5. Run engine to highest load point you can for 5 minutes. 6. Refresh codes. Is 000190.00 still active?	YES: GO TO 5 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

5 Cylinder Testing	1. Ignition ON, Engine OFF. 2. Run CYLINDER COMPRESSION TEST and record values. 3. Run CYLINDER MISFIRE TEST and record values. 4. Run CYLINDER CUTOFF TEST and record values. Do these tests all point to a problem in a particular cylinder?	YES: Replace injector in the suspected cylinder. GO TO 6 NO: GO TO 7 -- -1/1
6 Overspeed Test	1. Ignition ON, Engine ON. 2. Reconnect Service ADVISOR, if disconnected. 3. Run engine to highest load point you can for 5 minutes. 4. Refresh codes. Is 000190.00 still active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1
7 Occurrence Count Check	Review stored information and look at occurrence count for 000190.00. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 8 NO: Return application to service. -- -1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure. 3. Refresh codes. Did 000190.00 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and confirm operating point. ---1/1
10 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000190.00 active?	YES: Start DTAC case. NO: Problem fixed, bad ECU program. ---1/1

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000190.16 — Engine Speed Moderately High

The ECU detects that engine speed exceeds the maximum rpm.

RG41221,0000231 -19-04OCT07-1/1

000190.16 — Engine Speed Moderately High Diagnostic Procedure

Troubleshooting Sequence:
000190.16

When DTC is Displayed:
When ever the ignition is on and the error is active.

Related Information:
The ECU detects that engine speed exceeds the maximum rpm allowed.

Alarm Level:
Warning

Control Unit Response:
The ECU stops fuel flow to the high pressure common rail (HPCR), by turning off the suction control valve on the high pressure fuel pump.

Additional References:
For more fuel system information, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000190.16 reappear active?	YES: GO TO 2 NO: GO TO 7 -- -1/1
❷ Application Check	For the engine to exceed the maximum allowed engine speed at this level, the application must be mechanically pushing the engine. Check the application for anything that could be pushing the engine to an overspeed condition such as trying to use the engine as a break when going down hill. Problem found to be application related?	YES: Repair application problem. NO: GO TO 3 -- -1/1
❸ Oil Level Check	Check application oil level Is oil level low?	YES: GO TO 4 NO: GO TO 5 -- -1/1
❹ Turbo Oil Seal Leak Test	1. Check for leaking oil seal on turbocharger, see 4.5L/6.8L - L1 - EXCESSIVE OIL CONSUMPTION in Section 4 Group 150 of the Base Engine manual. 2. Fill oil to proper level. 3. Ignition ON, Engine ON. 4. Reconnect Service ADVISOR, if disconnected. 5. Run engine to highest load point you can for 5 minutes. 6. Refresh codes. Is 000190.16 still active?	YES: GO TO 5 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

5 Cylinder Testing	1. Ignition ON, Engine OFF. 2. Run CYLINDER COMPRESSION TEST and record values. 3. Run CYLINDER MISFIRE TEST and record values. 4. Run CYLINDER CUTOFF TEST and record values. Do these tests all point to a problem in a particular cylinder?	YES: Replace injector in the suspected cylinder. GO TO 6 NO: GO TO 7 ---1/1
6 Overspeed Test	1. Ignition ON, Engine ON. 2. Reconnect Service ADVISOR, if disconnected. 3. Run engine to highest load point you can for 5 minutes. 4. Refresh codes. Is 000190.16 still active?	YES: Start a DTAC case. NO: Problem fixed. ---1/1
7 Occurrence Count Check	Review stored information and look at occurrence count for 000190.16. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 8 NO: Return application to service. ---1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 ---1/1

Trouble Code Diagnostics and Tests

9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure. 3. Refresh codes. Did 000190.16 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and confirm operating point. ---1/1
10 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000190.16 active?	YES: Start DTAC case. NO: Problem fixed, bad ECU program. ---1/1

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000237.02 — VIN Security Data Invalid

For troubleshooting procedures please see the application troubleshooting manual.

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**000237.13 — VIN Option Code Security Data
Conflict**

*For troubleshooting procedures please see the application
troubleshooting manual.*

DB92450,0000075 -19-12OCT07-1/1

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000237.31 — VIN Security Data Missing

For troubleshooting procedures please see the application troubleshooting manual.

DB92450,0000074 -19-12OCT07-1/1

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000412.00 — EGR Temperature Signal Extremely High

The ECU senses the Exhaust Gas Recirculation (EGR) temperature above specification.

RG41221,0000232 -19-15FEB08-1/1

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000412.00 — EGR Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

000110.0, 000110.15, and 00110.16

000412.00

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an EGR temperature of 299° C (570° F) on OEM engines.

The engine has to be running for 3 minutes before the code is set.

001569.31 is set when this code is active.

Alarm Level:

Stop

Control Unit Response:

Maximum engine power is derated up to 50 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further EGR temperature sensor information, see EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on exhaust gas recirculation valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Ignition ON, Engine ON. 4. Let engine idle for 3 minutes before proceeding. 5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 6. Refresh Codes. Did 000412.00 reappear active?	YES: GO TO 2 NO: GO TO 14
❷ Check Intake Manifold Air Temperature	1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high intake manifold air temperature active. (105.15, 105.16, or 105.00)?	YES: GO TO 3 NO: GO TO 5

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Trouble Code Diagnostics and Tests

③ Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 13 NO: Reinstall EGR valve. GO TO 4
④ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 13 NO: GO TO 5
⑤ Check Exhaust Gas Recirculation Cooler	1. Ignition OFF, Engine OFF. 2. Remove exhaust gas recirculation cooler. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) COOLER in Section 02, Group 100 earlier in this manual. 3. Inspect the EGR cooler for debris and carbon build up in the exhaust gas passage causing blockage or loss of heat transfer. 4. Inspect coolant passage for proper coolant flow through EGR cooler. Is the exhaust gas or coolant passages blocked or restricted?	YES: Replace EGR cooler. GO TO 13 NO: GO TO 6

Trouble Code Diagnostics and Tests

6 Check Exhaust System	Check for restrictions or other signs of high exhaust temperature in the exhaust system. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS in base engine manual, Section 04, Group 150. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 7 -- -1/1
7 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 13 NO: GO TO 8 -- -1/1
8 Check EGR Temperature Sensor	1. Remove EGR sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 13 NO: GO TO 9 -- -1/1
9 Check EGR Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With EGR temperature sensor removed from engine, reconnect EGR temperature sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the EGR temperature sensor in hot water along with a thermometer. b. Let the EGR temperature sensor cool down to ambient temperature. 5. Monitor the EGR temperature from within Service ADVISOR. Does the sensor reading closely match the temperature of the hot water or ambient air? Note that the EGR temperature sensor is not as accurate at lower temperatures, allow for more tolerance when measuring EGR temperature sensor at lower temperatures.	YES: EGR temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: EGR temperature sensor has already been replaced. GO TO 10 NO: Replace EGR temperature sensor. GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

10 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000412.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 000412.03 become active?	YES: ECU has not been reprogrammed. GO TO 12 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 11 -- -1/1
11 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000412.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 NO: ECU has not been reprogrammed. GO TO 12 NO: ECU has been reprogrammed. Replace ECU. GO TO 13 -- -1/1
12 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000412.00 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000412.00 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. -- -1/1
14 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000412.03 — EGR Temperature Signal Out of Range High

The exhaust gas recirculation exhaust temperature input voltage exceeds the sensor's high voltage specification.

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000412.03 —EGR Temperature Signal Out of Range High Diagnostic Procedure

Related Information:

The EGR exhaust temperature input voltage exceeds the sensor's high voltage specification. The voltage corresponds to a temperature that is lower than what is physically possible for EGR temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU's high EGR exhaust temperature engine protection feature disabled. The ECU will try to maintain the engine operating envelope.

Additional References:

For more EGR exhaust temperature sensor information, see EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** or the **TURBOCHARGER ACTUATOR CALIBRATION** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

NOTE: It has been found in some older ECU operating codes that the EGR temperature was seen as an Out Of Range condition at low temperatures due to the high temperature range of the sensor. This problem has been addressed and fixed in the newer ECU operating codes. If this code does not clear up after the engine has been running for 5 minutes proceed with this troubleshooting procedure.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000412.03 reappear active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on EGR exhaust temperature sensor connector T03 and EGR exhaust temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check EGR Exhaust Temperature Return Circuit Resistance	On the harness, measure the resistance between EGR exhaust temperature sensor connector T03-B and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Check For EGR Exhaust temperature Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between EGR exhaust temperature sensor connector T03-A (+) and T03-B (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

5 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-E2 and J03-B2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 ---1/1
6 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-E2 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 ---1/1
7 Check for DTC Change with EGR exhaust temperature Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on EGR exhaust temperature sensor connector terminals T03-A and T03-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 000412.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 ---1/1
8 Check for DTC 000412.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T03. 3. Reconnect T03 to EGR exhaust temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000412.03 now an active DTC?	YES: Replace EGR exhaust temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 ---1/1

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Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-E2 and J03-B2. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check EGR Exhaust Temperature Sensor Circuit Continuity	1. Disconnect EGR exhaust temperature sensor connector T03. 2. On the harness, measure the resistance between ECU J03-E2 and EGR exhaust temperature sensor connector T03-A. 3. On the harness, measure the resistance between ECU J03-B2 and EGR exhaust temperature sensor connector T03-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the EGR Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the EGR exhaust temperature sensor and ECU J03 connector. <i>NOTE: The EGR temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1
12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in EGR exhaust temperature sensor connector T03. 3. Replace EGR exhaust temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 000412.03 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor the EGR Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the EGR exhaust temperature sensor and ECU J03 connector. <i>NOTE: The EGR temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000412.03 now active?	YES: GO TO 2 NO: GO TO 15 -- -1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect EGR exhaust temperature sensor connector T03. 3. Perform TERMINAL TEST on T03. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-E2 and J03-B2. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000412.03 now active?	YES: GO TO 2 NO: GO TO 17 -- -1/1
17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000412.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 -- -1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

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000412.04 — EGR Temperature Signal Out of Range Low

The exhaust gas recirculation exhaust temperature input voltage drops below the sensor's low voltage specification.

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000412.04 — EGR Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000412.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The EGR temperature input voltage drop below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for EGR temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For more EGR temperature sensor information, see EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 000412.04 reappear active?	YES: GO TO 2 NO: GO TO 16 ---1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the EGR exhaust temperature sensor connector T03. 3. Perform TERMINAL TEST on EGR temperature sensor connector T03 and EGR exhaust temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 ---1/1
❸ Check for DTC 000412.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 000412.04 still an active DTC?	YES: GO TO 8 NO: GO TO 4 ---1/1
❹ Check for DTC 000412.03	Is DTC 000412.03 now an active DTC with EGR exhaust temperature sensor connector T03 still disconnected?	YES: GO TO 5 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

5 Sensor Shorted to Ground Test	On the EGR exhaust temperature sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 1k ohms?	YES: Replace EGR exhaust temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- --1/1
6 Sensor Internal Short Test	On the EGR exhaust temperature sensor, measure the resistance between terminal A and terminal B. Is the resistance less than 50 ohms?	YES: Replace EGR temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 -- --1/1
7 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor EGR Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between EGR temperature sensor and ECU J03 connector. <i>NOTE: The EGR temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace EGR exhaust temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- --1/1
8 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-E2 and J03-B2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- --1/1

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Trouble Code Diagnostics and Tests

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-E2 and EGR exhaust temperature sensor T03-A. 2. On the harness, measure the resistance between ECU J03-B2 and EGR exhaust temperature sensor T03-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-E2 and single point ground. Was the resistance less than 1k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check for DTC Active Status Change with J03 Disconnected	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 000412.04.</i> 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 000412.04 still active with J03 disconnected?	YES: GO TO 15 NO: GO TO 12 -- -1/1
12 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-E2 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor EGR Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between EGR temperature sensor and ECU J03 connector. <i>NOTE: The EGR temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Active DTC 000412.04	Refresh DTCs Is DTC 000412.04 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
15 Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 000412.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
16 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor EGR Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between EGR temperature sensor and ECU J03 connector. <i>NOTE: The EGR temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 000412.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect EGR temperature sensor connector T03. 3. Perform TERMINAL TEST on T03. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-E2 and J03-B2. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 000412.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 000412.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

000412.15 — EGR Temperature Signal Slightly High

The ECU senses the Exhaust Gas Recirculation (EGR) temperature above specification.

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00412.15 — EGR Temperature Signal Slightly High Diagnostic Procedure

Troubleshooting Sequence:

000110.0, 000110.15, and 00110.16
000412.15

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an EGR temperature of 280° C (536° F) on OEM engines.
The engine has to be running for 3 minutes before the code is set.
001569.31 is set when this code is active.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 5 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further EGR temperature sensor information, see EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on exhaust gas recirculation valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Ignition ON, Engine ON. 4. Let engine idle for 3 minutes before proceeding. 5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 6. Refresh Codes. Did 000412.15 reappear active?	YES: GO TO 2 NO: GO TO 14

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❷ Check Intake Manifold Air Temperature	1. Ignition ON, Engine ON. 2. Let engine run for 3 minutes. 3. Refresh codes from within Service Advisor. Are any DTCs related to high intake manifold air temperature active. (105.15, 105.16, or 105.00)?	YES: GO TO 3 NO: GO TO 5

-- -1/1

Trouble Code Diagnostics and Tests

③ Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 13 NO: Reinstall EGR valve. GO TO 4
④ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 13 NO: GO TO 5
⑤ Check Exhaust Gas Recirculation Cooler	1. Ignition OFF, Engine OFF. 2. Remove exhaust gas recirculation cooler. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) COOLER in Section 02, Group 100 earlier in this manual. 3. Inspect the EGR cooler for debris and carbon build up in the exhaust gas passage causing blockage or loss of heat transfer. 4. Inspect coolant passage for proper coolant flow through EGR cooler. Is the exhaust gas or coolant passages blocked or restricted?	YES: Replace EGR cooler. GO TO 13 NO: GO TO 6

Trouble Code Diagnostics and Tests

6 Check Exhaust System	Check for restrictions or other signs of high exhaust temperature in the exhaust system. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS in base engine manual, Section 04, Group 150. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 7 -- -1/1
7 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 13 NO: GO TO 8 -- -1/1
8 Check EGR Temperature Sensor	1. Remove EGR sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 13 NO: GO TO 9 -- -1/1
9 Check EGR Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With EGR temperature sensor removed from engine, reconnect EGR temperature sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the EGR temperature sensor in hot water along with a thermometer. b. Let the EGR temperature sensor cool down to ambient temperature. 5. Monitor the EGR temperature from within Service ADVISOR. Does the sensor reading closely match the temperature of the hot water or ambient air? Note that the EGR temperature sensor is not as accurate at lower temperatures, allow for more tolerance when measuring EGR temperature sensor at lower temperatures.	YES: EGR temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 10 NO: Replace EGR temperature sensor. GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

10 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000412.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 000412.03 become active?	YES: ECU has not been reprogrammed. GO TO 12 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 11 -- -1/1
11 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000412.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 NO: ECU has not been reprogrammed. GO TO 12 NO: ECU has been reprogrammed. Replace ECU. GO TO 13 -- -1/1
12 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000412.15 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000412.15 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. -- -1/1
14 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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000412.16 — EGR Temperature Signal Moderately High

The ECU senses the Exhaust Gas Recirculation (EGR) temperature above specification.

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00412.16 — EGR Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

000110.0, 000110.15, and 00110.16
000412.16

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an EGR temperature of 290° C (554° F) on OEM engines.
The engine has to be running for 3 minutes before the code is set.
001569.31 is set when this code is active.

Alarm Level:

Stop

Control Unit Response:

Maximum engine power is derated up to 50 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further EGR temperature sensor information, see EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on exhaust gas recirculation valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Ignition ON, Engine ON.

4. Let engine idle for 3 minutes before proceeding.

5. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

6. Refresh Codes.

Did 000412.16 reappear active?

YES: GO TO 2

NO: GO TO 14

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② Check Intake Manifold Air Temperature

1. Ignition ON, Engine ON.

2. Let engine run for 3 minutes.

3. Refresh codes from within Service Advisor.

Are any DTCs related to high intake manifold air temperature active. (105.15, 105.16, or 105.00)?

YES: GO TO 3

NO: GO TO 5

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Trouble Code Diagnostics and Tests

③ Check EGR Valve	1. Ignition OFF, Engine OFF. 2. Remove EGR Valve. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual. 3. Reconnect the EGR harness connector to the EGR valve. 4. Ignition ON, Engine OFF. 5. From within Service ADVISOR and under Interactive Tests, run ECU: EGR Valve Clean Test. 6. Observe that the EGR valve cycles open and closed. When the clean cycle has finished, the EGR valve should be completely closed. Does the EGR valve remain partly open after the clean test?	YES: Replace and calibrate new EGR valve. See EXHAUST GAS RECIRCULATION VALVE CALIBRATION earlier in this section of the manual. GO TO 13 NO: Reinstall EGR valve. GO TO 4
④ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 13 NO: GO TO 5
⑤ Check Exhaust Gas Recirculation Cooler	1. Ignition OFF, Engine OFF. 2. Remove exhaust gas recirculation cooler. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) COOLER in Section 02, Group 100 earlier in this manual. 3. Inspect the EGR cooler for debris and carbon build up in the exhaust gas passage causing blockage or loss of heat transfer. 4. Inspect coolant passage for proper coolant flow through EGR cooler. Is the exhaust gas or coolant passages blocked or restricted?	YES: Replace EGR cooler. GO TO 13 NO: GO TO 6

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Trouble Code Diagnostics and Tests

6 Check Exhaust System	Check for restrictions or other signs of high exhaust temperature in the exhaust system. See CHECK FOR INTAKE AND EXHAUST RESTRICTIONS in base engine manual, Section 04, Group 150. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 7 -- -1/1
7 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding areas for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 13 NO: GO TO 8 -- -1/1
8 Check EGR Temperature Sensor	1. Remove EGR sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 13 NO: GO TO 9 -- -1/1
9 Check EGR Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With EGR temperature sensor removed from engine, reconnect EGR temperature sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the EGR temperature sensor in hot water along with a thermometer. b. Let the EGR temperature sensor cool down to ambient temperature. 5. Monitor the EGR temperature from within Service ADVISOR. Does the sensor reading closely match the temperature of the hot water or ambient air? Note that the EGR temperature sensor is not as accurate at lower temperatures, allow for more tolerance when measuring EGR temperature sensor at lower temperatures.	YES: EGR temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: EGR temperature sensor has already been replaced. GO TO 10 NO: Replace EGR temperature sensor. GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

10 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 000412.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the EGR temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 000412.03 become active?	YES: ECU has not been reprogrammed. GO TO 12 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 11 -- -1/1
11 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 000412.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 13 NO: ECU has not been reprogrammed. GO TO 12 NO: ECU has been reprogrammed. Replace ECU. GO TO 13 -- -1/1
12 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000412.16 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 000412.16 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. ---1/1
14 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. ---1/1

000611.03 — Injector Shorted to Power

The ECU detects that injector wiring is shorted to a power source.

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000611.03 — Injector Shorted to Power Diagnostic Procedure

Troubleshooting Sequence:

000611.03

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during the Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects that injector wiring is shorted to a voltage source.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by either the injector high side wiring or injector low side wiring being shorted to a voltage source.

Alarm Level:

Stop

Control Unit Response:

The ECU will attempt to control the engine in a normal manner. Engine may run poorly or stall, depending on the location of short.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1

- see 4.5L 24V ECU WIRING DIAGRAM 1

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000611.03 reappear active?	YES: GO TO 2 NO: GO TO 12
❷ Check for DTC Change with Injector Harness Disconnected	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is DTC 000611.03 still active? <i>NOTE: Ignore DTCs for high resistance in all injector circuits that may now be active because of this test.</i>	YES: GO TO 5 NO: GO TO 3
❸ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 4

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Trouble Code Diagnostics and Tests

④ Check Injector Harness for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the injector harness (male pin terminals), measure the voltage between the each terminal of the injector harness connector and single point ground. Was any voltage measurement greater than 0.5V?	YES: Fix problem. GO TO 11 NO: GO TO 5 -- -1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 6 -- -1/1
⑥ Check Engine Harness for Correct Pin Out	With 6.8L: On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 12-way injector connector: • Terminal J1-G1 to terminal 4 • Terminal J1-G2 to terminal 9 • Terminal J1-A1 to terminal 10 • Terminal J1-B1 to terminal 2 • Terminal J1-C1 to terminal 12 • Terminal J1-D1 to terminal 3 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 11 Are all resistance readings less than 10 ohms? With 4.5L: On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 6-way injector connector: • Terminal J1-G1 to terminal 5 • Terminal J1-G2 to terminal 6 • Terminal J1-C1 to terminal 2 • Terminal J1-D1 to terminal 4 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 3 Are all resistance readings less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

7 Check Engine Harness for Short to Voltage Source	1. Reconnect engine harness to injector harness connector. 2. Ignition ON, engine OFF. 3. On the harness, measure the voltage from injector voltage supply 1 (J1-G1) to single point ground. 4. On the harness, measure the voltage from injector voltage supply 2 (J1-G2) to single point ground. Is any voltage greater than 0.5V?	YES: Fix problem. GO TO 11 NO: GO TO 8 -- -1/1
8 Check Engine Harness for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 3. On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and all other terminals in the J1 connector EXCEPT the following terminals: • J1-A1 • J1-B1 • J1-C1 • J1-D1 • J1-E1 • J1-F1 Are all resistance readings greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 11 -- -1/1
9 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.03 reappear active?	YES: GO TO 10 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.03 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
11 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.03 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
12 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. YES: If a certain operating point exists when error occurs then GO TO 13 NO: GO TO 14 -- -1/1
13 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000611.03 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

14 Terminal Test and Harness Inspection	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector and injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent short to a voltage source. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 15 -- -1/1
15 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Is 000611.03 active with engine running?	YES: GO TO 1. NO: GO TO 16. -- -1/1
16 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Is 000611.03 active with engine running?	YES: GO TO 1 NO: Problem fixed or conditions to generate 000611.03 have not been duplicated. -- -1/1

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000611.04 — Injector Shorted to Ground

The ECU detects that injector wiring is shorted to ground.

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000611.04 — Injector Shorted to Ground Diagnostic Procedure

Troubleshooting Sequence:

000611.04

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also displayed during the Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects that injector wiring is shorted to ground.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a short to ground of injector high side or low side wiring, or by an injector coil that is shorted to ground.

Alarm Level:

Stop

Control Unit Response:

The ECU will not permit the engine to operate when this DTC is active.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000611.04 reappear active?	YES: GO TO 2 NO: GO TO 14 -- -1/1
❷ Check for DTC Change with Injector Harness Disconnected	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is DTC 000611.04 still active? <i>NOTE: Ignore DTCs for high resistance in all injector circuits that may now be active because of this test.</i>	YES: GO TO 7 NO: GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Check Injector Harness for Short to Ground	On the injector harness (male pin terminals), measure the resistance between each terminal of the injector harness connector and single point ground. Are all resistance readings greater than 1k ohms?	YES: GO TO 7 NO: GO TO 5 -- -1/1
5 Inspect Injector Harness	1. Remove rocker cover. 2. Inspect injector harness for damage that would cause a short to ground. Were any problems found?	YES: Replace injector harness. GO TO 13 NO: GO TO 6 -- -1/1
6 Check Injector Coils for Short to Ground	1. Loosen all injector terminal nuts. 2. Lift injector connectors away from injector studs. 3. On each of the injectors, measure the resistance between each injector stud and single point ground. Are all resistance readings greater than 1k ohms?	YES: Replace injector harness. GO TO 13 NO: Replace injector(s) having less than 1k ohms of resistance to ground. GO TO 13 -- -1/1
7 ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1 Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 8 -- -1/1

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Trouble Code Diagnostics and Tests

8 Check Engine Harness for Correct Pin Out	With 6.8L: On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 12-way injector connector: • Terminal J1-G1 to terminal 4 • Terminal J1-G2 to terminal 9 • Terminal J1-A1 to terminal 10 • Terminal J1-B1 to terminal 2 • Terminal J1-C1 to terminal 12 • Terminal J1-D1 to terminal 3 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 11 Are all resistance readings less than 10 ohms? With 4.5L: On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 6-way injector connector: • Terminal J1-G1 to terminal 5 • Terminal J1-G2 to terminal 6 • Terminal J1-C1 to terminal 2 • Terminal J1-D1 to terminal 4 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 3 Are all resistance readings less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 13 ---1/1
9 Check Engine Harness for Short to Ground	1. Reconnect engine harness to injector harness connector. 2. On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and single point ground. 3. On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and single point ground. Are all resistance readings greater than 1k ohms?	YES: GO TO 10 NO: Fix problem. GO TO 13 ---1/1

Trouble Code Diagnostics and Tests

10 Check Engine Harness for Wire-to-Wire Short	- On the harness, measure the resistance between injector voltage supply 1 (J1-G1) and all other terminals in the J1 connector EXCEPT the following terminals: - J1-A1 - J1-B1 - J1-C1 - J1-D1 - J1-E1 - J1-F1 - On the harness, measure the resistance between injector voltage supply 2 (J1-G2) and all other terminals in the J1 connector EXCEPT the following terminals: - J1-A1 - J1-B1 - J1-C1 - J1-D1 - J1-E1 - J1-F1 Are all resistance readings greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 13
11 Reprogram ECU	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> - Ignition OFF, engine OFF. - Reconnect all connectors and reinstall rocker cover, if removed. - Download latest ECU payload and reprogram ECU. - Ignition ON, engine OFF. - Refresh DTCs. - Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). - Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.04 reappear active?	YES: GO TO 12 NO: Problem fixed.
12 Replace ECU	- Ignition OFF, engine OFF. - Replace ECU. - Ignition ON, engine OFF. - Refresh DTCs. - Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). - Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.04 reappear active?	YES: Open DTAC case. NO: Problem fixed.

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Trouble Code Diagnostics and Tests

13 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000611.04 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
14 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. YES: If a certain operating point exists when error occurs then GO TO 15 NO: GO TO 16 -- -1/1
15 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000611.04 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 16 -- -1/1
16 Terminal Test and Harness Inspection	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector and injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent short to ground. Were any problems found?	YES: Fix problem. GO TO 13 NO: GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000611.04 active with engine running?	YES: GO TO 1. NO: GO TO 18. -- -1/1
18 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000611.04 active with engine running?	YES: GO TO 1 NO: Problem fixed or conditions to generate 000611.04 have not been duplicated. -- -1/1

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000627.01 — All Injectors Circuits Have High Resistance

The ECU detects that all injector circuits have high resistance.

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000627.01— All Injector Circuits Have High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000627.18

000627.01

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also displayed during the Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in all injector circuits.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few additional ohms of resistance in the injector circuits.

This DTC can also be caused by a low ECU voltage supply.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner, but the engine may not run due to low injector current.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000627.01 reappear active?	YES: GO TO 2 NO: GO TO 12 ---1/1
② Check ECU Battery Voltage Supply	Monitor Battery Voltage data point in Service ADVISOR. Is the voltage greater than 11.7V for 12V systems or 23.5V for 24V systems?	YES: GO TO 3 NO: Recharge application batteries or determine cause of low ECU voltage. GO TO 11 ---1/1
③ Check Connectors	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Verify engine harness 12-way (6.8L) or 6-way (4.5L) connector is fully attached to injector harness connector. 3. Verify ECU J1 connector is fully attached to ECU. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 4 ---1/1

Trouble Code Diagnostics and Tests

4 Terminal Test	1. Disconnect engine harness from injector harness connector. 2. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 5 -- -1/1
5 Check Injector #1 Circuit for High Resistance	With 6.8L - On the injector harness 12-way connector (male pin terminals), measure the resistance between injector voltage supply (terminal 4) and injector #1 control (terminal 1). With 4.5L - On the injector harness 6-way connector (male pin terminals), measure the resistance between injector voltage supply (terminal 5) and injector #1 control (terminal 1). Is resistance reading less than 2 ohms?	YES: GO TO 6 NO: Repair problem. GO TO 11 -- -1/1
6 ECU Terminal Test	Perform TERMINAL TEST on J1 connector. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 7 -- -1/1
7 Check Engine Harness for High Resistance	With 6.8L - On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 12-way injector connector: • Terminal J1-G1 to terminal 4 • Terminal J1-G2 to terminal 9 • Terminal J1-A1 to terminal 10 • Terminal J1-B1 to terminal 2 • Terminal J1-C1 to terminal 12 • Terminal J1-D1 to terminal 3 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 11 Are all resistance readings less than 2 ohms? With 4.5L - On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector and the 6-way injector connector: • Terminal J1-G1 to terminal 5 • Terminal J1-G2 to terminal 6 • Terminal J1-C1 to terminal 2 • Terminal J1-D1 to terminal 4 • Terminal J1-E1 to terminal 1 • Terminal J1-F1 to terminal 3 Are all resistance readings less than 2 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 11 -- -1/1

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Trouble Code Diagnostics and Tests

8 Check Injector Circuits for High Resistance	1. Reconnect engine harness to injector harness connector. 2. On the engine harness, measure the resistance between the following injector circuit terminals in the J1 connector: • Terminal J1-G1 to J1-B1 (only with 6.8L) • Terminal J1-G1 to J1-D1 • Terminal J1-G1 to J1-E1 • Terminal J1-G2 to J1-A1 (only with 6.8L) • Terminal J1-G2 to J1-C1 • Terminal J1-G2 to J1-F1 Are all resistance readings less than 2 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 11 -- -1/1
9 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000627.01 reappear active?	YES: GO TO 10 NO: Problem fixed. -- -1/1
10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000627.01 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

11 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000627.01 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
12 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. YES: If a certain operating point exists when error occurs then GO TO 13 NO: GO TO 14 -- -1/1
13 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000627.01 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 14 -- -1/1
14 Terminal Test and Harness Inspection	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector and injector harness connector. 3. Inspect engine wire harness and injector harness carefully for damage which may cause an intermittent open circuit. Were any problems found?	YES: Fix problem. GO TO 11 NO: GO TO 15 -- -1/1

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15 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000627.01 active with engine running?	YES: GO TO 1. NO: GO TO 16.

-- -1/1

16 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Refresh DTCs. Is 000627.01 active with engine running?	YES: GO TO 1 NO: Problem fixed or conditions to generate 000627.01 have not been duplicated.

-- -1/1

000627.18 — Injector Power Supply Voltage Out of Range Low

The ECU detects a voltage below specification on ECU battery supply terminals.

RG41221,00002A5 -19-04OCT07-1/1

000627.18 — ECU Injector Power Supply Voltage Out of Range Low Diagnostic Procedure

Related Information:

The ECU detects that its battery voltage supply is less than a programmable value for more than 1 second with engine speed greater than a programmable value.

The ECU has four internally-connected battery supply terminals and three internally-connected ground terminals.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

If ECU battery voltage supply is too low, injectors may not operate.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 4
 - see 4.5L 24V ECU WIRING DIAGRAM 4
 - see 6.8L 12V ECU WIRING DIAGRAM 4
 - see 6.8L 24V ECU WIRING DIAGRAM 4
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Start engine and operate at speeds above 1200 rpm. Did 000627.18 reappear active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
2 Check Battery Voltage	1. Ignition ON, engine ON. 2. Measure voltage from application battery positive terminal to battery negative terminal for 12V applications or across series connected batteries for 24V applications. Is voltage greater than 13V for 12V applications or 26V for 24V applications with engine running?	YES: GO TO 3 NO: Fix application charging system problem. GO TO 9 -- -1/1
3 Check ECU Battery Voltage Data Point	Monitor Battery Voltage data point in Service ADVISOR with engine running. Is the voltage greater than 12.5V for 12V systems or 25V for 24V systems?	YES: GO TO 7 NO: GO TO 4 -- -1/1
4 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J2 connector. 3. Perform TERMINAL TEST on J2. Where any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Check ECU Battery Supply	<i>NOTE: The ECU has four battery supply terminals and three ground terminals. The four battery supply terminals are all connected together inside the ECU, as are the three ground terminals.</i> 1. On the harness, measure voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2). 2. On the harness, measure voltage from ECU battery supply (J2-L4) to ECU ground (J2-L3). 3. On the harness, measure voltage from ECU battery supply (J2-M1) to ECU ground (J2-M2). 4. On the harness, measure voltage from ECU battery supply (J2-M4) to single point ground. Are all voltage measurements within 1V of battery terminal voltage?	YES: GO TO 6 NO: Fix problem in ECU battery supply or ground circuits. GO TO 9
6 Check Wiring Harness Resistance	1. Disconnect application battery negative cable. 2. On the harness, measure resistance between each of the ECU battery supply terminals (J2-L1, J2-L4, J2-M1, and J2-M4) to the battery positive terminal. 3. On the harness, measure resistance between each of the ECU grounds (J2-L2, J2-L3, and J2-M2) to the disconnected ECU battery negative terminal. Are all resistance measurements less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9
7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Start engine and operate at speeds above 1200 rpm. 5. Refresh DTCs. Did DTC 000627.18 reappear active?	YES: GO TO 8 NO: Problem fixed.

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Trouble Code Diagnostics and Tests

8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Start engine and operate at speeds above 1200 rpm. 4. Refresh DTCs. Did DTC 000627.18 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Start engine and operate at speeds above 1200 rpm. 4. Refresh DTCs. Did DTC 000627.18 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 000627.18 reappear active when engine operating point was reached?	YES: GO TO 2 NO: GO TO 12 -- -1/1

Trouble Code Diagnostics and Tests

12 Check for Intermittent Wiring Problem	1. Ignition ON, engine OFF. 2. Monitor Battery Voltage data point in Service ADVISOR. 3. Gently wiggle wiring harness between ECU and battery terminals. Is the minimum Battery Voltage data point recorded during the check within 1V of battery terminal voltage?	YES: GO TO 13 NO: Repair source of intermittent high resistance in ECU battery supply and ground. GO TO 9 ---1/1
13 Terminal Test and Harness Inspection	1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST of single point ground stud. 3. Perform TERMINAL TEST of ECU battery supply fuse holder. 4. Perform TERMINAL TEST at battery terminals. 5. Perform TERMINAL TEST on the ECU J2 connector. 6. Inspect engine wire harness for damage which may cause an intermittent open circuit. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 14 ---1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Start engine and operate at speeds above 1200 rpm. 3. Refresh DTCs. Is 000627.18 active with engine running?	YES: GO TO 2 NO: GO TO 15 ---1/1
15 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Start engine and operate at speeds above 1200 rpm. 3. Refresh DTCs. Is 000627.18 active with engine running?	YES: GO TO 2 NO: Problem fixed or conditions to generate 000627.18 have not been duplicated. ---1/1

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000629.12 — ECU EEPROM Error

The ECU detects an internal problem.

JB81757,0000016 -19-04OCT07-1/1

000629.12 — ECU EEPROM Error Diagnostic Procedure

Troubleshooting Sequence:
000629.12

When DTC is Displayed:
The ECU detects an internal memory problem.

Related Information:
This may be generated after ECU has been reprogrammed.

Alarm Level:
Stop

Control Unit Response:
The ECU will attempt to control the engine in a normal manner. Engine may not run or may run poorly.

-- -1/1

1 Reprogram ECU and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.
2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Monitor Battery Voltage data point in Service ADVISOR.

Is the voltage greater than 11.7V for 12V systems or 23.5V for 24V systems?

YES: GO TO 2

NO: Recharge application batteries or determine cause of low ECU voltage. GO TO 2

-- -1/1

Trouble Code Diagnostics and Tests

② Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Disconnect Service ADVISOR. 3. Ignition OFF, engine OFF for 5 minutes. 4. Ignition ON, engine OFF. 5. Connect Service ADVISOR Did 000629.12 reappear active?	YES: GO TO 3 NO: Problem fixed. -- -1/1
③ Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Disconnect Service ADVISOR. 4. Ignition OFF, engine OFF for 5 minutes. 5. Ignition ON, engine OFF. 6. Connect Service ADVISOR Did 000629.12 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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000629.13 — ECU Boot Block Error

The ECU detects an internal problem.

RG41221,000023D -19-13SEP07-1/1

000629.13 — ECU Boot Block Error Diagnostic Procedure

Troubleshooting Sequence:
000629.13

When DTC is Displayed:
The ECU detects an internal memory problem.

Related Information:
This DTC may be generated after ECU has been reprogrammed.

Alarm Level:
Stop

Control Unit Response:
The ECU will not permit engine to run.

-- -1/1

1 Reprogram ECU

1. Download latest ECU payload and reprogram ECU.
 2. Disconnect Service ADVISOR.
 3. Ignition OFF, engine OFF for 5 minutes.
 4. Ignition ON, engine OFF.
 5. Connect Service ADVISOR
- Did 000629.13 reappear active?

YES: GO TO 2
NO: Problem fixed.

-- -1/1

Trouble Code Diagnostics and Tests

2 Replace ECU

- 1. Ignition OFF, engine OFF.
 - 2. Replace ECU.
 - 3. Disconnect Service ADVISOR.
 - 4. Ignition OFF, engine OFF for 5 minutes.
 - 5. Ignition ON, engine OFF.
 - 6. Connect Service ADVISOR
- Did 000629.13 reappear active?

YES: Open DTAC case.
NO: Problem fixed.

--1/1

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000636.02 — Pump Position Sensor Signal Invalid

The ECU detects excessive noise (extra pulses) on the pump position sensor input.

RG41221,000023E -19-07FEB08-1/1

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000636.02 — Pump Position Sensor Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:

000636.08

000636.02

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU detects extra pulses (electrical noise) in the pump position sensor signal.

The extra pulses may be caused by electromagnetic interference or by a sensor signal wire that is shorted to some other signal wire.

Wiring problems such as loose terminals or water in connectors may also cause this DTC.

Alarm Level:

Warning

Control Unit Response:

Prolonged cranking time may be required to start the engine.

The ECU will use the crank sensor input to determine camshaft and pump position.

If a crank sensor DTC accompanies 000636.02, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start or crank engine. 5. Refresh DTCs. Did 000636.02 reappear active with engine running or cranking?	YES: GO TO 2 NO: GO TO 20 -- -1/1
❷ Check Speed Sensor Data Points	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Pump Position Sensor Status 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application.  CAUTION: Use caution when working near rotating components. 4. Gently wiggle wire harness between pump position sensor and ECU. <i>NOTE: The Pump Position Sensor Noise Indicator has a value of 0 if the pump position signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Pump Position Sensor Improper Pattern Indicator is 0% if recent pump position signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Pump Position Sensor Status has a value of 47 if the pump position signal is good with engine speed above 400 rpm. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the pump position sensor signal which are too brief to cause a DTC to become active.</i> <i>NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.</i> Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	YES: Found engine wiring problem. Repair problem. GO TO 19 YES: Some device on application causes the electrical noise. Open DTAC case. NO: GO TO 3 -- -1/1

Trouble Code Diagnostics and Tests

③ Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 4 ---1/1
④ Inspect Target	1. Remove pump position sensor. 2. Using mirror, visually inspect webs on rear face of upper idler gear through the sensor mounting hole as engine is rotated. Look for burs, chips, or debris on webs and rear face of gear. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 5 ---1/1
⑤ Inspect Pump Position Sensor	<i>NOTE: See REMOVE AND INSTALL PUMP POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	YES: Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 19 NO: GO TO 6 ---1/1
⑥ Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	YES: Reinstall pump position sensor. Do not reconnect to harness. GO TO 7 NO: Replace pump position sensor. GO TO 19 ---1/1

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Trouble Code Diagnostics and Tests

7 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 8 -- -1/1
8 Check for Shorted to Ground Sensor Return	On the harness, measure the resistance between the ECU connector pump position sensor return (J3-G3) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 19 -- -1/1
9 Check Sensor Circuit Resistance	<i>NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 19 -- -1/1
10 Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform TERMINAL TEST on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 11 -- -1/1
11 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently wiggling wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently wiggling wire harness. Were any intermittent wiring problems found?	YES: Fix problem. GO TO 19 NO: GO TO 12 -- -1/1
12 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 13 NO: Fix problem. GO TO 19 -- -1/1

Trouble Code Diagnostics and Tests

13 Check Sensor Wiring	Examine pump position sensor wiring between the pump position sensor and the ECU. Check for the following: • Verify that pump position sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to pump position sensor signal and return wires is evident. Were any problems found?	YES: Replace pump position sensor wiring with twisted pair or repair problem. GO TO 19 NO: GO TO 14 ---1/1
14 Check Wire Harness Routing	Examine routing of pump position sensor wiring between pump position sensor and ECU. Is pump position sensor wiring routed near sources of strong electric or magnetic fields such as 2-way radio antenna, alternator, inverter, a.c. generator, or other similar device on the application?	YES: Reroute pump position sensor wires away from device. GO TO 19 NO: GO TO 15 ---1/1
15 Check for Alternator Noise	1. Disconnect negative battery cable. 2. Disconnect alternator positive output cable and insulate cable terminal. 3. Disconnect all other alternator connectors. 4. Reconnect negative battery cable. 5. Reconnect ECU and sensor connectors. 6. Ignition ON, engine ON. Did DTC 000636.02 reappear active with engine running?	YES: GO TO 16 NO: Repair alternator problem. GO TO 19 ---1/1
16 Replace Pump Position Sensor	Has pump position sensor been replaced during this procedure?	YES: GO TO 17 NO: Replace pump position sensor. GO TO 19 ---1/1
17 Reprogram ECU	Download latest ECU payload and reprogram ECU. Did DTC 000636.02 reappear active with engine running?	YES: GO TO 18 NO: Problem fixed. ---1/1
18 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.02 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. ---1/1

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Trouble Code Diagnostics and Tests

19 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors (disconnect battery negative cable prior to reinstalling alternator positive cable, if applicable). 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000636.02 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
20 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 2 -- -1/1

000636.05 — Pump Position Sensor Circuit Has High Resistance

The ECU detects low current on the pump position sensor wiring.

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000636.05 — Pump Position Sensor Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000636.05

Related Information:

The ECU detects high resistance or an open circuit in the pump position circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

DTC 000636.08 may also be active when engine is running.

Additional References:

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

-- -1/1

Trouble Code Diagnostics and Tests

❶ Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 12 NO: GO TO 2 ---1/1
❷ Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	YES: GO TO 3 NO: Remove pump position sensor. GO TO 11 ---1/1
❸ Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 12 NO: GO TO 4 ---1/1
❹ Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 5 NO: Fix problem. GO TO 12 ---1/1
❺ Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 6 NO: Fix problem. GO TO 12 ---1/1
❻ Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU pump position sensor signal (J3-G4) and single point ground. Is voltage less than 0.5V?	YES: GO TO 7 NO: Fix problem. GO TO 12 ---1/1

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Trouble Code Diagnostics and Tests

7 Check for Intermittent Open Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.05 reappear active?	YES: GO TO 8 NO: Recheck for intermittent open circuit. GO TO 1 ---1/1
8 Replace Pump Position Sensor	Has pump position sensor been replaced during this diagnostic procedure?	YES: GO TO 9 NO: Remove pump position sensor. GO TO 11 ---1/1
9 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.05 reappear active?	YES: GO TO 10 NO: Problem fixed. ---1/1
10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. ---1/1

Trouble Code Diagnostics and Tests

11 Inspect Pump Position Sensor	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	YES: Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 12 NO: Replace pump position sensor. GO TO 12 ---1/1
12 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.05 reappear active?	YES: GO TO 1 NO: Problem fixed. ---1/1

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000636.06 — Pump Position Sensor Circuit Has Low Resistance

The ECU detects high current on the pump position sensor wiring.

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000636.06 — Pump Position Sensor Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000636.06

Related Information:

The ECU detects low resistance or a short to ground in the pump position circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

DTC 000636.08 may also be active when engine is running.

Additional References:

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Check for DTC Change with Sensor Disconnected	1. Ignition ON, engine OFF. 2. Disconnect pump position sensor connector. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000636.05 now an active DTC?	YES: Remove pump position sensor. GO TO 13 NO: GO TO 2 ---1/1
❷ Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 3 ---1/1
❸ Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	YES: Do not reconnect sensor to harness. GO TO 4 NO: Remove pump position sensor. GO TO 13 ---1/1
❹ Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on connector J3. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 5 ---1/1
❺ Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 14 ---1/1

Trouble Code Diagnostics and Tests

6 Check for Wire-to-Wire Short	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and return (J3-G3). Is the resistance greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 14 -- -1/1
7 Check for Short to Ground of Sensor Signal	On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 8 NO: Fix problem. GO TO 14 -- -1/1
8 Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 14 -- -1/1
9 Check for Intermittent Shorted Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.06 reappear active?	YES: GO TO 10 NO: Recheck for intermittent shorted circuit. GO TO 1 -- -1/1
10 Replace Pump Position Sensor	Has pump position sensor been replaced during this diagnostic procedure?	YES: GO TO 11 NO: Remove pump position sensor. GO TO 13 -- -1/1
11 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.06 reappear active?	YES: GO TO 12 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

12 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. ---1/1
13 Inspect Pump Position Sensor	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	YES: Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 14 NO: Replace pump position sensor. GO TO 14 ---1/1
14 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000636.06 reappear active?	YES: GO TO 1 NO: Problem fixed. ---1/1

000636.08 — Pump Position Sensor Signal Missing

The ECU does not detect the pump position sensor input.

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000636.08 — Pump Position Sensor Signal Missing Diagnostic Procedure

Troubleshooting Sequence:

000636.05 or 000636.06

000636.08

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU does not detect a pump position sensor signal when engine is cranking or running.
This DTC can be caused by an open or shorted circuit in the sensor wiring.

Alarm Level:

Warning

Control Unit Response:

Prolonged cranking time may be required to start the engine.

The ECU will use the crank sensor input to determine camshaft and pump position.

If a crank sensor DTC accompanies 000636.08, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start or crank engine. 5. Refresh DTCs. Did 000636.08 reappear active with engine running or cranking?	YES: GO TO 2 NO: GO TO 19 -- -1/1
❷ Check for Open or Shorted Sensor Circuit	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000636.05 or 000636.06 active?	YES: Discontinue test for 000636.08 and perform test for 000636.05 or 000636.06. NO: GO TO 3 -- -1/1
❸ Check for Loose Sensor	<i>NOTE: See REMOVE AND INSTALL PUMP POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.</i> 1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor connector. 3. Verify pump position sensor installation torque. Was pump position sensor fully threaded into mounting hole?	YES: GO TO 4 NO: Torque sensor to specified value. GO TO 18 -- -1/1
❹ Test Sensor Terminals	Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 18 NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	YES: Do not reconnect sensor to harness. GO TO 6 NO: Remove pump position sensor. GO TO 17 -- -1/1
6 Check for Recent Mechanical Repair	Has an internal engine repair requiring removal of upper idler gear been performed just prior to 000636.08 appearing?	YES: GO TO 7 NO: GO TO 8 -- -1/1
7 Inspect Target	1. Remove pump position sensor. 2. Verify that webs are visible through the pump position sensor mounting hole as engine is rotated. <i>NOTE: Webs on upper idler gear would not be visible if gear or thrust washer were installed incorrectly.</i> Are webs on upper idler gear visible?	YES: GO TO 8 NO: Fix mechanical problem, GO TO 18 -- -1/1
8 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 18 NO: GO TO 9 -- -1/1
9 Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

10 Check for Wire-to-Wire Short	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and return (J3-G3). Is the resistance greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 18 -- -1/1
11 Check for Short to Ground of Sensor Signal	On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 18 -- -1/1
12 Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 13 NO: Fix problem. GO TO 18 -- -1/1
13 Check for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between ECU pump position sensor signal (J3-G4) and single point ground. Is the voltage less than 0.5V?	YES: GO TO 14 NO: Fix problem. GO TO 18 -- -1/1
14 Replace Pump Position Sensor	Has pump position sensor been replaced during this diagnostic procedure?	YES: GO TO 15 NO: Remove pump position sensor. GO TO 17 -- -1/1
15 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. Did 000636.08 reappear active with engine running?	YES: GO TO 16 NO: Problem fixed. -- -1/1
16 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.08 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

17 Inspect Pump Position Sensor	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	YES: Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 18 NO: Replace pump position sensor. GO TO 18 ---1/1
18 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. Did 000636.08 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. ---1/1
19 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 2 ---1/1

000636.10 — Pump Position Signal Rate of Change Abnormal

The ECU detects an improper pattern on the pump position sensor input.

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000636.10 — Pump Position Sensor Signal Rate of Change Abnormal Diagnostic Procedure

Troubleshooting Sequence:

000636.08

000636.10

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU detects an improper pattern (pulses missing) on the pump position sensor input.

Inadvertently swapping the pump position sensor harness connector with the crank sensor harness connector may cause this DTC along with 000637.10.

Wiring problems such as loose terminals or water in connectors may also cause this DTC.

A loose crankshaft timing wheel may also cause this DTC.

Alarm Level:

Warning

Control Unit Response:

Prolonged cranking time may be required to start the engine.

The ECU will use the crank sensor input to determine camshaft and pump position.

If a crank sensor DTC accompanies 000636.10, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Additional References:

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start or crank engine. 5. Refresh DTCs. Did 000636.10 reappear active with engine running or cranking?	YES: GO TO 2 NO: GO TO 23 ---1/1
❷ Check for Open or Shorted Sensor Circuit	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000636.05 or 000636.06 now active?	YES: Discontinue test for 000636.10 and perform test for 000636.05 or 000636.06. NO: GO TO 3 ---1/1

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Trouble Code Diagnostics and Tests

③ Check for Loose Crank Sensor Timing Wheel	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Attempt to start engine. 6. Operate engine for one minute through rpm range and monitor DTCs, if engine started. 7. Ignition OFF, engine OFF. 8. Reconnect crank sensor. Did engine start and run without generating 000636.10?	YES: Crankshaft timing wheel may be loose. Repair per instructions in CTM 104. NO: GO TO 4 -- -1/1
④ Check Speed Sensor Data Points	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Pump Position Sensor Status 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application.  CAUTION: Use caution when working near rotating components. 4. Gently wiggle wire harness between crank sensor and ECU. <i>NOTE: The Pump Position Sensor Noise Indicator has a value of 0 if the pump position signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Pump Position Sensor Improper Pattern Indicator is 0% if recent pump position signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Pump Position Sensor Status has a value of 47 with engine speed above 400 rpm if the pump position signal is good. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the pump position sensor signal which are too brief to cause a DTC to become active.</i> <i>NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.</i> Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	YES: Engine wiring problem. Repair problem. GO TO 22 YES: Some device on application causes the noise. Open DTAC case. NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Check for Loose Sensor	<i>NOTE: See REMOVE AND INSTALL PUMP POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.</i> 1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor connector. 3. Verify pump position sensor installation torque. Was pump position sensor fully threaded into mounting hole?	YES: GO TO 6 NO: Torque sensor to specified value. GO TO 22 -- -1/1
6 Test Sensor Terminals	Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 22 NO: GO TO 7 -- -1/1
7 Inspect Target	1. Remove pump position sensor. 2. Using mirror, visually inspect webs on rear face of upper idler gear through the sensor mounting hole as engine is rotated. Look for burs, chips, or debris on webs and rear face of gear. Were any problems found?	YES: Fix problem. GO TO 22 NO: GO TO 8 -- -1/1
8 Inspect Sensor	Examine tip of pump position sensor for damage due to contact with upper idler gear Does sensor appear damaged due to contact with gear?	YES: Replace pump position sensor. Determine cause if replacement sensor also becomes damaged. GO TO 22 NO: GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

9 Check Sensor Resistance	On the pump position sensor, measure the resistance between the signal (B) and return (A). Is the resistance between 2500 ohms and 3500 ohms?	YES: Reinstall pump position sensor. Do not reconnect to harness. GO TO 10 NO: Replace pump position sensor. GO TO 22 ---1/1
10 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 22 NO: GO TO 11 ---1/1
11 Check for Shorted Sensor Return	On the harness, measure the resistance between the ECU pump position sensor return (J3-G3) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 22 ---1/1
12 Check Sensor Circuit Resistance	<i>NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 13 NO: Fix problem. GO TO 22 ---1/1
13 Check for Intermittent Short Between Signal and Return	1. Verify pump position sensor is disconnected. 2. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and the pump position sensor return (J3-G3) while gently moving wire harness. Is resistance greater than 1k ohms?	YES: GO TO 14 NO: Fix problem. GO TO 22 ---1/1

Trouble Code Diagnostics and Tests

14 Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform TERMINAL TEST on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	YES: Fix problem. GO TO 22 NO: GO TO 15 -- -1/1
15 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently moving wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently moving wire harness. Were any intermittent wiring problems found?	YES: Fix problem. GO TO 22 NO: GO TO 16 -- -1/1
16 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 17 NO: Fix problem. GO TO 22 -- -1/1
17 Check Sensor Resistance at ECU	1. Reconnect pump position sensor connector. 2. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and return (J3-G3). Is the resistance between 2500 ohms and 3500 ohms?	YES: GO TO 18 NO: Fix problem. GO TO 22 -- -1/1
18 Inspect Sensor Wiring	Examine pump position sensor wiring between the pump position sensor and the ECU. Check for the following: • Verify that pump position sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to pump position sensor signal and ground wires is evident. Were any problems found?	YES: Replace pump position sensor wiring with twisted pair or repair problem. GO TO 22 NO: GO TO 19 -- -1/1

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Trouble Code Diagnostics and Tests

19 Replace Pump Position Sensor	Has pump position sensor been replaced during this procedure?	YES: GO TO 20 NO: Replace pump position sensor. GO TO 22 -- -1/1
20 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reinstall ECU connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000636.10 reappear active with engine running?	YES: GO TO 21 NO: Problem fixed. -- -1/1
21 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000636.10 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
22 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000636.10 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
23 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 4 -- -1/1

000637.02 — Crank Position Sensor Signal Invalid

The ECU detects excessive noise (extra pulses) on the crank sensor input.

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000637.02 — Crank Position Sensor Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:

000637.08

000637.02

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU detects extra pulses (electrical noise) in the crank sensor signal.

The extra pulses may be caused by electromagnetic interference or by a sensor signal wire that is shorted to some other signal wire.

Wiring problems such as loose terminals or water in connectors may also cause this DTC.

Alarm Level:

Warning

Control Unit Response:

The ECU will use the pump position sensor input to determine piston position.

Prolonged cranking time may be required to start the engine.

If a pump position sensor DTC accompanies 000637.02, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Maximum engine power is derated up to 50 percent.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2

- see 4.5L 24V ECU WIRING DIAGRAM 2

- see 6.8L 12V ECU WIRING DIAGRAM 2

- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.
NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Start or crank engine.
 5. Refresh DTCs.
- Did 000637.02 reappear active with engine running or cranking?

YES: GO TO 2
NO: GO TO 20

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Trouble Code Diagnostics and Tests

② Check Speed Sensor Data Points	1. Monitor the following Data Points in Service ADVISOR: • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator • Crank Position Status • Crank Position Sensor Speed 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application.  CAUTION: Use caution when working near rotating components. 4. Gently wiggle wire harness between crank sensor and ECU. <i>NOTE: The Crank Position Input Noise Indicator has a value of 0 if the crank sensor signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator is 0% if recent crank sensor signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Crank Position Status has a value of 47 with engine speed above 400 rpm if the crank sensor signal is good. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.</i> <i>NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.</i> Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	YES: Engine wiring problem. Fix problem. GO TO 19 YES: Some device on application causes the noise. Open DTAC case. NO: GO TO 3 -- -1/1
③ Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor connector. 3. Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 4 -- -1/1
④ Inspect Target	1. Remove crank sensor. 2. Visually inspect timing wheel teeth for damage or debris as engine is rotated. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Inspect Sensor	<i>NOTE: See REMOVE AND INSTALL CRANKSHAFT POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor replacement instructions.</i> Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	YES: Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO 19 NO: GO TO 6 -- -1/1
6 Check Sensor Resistance	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	YES: Reinstall crank sensor. Do not reconnect to harness. GO TO 7 NO: Replace crank sensor. GO TO 19 -- -1/1
7 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 8 -- -1/1
8 Check for Shorted Sensor Return	On the harness, measure the resistance between the ECU connector crank sensor return (J3-F3) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 19 -- -1/1
9 Check Sensor Circuit Resistance	<i>NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 19 -- -1/1
10 Test ECU Terminals	1. Disconnect ECU J2 connector. 2. Perform TERMINAL TEST on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	YES: Fix problem. GO TO 19 NO: GO TO 11 -- -1/1

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11 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently wiggling wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently wiggling wire harness. Were any intermittent wiring problems found?	YES: Fix problem. GO TO 19 NO: GO TO 12 -- -1/1
12 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 13 NO: Fix problem. GO TO 19 -- -1/1
13 Check Sensor Wiring	Examine crank sensor wiring between the crank sensor and the ECU. Check for the following: • Verify that crank sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to crank sensor signal and return wires is evident. Were any problems found?	YES: Replace crank sensor wiring with twisted pair or repair problem. GO TO 19 NO: GO TO 14 -- -1/1
14 Check Wire Harness Routing	Examine routing of crank sensor wiring between crank sensor and ECU. Is crank sensor wiring routed near sources of strong electric or magnetic fields such as 2-way radio antenna, alternator, inverter, a.c. generator, or other similar device on the application?	YES: Reroute crank sensor wires away from device. GO TO 19 NO: GO TO 15 -- -1/1
15 Check for Alternator Noise	1. Disconnect negative battery cable. 2. Disconnect alternator positive output cable and insulate cable terminal. 3. Disconnect all other alternator connectors. 4. Reconnect negative battery cable. 5. Reconnect ECU and sensor connectors. 6. Ignition ON, engine ON. Did DTC 000637.02 reappear active with engine running?	YES: GO TO 16 NO: Repair alternator problem. GO TO 19 -- -1/1

Trouble Code Diagnostics and Tests

16 Replace Crank Position Sensor	Has crank sensor been replaced during this procedure?	YES: GO TO 17 NO: Replace crank sensor. GO TO 19 -- -1/1
17 Reprogram ECU	Download latest ECU payload and reprogram ECU. Did DTC 000637.02 reappear active with engine running?	YES: GO TO 18 NO: Problem fixed. -- -1/1
18 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.02 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
19 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors (disconnect battery negative cable prior to reinstalling alternator positive cable, if applicable). 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000637.02 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
20 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 2 -- -1/1

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000637.05 — Crank Sensor Circuit Has High Resistance

The ECU detects low current on the crank sensor wiring.

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000637.05 — Crank Sensor Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000637.05

Related Information:

The ECU detects high resistance or an open circuit in the crank sensor circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

DTC 000637.08 may also be active when engine is running.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

1 Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 12 NO: GO TO 2 -- -1/1
2 Check Sensor Resistance	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	YES: GO TO 3 NO: Remove crank sensor. GO TO 11 -- -1/1
3 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 12 NO: GO TO 4 -- -1/1
4 Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 5 NO: Fix problem. GO TO 12 -- -1/1
5 Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and all other terminals in the J1, J2 and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 6 NO: Fix problem. GO TO 12 -- -1/1
6 Check for Short to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU crank sensor signal (J3-F4) and single point ground. Is voltage less than 0.5V?	YES: GO TO 7 NO: Fix problem. GO TO 12 -- -1/1

Trouble Code Diagnostics and Tests

7 Check for Intermittent Open Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.05 reappear active?	YES: GO TO 8 NO: Recheck for intermittent open circuit. GO TO 1 -- -1/1
8 Replace Crank Sensor	Has crank sensor been replaced during this diagnostic procedure?	YES: GO TO 9 NO: Remove crank sensor. GO TO 11 -- -1/1
9 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.05 reappear active?	YES: GO TO 10 NO: Problem fixed. -- -1/1
10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Inspect Crank Sensor	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	YES: Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO 12 NO: Replace crank sensor. GO TO 12

--1/1

12 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.05 reappear active?	YES: GO TO 1 NO: Problem fixed.

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000637.06 — Crank Sensor Circuit Has Low Resistance

The ECU detects high current on the crank sensor wiring.

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000637.06 — Crank Sensor Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000637.06

Related Information:

The ECU detects low resistance or a short to ground in the crank sensor circuit during the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

DTC 000637.08 may also be active when engine is running.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Check for DTC Change with Sensor Disconnected	1. Ignition ON, engine OFF. 2. Disconnect crank sensor connector. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 000637.05 now an active DTC?	YES: Remove crank sensor. GO TO 13 NO: GO TO 2 -- -1/1
❷ Test Sensor Terminals	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 3 -- -1/1
❸ Check Sensor Resistance	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	YES: Do not reconnect sensor to harness. GO TO 4 NO: Remove crank sensor. GO TO 13 -- -1/1
❹ Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 5 -- -1/1
❺ Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 14 -- -1/1
❻ Check for Wire-to-Wire Short	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and return (J3-F3). Is the resistance greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 14 -- -1/1

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7 Check for Short to Ground of Sensor Signal	On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 8 NO: Fix problem. GO TO 14 -- -1/1
8 Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 14 -- -1/1
9 Check for Intermittent Shorted Circuit	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.06 reappear as active?	YES: GO TO 10 NO: Recheck for intermittent shorted circuit. GO TO 1 -- -1/1
10 Replace Crank Sensor	Has crank sensor been replaced during this diagnostic procedure?	YES: GO TO 11 NO: Remove crank sensor. GO TO 13 -- -1/1
11 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.06 reappear active?	YES: GO TO 12 NO: Problem fixed. GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

12 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
13 Inspect Crank Sensor	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	YES: Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO 14 NO: Replace crank sensor. GO TO 14 -- -1/1
14 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000637.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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000637.07 — Crank and Pump Position Signals Out of Sync

The ECU detects that the pump position and crank sensor inputs are not in sync with each other.

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000637.07 — Crank and Pump Position Signals Out of Sync Diagnostic Procedure

Troubleshooting Sequence:

000636.08 or 000637.08

000636.10, 000637.10, 000636.02 or 000637.02

000637.07

When DTC is Displayed:

The engine is running above 400 rpm and the error condition is active.

Related Information:

The ECU detects that the pump position sensor signal is not correctly timed relative to the crank sensor signal.

This DTC may be caused by incorrect upper idler gear timing or by a damaged timing wheel.

Wiring problems such as loose terminals or water in connectors may also cause this DTC to be active intermittently.

Alarm Level:

Warning

Control Unit Response:

Prolonged cranking time may be required to start the engine.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more pump position sensor information, see PUMP POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start engine. 5. Refresh DTCs. Did 000637.07 reappear active with engine running?	YES: GO TO 2 NO: GO TO 15 -- -1/1
❷ Check for Recent Mechanical Repair	Has an internal engine repair requiring timing gear removal been performed just prior to DTC 000637.07 appearing and does the DTC reappear repeatedly after refreshing active DTCs with engine running?	YES: Check crankshaft to upper idler gear timing. GO TO 14 NO: GO TO 3 -- -1/1
❸ Check for Loose Crank Sensor Timing Wheel	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor and secure connector away from rotating components. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Attempt to start engine. 6. Operate engine for one minute through rpm range while monitoring DTCs, if engine started. 7. Ignition OFF, engine OFF. 8. Reconnect crank sensor. Did engine start, run, and have good performance?	YES: Crankshaft timing wheel may be loose. Repair per instructions in base engine manual. NO: GO TO 4 -- -1/1

4 Check Speed Sensor Data Points	1. Monitor the following Data Points in Service ADVISOR: • Pump Position Sensor Noise Indicator • Pump Position Sensor Improper Pattern Indicator • Pump Position Sensor Status • Pump Position Sensor Speed • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator • Crank Position Status • Crank Position Sensor Speed 2. Operate engine through normal speed and load. 3. Switch ON and OFF any electrical devices on the application.  CAUTION: Use caution when working near rotating components. 4. Gently wiggle wire harness between speed sensors and ECU. <i>NOTE: The Crank Position Input Noise Indicator and Pump Position Sensor Noise Indicator have a value of 0 if the signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator and Pump Position Sensor Improper Pattern Indicator are 0 if recent sensor signal patterns were good. The value will increase if errors in the signal pattern are detected and will count down to 0 once the signal pattern is error-free. The Pump Position Sensor Status and Crank Position Status has a value of 47 with engine speed above 400 rpm if the crank sensor signal is good. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.</i> <i>NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.</i> Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	YES: Engine wiring problem. Repair problem. GO TO 14 YES: Some device on application causes the noise. Open DTAC case. NO: GO TO 5 -- -1/1
5 Test Crank Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect crank sensor. 3. Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 14 NO: Do not reconnect sensor. GO TO 6 -- -1/1

Trouble Code Diagnostics and Tests

6 Test Pump Position Sensor Terminals	1. Ignition OFF, engine OFF. 2. Disconnect pump position sensor. 3. Perform TERMINAL TEST on pump position sensor and connector. Were any problems found?	YES: Fix problem. GO TO 14 NO: Do not reconnect sensor. GO TO 7 ---1/1
7 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 8 ---1/1
8 Check Pump Position Sensor Circuit Resistance	<i>NOTE: Verify that pump position sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU pump position sensor signal (J3-G4) and the pump position sensor connector signal (B). 2. On the harness, measure the resistance between ECU pump position sensor return (J3-G3) and the pump position sensor connector return (A). Are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 14 ---1/1
9 Check Crank Position Sensor Circuit Resistance	<i>NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 14 ---1/1

Trouble Code Diagnostics and Tests

10 Check for Intermittent Short Between Signal and Return	1. Crank sensor and pump position sensors are disconnected. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and the crank sensor return (J3-F3) while gently wiggling harness. 3. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and the pump position sensor return (J3-G3) while gently wiggling harness. Is resistance greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 14 ---1/1
11 Check for Intermittent Short Between Signal and Ground	1. Crank sensor and pump position sensors are disconnected. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and single point ground while gently wiggling harness. 3. On the harness, measure the resistance between the ECU pump position sensor signal (J3-G4) and single point ground while gently wiggling harness. Is resistance greater than 1k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 14 ---1/1
12 Reprogram ECU	1. Reinstall all connectors. 2. Download latest ECU payload and reprogram ECU. Did 000637.07 reappear active with engine running?	YES: GO TO 13 NO: Problem fixed. ---1/1
13 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did 000637.07 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. ---1/1
14 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did 000637.07 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. ---1/1

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Trouble Code Diagnostics and Tests

15 Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: GO TO 4

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000637.08 — Crank Position Sensor Signal Missing

The ECU does not detect the crank sensor input.

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000637.08 — Crank Sensor Signal Missing Diagnostic Procedure

Troubleshooting Sequence:

000637.05 or 000637.06

000637.08

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU does not detect a crank sensor signal when engine is cranking or running.

This DTC can be caused by an open or shorted circuit in the sensor wiring.

Alarm Level:

Warning

Control Unit Response:

The ECU will use the pump position sensor input to determine piston position.

Prolonged cranking time may be required to start the engine.

If a pump position sensor DTC accompanies 000637.08, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Maximum engine power is derated up to 50 percent.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2

- see 4.5L 24V ECU WIRING DIAGRAM 2

- see 6.8L 12V ECU WIRING DIAGRAM 2

- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start or crank engine. 5. Refresh DTCs. Did 000637.08 reappear active with engine running or cranking?	YES: GO TO 2 NO: GO TO 19 ---1/1
❷ Check for Open or Shorted Sensor Circuit	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is DTC 000637.05 or 000637.06 now an active DTC?	YES: Discontinue test for 000637.08 and perform test for 000637.05 or 000637.06. NO: GO TO 3 ---1/1
❸ Check for Loose Sensor	<i>NOTE: See REMOVE AND INSTALL CRANKSHAFT POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.</i> 1. Ignition OFF, engine OFF. 2. Disconnect crank sensor connector. 3. Verify crank sensor installation torque. Was crank sensor fully threaded into mounting hole?	YES: GO TO 4 NO: Torque sensor to specified value. GO TO 18 ---1/1

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4 Test Sensor Terminals	Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 18 NO: GO TO 5 -- -1/1
5 Check Sensor Resistance	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	YES: Do not reconnect sensor to harness. GO TO 6 NO: Remove crank sensor. GO TO 17 -- -1/1
6 Check for Recent Mechanical Repair	Has an internal engine repair requiring removal of timing wheel been performed just prior to DTC 000637.08 appearing?	YES: GO TO 7 NO: GO TO 8 -- -1/1
7 Inspect Target	1. Remove crank sensor. 2. Verify that timing wheel teeth are visible through the crank sensor mounting hole as engine is rotated. Are teeth on timing wheel visible?	YES: GO TO 8 NO: Fix mechanical problem, GO TO 18 -- -1/1
8 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 18 NO: GO TO 9 -- -1/1
9 Check Sensor Circuit Resistance	1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 18 -- -1/1
10 Check for Wire-to-Wire Short	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and return (J3-F3). Is the resistance greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

11 Check for Short to Ground of Signal	On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 18 -- -1/1
12 Check for Wire-to-Wire Short	1. Disconnect ECU J1 and J2 connectors. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and all other terminals in the J1, J2 and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 13 NO: Fix problem. GO TO 18 -- -1/1
13 Check for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU crank sensor signal (J3-F4) and single point ground. Is the voltage less than 0.5V?	YES: GO TO 14 NO: Fix problem. GO TO 18 -- -1/1
14 Replace Crank Sensor	Has crank sensor been replaced during this diagnostic procedure?	YES: GO TO 15 NO: Remove crank sensor. GO TO 17 -- -1/1
15 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000637.08 reappear active with engine running?	YES: GO TO 16 NO: Problem fixed. -- -1/1
16 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.08 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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17 Inspect Crank Sensor	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	YES: Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO 18 NO: Replace crank sensor. GO TO 18 -- -1/1
18 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine ON. Did DTC 000637.08 reappear active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
19 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 2 -- -1/1

000637.10 — Crank Position Signal Rate of Change Abnormal

The ECU detects an improper pattern on the crank sensor input.

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000637.10 — Crank Sensor Signal Rate of Change Abnormal Diagnostic Procedure

Troubleshooting Sequence:

000637.08

000637.10

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU detects an improper pattern (pulses missing) on the crank sensor input.

Swapping the pump position sensor harness connector with the crank position sensor harness connector may cause this DTC along with 000636.10.

Wiring problems such as loose terminals or water in connectors may also cause this DTC.

Alarm Level:

Warning

Control Unit Response:

Prolonged cranking time may be required to start the engine.

The ECU will use the pump position sensor input to determine piston position.

If a pump position sensor DTC accompanies 000637.10, the engine cannot be started and will stall if running until at least one of the two codes is repaired.

Maximum engine power is derated up to 50 percent.

Additional References:

For more crank sensor information, see CRANK POSITION SENSOR in Section 03, Group 140 earlier in this manual.

For more information on speed sensors, see MEASURING SPEED in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Start or crank engine. 5. Refresh DTCs. Did 000637.10 reappear active with engine running or cranking?	YES: GO TO 2 NO: GO TO 22 ---1/1
❷ Check for Open or Shorted Sensor Circuit	1. Ignition ON, engine OFF. 2. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is DTC 000637.05 or 000637.06 now an active DTC?	YES: Discontinue test for 000637.10 and perform test for 000637.05 or 000637.06. NO: GO TO 3 ---1/1

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③ Check Speed Sensor Data Points	1. Monitor the following Data Points in Service ADVISOR: • Crank Position Input Noise Indicator • Crank Improper Pattern Indicator • Crank Position Status • Crank Position Sensor Speed 2. Operate engine through normal speed and load ranges. 3. Switch ON and OFF any electrical devices on the application.  CAUTION: Use caution when working near rotating components. 4. Gently wiggle wire harness between crank sensor and ECU. <i>NOTE: The Crank Position Input Noise Indicator has a value of 0 if the crank sensor signal is good. The value will temporarily increase if noise is detected in the sensor signal. The Crank Improper Pattern Indicator is 0% if recent crank sensor signal patterns were good. The percentage will increase if errors in the signal pattern are detected and will count down to 0% once the signal pattern is error-free. The Crank Position Status has a value of 47 with engine speed above 400 rpm if the crank sensor signal is good. The value will be something other than 47 if a sensor signal problem is detected. These data points can be used to locate intermittent problems with the crank sensor signal which are too brief to cause a DTC to become active.</i> <i>NOTE: Internal Data Monitor in Service ADVISOR may also be used to locate intermittent speed sensor circuit problems. See INTERNAL DATA MONITOR (IDM) earlier in this group for more information on using this feature. Select the data points defined earlier in this step and set sample rate to 5 ms.</i> Were you able to find some mode of operation or an intermittent wiring problem which causes the Speed Sensor Data Points to indicate a signal problem?	YES: Engine wiring problem. Repair problem. GO TO 21 YES: Some device on application causes the noise. Open DTAC case. NO: GO TO 4 -- -1/1
④ Check for Loose Sensor	<i>NOTE: See REMOVE AND INSTALL CRANKSHAFT POSITION SENSOR in Section 02, Group 110 earlier in this manual for sensor torque specifications.</i> 1. Ignition OFF, engine OFF. 2. Disconnect crank sensor connector. 3. Verify crank sensor installation torque. Was crank sensor fully threaded into mounting hole?	YES: GO TO 5 NO: Torque sensor to specified value. GO TO 21 -- -1/1
⑤ Test Sensor Terminals	Perform TERMINAL TEST on crank sensor and connector. Were any problems found?	YES: Fix problem. GO TO 21 NO: GO TO 6 -- -1/1

Trouble Code Diagnostics and Tests

6 Inspect Target	1. Remove crank sensor. 2. Visually inspect timing wheel teeth for damage or debris as engine is rotated. Were any problems found?	YES: Fix problem. GO TO 21 NO: GO TO 7 -- -1/1
7 Inspect Sensor	Examine tip of crank sensor for damage due to contact with timing wheel Does sensor appear damaged due to contact with timing wheel?	YES: Replace crank sensor. Determine cause if replacement sensor also becomes damaged. GO TO 21 NO: GO TO 8 -- -1/1
8 Check Sensor Resistance	On the crank sensor, measure the resistance between the signal (A) and return (B). Is the resistance between 2500 ohms and 3500 ohms?	YES: Reinstall crank sensor. Do not reconnect to harness. GO TO 9 NO: Replace crank sensor. GO TO 21 -- -1/1
9 Test ECU Terminals	1. Disconnect ECU J3 connector. 2. Perform TERMINAL TEST on J3. Were any problems found?	YES: Fix problem. GO TO 21 NO: GO TO 10 -- -1/1
10 Check for Shorted Sensor Return	On the harness, measure the resistance between the ECU connector crank sensor return (J3-F3) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 11 NO: Fix problem. GO TO 21 -- -1/1
11 Check Sensor Circuit Resistance	<i>NOTE: Verify that crank sensor signal and return wires are in the specified connector cavities (not swapped).</i> 1. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and the crank sensor connector signal (A). 2. On the harness, measure the resistance between ECU crank sensor return (J3-F3) and the crank sensor connector return (B). Are both resistance measurements less than 10 ohms?	YES: GO TO 12 NO: Fix problem. GO TO 21 -- -1/1

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12 Check for Intermittent Short Between Signal and Return	1. Verify crank sensor is disconnected. 2. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and the crank sensor return (J3-F3). Is resistance greater than 1k ohms?	YES: GO TO 13 NO: Fix problem. GO TO 21 -- -1/1
13 Test Terminals	1. Disconnect ECU J2 connector. 2. Perform TERMINAL TEST on J2. Examine ECU battery supply (J2-L1), ignition (J2-B2), and ground (J2-L2) terminals carefully. Were any problems found?	YES: Fix problem. GO TO 21 NO: GO TO 14 -- -1/1
14 Check for Intermittent ECU Power Supply Problem	1. Ignition ON, engine OFF. 2. Measure the voltage from ECU battery supply (J2-L1) to ECU ground (J2-L2) while gently wiggling wire harness. 3. Measure the voltage from ECU ignition (J2-B2) to ECU ground (J2-L2) while gently wiggling wire harness. Were any intermittent wiring problems found?	YES: Fix problem. GO TO 21 NO: GO TO 15 -- -1/1
15 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU crank sensor signal (J3-F4) and all other terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 16 NO: Fix problem. GO TO 21 -- -1/1
16 Check Sensor Resistance at ECU	1. Reconnect crank sensor connector. 2. On the harness, measure the resistance between ECU crank sensor signal (J3-F4) and return (J3-F3). Is the resistance between 2500 ohms and 3500 ohms?	YES: GO TO 17 NO: Fix problem. GO TO 21 -- -1/1

Trouble Code Diagnostics and Tests

17 Inspect Crank Sensor Wiring	Examine crank sensor wiring between the crank sensor and the ECU. Check for the following: • Verify that crank sensor signal and return wires are twisted together throughout the harness. • Verify that no physical damage to crank sensor signal and return wires is evident. Were any problems found?	YES: Replace crank sensor wiring with twisted pair or repair problem. GO TO 21 NO: GO TO 18 -- -1/1
18 Replace Crank Sensor	Has crank sensor been replaced during this procedure?	YES: GO TO 19 NO: Replace crank sensor. GO TO 21 -- -1/1
19 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reinstall ECU connectors. 3. Download latest ECU payload and reprogram ECU. Did DTC 000637.10 reappear active with engine running?	YES: GO TO 20 NO: Problem fixed. -- -1/1
20 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. Did DTC 000637.10 reappear active with engine running?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
21 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Refresh DTCs. 6. Operate engine through normal speed and load. Did DTC 000637.10 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

22 Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: GO TO 3

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000641.04 — VGT Actuator Supply Voltage Out of Range Low

The ECU receives a message stating the power supplied to the actuator is to low.

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000641.04 — VGT Actuator Supply Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

000641.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU receives a message stating the power supplied to the actuator is to low. If this code sets, the engine may experience low power due to turbo actuator not moving properly.

Alarm Level:

Warning

Control Unit Response:

The turbo actuator has been disabled after numerous attempts to power it. Engine performance will be degraded.

Additional References:

For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or zzzzTURBOCHARGER ACTUATOR CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh codes. Is 000641.04 active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Actuator Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect actuator connector from engine harness connector. 3. Ignition ON, Engine OFF. 4. Measure the voltage between the power (terminal 1) and ground (terminal 2 in the engine harness connector). Is the voltage approximately battery voltage?	YES: GO TO 8 NO: GO TO 3 -- -1/1
❸ VGT Actuator Connector Terminal Test	1. Disconnect VGT actuator connectors. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 -- -1/1
❹ Ground Connection Check	Measure resistance between VGT actuator ground (terminal 2) in engine harness and application single point ground. Is resistance less than 1 ohm?	YES: GO TO 5 NO: Repair connection. Reconnect all connectors and retest. -- -1/1
❺ Power Connection Check One	Measure resistance between VGT actuator power (terminal 1) and the ECU VGT power (J1 terminal H3) in the engine harness. Is resistance less than 1 ohm?	YES: GO TO 6 NO: Repair connection. Reconnect all connectors and retest. -- -1/1

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6 Power Connection Check Two	Measure resistance between VGT actuator power (terminal 1) and the ECU VGT power (J1 terminal H4) in the engine harness. Is resistance less than 1 ohm?	YES: GO TO 7 NO: Repair connection. Reconnect all connectors and retest. -- -1/1
7 ECU Internal Resistance Check	Measure resistance between the ECU VGT power (J1 terminal H4) and ECU ground (J2 terminal M2) on the ECU. Is resistance between 4.5k and 5.5k ohms?	YES: Everything checks good. Reconnect all connectors and retest. NO: Wiring checks good. Replace ECU and retest. -- -1/1
8 Occurrence Count Check	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 9 NO: GO TO 10 -- -1/1
9 VGT Actuator and ECU Connector Terminal Test	1. Disconnect VGT actuator connector and all ECU connectors. 2. Perform TERMINAL TEST on all connectors. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 10 -- -1/1
10 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 11 NO: GO TO 13 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Is 000641.04 active?	YES: GO TO 12 NO: GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

12 Actuator Cooling System Check	1. Ignition OFF, Engine OFF. 2. Bleed air from the actuator cooling system, see COOLING SYSTEM DEAERATION in base engine manual. 3. Ignition ON, Engine ON. 4. Set engine to operating point that caused error. Is 000641.04 active?	YES: Remove and Replace VGT actuator. Recalibrate, see TURBO LEARN VALUE RESET TEST. NO: Problem fixes. Actuator cooling system had air in it. -- -1/1
13 VGT Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect VGT actuator connector. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 14 -- -1/1
14 ECU Connector Terminal Test	1. Disconnect ECU connectors J1 (black face) and J2 (red face). 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 15 -- -1/1
15 Actuator Removal and Install	1. Reconnect ECU connector. 2. Remove and Install turbo actuator, see REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in base engine manual. 3. Recalibrate, see TURBOCHARGER ACTUATOR CALIBRATION in Service ADVISOR. 4. Refresh codes. Is 000641.04 active?	YES: GO TO 16 NO: Problem fixed. Bad actuator. -- -1/1

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Trouble Code Diagnostics and Tests

16 Reprogram ECU	1. Ignition ON, Engine OFF. 2. Reprogram ECU, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Is 000641.04 active?	YES: Remove and Replace ECU. Retest. NO: Problem fixed. Bad ECU program. -- -1/1
17 VGT Actuator Connector Terminal Test	1. Ignition OFF, Engine OF. 2. Disconnect VGT actuator connectors. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: Remove and Replace VGT actuator. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. -- -1/1

000641.12 — VGT Actuator Communication Error

The ECU has lost communications with the turbo actuator controller.

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000641.12 — VGT Actuator Communication Error Diagnostic Procedure

Troubleshooting Sequence:

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000641.04

000641.12

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU determines it has lost communications with the actuator.

Alarm Level:

Warning

Control Unit Response:

The Actuator will go to the 20% closed position and stay there.

Additional References:

For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

For more turbocharger information, see VARIABLE GEOMETRY TURBOCHARGER (VGT) OPERATION (TIER 3/STAGE IIIA) in the base engine manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7

- see 4.5L 24V ECU WIRING DIAGRAM 7

- see 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or TURBOCHARGER ACTUATOR CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh codes. Is 000641.12 active?	YES: GO TO 2 NO: GO TO 23 -- -1/1
❷ VGT Actuator Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect VGT actuator connector. 3. Check both the actuator and engine harness connector, see TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 3 -- -1/1
❸ Supply Voltage Check in Harness	1. Ignition ON, Engine OFF. 2. Monitor Battery Voltage on Service ADVISOR. 3. In the engine harness actuator connector measure the voltage between the power (terminal 1) and ground (terminal 2). Is the voltage battery voltage ± 1 volt?	YES: GO TO 4 NO: GO TO 9 -- -1/1

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④ Actuator Communications Circuit Resistance Check	1. Ignition OFF, Engine OFF. 2. In the actuator connector measure and record the following resistance values: • Ground (terminal 2) and communications (UART) (terminal 4). Specification —Resistance 45k to 55k ohms <i>NOTE: For this step place black lead on terminal 1 and red lead on terminal 2 to check for capacitor action.</i> • Power (terminal 1) and ground (terminal 2). Specification —Resistance Greater than 20 M ohms after 20 seconds. Are values within specifications?	YES: GO TO 5 NO: Replace actuator, recalibrate, see INSTALL TURBOCHARGER ACTUATOR.
⑤ ECU Communications Circuit Resistance Check	IMPORTANT: If you are using an EDL to connect the application to Service ADVISOR, select the “Disconnect” icon and electronically disconnect from the ECU. If you get incorrect resistance readings insure the EDL is no longer connected to Service ADVISOR. In the engine harness actuator connector measure the resistance between communications ground (terminal 2) and communications (UART) (terminal 4). Is resistance between 1k and 2k ohms?	YES: GO TO 6 NO: Value is near zero ohms. Check for pinched or melted wiring, repair. Reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST. NO: Value not correct also not near zero ohms. GO TO 20
⑥ ECU Actuator Power Circuit Resistance Check	In the engine harness actuator connector measure the resistance between ground (terminal 2) and power (terminal 1). Is resistance between 4.5k and 5.5k ohms?	YES: GO TO 7. NO: GO TO 12.
⑦ Communications Short to High Voltage Check	1. Ignition ON, Engine OFF. 2. In the engine harness actuator connector measure the voltage between the communications (UART) (terminal 4) and ground (terminal 2). Is voltage above 5.5 volts?	YES: GO TO 8 NO: GO TO 17

Trouble Code Diagnostics and Tests

8 Communications Short Resistance Check	1. Ignition OFF, Engine OFF. 2. Remove all ECU connectors. 3. In the engine harness ECU connectors measure resistance between the communications (UART) (J3 terminal E4) wire and all other terminals. Are any terminals shorted to J3 terminal E4?	YES: Repair wiring and run HARNESS DIAGNOSTIC MODE TEST. NO: Check for pinched or melted wiring, repair. Reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST. ---1/1
9 Supply Voltage Check to Chassis Ground	1. Ignition ON, Engine OFF. 2. Monitor Battery Voltage on Service ADVISOR. 3. In the engine harness actuator connector measure the voltage between the power (terminal 1) and application single point ground. Is the voltage battery voltage ± 1 volt?	YES: GO TO 10 NO: GO TO 11 ---1/1
10 Ground Connection Check	1. Ignition OFF, Engine OFF. 2. Short meter leads together and write down the meter zero value. 3. In engine harness actuator connector measure resistance between ground (terminal 2) and application single point ground. 4. Subtract the meter zero value from the measured value in step 3. Is resistance less than 0.5 ohms?	YES: GO TO 2 NO: Repair ground wire problem. Reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST. ---1/1

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Trouble Code Diagnostics and Tests

11 Power Connection Check	1. Disconnect ECU connector J1 (black face). 2. Short meter leads together and write down the meter zero value. 3. In the engine harness connectors measure and record the following resistance values: • Actuator connector power (terminal 1) to ECU actuator drive (terminal J1-H3). • Actuator connector power (terminal 1) to ECU actuator drive (terminal J1-H4). • Actuator connector ground (terminal 2) to application single point ground. <i>NOTE: Subtract the value recorded in step 2 from each value above to get the actual resistance reading.</i> Specification —Resistance Less than 0.5 ohms are values within specification?	YES: GO TO 2 NO: Repair wire that does not meet specification. Reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
12 Single Point Ground Resistance Check	1. Short meter leads together and write down the meter zero value. 2. In the engine harness actuator connector measure the resistance between ground (terminal 2) and application single point ground. <i>NOTE: Subtract the value recorded in step 1 from step 2 above to get the actual resistance reading.</i> Is resistance less than 0.5 ohms?	YES: GO TO 13 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
13 ECU J1 Connector Terminal Test	1. Disconnect ECU J1 (black face) connector. 2. Check connector, see TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

14 Power Connection Check	1. Short meter leads together and write down the meter zero value. 2. In the engine harness connectors measure and record the following resistance values: • Actuator connector power (terminal 1) to ECU actuator drive (terminal J1-H3). • Actuator connector power (terminal 1) to ECU actuator drive (terminal J1-H4). <i>NOTE: Subtract the value recorded in step 1 from each value above to get the actual resistance reading.</i> Specification —Resistance Less than 0.5 ohms Are values within specification?	YES: GO TO 15 NO: Repair connection. Reconnect all connectors and HARNESS DIAGNOSTIC MODE TEST. -- -1/1
15 ECU J2 Connector Terminal Test	1. Disconnect ECU J2 (red face) connector. 2. Check connector, see TERMINAL TEST earlier in this section. Were any problems found?	YES: Repair problems and run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 16 -- -1/1
16 ECU Internal Resistance Check	1. Short meter leads together and write down the meter zero value. 2. On the ECU measure and record the following resistance values: • ECU actuator drive (terminal J1-H3) to ECU ground (terminal J2-M2). • ECU actuator drive (terminal J1-H4) to ECU ground (terminal J2-M2). <i>NOTE: Subtract the value recorded in step 1 from each value above to get the actual resistance reading.</i> Specification —Resistance Between 4.5k and 5.75k ohms Are values within specification?	YES: Everything checks good. Reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST. NO: Replace ECU and run HARNESS DIAGNOSTIC MODE TEST. -- -1/1

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Trouble Code Diagnostics and Tests

17 Actuator HARNESS DIAGNOSTIC MODE TEST	1. Ignition OFF, Engine OFF. 2. Reconnect VGT actuator connector. 3. Ignition ON, Engine OFF. 4. Run HARNESS DIAGNOSTIC MODE TEST. Is 000641.12 active?	YES: GO TO 18 NO: Problem fixed. Bad connection. -- -1/1
18 Actuator Removal and Install	1. Reconnect ECU connector. 2. Remove and Install turbo actuator, see REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in base engine manual. 3. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. 4. Refresh codes. Is 000641.12 active?	YES: GO TO 19 NO: Problem fixed. Bad actuator. -- -1/1
19 Reprogram ECU	1. Ignition ON, Engine OFF. 2. Reprogram ECU, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Is 000641.12 active?	YES: Remove and Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: Problem fixed. Bad ECU program. -- -1/1
20 ECU Connectors Terminal Test	1. Disconnect all ECU connectors. 2. Check all connectors, see TERMINAL TEST earlier in this section. Were any problems found?	YES: Repair problems and run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 21 -- -1/1

Trouble Code Diagnostics and Tests

21 Open Wire Test	1. Short meter leads together and write down the meter zero value. 2. In the engine harness connectors measure and record the following resistance values: • Actuator connector, communications (UART) (terminal 4) to communications (UART) (terminal J3-E4). • Actuator connector, ground (terminal 2) to ECU ground (terminal J2-M2). <i>NOTE: Subtract the value recorded in step 1 from each value above to get the actual resistance reading.</i> Specification —Resistance Less than 0.5 ohms Are values within specification?	YES: GO TO 22 NO: Repair open wire, reconnect all connectors and run HARNESS DIAGNOSTIC MODE TEST.
22 ECU Internal Resistance Check	Measure resistance between the ECU VGT power (J1 terminal H4) and ECU ground (J2 terminal M2) on the ECU. Is resistance between 4.5k and 5.5k ohms?	YES: Everything checks good. Reconnect all connectors and HARNESS DIAGNOSTIC MODE TEST. NO: Wiring checks good. Replace ECU and HARNESS DIAGNOSTIC MODE TEST.
23 Occurrence Count Check	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 24 NO: GO TO 25
24 VGT Actuator and ECU Connector Terminal Test	1. Disconnect VGT actuator connector and all ECU connectors. 2. Check all connectors, see TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 25

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Trouble Code Diagnostics and Tests

25 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 26 NO: GO TO 28 -- -1/1
26 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Is 000641.12 active?	YES: GO TO 27 NO: GO TO 31 -- -1/1
27 Actuator Cooling System Check	1. Ignition OFF, Engine OFF. 2. Bleed air from the actuator cooling system, see COOLING SYSTEM DEAERATION in base engine manual. 3. Ignition ON, Engine ON. 4. Set engine to operating point that caused error. Is 000641.12 active?	YES: Remove and Replace VGT actuator. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. NO: Problem fixes. Actuator cooling system had air in it. -- -1/1
28 VGT Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect VGT actuator connector and ECU connector J1 (black face). 3. Check connectors, see TERMINAL TEST. Were any problems found?	YES: Repair problem, reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 29 -- -1/1

Trouble Code Diagnostics and Tests

29 Reprogram ECU	1. Ignition ON, Engine OFF. 2. Reprogram ECU, see ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Is 000641.12 active?	YES: Remove and Replace ECU. HARNESS DIAGNOSTIC MODE TEST. NO: Problem fixed. Bad ECU program. ---1/1
30 Actuator Removal and Install	1. Reconnect ECU connector. 2. Remove and Install turbo actuator, see REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in base engine manual. 3. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. 4. Refresh codes. Is 000641.12 active?	YES: GO TO 31 NO: Problem fixed. Bad actuator. ---1/1
31 VGT and ECU Connectors Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect VGT actuator connector and ECU connector J1 (black face). 3. Check connectors, see TERMINAL TEST. Were any problems found?	YES: Repair problem, reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: Remove and Install turbo actuator. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. ---1/1

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000641.13 — VGT Actuator Learn Error

The ECU receives a message from the actuator stating it could not reach its expected end points.

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000641.13 — VGT Actuator Learn Error Diagnostic Procedure

Troubleshooting Sequence:
000641.13

When DTC is Displayed:

After running the HARNESS DIAGNOSTIC MODE TEST or INSTALL TURBOCHARGER ACTUATOR.

Related Information:

The ECU receives a message from the actuator stating it could not reach its expected end points during the turbo learn portion of the HARNESS DIAGNOSTIC MODE TEST or TURBOCHARGER ACTUATOR CALIBRATION.

Alarm Level:

Warning

Control Unit Response:

Engine will continue to operate without any performance loss.

Additional References:

For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

For more turbocharger information, see VARIABLE GEOMETRY TURBOCHARGER (VGT) OPERATION (TIER 3/STAGE IIIA) in the base engine manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
 - see 4.5L 24V ECU WIRING DIAGRAM 7
 - see 6.8L 12V ECU WIRING DIAGRAM 7
 - see 6.8L 24V ECU WIRING DIAGRAM 7
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or INSTALL TURBOCHARGER ACTUATOR the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Run HARNESS DIAGNOSTIC MODE TEST. 5. Refresh codes. Is 000641.13 active?	YES: GO TO 2 NO: Checks good. Return to service. -- -1/1
❷ Actuator Linkage Test	1. Ignition OFF, Engine OFF.  CAUTION: Turbo and linkage may be very hot. 2. Check turbo to actuator linkage for free movement through it's complete travel, see REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in base engine manual. Is linkage movement free?	YES: GO TO 3 NO: GO TO 5 -- -1/1
❸ Actuator Linkage Hold Position Check	1. Not the position of the actuator linkage. It should change in the next step. 2. Ignition ON, Engine ON. 3. Linkage should have moved slightly and is being held in that position. Did linkage move and is it being held in position?	YES: GO TO 4 NO: Remove and replace Actuator. Recalibrate actuator, see INSTALL TURBOCHARGER ACTUATOR, in Service ADVISOR. -- -1/1

Trouble Code Diagnostics and Tests

4 Other Codes Check	1. Ignition ON, Engine OFF. 2. Refresh DTC list. Are there any 000641 error codes active?	YES: Troubleshoot those active codes. NO: Replace Actuator. Recalibrate actuator, see INSTALL TURBOCHARGER ACTUATOR, in Service. --1/1
5 Turbo Vane and Linkage Check	Test VGT, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Group 150 earlier in this manual. Did test pass?	YES: Checks good. Return to service. NO: Test VGT, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Group 150 earlier in this manual. --1/1

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000641.16 — Turbo Actuator Temperature Moderately High

The ECU receives a turbo actuator temperature above specification message from the actuator.

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000641.16 — Turbo Actuator Temperature Moderately High Diagnostic Procedure

Troubleshooting Sequence:

000110.00 or 000110.15 or 000110.16
000641.12 or 000641.04
000641.16

When DTC is Displayed:

When ever the error is active and the engine has been running for a minimum of 3 minutes.

Related Information:

The turbo actuator notifies the ECU that the turbo actuator temperature is above specification, 115°C (239°F).

Alarm Level:

Warning

Control Unit Response:

Normal operation.

Additional References:

For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

For more turbocharger information, see TURBOCHARGER in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
 - see 4.5L 24V ECU WIRING DIAGRAM 7
 - see 6.8L 12V ECU WIRING DIAGRAM 7
 - see 6.8L 24V ECU WIRING DIAGRAM 7
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or INSTALL TURBOCHARGER ACTUATOR the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Run engine at idle for 5 minutes. 6. Refresh codes. Is 000641.16 active?	YES: GO TO 2 NO: GO TO 5 -- -1/1
❷ Cool Engine Check	1. Ignition OFF, Engine OFF. 2. Cool engine to temperature of current surroundings. 3. Ignition ON, Engine OFF. 4. Connect Service ADVISOR, if not connected, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 5. Refresh codes. Is 000641.16 active?	YES: Replace VGT Actuator. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. Then GO TO 3 NO: GO TO 3 -- -1/1
❸ Actuator Cooling System Check	1. Ignition OFF, Engine OFF. 2. Bleed air from the actuator cooling system, see COOLING SYSTEM DEAERATION in base engine manual. Is air bleeding complete?	YES: GO TO 4 NO: Bleed air from the actuator cooling system, see COOLING SYSTEM DEAERATION in base engine manual. -- -1/1

Trouble Code Diagnostics and Tests

4 Hot Operation Test	1. Ignition ON, Engine ON. 2. Run engine to hottest operating temperature. 3. Refresh codes. Is 000641.16 active?	YES: Remove and Replace actuator. Recalibrate, see INSTALL TURBOCHARGER ACTUATOR. NO: Problem fixed. Actuator cooling system had air in it. -- -1/1
5 Occurrence Count Check	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review occurrence counts in the snapshot capture information for cooling system codes (000110.00, 000110.15, 000110.16). Are any of the occurrence counts nearly the same as for 000641.16?	YES: Trouble shoot the code that's count nearly matches. NO: GO TO 3. -- -1/1

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000647.05 — Engine Fan Drive Circuit Has High Resistance

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,000000D -19-04AUG07-1/1

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000647.31 — Engine Fan Drive Manual Purge Switch Active Too Long

For troubleshooting procedures please see the application troubleshooting manual.

DN22556,000062D -19-20DEC07-1/1

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000651.02 — Injector #1 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #1.

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000651.02 — Injector #1 Part # Data Invalid Diagnostic Procedure

Troubleshooting Sequence: 000651.02

When DTC is Displayed:

During an injector programming event.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Related Information:

The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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① Part Number Input Method Check

Was the part number typed in manually?

YES: GO TO 2

NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

2 Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
3 Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
4 Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
5 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000651.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
6 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

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Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000651.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. ---1/1
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service. ---1/1
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	YES: GO TO 10 NO: Contact John Deere Custom Performance. ---1/1

Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000651.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

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000651.05 — Injector #1 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #1 electronic injector circuit.

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000651.05 — Injector #1 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000627.01

000651.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #1 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #1 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh DTCs.

5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi).

NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the HARNESS DIAGNOSTIC MODE TEST results will be invalid.

6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

Did 000651.05 reappear active?

YES: GO TO 2

NO: GO TO 10

-- -1/1

2 Terminal Test



CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON!

NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.

1. Ignition OFF, engine OFF.

2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness.

3. Perform TERMINAL TEST on injector harness connector.

Were any problems found?

YES: Fix problem. GO TO 9

NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Check Injector Harness Resistance	With 6.8L - On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 4) and injector #1 low side control (terminal 1). With 4.5L - On the injector harness 6-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 5) and injector #1 low side control (terminal 1). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
④ Check Injector Coil Resistance	1. Remove rocker arm cover. 2. On the #1 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace #1 injector. GO TO 9 -- -1/1
⑤ ECU Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1
⑥ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #1 control (terminal J1-E1) and the injector harness 12-way connector (terminal 1). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 12-way connector (terminal 4). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #1 control (terminal J1-E1) and the injector harness 6-way connector (terminal 1). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 6-way connector (terminal 5). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000651.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 -- -1/1
12 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #1, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 -- -1/1
13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.05 reappear active with engine running?	YES: GO TO 1. NO: GO TO 14. -- -1/1

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Trouble Code Diagnostics and Tests

14 Reprogram ECU

1. Download latest ECU payload and reprogram ECU.
 2. Ignition ON, engine ON.
 3. Refresh DTCs.
- Did 000651.05 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #1.
GO TO 9

-- -1/1

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000651.06 — Injector #1 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #1 electronic injector circuit.

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000651.06 — Injector #1 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000651.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #1 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1

- see 4.5L 24V ECU WIRING DIAGRAM 1

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000651.06 reappear active?	YES: GO TO 2 NO: GO TO 11
❷ Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.05, high injector #1 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5

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Trouble Code Diagnostics and Tests

③ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 ---1/1
④ Check Injector Harness for Wire to Wire Short	1. Loosen injector #1 terminal nuts. 2. Lift injector #1 connector away from injector studs. 3. On the injector harness connector (male pin terminals), measure the resistance between injector #1 control (terminal 1) and all other terminals in the injector harness connector. Are all resistance readings greater than 1k ohms?	YES: Replace injector #1. GO TO 10 NO: Replace injector harness. GO TO 10 ---1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 6 ---1/1
⑥ Check Engine Harness for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #1 control (terminal J1-E1) and all terminals in the J1, J2 and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
⑦ Check Engine Harness for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #1 control (terminal J1-E1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000651.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 ---1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000651.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 ---1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #1, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 ---1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.06 reappear active with engine running?	YES: GO TO 1. NO: GO TO 15. ---1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000651.06 reappear active with engine running?	YES: GO TO 1 NO: Replace injector #1. GO TO 10

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000651.07 — Injector #1 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #1.

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000651.07 — Injector #1 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000651.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #1 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #1 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000651.07 reappear active?	YES: GO TO 2 NO: GO TO 5
❷ Fuel Line Inspection	1. Ignition ON, Engine ON. CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines. CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #1 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #1?

YES: Replace injector #1.
GO TO 11

NO: GO TO 4

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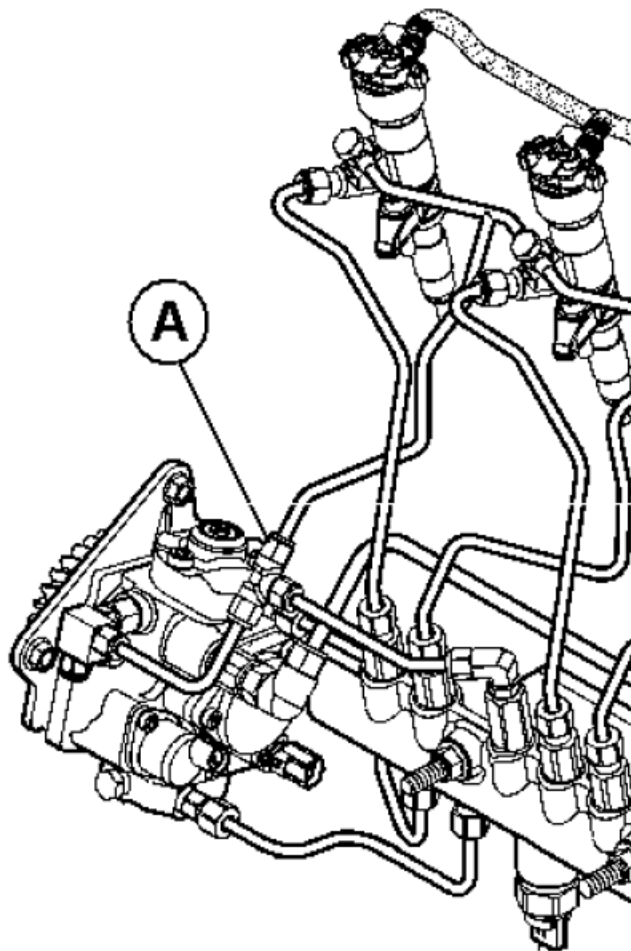
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.
4. Ignition ON, Engine Idling.
5. Collect fuel for 2 minutes.
6. Measure the amount of fuel collected in the container.

Specification

4.5L—Volume..... 0.6 L (20 oz)

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #1.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000651.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 ---1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #1?	YES: Replace injector #1. GO TO 11 NO: GO TO 8 ---1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 ---1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 ---1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000651.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. ---1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 ---1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000651.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000651.13 — Injector #1 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000651.13 — Injector #1 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000651.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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**1 QR Code Input
Method Check**

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

2 Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
3 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
4 Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
5 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.

NO: Start a DTAC case.

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000652.02 — Injector #2 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #2.

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000652.02 — Injector #2 Part # Data Invalid Diagnostic Procedure

Troubleshooting Sequence:
000652.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Related Information:
The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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1 Part Number Input Method Check	Was the part number typed in manually?	YES: GO TO 2 NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
③ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
④ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
⑤ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000652.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
⑥ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000652.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service.
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service.
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	YES: GO TO 10 NO: Contact John Deere Custom Performance.

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Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000652.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

000652.05 — Injector #2 Circuit Has High Resistance

The ECU detects a High resistance in the cylinder #2 electronic injector circuit.

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000652.05 — Injector #2 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

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000652.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #2 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #2 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1

- see 4.5L 24V ECU WIRING DIAGRAM 1

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000652.05 reappear active?	YES: GO TO 2 NO: GO TO 10

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❷ Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 3

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Trouble Code Diagnostics and Tests

③ Check Injector Harness Resistance	With 6.8L - On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 4) and injector #2 low side control (terminal 2). With 4.5L - On the injector harness 6-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 6) and injector #2 low side control (terminal 2). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
④ Check Injector Coil Resistance	1. Remove heat shield and rocker arm cover. 2. On the #2 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace injector. GO TO 9 -- -1/1
⑤ ECU Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1
⑥ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-B1) and the injector harness 12-way connector (terminal 2). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 12-way connector (terminal 4). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-C1) and the injector harness 6-way connector (terminal 2) 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 6-way connector (terminal 6). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

7 Reprogram ECU	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal installation instructions.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 ---1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000652.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 ---1/1
12 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #2, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 ---1/1
13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.05 reappear active with engine running?	YES: GO TO 1. NO: GO TO 14. ---1/1

Trouble Code Diagnostics and Tests

14 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000652.05 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #2.
GO TO 9

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000652.06 — Injector #2 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #2 electronic injector circuit.

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000652.06 — Injector #2 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000652.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #2 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000652.06 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.05, high injector #2 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

③ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 -- -1/1
④ Check Injector Harness for Wire to Wire Short	1. Loosen injector #2 terminal nuts. 2. Lift injector #2 connector away from injector studs. 3. On the injector harness connector (male pin terminals), measure the resistance between injector #2 control (terminal 2) and all other terminals in the injector harness connector. Are all resistance readings greater than 1k ohms?	YES: Replace #2 injector. GO TO 10 NO: Replace injector harness. GO TO 10 -- -1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

⑥ Check Engine Harness for Wire-to-Wire Short	With 6.8L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-B1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #2 control (terminal J1-C1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
⑦ Check Engine Harness for Short to Voltage Source	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #2 control (terminal J1-B1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #2 control (terminal J1-C1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000652.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 ---1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000652.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 ---1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #2, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 ---1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000652.06 reappear active with engine running?	YES: GO TO 1. NO: GO TO 15. ---1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000652.06 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #2.
GO TO 10

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000652.07 — Injector #2 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #2.

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000652.07 — Injector #2 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000652.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #2 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #2 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000652.07 reappear active?	YES: GO TO 2 NO: GO TO 5
❷ Fuel Line Inspection	1. Ignition ON, Engine ON. CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines. CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #2 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #2?

YES: Replace injector #2.
GO TO 11

NO: GO TO 4

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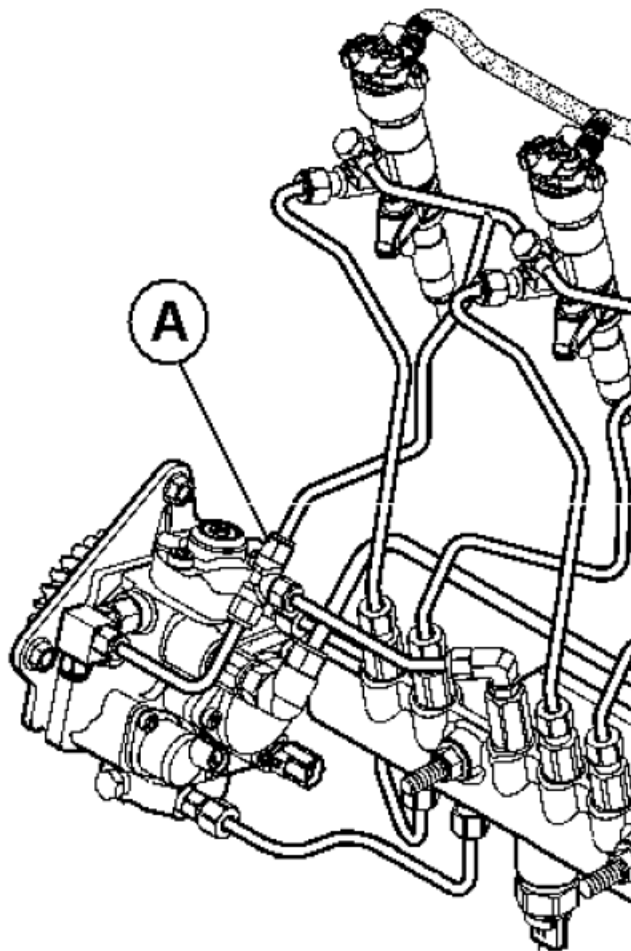
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.
4. Ignition ON, Engine Idling.
5. Collect fuel for 2 minutes.
6. Measure the amount of fuel collected in the container.

Specification

4.5L—Volume..... 0.6 L (20 oz)

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #2.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000652.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 -- -1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #2?	YES: Replace injector #2. GO TO 11 NO: GO TO 8 -- -1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 -- -1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 -- -1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000652.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. -- -1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000652.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000652.13 — Injector #2 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000652.13 — Injector #2 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000652.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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**1 QR Code Input
Method Check**

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

2 Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
3 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
4 Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
5 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.

NO: Start a DTAC case.

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000653.02 — Injector #3 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #3.

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000653.02 — Injector #3 Part # Data Invalid Diagnostic Procedure

Troubleshooting Sequence:
000653.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Related Information:
The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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1 Part Number Input Method Check	Was the part number typed in manually?	YES: GO TO 2 NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
③ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
④ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
⑤ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000653.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
⑥ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000653.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service.
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service.
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILESS earlier in this Group. Were you able to get a new file?	YES: GO TO 10 NO: Contact John Deere Custom Performance.

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Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000653.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

000653.05 — Injector #3 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #3 electronic injector circuit.

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000653.05 — Injector #3 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000627.01

000653.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #3 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #3 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1

- see 4.5L 24V ECU WIRING DIAGRAM 1

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000653.05 reappear active?	YES: GO TO 2 NO: GO TO 10

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❷ Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 3

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Trouble Code Diagnostics and Tests

③ Check Injector Harness Resistance	With 6.8L - On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 4) and injector #3 low side control (terminal 3). With 4.5L - On the injector harness 6-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 6) and injector #3 low side control (terminal 3). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
④ Check Injector Coil Resistance	1. Remove rocker arm cover. 2. On the #3 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace #3 injector. GO TO 9 -- -1/1
⑤ Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1
⑥ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-D1) and the injector harness 12-way connector (terminal 3). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 12-way connector (terminal 4). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-F1) and the injector harness 6-way connector (terminal 3). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 6-way connector (terminal 6). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 ---1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000653.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 ---1/1
12 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #3, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 ---1/1
13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.05 reappear active with engine running?	YES: GO TO 1. NO: GO TO 14. ---1/1

Trouble Code Diagnostics and Tests

14 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000653.05 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #3.
GO TO 9

000653.06 — Injector #3 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #3 electronic injector circuit.

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000653.06 — Injector #3 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000653.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #3 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

1 Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000653.06 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
2 Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.05, high injector #3 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

③ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 -- -1/1
④ Check Injector Harness for Wire to Wire Short	1. Loosen injector #3 terminal nuts. 2. Lift injector #3 connector away from injector studs. 3. On the injector harness connector (male pin terminals), measure the resistance between injector #3 control (terminal 3) and all other terminals in the injector harness connector. Are all resistance readings greater than 1k ohms?	YES: Replace injector #3. GO TO 10 NO: Replace injector harness. GO TO 10 -- -1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

⑥ Check Engine Harness for Wire-to-Wire Short	With 6.8L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-D1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #3 control (terminal J1-F1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
⑦ Check Engine Harness for Short to Voltage Source	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #3 control (terminal J1-D1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #3 control (terminal J1-F1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000653.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 ---1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000653.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 ---1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #3, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 ---1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000653.06 reappear active with engine running?	YES: GO TO 1 NO: GO TO 15. ---1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000653.06 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #3.
GO TO 10

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000653.07 — Injector #3 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #3.

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000653.07 — Injector #3 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000653.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #3 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #3 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000653.07 reappear active?	YES: GO TO 2 NO: GO TO 5
❷ Fuel Line Inspection	1. Ignition ON, Engine ON. CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines. CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #3 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #3?

YES: Replace injector #3.
GO TO 11

NO: GO TO 4

-- -1/1

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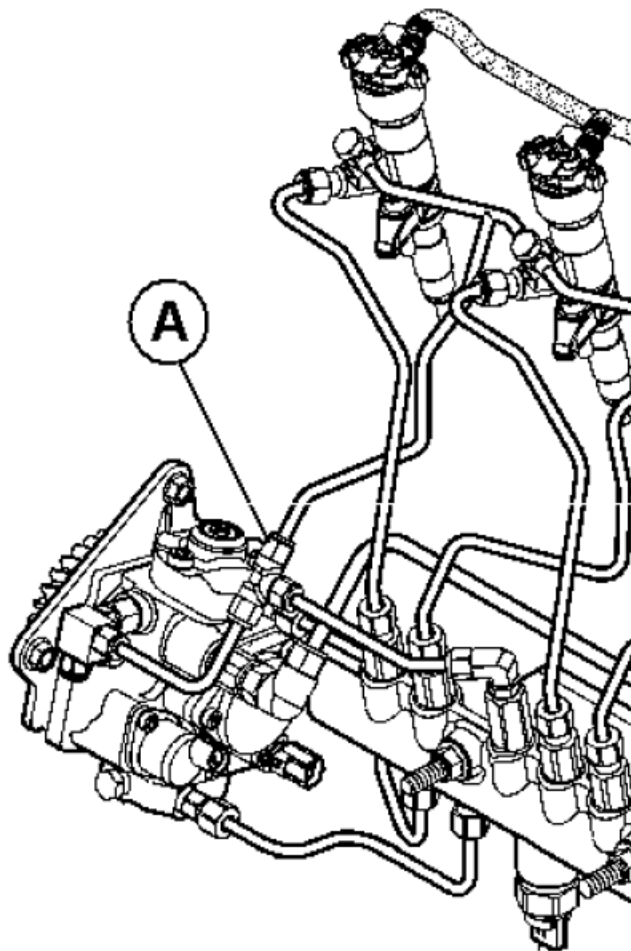
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.
4. Ignition ON, Engine Idling.
5. Collect fuel for 2 minutes.
6. Measure the amount of fuel collected in the container.

Specification

4.5L—Volume..... 0.6 L (20 oz)

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #3.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000653.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 -- -1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #3?	YES: Replace injector #3. GO TO 11 NO: GO TO 8 -- -1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 -- -1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 -- -1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000653.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. -- -1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000653.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000653.13 — Injector #3 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000653.13 — Injector #3 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000653.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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**1 QR Code Input
Method Check**

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

2 Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
3 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
4 Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
5 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.
NO: Start a DTAC case.

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000654.02 — Injector #4 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #4.

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000654.02 — Injector #4 Part Invalid Diagnostic Procedure

Troubleshooting Sequence:

000654.02

When DTC is Displayed:

During an injector programming event.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Related Information:

The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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① Part Number Input Method Check

Was the part number typed in manually?

YES: GO TO 2

NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
③ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
④ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
⑤ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000654.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
⑥ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000654.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service. -- -1/1
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	YES: GO TO 1 NO: Contact John Deere Custom Performance. -- -1/1

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Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000654.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

000654.05 — Injector #4 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #4 electronic injector circuit.

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000654.05 — Injector #4 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

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000654.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #4 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #4 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000654.05 reappear active?	YES: GO TO 2 NO: GO TO 10 04 160 .611 ---1/1
❷ Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 3 ---1/1

Trouble Code Diagnostics and Tests

③ Check Injector Harness Resistance	With 6.8L - On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 9) and injector #4 low side control (terminal 10). With 4.5L - On the injector harness 6-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 5) and injector #4 low side control (terminal 4). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
④ Check Injector Coil Resistance	1. Remove rocker arm cover. 2. On the #4 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace #4 injector. GO TO 9 -- -1/1
⑤ ECU Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1
⑥ Check Engine Harness Resistance	With 6.8L: 1. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-A1) and the injector harness 12-way connector (terminal 10). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 12-way connector (terminal 9). Are both resistance readings less than 2 ohms? With 4.5L: 1. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-D1) and the injector harness 6-way connector (terminal 4) 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G1) and the injector harness 6-way connector (terminal 5). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000654.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 -- -1/1
12 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #4, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 -- -1/1
13 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.05 reappear active with engine running?	YES: GO TO 1. NO: GO TO 14. -- -1/1

Trouble Code Diagnostics and Tests

14 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000654.05 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #4.
GO TO 9

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000654.06 — Injector #4 Circuit Has Low Resistance

The ECU detects a Low resistance in the cylinder #4 electronic injector circuit.

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000654.06 — Injector #4 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000654.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #4 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

① Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000654.06 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
② Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way (6.8L) or 6-way (4.5L) connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.05, high injector #4 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

③ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 ---1/1
④ Check Injector Harness for Wire to Wire Short	With 6.8L: 1. Loosen injector #4 terminal nuts. 2. Lift injector #4 connector away from injector studs. 3. On the injector harness 12-way connector (male pin terminals), measure the resistance between injector #4 control (terminal 10) and all other terminals in the 12-way connector. Are all resistance readings greater than 1k ohms? With 4.5L: 1. Loosen injector #4 terminal nuts. 2. Lift injector #4 connector away from injector studs. 3. On the injector harness 6-way connector (male pin terminals), measure the resistance between injector #4 control (terminal 4) and all other terminals in the 6-way connector. Are all resistance readings greater than 1k ohms?	YES: Replace injector. GO TO 10 NO: Replace injector harness. GO TO 10 ---1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 6 ---1/1

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Trouble Code Diagnostics and Tests

6 Check Engine Harness for Wire-to-Wire Short	With 6.8L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-A1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms? With 4.5L: 1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #4 control (terminal J1-D1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
7 Check Engine Harness for Short to Voltage Source	With 6.8L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #4 control (terminal J1-A1) and single point ground. Is voltage greater than 0.5V? With 4.5L: 1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #4 control (terminal J1-D1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000654.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 -- -1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000654.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 -- -1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #4, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 -- -1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.06 reappear active with engine running?	YES: GO TO 1. NO: GO TO 15. -- -1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000654.06 reappear active with engine running?	YES: GO TO 1 NO: Replace injector #4. GO TO 10

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000654.07 — Injector #4 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #4.

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000654.07 — Injector #4 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000654.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #4 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #4 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000654.07 reappear active?	YES: GO TO 2 NO: GO TO 5

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON.  CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.  CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #4 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #4?

YES: Replace injector #4.
GO TO 11

NO: GO TO 4

-- -1/1

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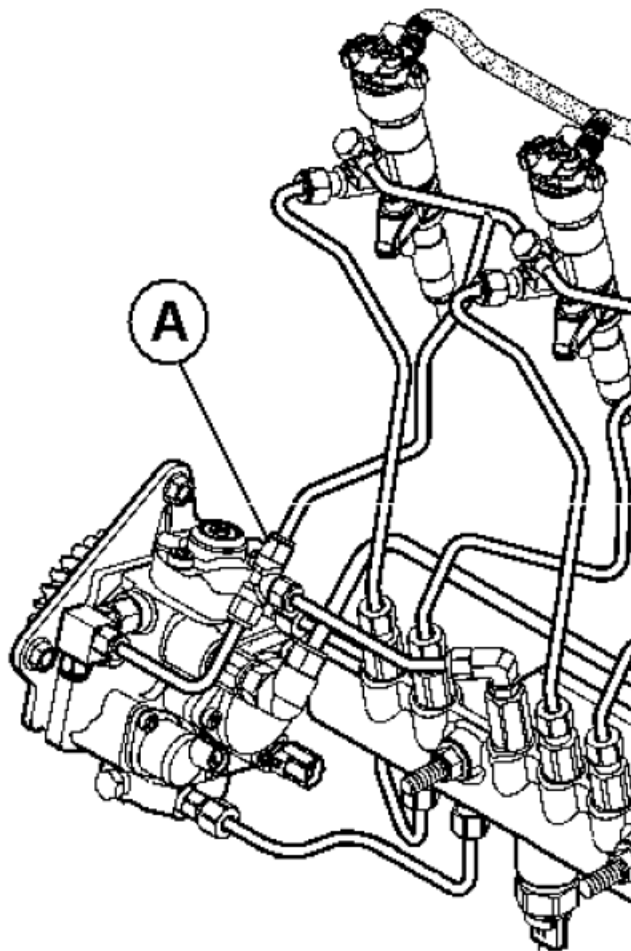
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.

4. Ignition ON, Engine Idling.

5. Collect fuel for 2 minutes.

6. Measure the amount of fuel collected in the container.

Specification

4.5L—Volume..... 0.6 L (20 oz)

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #4.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000654.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 ---1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #4?	YES: Replace injector #4. GO TO 11 NO: GO TO 8 ---1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 ---1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 ---1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000654.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. ---1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 ---1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000654.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000654.13 — Injector #4 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000654.13 — Injector #4 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000654.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

-- -1/1

1 QR Code Input Method Check

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

② Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
③ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
④ Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
⑤ Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
⑥ ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.

NO: Start a DTAC case.

-- -1/1

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000655.02 — Injector #5 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #5.

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000655.02 — Injector #5 Part # Data Invalid Diagnostic Procedure

Troubleshooting Sequence:
000655.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Related Information:
The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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1 Part Number Input Method Check	Was the part number typed in manually?	YES: GO TO 2 NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
③ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
④ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
⑤ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000655.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
⑥ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000655.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service.
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service.
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	YES: GO TO 10 NO: Contact John Deere Custom Performance.

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Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000655.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

000655.05 — Injector #5 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #5 electronic injector circuit.

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000655.05 — Injector #5 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

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000655.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #5 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #5 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000655.05 reappear active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
❷ Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 3 -- -1/1
❸ Check Injector Harness Resistance	On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 9) and injector #5 low side control (terminal 11). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
❹ Check Injector Coil Resistance	1. Remove rocker arm cover. 2. On the #5 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace injector. GO TO 9 -- -1/1
❺ ECU Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

6 Check Engine Harness Resistance	1. On the harness, measure the resistance between the ECU injector #5 control (terminal J1-F1) and the injector harness 12-way connector (terminal 11). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 12-way connector (terminal 9). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1
7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000655.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 -- -1/1
12 Terminal Test	1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #5, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Reconnect and Retest

1. Reconnect all connectors.
 2. Ignition ON, engine ON.
 3. Refresh DTCs.
- Did 000655.05 reappear active with engine running?

YES: GO TO 1.
NO: GO TO 14.

--1/1

14 Reprogram ECU

1. Download latest ECU payload and reprogram ECU.
 2. Ignition ON, engine ON.
 3. Refresh DTCs.
- Did 000655.05 reappear active with engine running?

YES: GO TO 1
NO: Replace injector #5.
GO TO 9

--1/1

000655.06 — Injector #5 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #5 electronic injector circuit.

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000655.06 — Injector #5 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000655.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #5 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000655.06 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way injector connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.05, high injector #5 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

③ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 ---1/1
④ Check Injector Harness for Wire to Wire Short	1. Loosen injector #5 terminal nuts. 2. Lift injector #5 connector away from injector studs. 3. On the injector harness connector (male pin terminals), measure the resistance between injector #5 control (terminal 11) and all other terminals in the injector harness connector. Are all resistance readings greater than 1k ohms?	YES: Replace injector #5. GO TO 10 NO: Replace injector harness. GO TO 10 ---1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Did you find a problem?	YES: Fix problem. GO TO 10 NO: GO TO 6 ---1/1
⑥ Check Engine Harness for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #5 control (terminal J1-F1) and all terminals in the J1, J2, and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
⑦ Check Engine Harness for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #5 control (terminal J1-F1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000655.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 -- -1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000655.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 -- -1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #5, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 -- -1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000655.06 reappear active with engine running?	YES: GO TO 1. NO: GO TO 15. -- -1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000655.06 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #5.
GO TO 10

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000655.07 — Injector #5 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #5.

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000655.07 — Injector #5 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000655.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #5 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #5 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

--1/1

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000655.07 reappear active?	YES: GO TO 2 NO: GO TO 5

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❷ Fuel Line Inspection	1. Ignition ON, Engine ON.  CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.  CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #5 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #5?

YES: Replace injector #5.
GO TO 11

NO: GO TO 4

-- -1/1

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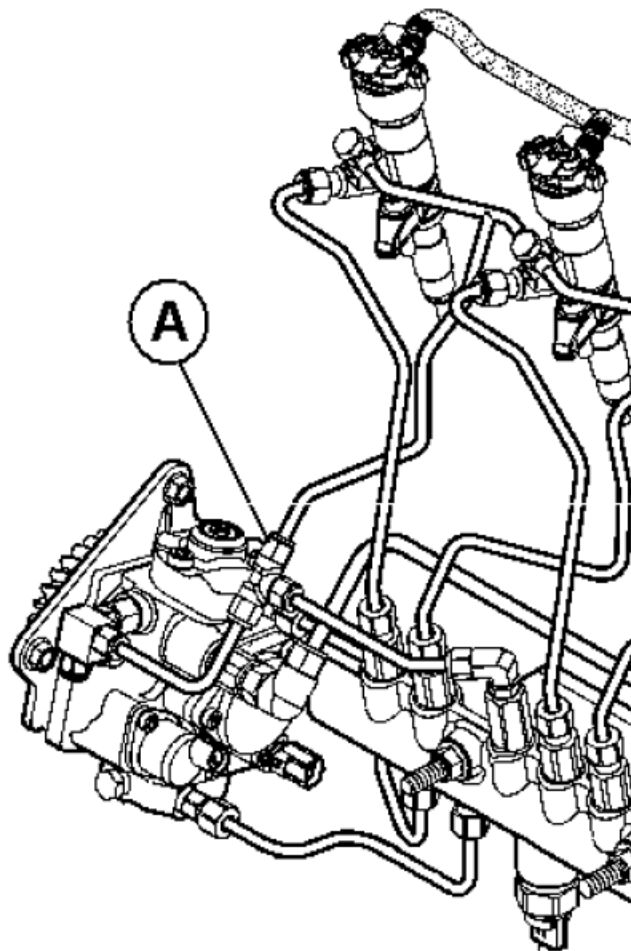
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.
4. Ignition ON, Engine Idling.
5. Collect fuel for 2 minutes.
6. Measure the amount of fuel collected in the container.

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #5.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000655.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 ---1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #5?	YES: Replace injector #5. GO TO 11 NO: GO TO 8 ---1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 ---1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 ---1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000655.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. ---1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 ---1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000655.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000655.13 — Injector #5 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000655.13 — Injector #5 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000655.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

-- -1/1

**1 QR Code Input
Method Check**

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

2 Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
3 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
4 Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
5 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.

NO: Start a DTAC case.

-- -1/1

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000656.02 — Injector #6 Part # Data Invalid

The ECU detects an incorrect injector part number was installed or calibrated into cylinder #6.

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000656.02 — Injector #6 Part # Data Invalid Diagnostic Procedure

Troubleshooting Sequence:
000656.02

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will try to maintain the engine operating envelope.

Related Information:
The ECU detects an incorrect injector part number was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

-- -1/1

1 Part Number Input Method Check	Was the part number typed in manually?	YES: GO TO 2 NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② Part Number Check	1. Select Injector Calibration in Service ADVISOR. 2. Check the part number on the injector data sheet against the one displayed. Are the part numbers the same?	YES: GO TO 3 NO: GO TO 4 -- -1/1
③ Part Verification	Verify with parts department that the injector that was installed is the correct one for the application. Is the injector the correct one?	YES: GO TO 5 NO: Remove injector and order proper injector. -- -1/1
④ Physical Verification of Part Number	1. Remove injector from engine, see REMOVE ELECTRONIC INJECTORS (EIS) in Section 2 Group 090 earlier in this manual. 2. Compare the inscribed part number against the datasheet and ordered injector. Is the injector the proper one for the application?	YES: Start a DTAC case. NO: Remove injector and order proper one. -- -1/1
⑤ Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000656.02 active?	YES: GO TO 6 NO: Problem fixed, return application to service. -- -1/1
⑥ ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Check payload and try again. -- -1/1

Trouble Code Diagnostics and Tests

7 Input Injector Data Again	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate and type in the required information. 3. Select Next. 4. Select Submit. 5. Select OK. 6. Select No. 7. Refresh codes. Is 000656.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service.
8 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	YES: GO TO 9 NO: Problem fixed, return application to service.
9 Download Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new file?	YES: GO TO 10 NO: Contact John Deere Custom Performance.

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Trouble Code Diagnostics and Tests

10 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	YES: GO TO 11 NO: Problem fixed, return application to service. -- -1/1
11 ECU Programming Check	1. Download the latest ECU software payload. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 12 NO: Check payload and try again. -- -1/1
12 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector file downloaded from the list of injectors. 4. Select Next. 5. Select Submit. 6. Select OK. 7. Select No. 8. Refresh codes. Is 000656.02 active?	YES: Start a DTAC case. NO: Problem fixed, return application to service. -- -1/1

000656.05 — Injector #6 Circuit Has High Resistance

The ECU detects a high resistance in the cylinder #6 electronic injector circuit.

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000656.05 — Injector #6 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

000627.01

000656.05

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects high resistance in the cylinder #6 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by an open circuit or by a few ohms of additional series resistance anywhere in the injector #6 circuit.

An open circuit in the injector high voltage supply may also cause active DTCs indicating high resistance in this and other injector circuits.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000656.05 reappear active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
❷ Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way connector between engine harness and injector harness. 3. Perform TERMINAL TEST on injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 3 -- -1/1
❸ Check Injector Harness Resistance	On the injector harness 12-way connector (male pin terminals), measure the resistance between injector high voltage supply (terminal 9) and injector #6 low side control (terminal 12). Is resistance less than 2 ohms?	YES: GO TO 5 NO: GO TO 4 -- -1/1
❹ Check Injector Coil Resistance	1. Remove rocker arm cover. 2. On the #6 injector, measure the resistance between the two injector studs. Is the resistance less than 2 ohms?	YES: Replace injector wire harness. GO TO 9 NO: Replace injector. GO TO 9 -- -1/1
❺ ECU Terminal Test	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

6 Check Engine Harness Resistance	1. On the harness, measure the resistance between the ECU injector #6 control (terminal J1-C1) and the injector harness 12-way connector (terminal 12). 2. On the harness, measure the resistance between the ECU high voltage supply (terminal J1-G2) and the injector harness 12-way connector (terminal 9). Are both resistance readings less than 2 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1
7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.05 reappear active?	YES: GO TO 8 NO: Problem fixed. -- -1/1
8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.05 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

9 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.05 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 9 YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000656.05 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 12 -- -1/1
12 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #6, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

13 Reconnect and Retest

1. Reconnect all connectors.
 2. Ignition ON, engine ON.
 3. Refresh DTCs.
- Did 000656.05 reappear active with engine running?

YES: GO TO 1.
NO: GO TO 14.

-- -1/1

14 Reprogram ECU

1. Download latest ECU payload and reprogram ECU.
 2. Ignition ON, engine ON.
 3. Refresh DTCs.
- Did 000656.05 reappear active with engine running?

YES: GO TO 1
NO: Replace injector #6.
GO TO 9

-- -1/1

000656.06 — Injector #6 Circuit Has Low Resistance

The ECU detects a low resistance in the cylinder #6 electronic injector circuit.

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000656.06 — Injector #6 Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

000656.06

When DTC is Displayed:

The engine is cranking or running and the error condition is active. The DTC may also be displayed during Harness Diagnostic Mode Test in Service ADVISOR, provided fuel rail pressure is below 5 MPa (725 psi).

Related Information:

The ECU detects low resistance in the cylinder #6 electronic injector circuit.

The ECU has two internally-connected terminals which provide a shared high voltage supply to all the injectors.

The ECU switches the low side (ground) to control each individual injector.

This DTC can be caused by a wire-to-wire short. A short between the low side wiring of two injectors will cause active DTCs indicating low resistance in both injectors.

This DTC can also be caused by an injector that has low coil resistance (coil windings are shorted together).

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Additional References:

For further electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 6.8L 12V ECU WIRING DIAGRAM 1

- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). <i>NOTE: Fuel Rail Pressure - Actual must be below 5 MPa (725 psi) or the Harness Diagnostic Mode Test results will be invalid.</i> 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did 000656.06 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Check for DTC Change with Open Injector Harness	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! <i>NOTE: See FUEL SYSTEM COMPONENTS located in Section 02, Group 90 earlier in this manual for component locations.</i> 1. Ignition OFF, engine OFF. 2. Disconnect 12-way connector between engine harness and injector harness. 3. Ignition ON, engine OFF. 4. Refresh DTCs 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.05, high injector #6 resistance, become active? <i>NOTE: Ignore DTCs for high resistance in the other injector circuits that may now be active because of this test.</i>	YES: GO TO 3 NO: Do not reconnect injector harness connector. GO TO 5 -- -1/1
❸ Injector Harness Terminal Test and Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on injector harness connector. 3. Remove rocker cover. 4. Inspect injector harness for damage. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 4 -- -1/1

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Trouble Code Diagnostics and Tests

④ Check Injector Harness for Wire to Wire Short	1. Loosen injector #6 terminal nuts. 2. Lift injector #6 connector away from injector studs. 3. On the injector harness connector (male pin terminals), measure the resistance between injector #6 control (terminal 12) and all other terminals in the injector harness connector. Are all resistance readings greater than 1k ohms?	YES: Replace injector #6. GO TO 10 NO: Replace injector harness. GO TO 10 ---1/1
⑤ ECU Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 6 ---1/1
⑥ Check Engine Harness for Wire-to-Wire Short	1. Disconnect ECU J2 and J3 connectors. 2. On the harness, measure the resistance between the ECU injector #6 control (terminal J1-C1) and all terminals in the J1, J2 and J3 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 10 ---1/1
⑦ Check Engine Harness for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the ECU injector #6 control (terminal J1-C1) and single point ground. Is voltage greater than 0.5V?	YES: Fix problem. GO TO 10 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF. 5. Refresh DTCs. 6. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 7. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.06 reappear active?	YES: GO TO 9 NO: Problem fixed. -- -1/1
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.06 reappear active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
10 Verification	<i>NOTE: See INSTALL ELECTRONIC INJECTORS (EIs) in Section 02, Group 90 earlier in this manual for injector terminal torque specification.</i> 1. Ignition OFF, engine OFF. 2. Reconnect all connectors and reinstall rocker cover, if removed. 3. Ignition ON, engine OFF. 4. Refresh DTCs. 5. Verify Fuel Rail Pressure - Actual data point is below 5 MPa (725 psi). 6. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Did DTC 000656.06 reappear active?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 -- -1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000656.06 reappear active when engine operating point was reached?	YES: GO TO 1 NO: GO TO 13 -- -1/1
13 Terminal Test	 CAUTION: Injectors are supplied with 90V. Electric shock hazard if ignition is ON! 1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, injector #6, and injector harness connector. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 -- -1/1
14 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine ON. 3. Refresh DTCs. Did 000656.06 reappear active with engine running?	YES: GO TO 1. NO: GO TO 15. -- -1/1

Trouble Code Diagnostics and Tests

15 Reprogram ECU

- 1. Download latest ECU payload and reprogram ECU.
 - 2. Ignition ON, engine ON.
 - 3. Refresh DTCs.
- Did 000656.06 reappear active with engine running?

YES: GO TO 1

NO: Replace injector #6.
GO TO 10

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000656.07 — Injector #6 Not Responding

The fuel rail pressure does not drop at the injection of fuel to cylinder #6.

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000656.07 — Injector #6 Not Responding Diagnostic Procedure

Troubleshooting Sequence: 000656.07

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU does not detects a drop in fuel rail pressure when cylinder #6 injects fuel.

Alarm Level:

Warning

Control Unit Response:

Engine will run rough and misfire since the injector in cylinder #6 is not injecting fuel.

Additional References:

For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

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① Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition ON, Engine ON. 5. Refresh Codes. Did 000656.07 reappear active?	YES: GO TO 2 NO: GO TO 5
② Fuel Line Inspection	1. Ignition ON, Engine ON. CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines. CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other high pressure lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately. Any fluids injected into the skin must be surgically removed within hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, USA. 2. Check for injector #6 fuel supply line leak. 3. Ignition OFF, Engine OFF. 4. Check for over bent/pinched or cracked fuel line between the rail and the injector. IMPORTANT: If a cracked line is found replace flow damper also. For flow damper replacement see, REMOVE AND INSTALL FLOW DAMPERS in Section 2 Group 090. Were any problems found?	YES: Repair problem. GO TO 11 NO: GO TO 3

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Trouble Code Diagnostics and Tests

③ Misfire Test

1. Ignition ON, Engine OFF.
 2. Perform Cylinder Cutout Test and record results.
 3. Perform Cylinder Misfire Test and record results.
- Do tests confirm a bad injector #6?

YES: Replace injector #6.
GO TO 11

NO: GO TO 4

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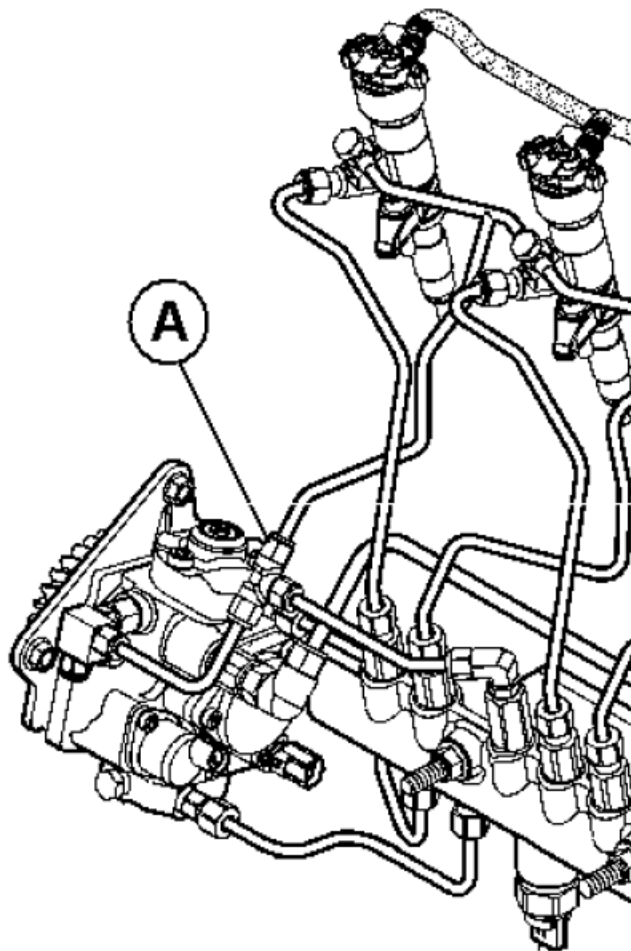
4 Injector Flow Rate Test

1. Ignition OFF, Engine OFF.



CAUTION: Fuel lines may be under high pressure. Use extreme caution while opening fuel lines. Let the engine sit for several minutes after cranking or running prior to opening fuel lines.

2. Disconnect the fuel leak off line at the High Pressure Pump "T" connector.



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A—Leak off line "T" fitting

3. Place leak off line into a container suitable for fuel.
4. Ignition ON, Engine Idling.
5. Collect fuel for 2 minutes.
6. Measure the amount of fuel collected in the container.

Specification

6.8L—Volume..... 0.7 L (24 oz)

Is the collected amount more than the specification?

YES: Replace injector #6.
GO TO 11

NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Occurrence Count Check	Review stored information and look at occurrence count for 000656.07. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 ---1/1
6 Misfire Test	1. Ignition ON, Engine OFF. 2. Perform Cylinder Cutout Test and record results. 3. Perform Cylinder Misfire Test and record results. Do tests confirm a bad injector #6?	YES: Replace injector #6. GO TO 11 NO: GO TO 8 ---1/1
7 Time Between Occurrences Check	Compare last occurrence engine hours with current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 8 ---1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 9 NO: GO TO 10 ---1/1
9 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 000656.07 reappear when engine operating point was reached?	YES: GO TO 2 NO: GO TO 8 and check the operating point. ---1/1
10 Reprogram ECU	Download latest ECU software payload and reprogram ECU using Service ADVISOR. Was reprogramming successful?	YES: GO TO 11 NO: Replace ECU, GO TO 11 ---1/1

Trouble Code Diagnostics and Tests

11 DTC Check	Ignition ON, Engine Idling. Is 000656.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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000656.13 — Injector #6 Calibration Fault

The ECU detects an incorrect QR Code was calibrated into the ECU.

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000656.13 — Injector #6 Calibration Fault Diagnostic Procedure

Troubleshooting Sequence:
000656.13

When DTC is Displayed:
During an injector programming event.

Alarm Level:
Warning

Control Unit Response:
The ECU will attempt to run the engine normally.

Related Information:
The ECU detects an incorrect QR Code was programmed into the ECU. The engine performance may be drastically effected. The engine will also be out of compliance with Tier 3 emission requirements.

Additional References:
For more electronic injector information, see ELECTRONIC INJECTOR (EI) OPERATION in Section 03, Group 130 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

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1 QR Code Input Method Check

Was the QR code typed in manually?

YES: GO TO 2
NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

2 Verification and Reentry of QR Code	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Check the written code against the one displayed. 4. Type it back in again. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 3 -- -1/1
3 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the sequence number of the injector installed from the list. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 4 -- -1/1
4 Retrieve New Injector Calibration File	Download a new injector calibration file, see DOWNLOADING ELECTRONIC INJECTOR CALIBRATION FILES earlier in this Group. Were you able to get a new calibration file?	YES: GO TO 5 NO: GO TO 6 -- -1/1
5 Automatic Input of Injector Data	1. Select Injector Calibration in Service ADVISOR. 2. Select the injector to calibrate. 3. Select the serial number of the injector file downloaded from the list of injectors. Did the ECU accept the QR code?	YES: Problem fixed. NO: GO TO 6 -- -1/1
6 ECU Programming	1. Download the latest ECU software. 2. Reprogram ECU. Was the ECU programming successful?	YES: GO TO 7 NO: Replace ECU. GO TO 3 -- -1/1

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Trouble Code Diagnostics and Tests

**7 Automatic Input of
Injector Data**

1. Select Injector Calibration in Service ADVISOR.
 2. Select the injector to calibrate.
 3. Select the serial number of the injector file downloaded from the list of injectors.
- Did the ECU accept the QR code?

YES: Problem fixed.
NO: Start a DTAC case.

-- -1/1

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000676.03 — Glow Plugs Signal Received When Not Expected

The ECU detects the glow plug relay output is high when the ECU is not energizing the relay.

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000676.03 — Glow Plug Signal Received When Not Expected Diagnostic Procedure

Troubleshooting Sequence:

000676.03

When DTC is Displayed:

The ECU is commanding the glow plug relay OFF but is detecting that the glow plug relay is energized.

Related Information:

The ECU supplies a high side output to the glow plug relay coil to energize the relay. The ECU monitors the output of the relay to determine if the relay is energized.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner.

Engine performance may be affected if glow plugs are powered with engine at operating temperature.

Additional References:

For further glow plug information, see GLOW PLUG OPERATION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF for at least 30 seconds. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh DTCs. Did 000676.03 reappear active?	YES: GO TO 2 NO: GO TO 12 -- -1/1
❷ Check Glow Plug Relay Output Voltage	<i>NOTE: The glow plug relay has four studs. The two smaller studs are connected to the relay coil. One of the large studs is connected to the battery voltage supply. The other large stud is the relay output which is connected to the glow plugs.</i> 1. Ignition ON, engine OFF for at least 30 seconds. 2. Verify that the ECU glow plug relay output sense terminal C05 is on the glow plug relay output stud and not the glow plug relay battery supply terminal. 3. Measure the voltage from the glow plug relay output terminal to single point ground. Is the glow plug relay output terminal voltage greater than 1V?	YES: GO TO 3 NO: GO TO 5 -- -1/1
❸ Check for Energized Glow Plug Relay	Measure voltage from glow plug relay coil high side terminal (C04) to single point ground. Is voltage greater than 1V?	YES: GO TO 6 NO: GO TO 4 -- -1/1
❹ Check for Stuck Glow Plug Relay Contacts	1. Remove glow plug fuse located in a sealed fuse holder near alternator output terminal. 2. Measure the voltage from the glow plug relay output terminal (C05) to single point ground. Is voltage greater than 1V?	YES: Repair short to voltage source in glow plug relay output wiring. GO TO 11 NO: Replace glow plug relay. GO TO 11 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check Glow Plug Relay Output Sense Wiring	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. 4. Measure the resistance between ECU glow plug relay output sense (J1-A4) and glow plug relay output terminal (C05). Are Terminal Test results good and is resistance less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 11 -- -1/1
6 Check Glow Plug Relay Control Circuit	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. 4. Measure the resistance between ECU glow plug relay control (J1-F4) and glow plug relay coil high side terminal (C04). Are Terminal Test results good and is resistance less than 10 ohms?	YES: Do not reconnect J1. GO TO 7 NO: Fix problem. GO TO 11 -- -1/1
7 Check Glow Plug Relay Control Circuit for Short to Voltage	1. Ignition ON, engine OFF. 2. Measure the voltage from glow plug relay coil high side terminal (C04) to single point ground. Is the voltage greater than 1V?	YES: Repair short to voltage of glow plug control circuit. GO TO 11 NO: GO TO 8 -- -1/1
8 Check Glow Plug Relay Control Circuit for Wire to Wire Short	1. Ignition OFF, engine OFF. 2. Remove glow plug relay coil high side terminal (C04) from glow plug relay. 3. Measure resistance between ECU glow plug relay control (J1-F4) and all other terminals in the J1 connector. Are all resistance values greater than 1k ohms?	YES: GO TO 9 NO: Fix problem. GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

9 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Download latest ECU payload and reprogram ECU. 4. Ignition ON, engine OFF for at least 30 seconds. 5. Refresh DTCs. Did DTC 000676.03 reappear active?	YES: GO TO 10 NO: Problem fixed. ---1/1
10 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF for at least 30 seconds. 4. Refresh DTCs. Did DTC 000676.03 reappear active?	YES: Open DTAC case. NO: Problem fixed. ---1/1
11 Verification	1. Ignition OFF, engine OFF for 10 seconds. 2. Reconnect all connectors. 3. Ignition ON, engine OFF for at least 30 seconds. 4. Refresh DTCs. Did DTC 000676.03 reappear active?	YES: GO TO 2 NO: Problem fixed. ---1/1
12 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 11 YES: If a certain operating point exists when error occurs then GO TO 13 NO: GO TO 14 ---1/1

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Trouble Code Diagnostics and Tests

13 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000676.03 reappear active when engine operating point was reached?	YES: GO TO 2 NO: GO TO 14 -- -1/1
14 Terminal Test and Harness Inspection	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on the ECU J1 connector and glow plug relay. 3. Inspect wiring harness for damage which could cause intermittent short to voltage source or wire to wire shorts. Were any problems found?	YES: Fix problem. GO TO 11 NO: Reconnect all connectors. GO TO 15 -- -1/1
15 Check for Intermittent Stuck Relay Contacts	1. Disconnect fuel temperature sensor to cause ECU to energize glow plug relay at next key cycle. 2. Ignition ON, engine OFF for at least 30 seconds. 3. Refresh DTCs. Did 000676.03 reappear active? <i>NOTE: Cycle ignition OFF for 10 seconds and repeat sub-steps 2-3 several times to cycle relay contacts, if 000676.03 does not reappear active.</i>	YES: Relay contacts may be stuck. GO TO 2 NO: GO TO 16 -- -1/1
16 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine ON for at least 30 seconds. 3. Refresh DTCs. Did 000676.03 reappear active?	YES: GO TO 2 NO: Problem fixed or conditions necessary to duplicate 000676.03 not met. -- -1/1

000676.05 — Glow Plug Signal Not Received When Expected

The ECU detects the glow plug relay output is low when the ECU is energizing the relay.

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000676.05 — Glow Plug Signal Not Received When Expected Diagnostic Procedure

Troubleshooting Sequence:

000676.05

When DTC is Displayed:

The ECU is commanding the glow plug relay ON but is detecting that the glow plug relay is not energized. This DTC will become stored when the ECU commands the glow plug relay OFF. The brief length of time that DTC is active may cause DTC to only be shown as a stored DTC.

Related Information:

The ECU uses fuel temperature to determine if glow plug relay should be energized. The ECU supplies a high side control to the glow plug relay to energize the relay. The ECU monitors the output of the relay to determine if glow plug relay is energized. This DTC may be caused by wiring problems including an open glow plug relay control circuit or an open circuit between the relay output and the ECU. This DTC may also be caused by a defective glow plug relay or a blown or missing glow plug fuse.

Alarm Level:

Warning

Control Unit Response:

The ECU will attempt to control the engine in a normal manner. The engine may require extended crank time or may not start in low ambient temperatures if glow plugs are not powered.

Additional References:

For further glow plug information, see GLOW PLUG OPERATION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Disconnect fuel temperature sensor connector to cause the ECU to attempt to energize the glow plug relay at next key cycle. <i>NOTE: Ignore DTC 000174.03 which will be generated due to fuel temperature sensor being disconnected.</i> 5. Clear DTCs. 6. Ignition OFF, engine OFF for 10 seconds. 7. Ignition ON, engine OFF. 8. Refresh DTCs. Did 000676.05 reappear active or stored?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Check Glow Plug Relay Voltage Supply	1. Ignition OFF, engine OFF. 2. Measure the voltage from the glow plug relay battery voltage supply terminal (cable between alternator output and glow plug relay) to single point ground. Is voltage within 1V of battery terminal voltage?	YES: GO TO 3 NO: Check for blown or missing glow plug fuse, loose connections, or open circuit. Fix problem. GO TO 10 -- -1/1
❸ Check Glow Plug Relay Output Voltage	1. Verify fuel temperature sensor is still disconnected. 2. Ignition ON, engine OFF. Glow plug relay should be energized for approximately 15 seconds. 3. Measure voltage from glow plug relay output terminal (C05) to single point ground while ECU is attempting to energize relay. Is voltage within 5V of battery terminal voltage?	YES: GO TO 4 NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

④ Check Relay Output Sense Wiring	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. 4. Measure the resistance between ECU glow plug relay output sense (J1-A4) and glow plug relay output sense terminal (C05). Are Terminal Test results good and is resistance less than 10 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 10 -- -1/1
⑤ Check Glow Plug Relay Coil Ground Circuit	1. Ignition OFF, engine OFF. 2. Measure the resistance between the glow plug relay control coil low side terminal (C03) and single point ground. Is resistance less than 2 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 10 -- -1/1
⑥ Check Glow Plug Relay Operation	1. Ignition OFF, engine OFF. 2. Disconnect relay high side control terminal (C04) from relay stud. 3. Attach a fused jumper wire between the glow plug relay battery supply terminal and the relay high side control stud. 4. Measure voltage from glow plug relay output terminal to single point ground. Is the voltage at relay output within 5V of battery terminal voltage?	YES: Remove jumper wire. GO TO 7 NO: Replace glow plug relay. GO TO 10 -- -1/1
⑦ Check Relay Control Wiring	1. Disconnect ECU J1 connector. 2. Perform TERMINAL TEST on J1. 3. Measure the resistance between ECU glow plug relay control (J1-F4) and glow plug relay coil high side control terminal (C04). Are Terminal Test results good and is resistance less than 2 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

8 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all connectors except fuel temperature sensor. 3. Download latest ECU payload and reprogram ECU. 4. Clear DTCs. 5. Ignition OFF, engine OFF for 10 seconds. 6. Ignition ON, engine OFF. 7. Refresh DTCs. Did DTC 000676.05 reappear active or stored?	YES: GO TO 9 NO: Problem fixed. Reconnect fuel temperature sensor and clear DTCs.
9 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Ignition OFF, engine OFF for 10 seconds. 6. Ignition ON, engine OFF. 7. Refresh DTCs. Did DTC 000676.05 reappear active or stored?	YES: Open DTAC case. NO: Problem fixed. Reconnect fuel temperature sensor and clear DTCs.

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Trouble Code Diagnostics and Tests

10 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors except fuel temperature sensor. 3. Ignition ON, engine OFF. 4. Clear DTCs. 5. Ignition OFF, engine OFF for 10 seconds. 6. Ignition ON, engine OFF. 7. Refresh DTCs. Did DTC 000676.05 reappear active or stored?	YES: GO TO 2 NO: Problem fixed. Reconnect fuel temperature sensor and clear DTCs. -- -1/1
11 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. GO TO 10 YES: If a certain operating point exists when error occurs then GO TO 12 NO: GO TO 13 -- -1/1
12 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh DTCs. Did 000676.05 reappear active when engine operating point was reached?	YES: GO TO 2 NO: GO TO 13 -- -1/1
13 Terminal Test	1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector, glow plug relay, and glow plug voltage supply circuit including fuse. Were any problems found?	YES: Fix problem. GO TO 10 NO: GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

14 Reconnect and Retest	1. Reconnect all connectors except fuel temperature sensor. 2. Ignition ON, engine OFF. 3. Clear DTCs. 4. Ignition OFF, engine OFF for 10 seconds. 5. Ignition ON, engine OFF. 6. Refresh DTCs. Did 000676.05 reappear active or stored?	YES: GO TO 2. NO: GO TO 15. -- -1/1
15 Reprogram ECU	1. Download latest ECU payload and reprogram ECU. 2. Ignition ON, engine OFF. 3. Clear DTCs. 4. Ignition OFF, engine OFF for 10 seconds. 5. Ignition ON, engine OFF. 6. Refresh DTCs. Did 000676.05 reappear active or stored?	YES: GO TO 2 NO: Problem fixed or conditions necessary to duplicate 000676.05 not met. Reconnect fuel temperature sensor and clear DTCs. -- -1/1

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000898.09 — TSC Message Time Out

For troubleshooting procedures please see the application troubleshooting manual.

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000970.31 — External Shutdown Commanded

The ECU has shutdown the engine due the external shutdown switch being activated.

NOTE: For additional information refer to the application troubleshooting manual.

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000970.31 — External Shutdown Commanded Diagnostic Procedure

Troubleshooting Sequence:

000970.31

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

OEM applications can be programmed with trim options. The customer has the option to have an external engine shutdown switch. When this feature is programmed into the ECU, the ECU will shutdown the engine when the switch is activated.

Alarm Level:

STOP

Control Unit Response:

If this code sets, the ECU will shut the engine down.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000970.31 reappear active?	YES: GO TO 2 NO: GO TO 14
❷ Check Condition That Set Switch	1. Ignition OFF, Engine OFF. 2. Refer to application manual to find what device is connected to external shutdown switch. 3. Inspect device for parameter that may have caused external shutdown switch to be activated. Depending on application, this may be wiring, mechanical linkage, or an environmental condition. Was a possible problem or operating point found that could cause the external shutdown switch to be activated?	YES: Repair problem. Retest application to verify DTC 970.31 is inactive. NO: No problem found. GO TO 3
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Remove wires or connector from external shutdown switch. 3. Perform TERMINAL TEST on connector and external shutdown switch. 4. Inspect surrounding area for pinched or melted wires. Were any problems found with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 4

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Trouble Code Diagnostics and Tests

④ Check Harness	Step 1. 1. Ignition ON, Engine OFF. 2. Refresh codes from within Service ADVISOR. 3. Record if 000970.31 is active. 4. GO TO step 2. Step 2. 1. Ignition OFF, Engine OFF. 2. On the harness, connect the two wires from the external shutdown switch together. 3. Ignition ON, Engine OFF. 4. Refresh codes from within Service ADVISOR. Did 000970.31 change state from step 1?	YES: Replace external shutdown switch. GO TO 13 NO: Problem in harness. GO TO 5 -- -1/1
⑤ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the two wires to the external shutdown switch from each other. 3. On harness, disconnect C08 auxiliary connector from main harness. 4. Perform TERMINAL TEST on both C08 connectors. 5. Inspect harness for pinched or melted wires near both C08 connectors. Were any problems found with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 6 -- -1/1
⑥ Check Auxiliary Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal K to each individual wire of the external shutdown switch. 3. On auxiliary harness connector C08, measure resistance from terminal Q to each individual wire of the external shutdown switch. Does each terminal, K and Q measure less than 5 ohms to one of the wires?	YES: GO TO 7 NO: Fix open wire in auxiliary harness. GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

7 Check Auxiliary Harness for Shorted Wire	<i>NOTE: Make sure the wires to the external shutdown switch are disconnected from the switch and not touching each other.</i> 1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal K to each terminal of C08. Was the measurements less than 100 ohms?	YES: Fix shorted wire in auxiliary harness. GO TO 13 NO: Problem in main harness. GO TO 8 ---1/1
8 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on ECU harness connector J2. 4. Inspect harness for pinched or melted wires near J2 ECU connector. Are there any problems with the wiring or connector?	YES: Fix problem. GO TO 13 NO: GO TO 9 ---1/1
9 Check ECU Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness, measure resistance from connector C08, terminal K to ECU connector J2, terminal K1. 3. On ECU harness, measure resistance from connector C08, terminal Q to ECU connector J2, terminal G3. Was either measurements greater than 5 ohms?	YES: Fix open wire in ECU harness. GO TO 13 NO: GO TO 10 ---1/1
10 Check ECU Harness for Shorted Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness connector C08, measure resistance from terminal K to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in ECU harness. GO TO 13 NO: ECU has not been reprogrammed. GO TO 11 NO: ECU has been reprogrammed. GO TO 12 ---1/1

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Trouble Code Diagnostics and Tests

11 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000970.31 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1
12 Check ECU	<i>NOTE: For ECU connector pinouts, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 earlier in this manual.</i> On ECU, measure resistance from terminal J2-K1 to terminal J2-G3. Is the measurement between 30K and 80K?	YES: Problem not found. Reconnect all connectors. GO TO 1 Confirm findings looking closely at connectors, wiring, and terminal numbers used for measurements. NO: Replace ECU. GO TO 13 -- -1/1
13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all wires, connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load ranges if possible. Did DTC 000970.31 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

14 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active? 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. --1/1

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000971.31 — External Derate Commanded

The ECU has derated the engine due the external fuel derate switch being activated.

NOTE: For additional information refer to the application troubleshooting manual.

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000971.31 — External Derate Commanded Diagnostic Procedure

Troubleshooting Sequence:

000971.31

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

OEM applications can be programmed with trim options. The customer has the option to have an external fuel derate switch. When this feature is programmed into the ECU, the ECU will derate the engine when the switch is activated.

Alarm Level:

Warning

Control Unit Response:

If the code is set, the ECU will derate the engine by a certain percentage of full power depending on the trim option selected.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on engine derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 000970.31 reappear active?	YES: GO TO 2 NO: GO TO 14 -- -1/1
❷ Check Condition That Set Switch	1. Ignition OFF, Engine OFF. 2. Refer to application manual to find what device is connected to external fuel derate switch. 3. Inspect device for parameter that may have caused external fuel derate switch to be activated. Depending on application, this may be wiring, mechanical linkage, or an environmental condition. Was a possible problem or operating point found that could cause the external fuel derate switch to be activated?	YES: Repair problem. Retest application to verify DTC 971.31 is inactive. NO: No problem found. GO TO 3 -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Remove wires or connector from external fuel derate switch. 3. Perform TERMINAL TEST on connector and external fuel derate switch. 4. Inspect surrounding area for pinched or melted wires. Were any problems found with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Check Harness	Step 1. 1. Ignition ON, Engine OFF. 2. Refresh codes from within Service ADVISOR. 3. Record if 000971.31 is active. 4. GO TO step 2. Step 2. 1. Ignition OFF, Engine OFF. 2. On the harness, connect the two wires from the external fuel derate switch together. 3. Ignition ON, Engine OFF. 4. Refresh codes from within Service ADVISOR. Did 000971.31 change state from step 1?	YES: Replace external fuel derate switch. GO TO 13 NO: Problem in harness. GO TO 5
5 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the two wires to the external fuel derate switch from each other. 3. On harness, disconnect C08 auxiliary connector from main harness. 4. Perform TERMINAL TEST on both C08 connectors. 5. Inspect harness for pinched or melted wires near both C08 connectors. Were any problems found with the wiring or connectors?	YES: Repair problem. GO TO 13 NO: GO TO 6
6 Check Auxiliary Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal J to each individual wire of the external fuel derate switch. 3. On auxiliary harness connector C08, measure resistance from terminal Q to each individual wire of the external fuel derate switch. Does each terminal, J and Q measure less than 5 ohms to one of the wires?	YES: GO TO 7 NO: Fix open wire in auxiliary harness. GO TO 13

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Trouble Code Diagnostics and Tests

7 Check Auxiliary Harness for Shorted Wire	<i>NOTE: Make sure the wires to the external fuel derate switch are disconnected from the switch and not touching each other.</i> 1. Ignition OFF, Engine OFF. 2. On auxiliary harness connector C08, measure resistance from terminal J to each terminal of C08. Was the measurements less than 100 ohms?	YES: Fix shorted wire in auxiliary harness. GO TO 13 NO: Problem in main harness. GO TO 8 -- -1/1
8 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Perform TERMINAL TEST on ECU harness connector J2. 4. Inspect harness for pinched or melted wires near J2 ECU connector. Are there any problems with the wiring or connector?	YES: Fix problem. GO TO 13 NO: GO TO 9 -- -1/1
9 Check ECU Harness for Open Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness, measure resistance from connector C08, terminal J to ECU connector J2, terminal J1. 3. On ECU harness, measure resistance from connector C08, terminal Q to ECU connector J2, terminal G3. Was either measurements greater than 5 ohms?	YES: Fix open wire in ECU harness. GO TO 13 NO: GO TO 10 -- -1/1
10 Check ECU Harness for Shorted Wire	1. Ignition OFF, Engine OFF. 2. On ECU harness connector C08, measure resistance from terminal J to each terminal of C08. Were any measurements less than 100 ohms?	YES: Fix shorted wire in ECU harness. GO TO 13 NO: ECU has not been reprogrammed. GO TO 11 NO: ECU has been reprogrammed. GO TO 12 -- -1/1

Trouble Code Diagnostics and Tests

11 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 000971.31 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 13 -- -1/1
12 Check ECU	<i>NOTE: For ECU connector pinouts, see ELECTRONIC CONTROL UNIT (ECU) SYSTEM OPERATION in Section 03, Group 140 earlier in this manual.</i> On ECU, measure resistance from terminal J2-J1 to terminal J2-G3. Is the measurement between 30K and 80K?	YES: Problem not found. Reconnect all connectors. GO TO 1 Confirm findings looking closely at connectors, wiring, and terminal numbers used for measurements. NO: Replace ECU. GO TO 13 -- -1/1
13 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all wires, connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load ranges if possible. Did DTC 000971.31 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

14 Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active?
 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.
- Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active. GO TO 2

NO: Start DTAC case.

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**001075.05 — Low Pressure Fuel Pump
Circuit Has High Resistance**

*The ECU detects high resistance in the low pressure fuel
pump control circuit.*

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001075.05 — Low Pressure Fuel Pump Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

001075.05

When DTC is Displayed:

The ignition is ON, ECU low pressure fuel pump output is OFF, and the error condition is active.

Related Information:

The ECU detects high resistance (open circuit) in the low pressure fuel pump (transfer pump) control circuit.

This DTC may also be set if the low pressure fuel pump control circuit is shorted to a voltage source.

ECU supplies a high side output to energize the low pressure fuel pump relay. The ECU switches the output OFF if ignition is ON for 60 seconds and engine is not running. The ECU will only check for high resistance in the low pressure fuel pump relay control circuit when the low pressure fuel pump relay control output is OFF and ignition is ON.

Alarm Level:

Warning

Control Unit Response:

ECU will attempt to operate in a normal manner.

Additional References:

NOTE: Consult application manual for more information on low pressure fuel pump system.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 8
- see 4.5L 24V ECU WIRING DIAGRAM 8
- see 6.8L 12V ECU WIRING DIAGRAM 8
- see 6.8L 24V ECU WIRING DIAGRAM 8

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. 6. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	YES: GO TO 2 NO: GO TO 10 -- -1/1
❷ Check Relay	<i>NOTE: Consult application manual for information on relay and wire harness.</i> 1. Ignition OFF, engine OFF. 2. Inspect terminals at low pressure fuel pump relay connector. 3. Check for open circuit in low pressure fuel pump relay control coil. 4. Check for open circuit in low pressure fuel pump relay ground wire. Did you find an open ground circuit, shorted or open low pressure fuel pump relay coil, or a terminal problem?	YES: Fix problem. GO TO 9 NO: Do not reconnect relay connector. GO TO 3 -- -1/1
❸ Test ECU Terminals	<i>NOTE: Some applications may use a different ECU output terminal than that specified in this procedure to control the low pressure fuel pump relay. Consult application manual for more information.</i> 1. Ignition OFF, engine OFF. 2. Disconnect ECU J2 connector. 3. Perform TERMINAL TEST on J2. Were any problems found?	YES: Fix problem. GO TO 9 NO: GO TO 4 -- -1/1
❹ Check Relay Control Circuit	On the harness, measure the resistance between ECU low pressure fuel pump control output (terminal J2-M3) and the high side of the low pressure fuel pump relay connector. Is the resistance less than 10 ohms?	YES: GO TO 5 NO: Fix problem. GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check Harness for Short to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage from the ECU J2 connector low pressure fuel pump relay control (terminal J2-M3) to single point ground. Is voltage less than 0.5V?	YES: GO TO 6 NO: Fix problem. GO TO 9 -- -1/1
6 Check Harness for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU J2 connector low pressure fuel pump relay control (terminal J2-M3) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 7 NO: Fix problem. GO TO 9 -- -1/1
7 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. 7. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	YES: GO TO 8 NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

8 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. 7. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
9 Verification	1. Ignition OFF, engine OFF for at least 5 seconds. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Wait 60 seconds for ECU to switch off low pressure fuel pump output. Did 001075.05 reappear active 60 seconds after ignition was cycled from OFF to ON?	YES: GO TO 1 NO: Problem fixed. -- -1/1
10 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: GO TO 2 -- -1/1

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**001075.06 — Low Pressure Fuel Pump
Circuit Has Low Resistance**

*The ECU detects low resistance in the low pressure fuel
pump control circuit.*

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001075.06 — Low Pressure Fuel Pump Circuit Has Low Resistance Diagnostic Procedure

Troubleshooting Sequence:

001075.06

When DTC is Displayed:

The ignition is ON, the ECU low pressure fuel pump output is ON, and the error condition is active.

Related Information:

The ECU detects low resistance (short to ground) in the low pressure fuel pump (transfer pump) control circuit.

ECU supplies a high side output to energize the low pressure fuel pump relay. The ECU switches the output OFF if ignition is ON for 60 seconds and engine is not running. The ECU will only check for low resistance in the low pressure fuel pump relay control circuit when the low pressure fuel pump relay control output is ON.

Alarm Level:

Warning

Control Unit Response:

ECU will attempt to operate in a normal manner.

Additional References:

NOTE: Consult application manual for more information on low pressure fuel pump system.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 8
- see 4.5L 24V ECU WIRING DIAGRAM 8
- see 6.8L 12V ECU WIRING DIAGRAM 8
- see 6.8L 24V ECU WIRING DIAGRAM 8

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	YES: GO TO 2 NO: GO TO 9 -- -1/1
❷ Check Relay	<i>NOTE: Consult application manual for information on relay and wire harness.</i> 1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel pump relay coil connector. 3. Inspect relay terminals. 4. Check for a shorted (low resistance) low pressure fuel pump relay control coil. Is low pressure fuel pump relay coil shorted?	YES: Replace relay. GO TO 8 NO: Do not reconnect relay connector. GO TO 3 -- -1/1
❸ Test ECU Terminals	<i>NOTE: Some applications may use a different ECU output terminal than that specified in this procedure to control the low pressure fuel pump relay. Consult application manual for more information.</i> 1. Disconnect ECU J2 connector. 2. Perform TERMINAL TEST on J2. Were any problems found?	YES: Fix problem. GO TO 8 NO: GO TO 4 -- -1/1
❹ Check Harness for Short to Ground	On the harness, measure the resistance between ECU low pressure fuel pump control output (terminal J2-M3) and single point ground. Is the resistance greater than 1k ohms?	YES: GO TO 5 NO: Fix problem. GO TO 8 -- -1/1

Trouble Code Diagnostics and Tests

5 Check for Wire-to-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. On the harness, measure the resistance between the ECU J2 connector low pressure fuel pump relay control (J2-M3) and all other terminals in the J1 and J2 connectors. Are all resistance measurements greater than 1k ohms?	YES: GO TO 6 NO: Fix problem. GO TO 8 ---1/1
6 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	YES: GO TO 7 NO: Problem fixed. ---1/1
7 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	YES: Open DTAC case. NO: Problem fixed. ---1/1
8 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. Did 001075.06 reappear active within 60 seconds of ignition ON?	YES: GO TO 1 NO: Problem fixed. ---1/1

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Trouble Code Diagnostics and Tests

⑨ Review Snapshot Information

1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: GO TO 2

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001075.12 — Low Pressure Fuel Pump Error Detected

The ECU detects an error in the low pressure fuel pump system.

DN22556,0000630 -19-03OCT07-1/1

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001075.12 — Low Pressure Fuel Pump Error Detected Diagnostic Procedure

Troubleshooting Sequence:

001075.12

When DTC is Displayed:

The ECU pump enable signal is ON and the pump status signal is not present for at least 30 seconds.

Related Information:

The low pressure fuel pump provides a low level signal (ground) to the ECU when the low pressure fuel pump status is good.

This DTC may be caused by wiring problems with the pump status or enable signal wires, or by a loss of battery voltage or ground to the low pressure fuel pump.

Alarm Level:

Warning

Control Unit Response:

ECU will attempt to operate in a normal manner. The engine may not start or may stall if low pressure fuel pump is not operational.

Additional References:

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 8
- see 4.5L 24V ECU WIRING DIAGRAM 8
- see 6.8L 12V ECU WIRING DIAGRAM 8
- see 6.8L 24V ECU WIRING DIAGRAM 8

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

For more information on the low pressure fuel pump, see ELECTRIC FUEL TRANSFER PUMP OPERATION (RACOR) in Section 03, Group 130 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Ignition OFF, engine OFF for at least 5 seconds. 5. Ignition ON, engine OFF. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: GO TO 2 NO: GO TO 15 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect low pressure fuel pump 6-way connector C19. 3. Perform TERMINAL TEST on 6-way connector C19. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 3 -- -1/1
❸ Check Pump Power and Ground	On the harness, measure the voltage between the low pressure fuel pump 6-way connector battery voltage supply (C19-5) and ground (C19-6). Is the voltage within 1V of battery terminal voltage?	YES: GO TO 5 NO: GO TO 4 -- -1/1
❹ Check Pump Ground	On the harness, measure the voltage between the low pressure fuel pump 6-way connector battery voltage supply (C19-5) and single point ground. Is the voltage within 1V of battery terminal voltage?	YES: Fix open circuit in pump ground wiring. GO TO 14 NO: Check 15A fuse F03. Fix open circuit in pump battery voltage supply wiring. GO TO 14 -- -1/1

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Trouble Code Diagnostics and Tests

5 Check for Pump Enable Signal	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between the low pressure fuel pump 6-way connector enable signal (C19-4) and single point ground within 60 seconds of ignition ON. Is the voltage within 2V of battery terminal voltage?	YES: GO TO 6 NO: GO TO 7 ---1/1
6 Check Status Circuit	1. Ignition OFF, engine OFF for at least 5 seconds. 2. On the harness, place a jumper wire between the low pressure fuel pump 6-way connector status signal (C19-3) and single point ground. 3. Ignition ON, engine OFF. 4. Refresh DTCs. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: GO TO 9 NO: Remove jumper. GO TO 11 ---1/1
7 Check Enable Circuit Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. 4. On the harness, measure the resistance between the ECU pump enable (J1-D4) and the pump 6-way connector enable (C19-4). Are Terminal Test results good and is resistance less than 10 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 14 ---1/1
8 Check for Shorted Enable Circuit	On the harness, measure the resistance between the ECU pump enable (J1-D4) and single point ground. Is resistance greater than 10k ohms?	YES: GO TO 12 NO: Fix problem. GO TO 14 ---1/1

Trouble Code Diagnostics and Tests

9 Check Status Circuit Continuity	1. Ignition OFF, engine OFF. 2. Disconnect ECU J1 connector. 3. Perform TERMINAL TEST on J1. 4. On the harness, measure the resistance between the ECU pump status (J1-E2) and the pump 6-way connector status (C19-3). Are Terminal Test results good and is resistance less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 14 -- -1/1
10 Check for Status Circuit Shorted to Voltage	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage from the ECU pump status (J1-E2) to single point ground. Is the voltage less than 0.5V?	YES: GO TO 12 NO: Fix problem. GO TO 14 -- -1/1
11 Replace Low Pressure Pump	<i>NOTE: For pump replacement instructions, see REMOVE FUEL TRANSFER PUMP and INSTALL FUEL TRANSFER PUMP in Group 02, Section 090 earlier in this manual.</i> 1. Ignition OFF, engine OFF. 2. Replace low pressure fuel pump. 3. Reconnect all electrical connectors. 4. Ignition ON, engine OFF. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: Recheck for intermittent wiring problems. GO TO 2 NO: Problem fixed. -- -1/1
12 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Ignition ON, engine OFF. 4. Download latest ECU payload and reprogram ECU. 5. Ignition OFF, engine OFF for at least 5 seconds. 6. Ignition ON, engine OFF. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: GO TO 13 NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

13 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Ignition ON, engine OFF. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
14 Verification	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. Did 001075.12 reappear active within 60 seconds after ignition ON?	YES: GO TO 3 NO: Problem fixed. -- -1/1
15 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Fix problem if found. YES: If a certain operating point exists when error occurs then GO TO 16 NO: GO TO 17 -- -1/1
16 Engine Error Operating Point Test	1. Ignition ON, engine ON 2. Set engine to operating point of failure and refresh codes. Did 001075.12 reappear active when engine operating point was reached?	YES: GO TO 2 NO: GO TO 17 -- -1/1

Trouble Code Diagnostics and Tests

17 Terminal Test and Harness Inspection	1. Ignition OFF, engine OFF 2. Perform TERMINAL TEST on the ECU J1 connector and fuel pump six-way connector C19. 3. Inspect wire harness between fuel pump and J1 connector for damage which may cause an intermittent problem. Were any problems found?	YES: Fix problem. GO TO 14 NO: GO TO 18 ---1/1
18 Reconnect and Retest	1. Reconnect all connectors. 2. Ignition ON, engine OFF. 3. Gently wiggle wire harness between fuel pump and ECU J1 connector. 4. Refresh DTCs. Is 001075.12 active?	YES: GO TO 3. NO: Problem fixed or conditions to generate 001075.12 have not been duplicated. ---1/1

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001109.31 — Approaching Engine Protection Shutdown

The ECU will shutdown the engine in 30 seconds due to a operating condition out of range.

NOTE: OEM applications can be programmed with trim options to disable certain engine parameters from shutting down the engine. For other applications, consult the operators manual for engine shutdown options.

NOTE: When protection shutdown options are overridden, severe damage can be caused to an application by continuously running the engine. Diagnose the problem as soon as possible.

RG41221,0000273 -19-03OCT07-1/1

001109.31 — Approaching Engine Protection Shutdown Diagnostic Procedure

Troubleshooting Sequence:

All other DTCs that are set.
001109.31

Related Information:

When 001109.31 is set, an associated DTC is set along with it. The associated DTC is the code that needs to be diagnosed.

Alarm Level:
WARNING

Control Unit Response:
If this code sets, the ECU will shut down the engine in 30 seconds.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

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❶ Engine Protection Shutdown:	Parameters that can cause the ECU to shutdown the engine. • The ECU detects water in fuel. See diagnostic procedure for DTC 000097.16 • The ECU detects high manifold air temperature. See diagnostic procedure for DTC 000105.00 • The ECU detects low oil pressure. See diagnostic procedure for DTC 000100.01 • The ECU detects high engine coolant temperature. See diagnostic procedure for DTC 000110.00 • The ECU detects coolant level switch is active. See diagnostic procedure for DTC 000111.01 • The ECU detects high fuel temperature. See diagnostic procedure for DTC 000174.00 Were any operating conditions found to cause the ECU to shutdown the engine?	YES: Diagnose problem. Diagnostic troubleshooting procedures are found in this section of the manual for OEM applications. -- -1/1

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001110.31 — Engine Protection Shutdown

The ECU has shutdown the engine due to a operating condition out of range.

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001110.31 — Engine Protection Shutdown Diagnostic Procedure

Troubleshooting Sequence:
All other DTCs that are set.
001110.31

Related Information:

NOTE: OEM applications can be programmed with trim options to disable certain engine parameters from shutting down the engine. For other applications, consult the operators manual for engine shutdown options.

NOTE: When protection shutdown options are over ridden, severe damage can be caused to an application by continuously running the engine. Diagnose the problem as soon as possible.

When 001110.31 is set, an associated DTC is set along with it. The associated DTC is the code that needs to be diagnosed.

Alarm Level:
 STOP

Control Unit Response:
 If this code sets and the shutdown is enabled, the ECU will shut down the engine.

Additional References:
 For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For more information on derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

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❶ Engine Protection Shutdown:	Parameters that can cause the ECU to shutdown the engine. • The ECU detects water in fuel. See diagnostic procedure for DTC 000097.16 • The ECU detects high manifold air temperature. See diagnostic procedure for DTC 000105.00 • The ECU detects low oil pressure. See diagnostic procedure for DTC 000100.01 • The ECU detects high engine coolant temperature. See diagnostic procedure for DTC 000110.00 • The ECU detects coolant level switch is active. See diagnostic procedure for DTC 000111.01 • The ECU detects high fuel temperature. See diagnostic procedure for DTC 000174.00 Were any operating conditions found to cause the ECU to shutdown the engine?	YES: Diagnose problem. Diagnostic troubleshooting procedures are found in this section of the manual for OEM applications. -- -1/1

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001136.00 — ECU Temperature Signal Extremely High

The ECU detects an internal temperature above specification.

RG41221,0000275 -19-04OCT07-1/1

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001136.00 — ECU Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

All xxxxxx.06 codes

000611.04

001136.00

Related Information:

The ECU senses an internal ECU temperature of 135° C (275° F) on OEM engines.

Alarm Level:

STOP

Control Unit Response:

The ECU limits the engine to 1200 RPMs.

Additional References:

For further ECU information, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.

For further ECU temperature sensor information, see ENGINE CONTROL UNIT (ECU) TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAMS
- see 4.5L 24V ECU WIRING DIAGRAMS
- see 6.8L 12V ECU WIRING DIAGRAMS
- see 6.8L 24V ECU WIRING DIAGRAMS

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 001136.00 reappear active?	YES: GO TO 2 NO: GO TO 7 -- -1/1
❷ Check Physical Environment	<i>NOTE: For Proper ECU mounting, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.</i> 1. Ignition OFF, Engine OFF. 2. Make the following checks: • Remove any items that are restricting the air flow around the ECU. • Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU. • Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow. Do any of the above conditions exist?	YES: Correct environment. GO TO 6 NO: GO TO 3 -- -1/1
❸ Direct Sunlight	Is the ECU in direct sunlight?	YES: Shade the ECU. GO TO 6 NO: GOT TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Test ECU	If a Programming Harness is available, perform the following steps. 1. Ignition OFF, Engine OFF 2. Disconnect all connectors from ECU. 3. Remove ECU from application. 4. Connect ECU to programming harness 5. Power ECU on from the Programming Harness. 6. Wait for 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.00 still active?	YES: Bad sensor. Replace ECU. GO TO 6 NO: Programming Harness not available. GO TO 5 NO: 001136.00 not active. Recheck physical environment. GO TO 1 -- -1/1
5 Test ECU	1. Ignition OFF, Engine OFF. 2. Disconnect all connectors from ECU. 3. Remove ECU from application. Isolate ECU from any hot areas. 4. Reconnect ECU connector J2. 5. Ignition ON, Engine OFF. 6. Wait 20 minutes. 7. Refresh codes from within Service ADVISOR. Is 001136.00 still active?	YES: Bad sensor. Replace ECU. GO TO 6 NO: Recheck physical environment. GO TO 1 -- -1/1

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Trouble Code Diagnostics and Tests

6 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 10 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 001136.00 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. ---1/1
7 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: Contact dealer or DTAC. ---1/1

001136.16 — ECU Temperature Signal Moderately High

The ECU detects an internal temperature above specification.

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001136.16 — ECU Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

All xxxxxx.06 codes

000611.04

001136.00

001136.16

Related Information:

The ECU senses an internal ECU temperature of 125° C (257° F) on OEM engines.

Alarm Level:

Warning

Control Unit Response:

The ECU will continue to operate normally.

Additional References:

For further ECU information, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.

For further ECU temperature sensor information, see ENGINE CONTROL UNIT (ECU) TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAMS
- see 4.5L 24V ECU WIRING DIAGRAMS
- see 6.8L 12V ECU WIRING DIAGRAMS
- see 6.8L 24V ECU WIRING DIAGRAMS

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 001136.16 reappear active?	YES: GO TO 2 NO: GO TO 7 -- -1/1
❷ Check Physical Environment	<i>NOTE: For Proper ECU mounting, see ENGINE CONTROL UNIT (ECU) MAINTENANCE in Section 02, Group 110 earlier in this manual.</i> 1. Ignition OFF, Engine OFF. 2. Make the following checks: • Remove any items that are restricting the air flow around the ECU. • Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU. • Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow. Do any of the above conditions exist?	YES: Correct environment. GO TO 6 NO: GO TO 3 -- -1/1
❸ Direct Sunlight	Is the ECU in direct sunlight?	YES: Shade the ECU. GO TO 6 NO: GOT TO 4 -- -1/1

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Trouble Code Diagnostics and Tests

4 Test ECU

If a Programming Harness is available, perform the following steps.

1. Ignition OFF, Engine OFF
2. Disconnect all connectors from ECU.
3. Remove ECU from application.
4. Connect ECU to programming harness
5. Power ECU on from the Programming Harness.
6. Wait for 20 minutes.
7. Refresh codes from within Service ADVISOR.

Is 001136.00 still active?

YES: Bad sensor.
Replace ECU. GO TO 6

NO: Programming
Harness not available.
GO TO 5

NO: 001136.00 not
active. Recheck physical
environment. GO TO 1

-- -1/1

5 Test ECU

1. Ignition OFF, Engine OFF.
2. Disconnect all connectors from ECU.
3. Remove ECU from application. Isolate ECU from any hot areas.
4. Reconnect ECU connector J2.
5. Ignition ON, Engine OFF.
6. Wait 20 minutes.
7. Refresh codes from within Service ADVISOR.

Is 001136.00 still active?

YES: Bad sensor.
Replace ECU. GO TO 6

NO: Recheck physical
environment. GO TO 1

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Trouble Code Diagnostics and Tests

6 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 10 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 001136.00 reappear as active with engine running?	YES: GO TO 1 NO: Problem fixed. -- -1/1
7 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. Try to determine cause. Repair and retest. NO: Contact dealer or DTAC. -- -1/1

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001172.03 — Compressor Inlet Temperature Signal Out of Range High

The turbo compressor inlet temperature input voltage exceeds the sensor's high voltage specification.

RG41221,0000277 -19-05FEB08-1/1

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001172.03 — Compressor Inlet Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

001172.03

When DTC is Displayed:

Whenever the ignition is on and the error is active.

Related Information:

The compressor inlet temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for compressor inlet temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default fuel temperature of 30° C (86° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more compressor inlet temperature sensor information, see TURBO COMPRESSOR INLET TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 001172.03 reappear active?	YES: GO TO 2 NO: GO TO 9 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on compressor inlet temperature sensor connector T06 and compressor inlet temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check Compressor Inlet Temperature Return Circuit Resistance	On the harness, measure the resistance between compressor inlet temperature sensor connector T06-B and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Check For Compressor Inlet Temperature Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between compressor inlet temperature sensor connector T06-A (+) and T06-B (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

5 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D1 and J03-H3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 ---1/1
6 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-D1 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 ---1/1
7 Check for DTC Change with Compressor Inlet Temperature Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on compressor inlet temperature sensor connector terminals T06-A and T06-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 0001172.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 ---1/1
8 Check for DTC 0001172.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T06. 3. Reconnect T06 to compressor inlet temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 0001172.03 now an active DTC?	YES: Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 ---1/1

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Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D1 and J03-H3. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check Compressor Inlet Temperature Sensor Circuit Continuity	1. Disconnect compressor inlet temperature sensor connector T06. 2. On the harness, measure the resistance between ECU J03-D1 and compressor inlet temperature sensor connector T06-A. 3. On the harness, measure the resistance between ECU J03-H3 and compressor inlet temperature sensor connector T06-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the Turbo Compressor Inlet Air Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the compressor inlet temperature sensor and ECU J03 connector. <i>NOTE: The turbo compressor inlet air temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12 -- -1/1
12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in compressor inlet temperature sensor connector T06. 3. Replace compressor inlet temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 0001172.03 active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor the Turbo Compressor Inlet Air Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the compressor inlet temperature sensor and ECU J03 connector. <i>NOTE: The turbo compressor inlet air temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 ---1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 0001172.03 now active?	YES: GO TO 2 NO: GO TO 15 ---1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect compressor inlet temperature sensor connector T06. 3. Perform TERMINAL TEST on T06. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-D1 and J03-H3. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 0001172.03 now active?	YES: GO TO 2 NO: GO TO 17 ---1/1
17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 0001172.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 ---1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. ---1/1

001172.04 — Compressor Inlet Temperature Signal Out of Range Low

The turbo compressor inlet temperature input voltage drops below the sensor's low voltage specification.

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001172.04 — Compressor Inlet Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

001172.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The turbo compressor inlet temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for turbo compressor inlet temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default turbo compressor inlet temperature of 30° C (86° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more turbo compressor inlet temperature sensor information, see TURBO COMPRESSOR INLET TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 001172.04 reappear active?	YES: GO TO 2 NO: GO TO 16 ---1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the compressor inlet temperature sensor connector T06. 3. Perform TERMINAL TEST on compressor inlet temperature sensor connector T06 and compressor inlet temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 ---1/1
❸ Check for DTC 001172.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 001172.04 still an active DTC?	YES: GO TO 8 NO: GO TO 4 ---1/1
❹ Check for DTC 001172.03	Is DTC 001172.03 now an active DTC with compressor inlet temperature sensor connector T06 still disconnected?	YES: GO TO 5 NO: GO TO 8 ---1/1

Trouble Code Diagnostics and Tests

5 Sensor Shorted to Ground Test	On the compressor inlet temperature sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 1k ohms?	YES: Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Sensor Internal Short Test	On the compressor inlet temperature sensor, measure the resistance between terminal A and terminal B. Is the resistance less than 50 ohms?	YES: Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 -- -1/1
7 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Turbo Compressor Inlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between compressor inlet temperature sensor and ECU J03 connector. <i>NOTE: The turbo compressor inlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace compressor inlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
8 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-D1 and J03-H3. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-D1 and compressor inlet temperature sensor T06-A. 2. On the harness, measure the resistance between ECU J03-H3 and compressor inlet temperature sensor T06-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-D1 and single point ground. Was the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check for DTC Active Status Change with J03 Disconnected	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 001172.04.</i> 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 001172.04 still active with J03 disconnected?	YES: GO TO 15 NO: GO TO 12 -- -1/1
12 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-D1 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Turbo Compressor Inlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between compressor inlet temperature sensor and ECU J03 connector. <i>NOTE: The turbo compressor inlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Active DTC 001172.04	Refresh DTCs Is DTC 001172.04 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
15 Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 001172.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
16 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Turbo Compressor Inlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between compressor inlet temperature sensor and ECU J03 connector. <i>NOTE: The turbo compressor inlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 001172.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect compressor inlet temperature sensor connector T06. 3. Perform TERMINAL TEST on T06. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-D1 and J03-H3. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 001172.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 001172.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

001180.00 — Calculated Turbine Inlet Temperature Signal Extremely High

The ECU senses a turbo turbine inlet temperature above specification.

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001180.00 — Calculated Turbine Inlet Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000107

Any DTC with SPN 000102

Any DTC with SPN 000103

Any DTC with SPN 000105

000108.02

Any DTC with SPN 000110

Any DTC with SPN 000157

Any DTC with SPN 000412

Any DTC with SPN 000641

Any DTC with SPN 001172

Any DTC with SPN 002630

Any DTC with SPN 002791

002795.07

001180.00

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU calculates that the turbo turbine inlet temperature is greater than a programmed value.

There is no physical turbine inlet temperature sensor. The ECU uses information from the manifold air temperature sensor, MAP sensor, and other measured or calculated values to calculate the turbine inlet temperature.

This DTC may be caused by any condition that limits intake air flow including intake air restrictions, charge air (boost) leaks, or turbo problems.

A false measurement obtained from one of the sensors used to calculate turbine inlet temperature may cause DTC 001180.00 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 50 percent.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2, 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 2, 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 2, 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 2, 6.8L 24V ECU WIRING DIAGRAM 3
 located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on temperature sensor testing see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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1 Read DTCs and Store Snapshot Information IMPORTANT: Do not force probes into connector terminals or damage Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.	1. Ignition ON, engine OFF. NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared. 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. Does the recorded information lead you to a possible cause of the problem?	YES: Fix problem. GO TO 2 NO: GO TO 2

-- -1/1

2 Check Intake and Exhaust System	1. Ignition OFF, engine OFF. 2. Check charge air system for loose clamps, damaged hoses, damaged charge air cooler, or other sources of charge air (boost) leaks. 3. Check for a restricted air filter element or other intake air flow restrictions. 4. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. 5. Check for exhaust system damage that could cause an exhaust restriction. Did you find a problem?	YES: Fix problem. GO TO 15 NO: Engine has NOT been operated in the past eight hours. GO TO 3 NO: Engine has been operated in the past eight hours. GO TO 4

-- -1/1

Trouble Code Diagnostics and Tests

③ Check Air Temperature Sensors on a Cold Engine	1. Ignition ON, engine OFF. 2. Monitor the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5

-- -1/1

④ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. <i>NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.</i> 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5

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Trouble Code Diagnostics and Tests

5 Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: EGR Fresh Air Temperature is higher or lower than the other two temperatures. GO TO 6 NO: Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 8 NO: EGR Temperature is higher or lower than the other two temperatures. GO TO 10
6 Check Charge Air Cooler Outlet Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 5

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Trouble Code Diagnostics and Tests

7 Check Charge Air Cooler Outlet Circuit	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace charge air cooler outlet sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1
8 Check Manifold Air Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and manifold air temperature sensor connector. 3. Perform TERMINAL TEST on J3 and manifold air temperature sensor connector. 4. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and the manifold air temperature sensor connector signal (T02-A). 5. On the harness, measure the resistance between the ECU manifold air temperature reference (J3-B2) and the manifold air temperature sensor connector reference (T02-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

9 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace manifold air temperature sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1
10 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Fix problem. GO TO 5 -- -1/1
11 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace EGR temperature sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

12 Retest Temperature Sensor Validity	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 13 -- -1/1
13 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 14 -- -1/1
14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: Open DTAC case. -- -1/1

Trouble Code Diagnostics and Tests

15 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 16 NO: Step 3 or 4 was performed earlier during this procedure. GO TO 18 NO: Step 3 or 4 was NOT performed earlier during this procedure. GO TO 4 -- -1/1
16 Recreate Operating Point	Recreate the engine operating point where 001180.00 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 001180.00 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 17 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. -- -1/1
17 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 001180.00 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 001180.00 active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

18 Recheck System

1. Perform CHARGE AIR SYSTEM test.
 2. Check the engine compartment for adequate fresh air supply to the engine for intake air and cooling.
 3. Check exhaust system for restrictions.
 4. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure.
 5. Download latest ECU payload and reprogram ECU, if not already performed during this procedure.
 6. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs.
- Were EGR-VGT System Temperature and Flow Test results good?

YES: GO TO 16
NO: Open DTAC case.

--1/1

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001180.16 — Calculated Turbine Inlet Temperature Signal Moderately High

The ECU senses a turbo turbine inlet temperature above specification.

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001180.16 — Calculated Turbine Inlet Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000107

Any DTC with SPN 000102

Any DTC with SPN 000103

Any DTC with SPN 000105

000108.02

Any DTC with SPN 000110

Any DTC with SPN 000157

Any DTC with SPN 000412

Any DTC with SPN 000641

Any DTC with SPN 001172

Any DTC with SPN 002630

Any DTC with SPN 002791

002795.07

001180.16

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU calculates that the turbo turbine inlet temperature is greater than a programmed value.

There is no physical turbine inlet temperature sensor. The ECU uses information from the manifold air temperature sensor, MAP sensor, and other measured or calculated values to calculate the turbine inlet temperature.

This DTC may be caused by any condition that limits intake air flow including intake air restrictions, charge air (boost) leaks, or turbo problems.

A false measurement obtained from one of the sensors used to calculate turbine inlet temperature may cause DTC 001180.16 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 5 percent.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2, 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 2, 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 2, 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 2, 6.8L 24V ECU WIRING DIAGRAM 3
 located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on temperature sensor testing see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. Does the recorded information lead you to a possible cause of the problem?	YES: Fix problem. GO TO 2 NO: GO TO 2 -- -1/1

Trouble Code Diagnostics and Tests

② Check Intake and Exhaust System	1. Ignition OFF, engine OFF. 2. Check charge air system for loose clamps, damaged hoses, damaged charge air cooler, or other sources of charge air (boost) leaks. 3. Check for a restricted air filter element or other intake air flow restrictions. 4. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. 5. Check for exhaust system damage that could cause an exhaust restriction. Did you find a problem?	YES: Fix problem. GO TO 15 NO: Engine has NOT been operated in the past eight hours. GO TO 3 NO: Engine has been operated in the past eight hours. GO TO 4 ---1/1
③ Check Air Temperature Sensors on a Cold Engine	1. Ignition ON, engine OFF. 2. Monitor the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 ---1/1

④ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. <i>NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.</i> 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 ---1/1
⑤ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: EGR Fresh Air Temperature is higher or lower than the other two temperatures. GO TO 6 NO: Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 8 NO: EGR Temperature is higher or lower than the other two temperatures. GO TO 10 ---1/1

Trouble Code Diagnostics and Tests

⑥ Check Charge Air Cooler Outlet Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 5 -- -1/1
⑦ Check Charge Air Cooler Outlet Circuit	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace charge air cooler outlet sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

8 Check Manifold Air Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and manifold air temperature sensor connector. 3. Perform TERMINAL TEST on J3 and manifold air temperature sensor connector. 4. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and the manifold air temperature sensor connector signal (T02-A). 5. On the harness, measure the resistance between the ECU manifold air temperature reference (J3-B2) and the manifold air temperature sensor connector reference (T02-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 5
9 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace manifold air temperature sensor. GO TO 12 NO: Fix problem. GO TO 5
10 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Fix problem. GO TO 5

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-- -1/1

Trouble Code Diagnostics and Tests

11 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace EGR temperature sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1
12 Retest Temperature Sensor Validity	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 13 -- -1/1
13 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: Open DTAC case. -- -1/1
15 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 16 NO: Step 3 or 4 was performed earlier during this procedure. GO TO 18 NO: Step 3 or 4 was NOT performed earlier during this procedure. GO TO 4 -- -1/1
16 Recreate Operating Point	Recreate the engine operating point where 001180.16 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 001180.16 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 17 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

17 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 001180.16 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 001180.16 active?	YES: Open DTAC case. NO: Problem fixed. ---1/1
18 Recheck System	1. Perform CHARGE AIR SYSTEM test. 2. Check the engine compartment for adequate fresh air supply to the engine for intake air and cooling. 3. Check exhaust system for restrictions. 4. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure. 5. Download latest ECU payload and reprogram ECU, if not already performed during this procedure. 6. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 16 NO: Open DTAC case. ---1/1

001347.03 — High Pressure Fuel Suction Control Valve Signal Out of Range High

ECU detects high current in the suction control valve return wire.

RG41221,000027F -19-04OCT07-1/1

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001347.03 — High Pressure Fuel Suction Control Valve Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

001347.03

When DTC is Displayed:

The engine is cranking or running, during Harness Diagnostic Mode Test, at key ON ECU startup process and the error condition is active.

Alarm Level:

Warning

Control Unit Response:

The ECU will not be able to control the high pressure pump suction control valve.

Related Information:

Typically this means that there is a short to power in the suction control valve circuit. The engine will probably not start because the valve is shut off when power is applied to it.

Additional References:

For more suction control valve information, see SUCTION CONTROL VALVE in Section 03, Group 140 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 001347.03 reappear active?	YES: GO TO 2 NO: GO TO 7 -- -1/1
❷ Voltage Measurement With Ignition Key OFF	1. Monitor and write down the Battery Voltage displayed on Service ADVISOR. 2. Ignition OFF, Engine OFF. 3. Disconnect the high pressure fuel pump suction control valve connector. 4. On the harness, measure the voltage between Drive + (terminal 1) and Drive - (terminal 2) Does the voltage equal battery voltage $\pm$ 2v?	YES: GO TO 3 NO: GO TO 4 -- -1/1
❸ Wiring Check	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. On the ECU harness, measure the voltage between Drive - (terminal J1-H2) and all other terminals in all ECU connectors. <i>NOTE: The battery is connected to J2 - L1, J2 - L4, J2 - M1, and J2 - M4.</i> Does the voltage equal battery voltage $\pm$ 2v?	YES: Short in suction control valve supply wire with terminal that measured same voltage. NO: Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. -- -1/1
❹ Voltage Measurement With Ignition Key ON	1. Ignition ON, Engine OFF. 2. On the harness, measure the voltage between Drive + (terminal 1) and Drive - (terminal 2) Does the voltage equal battery voltage $\pm$ 2v?	YES: GO TO 5 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

5 Wiring Check	1. Ignition OFF, Engine OFF. 2. Disconnect all ECU connectors. 3. Ignition ON, Engine OFF. 4. On the ECU harness, measure the voltage between Drive - (terminal J1-H2) and all other terminals in all ECU connectors. <i>NOTE: The battery is connected to J2 – L1, J2 – L4, J2 – M1, and J2 – M4. Ignition is connected to J2 – B2.</i> Does any measurement equal battery voltage $\pm 2v$?	YES: Short in suction control valve supply wire with terminal that measured same voltage. NO: Problem not found, reconnect all connectors. GO TO 4 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made. -- -1/1
6 ECU Drive Circuit Resistance Check	On the ECU, measure the resistance between Drive + (terminal J1-H1) and Drive - (terminal J1-H2). Is the resistance infinite ohms?	YES: Start a DTAC case. NO: Replace ECU. GO TO 1 -- -1/1
7 Occurrence Count Check	Review stored information and look at occurrence count for 001347.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 8 NO: GO TO 9 -- -1/1
8 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the suction control valve harness connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 10 -- -1/1
9 Review Engine Hours	Compare engine hours of last occurrence of the snapshot capture data with the current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 001347.03 reappear when engine operating point was reached?	YES: GO TO 1 NO: GO TO 10 and confirm the operating point. -- -1/1
12 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the high pressure fuel pump suction control valve connector and ECU J1 connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1
13 Software Updates	1. Download latest software, reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 001347.03 active?	YES: Start a DTAC Case. NO: Problem fixed, faulty ECU program. -- -1/1

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001347.05 — High Pressure Fuel Pump Solenoid #1 Circuit Has High Resistance

The ECU is unable to match the measured pump current with the commanded pump current.

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001347.05 — High Pressure Fuel Pump Solenoid #1 Circuit Has High Resistance Diagnostic Procedure

Troubleshooting Sequence:

001347.03

001347.05

When DTC is Displayed:

The engine is cranking or running, during Harness Diagnostic Mode Test, at key ON ECU startup process and the error condition is active.

Alarm Level:

Warning

Control Unit Response:

The ECU will not be able to control the high pressure pump suction control valve.

Related Information:

Typically this means that there is a short to ground or an open in the high pressure fuel pump suction control valve circuit. The engine will probably not start because the valve is wide open which will cause maximum pressure which will trip the pressure relief valve on the rail.

Additional References:

For more suction control valve information, see SUCTION CONTROL VALVE in Section 03, Group 140 earlier in this manual.

For more information on the fuel system, see FUEL SYSTEM OPERATION in Section 03, Group 130 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 1
- see 4.5L 24V ECU WIRING DIAGRAM 1
- see 6.8L 12V ECU WIRING DIAGRAM 1
- see 6.8L 24V ECU WIRING DIAGRAM 1

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Cycle the ignition key OFF then ON. 5. Refresh Codes. Did 001347.05 reappear active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
❷ Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect the high pressure fuel pump suction control valve connector. 3. Perform TERMINAL TEST on the suction control valve harness connector. Were any problems found?	YES: Repair problem. GO TO 2 NO: GO TO 3 -- -1/1
❸ Valve Resistance Check	On the Suction Control Valve, measure the resistance between drive + (terminal 1) and drive - (terminal 2). Specification Suction Control Valve Coil—Resistance at room temperature..... 2.5 ± 1.0 ohms Is the measurement within specification?	YES: GO TO 4 NO: Replace suction control valve. GO TO 1 -- -1/1

Trouble Code Diagnostics and Tests

4 Short to Ground Wiring Check	On the harness, measure the resistance between: • drive + (terminal 1) and drive - (terminal 2). • drive + (terminal 1) and application single point ground. Specification Total resistance—Resistance at room temperature Less than 10 ohms? Are values within specification?	YES: GO TO 5 NO: GO TO 8 ---1/1
5 Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect the ECU connector J1. 3. Perform TERMINAL TEST on connector ECU J1. Were any problems found?	YES: Repair problem. GO TO 1 NO: GO TO 6 ---1/1
6 Short to Ground Wiring, ECU Disconnected Check	On the harness, measure the resistance between: • drive + (terminal 1) and drive - (terminal 2). • drive + (terminal 1) and application single point ground. Is either measurement less than 1000 ohms?	YES: Repair shorted wire that measured less than 1000 ohms. GO TO 1 NO: GO TO 7 ---1/1
7 ECU Drive Circuit Resistance Check	On the ECU, measure the resistance between Drive + (terminal J1-H1) and Drive - (terminal J1-H2). Is the resistance infinite ohms?	YES: Start a DTAC case. NO: Replace ECU. GO TO 1 ---1/1
8 Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect the ECU connector J1. 3. Perform TERMINAL TEST on connector ECU J1. Were any problems found?	YES: Repair problem. GO TO 1 NO: GO TO 9 ---1/1

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Trouble Code Diagnostics and Tests

9 Open Wiring Check	On the harness, measure the resistance between: - suction control valve drive + (terminal 1) and ECU drive + (terminal J1-H1). - suction control valve drive - (terminal 2) and ECU drive - (terminal J1-H2). Is either measurement greater than 10 ohms?	YES: Repair open wire that measured greater than 10 ohms. GO TO 1 NO: GO TO 10 -- -1/1
10 Software Updates	- Download latest software, reprogram ECU using Service ADVISOR. - Cycle the ignition key OFF then ON. - Refresh codes. Is 001347.05 active?	YES: Start a DTAC Case. NO: Problem fixed, faulty ECU program. -- -1/1
11 Occurrence Count Check	Review stored information and look at occurrence count for 001347.05. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 12 NO: GO TO 13 -- -1/1
12 Terminal Test	- Ignition OFF, Engine OFF - Perform TERMINAL TEST on the suction control valve harness connector. Were any problems found?	YES: Repair problem. GO TO 1 NO: GO TO 14 -- -1/1
13 Review Engine Hours	Compare engine hours of last occurrence of the snapshot capture data with the current engine hours. Is the difference greater than 50 hours?	YES: Return application to service. NO: GO TO 14 -- -1/1
14 Further Review of Snapshot Information	Review stored information collected in step 1 Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. YES: If a certain operating point exists when error occurs then GO TO 15 NO: GO TO 16 -- -1/1

Trouble Code Diagnostics and Tests

15 Engine Error Operating Point Test	1. Ignition ON, Engine ON 2. Set engine to operating point of failure and refresh codes Did 001347.05 reappear when engine operating point was reached?	YES: Replace high pressure fuel pump suction control valve. GO TO 1 NO: GO TO 14 and confirm the operating point. -- -1/1
16 Terminal Test	1. Ignition OFF, Engine OFF 2. Perform TERMINAL TEST on the high pressure fuel pump suction control valve connector and ECU J1 connector. Were any problems found?	YES: Repair problem. GO TO 14 NO: GO TO 17 -- -1/1
17 Software Updates	1. Download latest software, reprogram ECU using Service ADVISOR. 2. Cycle the ignition key OFF then ON. 3. Refresh codes. Is 001347.05 active?	YES: Start a DTAC Case. NO: Problem fixed, faulty ECU program. -- -1/1

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001347.07 — High Pressure Fuel Pump Not Able to Meet Required Rail Pressure

The ECU detects fuel rail pressure 5 MPa (725 psi) above or below the expected pressure.

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001347.07 — High Pressure Fuel Pump Not Able to Meet Required Rail Pressure Diagnostic Procedure

Troubleshooting Sequence:

000094.17

000157.03 or 157.04 or 157.10

001347.07

When DTC is Displayed:

The engine is cranking or running and the error condition is active.

Related Information:

The ECU detects fuel rail pressure 5 MPa (725 psi) above or below the expected pressure.

Alarm Level:

Warning

Control Unit Response: If this code sets, the ECU will command the high pressure fuel pump to increase or decrease the amount of fuel supplied to the HPCR.

The engine could miss or run rough.

Engine may have low power.

Additional References:

For more fuel rail pressure sensor information, see FUEL RAIL PRESSURE SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

 **CAUTION:** Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

 **CAUTION:** Fuel in the high pressure common rail is under extremely high pressure. Do NOT start this procedure until the engine has been turned OFF for at least 5 minutes.

-19- -2/2

 **Important:** Record DTCs and Store Snapshot Information.

IMPORTANT: Always use two wrenches when disconnecting and reconnecting fuel lines.

1. Ignition ON, engine OFF.
NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Refresh Codes.
- Did 001347.07 reappear active?

YES: GO TO 2
NO: GO TO 5

-- -1/1

Trouble Code Diagnostics and Tests

② Fuel Rail Pressure Sensor Voltage Check	<i>NOTE: Engine OFF for at least 15 minutes to ensure fuel rail pressure has dropped to 0.0 kPa (0.0 psi).</i> Monitor the following data points: - Fuel Rail Pressure Input Voltage Specification Fuel Rail Pressure Sensor Output— Voltage 0.9 - 1.1 V - Fuel Rail Pressure - Actual Specification Fuel Rail Pressure—Pressure..... 0.0 kPa (0.0 psi) Are all values within specifications?	YES: GO TO 5 NO: GO TO 3
③ Terminal Test	- Ignition OFF, Engine OFF. - Disconnect fuel rail pressure sensor connector. - Perform TERMINAL TEST on fuel rail pressure sensor, harness and connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4
④ Fuel Rail Pressure Sensor Resistance Checks	On the fuel rail pressure sensor, make the following resistance measurements. - between signal (terminal 1) and return (terminal 2). Specification Fuel Rail Pressure Sensor—Resistance..... 8k - 16.4k ohms - between signal (terminal 1) and supply (terminal 3). Specification Fuel Rail Pressure Sensor—Resistance..... 1k - 3k ohms - between all terminals and sensor body. Specification Fuel Rail Pressure Sensor—Resistance..... infinite ohms Are all measurements within specification.	YES: GO TO 5 NO: Replace rail pressure sensor. GO TO 1

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Trouble Code Diagnostics and Tests

**5 High Pressure Fuel
System Check**

Perform F2 - HIGH PRESSURE FUEL SYSTEM CHECK in Group 150 earlier in this Section.

Did test pass?

YES: Problem fixed. Had bad Suction Control Valve.

NO: Start a DTAC case.

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001569.31 — Engine in Derate Condition

Engine in Derate Condition

Related Information:

The engine power derate diagnostic trouble code is information to the operator that the ECU has detected a condition such as high coolant temperature and is derating the engine by limiting the maximum amount of fuel available to the engine. This code will only set as a result of another DTC setting.

Alarm Level:

Warning

Control Unit Response:

The ECU will limit the amount of engine power in an attempt to protect the engine.

Additional References:

For more information on derate specifications, see OEM ENGINES - DERATE SPECIFICATIONS in Section 06, Group 210 later in this manual.

For more information on derates see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 3 Group 140 earlier in this manual.

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001638.00 — Hydraulic Oil Temperature Extremely High

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,000000F –19–04AUG07–1/1

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001638.03 — Hydraulic Oil Temperature Signal Out of Range High

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,0000010 -19-04AUG07-1/1

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001638.04 — Hydraulic Oil Temperature Signal Out of Range Low

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,0000011 -19-04AUG07-1/1

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001638.16 — Hydraulic Oil Temperature Moderately High

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,0000012 -19-04AUG07-1/1

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001639.01 — ECU Detects Zero Fan Speed

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000035 –19–04AUG07–1/1

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001639.16 — ECU Detects Higher Fan Speed Than Desired

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000036 -19-04AUG07-1/1

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001639.18 — ECU Detects Lower Fan Speed Than Desired

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000037 -19-04AUG07-1/1

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002000.13 — Security Violation

For troubleshooting procedures please see the application troubleshooting manual.

RG40854,000000B -19-04AUG07-1/1

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,801

002005.09 — ACU Message Missing

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000038 -19-04AUG07-1/1

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002005.14 — Incorrect ACU Message Received

The ECU receives a communication error message from the ACU.

DM59778,0000015 -19-03OCT07-1/1

002005.14 — Incorrect ACU Message Received Diagnostic Procedure

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① Communication Test

1. Connect to Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Group 160 earlier in this Section.
 2. From Service ADVISOR run COMMUNICATION TEST.
 3. Refresh codes.
- Did 002005.14 reappear active?

YES: For troubleshooting procedures please see the application troubleshooting manual.

NO: Problem fixed.

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002030.09 — A/C Clutch Status Signal Missing

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,0000039 –19–04AUG07–1/1

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002071.09 — CCU Message Missing

For troubleshooting procedures please see the application troubleshooting manual.

WL30140,000003A -19-04AUG07-1/1

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002580.03 — Brake Pressure Signal Out of Range High

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,0000013 -19-04AUG07-1/1

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002580.04 — Brake Pressure Signal Out of Range Low

For troubleshooting procedures please see the application troubleshooting manual.

DM59778,0000014 -19-04AUG07-1/1

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002630.00 — Charge Air Cooler Outlet Temperature Signal Extremely High

The ECU senses an Charge Air Cooler Outlet Temperature above specification.

RG41221,0000283 –19–04OCT07–1/1

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002630.00 - Charge Air Cooler Outlet Temperature Signal Extremely High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000102

Any DTC with SPN 000103

Any DTC with SPN 001172

Any DTC with SPN 000110

002630.00

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an charged air cooler outlet temperature of 91° C (195° F) on OEM engines.

The engine has to be running for 3 minutes before the code is set.

001569.31 is set when this code is active.

Alarm Level:

Stop

Control Unit Response:

Maximum engine power is derated up to 60 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further charge air cooler outlet air temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 3

- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh Codes.

Did 002630.00 reappear active?

YES: GO TO 2

NO: GO TO 11

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② Restricted or Dirty Charge Air Cooler

NOTE: See application troubleshooting for information on removing, testing, and cleaning charge air cooler.

Make sure that the charge air cooler is clean and free from excess debris. The charge air cooler needs to be cleaned periodically.

Is the charge air cooler clean of debris?

YES: GO TO 3

NO: Clean the charge air cooler. GO TO 10

– – –1/1

Trouble Code Diagnostics and Tests

③ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 10 NO: GO TO 4 -- -1/1
④ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding area for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 10 NO: GO TO 5 -- -1/1
⑤ Check Charge Air Cooler Outlet Temperature Sensor	1. Remove charged air cooler outlet temperature sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

6 Check Charge Air Cooler Outlet Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With charged air cooler outlet temperature sensor removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the charged air cooler outlet temperature sensor in hot water along with a thermometer. b. Let the charged air cooler outlet temperature sensor cool down to ambient temperature. 5. Monitor the charged air cooler outlet (or EGR fresh air) temperature from within Service ADVISOR. Does the sensor reading match the temperature of the hot water or ambient air within 5° F?	YES: Charged air cooler outlet temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Charged air cooler outlet temperature sensor has already been replaced. GO TO 7 NO: Replace charged air cooler outlet temperature sensor. GO TO 10 -- -1/1
7 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 002630.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 002630.03 become active?	YES: ECU has not been reprogrammed. GO TO 9 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 8 -- -1/1
8 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 002630.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: ECU has not been reprogrammed. GO TO 9 NO: ECU has been reprogrammed. Replace ECU. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 002630.00 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1
10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 002630.00 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. -- -1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

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002630.03 — Charge Air Cooler Outlet Temperature Signal Out of Range High

The charge air cooler outlet temperature input voltage exceeds the sensor's high voltage specification.

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002630.03 — Charge Air Cooler Outlet Temperature Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

002630.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The charge air cooler outlet temperature input voltage increases above the sensor's high voltage specification. This corresponds to a temperature that is lower than what is physically possible for the charge air temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default charge air cooler outlet temperature of -1° C (30° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more charge air cooler outlet temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
 - see 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 3
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 002630.03 reappear active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Perform TERMINAL TEST on charge air cooler outlet temperature sensor connector T01 and charge air cooler outlet temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check Charge Air Cooler Outlet Temperature Return Circuit Resistance	On the harness, measure the resistance between charge air cooler outlet temperature sensor connector T01-B and single point ground. Is the resistance less than 5 ohms?	YES: GO TO 4 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
❹ Check For Charge Air Cooler Outlet Temperature Signal Circuit Shorted to Voltage Source	1. Ignition ON, engine OFF. 2. On the harness, measure the voltage between charge air cooler outlet temperature sensor connector T01-A (+) and T01-B (-). Is the voltage greater than 5.5V?	YES: GO TO 5 NO: GO TO 7 -- -1/1

Trouble Code Diagnostics and Tests

5 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-F2 and J03-B2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 ---1/1
6 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-F2 and all other terminals in ECU harness connectors J01, J02 and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Inspect harness for short to some voltage source. If none found, reinstall connectors and recheck procedure. GO TO 1 ---1/1
7 Check for DTC Change with Charge Air Cooler Outlet Temperature Signal Shorted to Return	1. Ignition OFF, engine OFF. 2. On the harness, install flex probes on charge air cooler outlet temperature sensor connector terminals T01-A and T01-B. 3. Connect jumper wire between flex probes. 4. Ignition ON, engine OFF. 5. Refresh DTCs Is DTC 0002630.04 now an active DTC?	YES: GO TO 8 NO: GO TO 9 ---1/1
8 Check for DTC 0002630.03 with Sensor Reconnected	1. Ignition OFF, engine OFF. 2. Remove flex probes from T01. 3. Reconnect T01 to charge air cooler outlet temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 0002630.03 now an active DTC?	YES: Replace charge air cooler outlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 ---1/1

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Trouble Code Diagnostics and Tests

9 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-F2 and J03-B2. Were Terminal Test results good?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
10 Check Charge Air Cooler Outlet Temperature Sensor Circuit Continuity	1. Disconnect charge air cooler outlet temperature sensor connector T01. 2. On the harness, measure the resistance between ECU J03-F2 and charge air cooler outlet temperature sensor connector T01-A. 3. On the harness, measure the resistance between ECU J03-B2 and charge air cooler outlet temperature sensor connector T01-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
11 Check for Intermittent Connection	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor the Charge Air Cooler Outlet Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the charge air cooler outlet temperature sensor and ECU J03 connector. <i>NOTE: The charge air cooler outlet temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 12
12 Replace Terminals and Sensor	1. Ignition OFF, engine OFF. 2. Replace terminals in charge air cooler outlet temperature sensor connector T01. 3. Replace charge air cooler outlet temperature sensor. 4. Ignition ON, engine OFF. 5. Refresh DTCs. Is DTC 0002630.03 active?	YES: Contact DTAC for support. NO: Problem fixed.

Trouble Code Diagnostics and Tests

13 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor the Charge Air Cooler Outlet Temperature Input Voltage data point in Service ADVISOR while gently wiggling the wiring harness between the charge air cooler outlet temperature sensor and ECU J03 connector. <i>NOTE: The charge air cooler outlet temperature input voltage will increase to approximately 5V when the sensor circuit is open.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 ---1/1
14 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 0002630.03 now active?	YES: GO TO 2 NO: GO TO 15 ---1/1
15 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect charge air cooler outlet temperature sensor connector T01. 3. Perform TERMINAL TEST on T01. 4. Disconnect ECU J03 connector. 5. Perform Terminal Test on J03-F2 and J03-B2. Were Terminal Test results good?	YES: GO TO 16 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. ---1/1
16 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 0002630.03 now active?	YES: GO TO 2 NO: GO TO 17 ---1/1
17 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 0002630.03. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 18 ---1/1
18 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. ---1/1

002630.04 — Charge Air Cooler Outlet Temperature Signal Out of Range Low

The charge air cooler outlet temperature input voltage drops below the sensor's low voltage specification.

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002630.04 — Charge Air Cooler Outlet Temperature Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

002630.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The Charge Air Cooler Outlet temperature input voltage drops below the sensor's low voltage specification. This corresponds to a temperature that is higher than what is physically possible for Charge Air Cooler Outlet temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default charge air cooler outlet temperature of 50° C (122° F). The ECU will try to maintain the engine operating envelope.

Additional References:

For more charge air cooler outlet temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3
- see 4.5L 24V ECU WIRING DIAGRAM 3
- see 6.8L 12V ECU WIRING DIAGRAM 3
- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 002630.04 reappear active?	YES: GO TO 2 NO: GO TO 16 -- -1/1
❷ Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect the charge air cooler outlet temperature sensor connector T01. 3. Perform TERMINAL TEST on charge air cooler outlet temperature sensor connector T01 and charge air cooler outlet temperature sensor. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Check for DTC 002630.04 Active Status Change with Sensor Disconnected	1. Ignition ON, Engine OFF. 2. Refresh codes. Is DTC 002630.04 still an active DTC?	YES: GO TO 8 NO: GO TO 4 -- -1/1
❹ Check for DTC 002630.03	Is DTC 002630.03 now an active DTC with charge air cooler outlet temperature sensor connector T01 still disconnected?	YES: GO TO 5 NO: GO TO 8 -- -1/1

Trouble Code Diagnostics and Tests

5 Sensor Shorted to Ground Test	On the charge air cooler outlet temperature sensor, measure the resistance between either terminal and single point ground. Is the resistance less than 1k ohms?	YES: Replace charge air cooler outlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 6 -- -1/1
6 Sensor Internal Short Test	On the charge air cooler outlet temperature sensor, measure the resistance between terminal A and terminal B. Is the resistance less than 50 ohms?	YES: Replace charge air cooler outlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 7 -- -1/1
7 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Charge Air Cooler Outlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between charge air cooler outlet temperature sensor and ECU J03 connector. <i>NOTE: The charge air cooler outlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Replace charge air cooler outlet temperature sensor. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
8 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect ECU J03 connector. 3. Perform TERMINAL TEST on terminals J03-F2 and J03-B2. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

9 Check Sensor Circuit Continuity	1. On the harness, measure the resistance between ECU J03-F2 and charge air cooler outlet temperature sensor T01-A. 2. On the harness, measure the resistance between ECU J03-B2 and charge air cooler outlet temperature sensor T01-B. Were both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
10 Check for Signal Shorted to Ground	On the harness, measure the resistance between ECU J03-F2 and single point ground. Was the resistance less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 11 -- -1/1
11 Check for DTC Active Status Change with J03 Disconnected	<i>NOTE: Many new error codes will appear in the next step. Disregard all codes except 002630.04.</i> 1. Verify ECU J03 connector is still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Is DTC 002630.04 still active with J03 disconnected?	YES: GO TO 15 NO: GO TO 12 -- -1/1
12 Check for Wire-Wire Short	1. Ignition OFF, engine OFF. 2. Disconnect ECU connectors J01 and J02. 3. Measure the resistance between ECU J03-F2 and all other terminals in the ECU harness connectors J01, J02, and J03. Was any measurement less than 100k ohms?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Check for Intermittent Short to Ground	1. Ignition OFF, engine OFF. 2. Reconnect all connectors. 3. Ignition ON, engine OFF. 4. Monitor Charge Air Cooler Outlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between charge air cooler outlet temperature sensor and ECU J03 connector. <i>NOTE: The charge air cooler outlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent short to ground found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 14 -- -1/1
14 Check for Active DTC 002630.04	Refresh DTCs Is DTC 002630.04 still active?	YES: Recheck measurements. GO TO 2 NO: Problem is intermittent. Contact DTAC for support. -- -1/1
15 Replace ECU	1. Replace ECU. 2. Reconnect all electrical connectors. 3. Refresh DTCs. Is DTC 002630.04 still active?	YES: Contact DTAC for support. NO: Problem fixed. -- -1/1
16 Check for Intermittent Connection	1. Ignition ON, engine OFF. 2. Monitor Charge Air Cooler Outlet Temperature Input Voltage data point in Service ADVISOR while gently wiggle wire harness between charge air cooler outlet temperature sensor and ECU J03 connector. <i>NOTE: The charge air cooler outlet temperature input voltage will decrease to approximately 0V when the sensor circuit is shorted to ground.</i> Was the source of the intermittent connection found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 17 -- -1/1
17 Check Snapshot Information	1. Review snapshot information stored in step 1. 2. Operate engine under conditions where DTC became active. Is DTC 002630.04 now active?	YES: GO TO 2 NO: GO TO 18 -- -1/1

Trouble Code Diagnostics and Tests

18 Terminal Test	1. Ignition OFF, engine OFF. 2. Disconnect charge air cooler outlet temperature sensor connector T01. 3. Perform TERMINAL TEST on T01. 4. Disconnect ECU J03 connector. 5. Perform TERMINAL TEST on J03-F2 and J03-B2. Were Terminal Test results good?	YES: GO TO 19 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
19 Get More Information	1. Talk to the operator who has observed the problem firsthand, if possible, to obtain more information on the conditions when the problem occurs. 2. Operate the engine under the conditions specified by the operator. Is DTC 002630.04 now active?	YES: GO TO 2 NO: GO TO 20 -- -1/1
20 Check DTAC Solutions	Search DTAC solutions in Service Advisor for known issues which may cause an intermittent DTC 002630.04. Were any applicable solutions found?	YES: Perform steps identified in DTAC solution. NO: GO TO 21 -- -1/1
21 Software Updates	Check Custom Performance for possible ECU software updates. Is a later version of ECU software available?	YES: Reprogram ECU with latest version of software. NO: Contact DTAC for support. -- -1/1

002630.15 — Charge Air Cooler Outlet Temperature Signal Slightly High

The ECU senses an Charge Air Cooler Outlet Temperature above specification.

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002630.15 — Charge Air Cooler Outlet Temperature Signal Slightly High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000102

Any DTC with SPN 000103

Any DTC with SPN 001172

Any DTC with SPN 000110

002630.15

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an charged air cooler outlet temperature of 88° C (190° F) on OEM engines.

The engine has to be running for 3 minutes before the code is set.

Alarm Level:

Warning

Control Unit Response:

The ECU continues to control the engine in normal operating parameters.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further charge air cooler outlet air temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 3

- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 002630.16 reappear active?	YES: GO TO 2 NO: GO TO 11

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❷ Restricted or Dirty Charge Air Cooler	<i>NOTE: See application troubleshooting for information on removing, testing, and cleaning charge air cooler.</i> Make sure that the charge air cooler is clean and free from excess debris. The charge air cooler needs to be cleaned periodically. Is the charge air cooler clean of debris?	YES: GO TO 3 NO: Clean the charge air cooler. GO TO 10

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Trouble Code Diagnostics and Tests

③ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 10 NO: GO TO 4 ---1/1
④ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding areas for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 10 NO: GO TO 5 ---1/1
⑤ Check Charge Air Cooler Outlet Temperature Sensor	1. Remove charged air cooler outlet temperature sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 6 ---1/1

Trouble Code Diagnostics and Tests

6 Check Charge Air Cooler Outlet Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With charged air cooler outlet temperature sensor removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the charged air cooler outlet temperature sensor in hot water along with a thermometer. b. Let the charged air cooler outlet temperature sensor cool down to ambient temperature. 5. Monitor the charged air cooler outlet (or EGR fresh air) temperature from within Service ADVISOR. Does the sensor reading match the temperature of the hot water or ambient air within 5° F?	YES: Charged air cooler outlet temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Charged air cooler outlet temperature sensor has already been replaced. GO TO 7 NO: Replace charged air cooler outlet temperature sensor. GO TO 10 -- -1/1
7 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 002630.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 002630.03 become active?	YES: ECU has not been reprogrammed. GO TO 9 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 8 -- -1/1
8 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 002630.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: ECU has not been reprogrammed. GO TO 9 NO: ECU has been reprogrammed. Replace ECU. GO TO 10 -- -1/1

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Trouble Code Diagnostics and Tests

9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 002630.15 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1
10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 002630.15 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. -- -1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

002630.16 — Charge Air Cooler Outlet Temperature Signal Moderately High

The ECU senses an Charge Air Cooler Outlet Temperature above specification.

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002630.16 — Charge Air Cooler Outlet Temperature Signal Moderately High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000102

Any DTC with SPN 000103

Any DTC with SPN 001172

Any DTC with SPN 000110

002630.16

When DTC is Displayed:

When the engine has been running 3 minutes and the error is active.

Related Information:

The ECU senses an charged air cooler outlet temperature of 89.5° C (193° F) on OEM engines.

The engine has to be running for 3 minutes before the code is set.

001569.31 is set when this code is active.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For further temperature sensor information, see MEASURING TEMPERATURE in Section 03, Group 140 earlier in this manual.

For further charge air cooler outlet air temperature sensor information, see CHARGE AIR COOLER OUTLET AIR TEMPERATURE SENSOR in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 3

- see 6.8L 12V ECU WIRING DIAGRAM 3

- see 6.8L 24V ECU WIRING DIAGRAM 3

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JT07328
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh Codes. Did 002630.16 reappear active?	YES: GO TO 2 NO: GO TO 11

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❷ Restricted or Dirty Charge Air Cooler	<i>NOTE: See application troubleshooting for information on removing, testing, and cleaning charge air cooler.</i> Make sure that the charge air cooler is clean and free from excess debris. The charge air cooler needs to be cleaned periodically. Is the charge air cooler clean of debris?	YES: GO TO 3 NO: Clean the charge air cooler. GO TO 10

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Trouble Code Diagnostics and Tests

③ Preliminary Check of Cooling System	Visually inspect cooling system components. See CHECK AND SERVICE COOLING SYSTEM in base engine manual, Section 04, Group 150. • Remove any blockage on or near radiator. • Inspect radiator hoses for signs of leakage or cracks. • Loose cooling fan belt. See CHECKING BELT TENSIONER SPRING TENSION and BELT WEAR in base engine manual, Section 02, Group 070. • Malfunctioning cooling fan. See INSPECT and INSTALL FAN ASSEMBLY in base engine manual, Section 02, Group 070. • Inspect radiator cap for failure. See PRESSURE TEST COOLING SYSTEM AND RADIATOR CAP in base engine manual, Section 04, Group 150. • Check radiator coolant is filled to proper level. • Inspect cooling fan shroud for damage. • Excessively high ambient air temperature. Were any problems found?	YES: Fix problem(s). GO TO 10 NO: GO TO 4 -- -1/1
④ Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Perform TERMINAL TEST on the harness and sensor connector. 4. Inspect surrounding areas for pinched or melted wires. Were any defects found?	YES: Fix problem. GO TO 10 NO: GO TO 5 -- -1/1
⑤ Check Charge Air Cooler Outlet Temperature Sensor	1. Remove charged air cooler outlet temperature sensor. See REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) EXHAUST TEMPERATURE SENSOR in Section 02, Group 110 earlier in this manual. 2. Inspect engine housing, sensor housing, and O-ring for defects. Were any defects found?	YES: Replace defective part. GO TO 10 NO: GO TO 6 -- -1/1

Trouble Code Diagnostics and Tests

6 Check Charge Air Cooler Outlet Temperature Sensor	1. Ignition OFF, Engine OFF. 2. With charged air cooler outlet temperature sensor removed from engine, reconnect sensor to its harness connector. 3. Ignition ON, Engine OFF. 4. Perform one or both of the steps below. a. Place the charged air cooler outlet temperature sensor in hot water along with a thermometer. b. Let the charged air cooler outlet temperature sensor cool down to ambient temperature. 5. Monitor the charged air cooler outlet (or EGR fresh air) temperature from within Service ADVISOR. Does the sensor reading match the temperature of the hot water or ambient air within 5° F?	YES: Charged air cooler outlet temperature sensor is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Charged air cooler outlet temperature sensor has already been replaced. GO TO 7 NO: Replace charged air cooler outlet temperature sensor. GO TO 10 -- -1/1
7 Check Signal Wire In Harness	<i>NOTE: Several new DTCs will appear in this step. Ignore all DTCs except for 002630.03</i> 1. Ignition OFF, Engine OFF. 2. Disconnect the charged air cooler outlet temperature sensor connector. 3. Ignition ON, Engine OFF. 4. Monitor DTCs from within Service ADVISOR. Did 002630.03 become active?	YES: ECU has not been reprogrammed. GO TO 9 YES: ECU has been reprogrammed. Wire harness is OK. Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: GO TO 8 -- -1/1
8 Check ECU	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Monitor the DTC codes from within Service ADVISOR. Did 002630.03 become active?	YES: Problem in harness. Perform TERMINAL TEST on ECU connector J3. Diagnose and fix harness problem. GO TO 10 NO: ECU has not been reprogrammed. GO TO 9 NO: ECU has been reprogrammed. Replace ECU. GO TO 10 -- -1/1

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Trouble Code Diagnostics and Tests

9 Reprogram ECU	1. Download latest ECU software payload and reprogram ECU. See ENGINE CONTROL UNIT (ECU) REPROGRAMMING INSTRUCTIONS in this section of the manual. 2. Reconnect all connectors and sensors. 3. Monitor DTCs in Service ADVISOR. 4. Let engine run for 3 minutes and refresh codes. Is 002630.16 still active?	YES: Problem not fixed. Recheck steps at beginning of procedure. GO TO 1 NO: Verify problem is fixed. GO TO 10 -- -1/1
10 Verification	1. Ignition OFF, Engine OFF. 2. Reconnect all connectors, hoses, sensors, etc. 3. Ignition ON, Engine ON. 4. Monitor DTCs in Service ADVISOR. 5. Let engine run for 3 minutes. 6. Refresh DTCs. 7. Operate engine through normal speed and load. Did DTC 002630.16 reappear as active with engine running?	YES: Problem not fixed. Recheck connectors and engine parameters that effect the exhaust system. GO TO 1 NO: Problem fixed. -- -1/1
11 Review Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review all stored codes. Does information relate to a possible intermittent or operating condition causing the code to become active. 3. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Retest. YES: Found operating point at which the code becomes active. GO TO 2 NO: Start DTAC case. -- -1/1

002659.02 — EGR Mass Flow Rate Data Invalid

The ECU senses a mismatch between the calculation methods used to determine exhaust gas recirculation flow.

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002659.02 — EGR Mass Flow Rate Data Invalid Diagnostic Procedure

Troubleshooting Sequence:

000107.00 or 000107.31
 Any DTC with SPN 002791
 Any DTC with SPN 000105
 Any DTC with SPN 000412
 Any DTC with SPN 002630
 Any DTC with SPN 000102
 Any DTC with SPN 000103
 Any DTC with SPN 000641
 002795.07
 002659.02

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU detects a large variation between EGR flow calculated by temperature difference and EGR flow calculated by pressure difference.

There is no physical EGR flow sensor. The ECU uses the difference between manifold air temperature and charge air outlet temperature to calculate EGR flow.

The ECU also uses the difference between the calculated exhaust manifold pressure and the intake manifold pressure (MAP) to calculate EGR flow.

This DTC may be caused by any condition that affects manifold pressures or actual EGR flow.

A false measurement obtained from one of the sensors used to calculate EGR flow may cause DTC 002659.02 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

The ECU will control the EGR/VGT system in open loop mode.

Additional References:

For further EGR valve information, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3, 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 3, 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 3, 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 3, 6.8L 24V ECU WIRING DIAGRAM 7 located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on temperature sensor testing see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328

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Connector Adapter Test Kit to make measurements in Connectors. This will ensure that terminal damage does not occur.

1. Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

Did 002795.07 or any DTC with SPN 002791 become active?

YES: Discontinue test for 002659.02 and perform test for 002795.07 or DTC with SPN 002791.

NO: GO TO 2

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Trouble Code Diagnostics and Tests

② Check for Swapped Sensor Connectors	<i>NOTE: The Charge Air Cooler Outlet Temperature sensor (connector T01) and the Manifold Air Temperature sensor (connector T02) are identical parts and are located close to each other on the intake manifold. The connectors for the two sensors can be inadvertently swapped on some applications.</i> 1. Inspect the wire harness to verify that the charge air outlet temperature sensor is connected to wire harness connector T01. 2. Inspect the wire harness to verify that the manifold air temperature sensor is connected to wire harness connector T02. <i>NOTE: If connector tag numbers are not present, disconnect the charge air cooler outlet temperature sensor and verify that DTC 0002630.03 is generated. If DTC 000105.03 is generated instead, the sensor connectors are swapped.</i> Were the sensors connected to the correct wire harness connectors?	YES: Engine is at ambient temperature and has not been operated in the past eight hours. GO TO 3 YES: Engine has been operated in the past eight hours. GO TO 4 NO: Connect the sensors to the correct wire harness connectors. GO TO 15 -- -1/1
③ Check Air Temperature Sensors on a Cold Engine	1. Ignition ON, engine OFF. 2. Monitor the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 -- -1/1

④ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. <i>NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.</i> 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 -- -1/1
⑤ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: EGR Fresh Air Temperature is higher or lower than the other two temperatures. GO TO 6 NO: Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 8 NO: EGR Temperature is higher or lower than the other two temperatures. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

⑥ Check Charge Air Cooler Outlet Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 5 -- -1/1
⑦ Check Charge Air Cooler Outlet Circuit	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace charge air cooler outlet sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

8 Check Manifold Air Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and manifold air temperature sensor connector. 3. Perform TERMINAL TEST on J3 and manifold air temperature sensor connector. 4. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and the manifold air temperature sensor connector signal (T02-A). 5. On the harness, measure the resistance between the ECU manifold air temperature reference (J3-B2) and the manifold air temperature sensor connector reference (T02-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 5
9 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace manifold air temperature sensor. GO TO 12 NO: Fix problem. GO TO 5
10 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Fix problem. GO TO 5

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Trouble Code Diagnostics and Tests

11 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace EGR temperature sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1
12 Retest Temperature Sensor Validity	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 4°C (7°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 13 -- -1/1
13 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 14 -- -1/1

Trouble Code Diagnostics and Tests

14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: Open DTAC case. -- -1/1
15 Check EGR Valve	<i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Ignition OFF, engine OFF. 2. Remove EGR valve. 3. Inspect EGR valve and O-rings for damage or blockage. 4. Verify that the part number of the EGR valve removed is the correct part for the engine. 5. Inspect intake and exhaust passages for damage or blockage which would restrict EGR flow. Were any problems found?	YES: Fix problem or replace incorrect EGR valve. GO TO 16 NO: GO TO 16 -- -1/1

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Trouble Code Diagnostics and Tests

16 Check EGR Valve Operation	1. Reconnect EGR valve connector and secure EGR valve to the engine. Do not permit valve to be suspended from wire harness. 2. Reconnect all other electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR while observing EGR valve. Did EGR valve open and close one time without generating any DTCs with SPN 002791?	YES: Reinstall EGR valve. GO TO 17 NO: DTC with SPN 002791 is now active. Discontinue test for 2659.02 and perform test for DTC with SPN 002791. NO: EGR valve did not open and close but no DTCs with SPN 002791 were generated. Replace EGR valve. GO TO 17 -- -1/1
17 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 18 NO: Step 3 or 4 was performed earlier during this procedure. GO TO 20 NO: Step 3 or 4 was NOT performed earlier during this procedure. GO TO 4 -- -1/1
18 Recreate Operating Point	Recreate the engine operating point where 002659.02 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.02 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 19 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

19 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 002659.02 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.02 active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
20 Recheck System	1. Perform CHARGE AIR SYSTEM test. 2. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. 3. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure. 4. Check for restricted exhaust flow through EGR cooler. 5. Check for restricted coolant flow through EGR cooler. 6. Replace EGR valve, if not already replaced during this procedure. 7. Download latest ECU payload and reprogram ECU, if not already performed during this procedure. 8. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 18 NO: Open DTAC case. -- -1/1

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002659.15 — EGR Mass Flow Rate Data Slightly High

The ECU detects exhaust gas recirculation flow when the exhaust gas recirculation valve is closed.

RG41221,0000289 –19–04OCT07–1/1

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002659.15 — EGR Mass Flow Rate Data Slightly High Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 002791

Any DTC with SPN 000105

Any DTC with SPN 000412

Any DTC with SPN 002630

002659.15

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU calculates EGR flow is occurring when the EGR valve is closed.

There is no physical EGR flow sensor. The ECU uses the difference between manifold air temperature and charge air outlet temperature to calculate EGR flow.

A false measurement obtained from one of the sensors used to calculate EGR flow may cause DTC 002659.15 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

The ECU will control the EGR/VGT system in open loop mode.

Additional References:

For further EGR valve information, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3, 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 3, 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 3, 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 3, 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on temperature sensor testing see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

Did any DTC with SPN 002791 become active?

YES: Discontinue test for 002659.15 and perform test for DTC with SPN 002791.

NO: Engine is at ambient temperature and has not been operated in the past eight hours. GO TO 2

NO: Engine has been operated in the past eight hours. GO TO 3

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② Check Air Temperature Sensors on a Cold Engine

1. Ignition ON, engine OFF.
2. Monitor the following data points in Service ADVISOR:
 - a. EGR Fresh Air Temperature
 - b. Manifold Air Temperature
 - c. EGR Temperature

Are the temperatures reported by these data points within the following specifications?

- EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other.
- EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.

YES: GO TO 14

NO: GO TO 4

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③ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. <i>NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.</i> 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 14 NO: GO TO 4 -- -1/1
④ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 14 NO: EGR Fresh Air Temperature is higher or lower than the other two temperatures. GO TO 5 NO: Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 7 NO: EGR Temperature is higher or lower than the other two temperatures. GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

5 Check Charge Air Cooler Outlet Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 6 NO: Fix problem. GO TO 4 -- -1/1
6 Check Charge Air Cooler Outlet Circuit	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace charge air cooler outlet sensor. GO TO 11 NO: Fix problem. GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

7 Check Manifold Air Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and manifold air temperature sensor connector. 3. Perform TERMINAL TEST on J3 and manifold air temperature sensor connector. 4. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and the manifold air temperature sensor connector signal (T02-A). 5. On the harness, measure the resistance between the ECU manifold air temperature reference (J3-B2) and the manifold air temperature sensor connector reference (T02-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 3
8 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace manifold air temperature sensor. GO TO 11 NO: Fix problem. GO TO 4
9 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 10 NO: Fix problem. GO TO 4

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Trouble Code Diagnostics and Tests

10 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace EGR temperature sensor. GO TO 11 NO: Fix problem. GO TO 4 -- -1/1
11 Retest Temperature Sensor Validity	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 14 NO: GO TO 12 -- -1/1
12 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 14 NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 14 NO: Open DTAC case. -- -1/1
14 Check EGR Valve	<i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Ignition OFF, engine OFF. 2. Remove EGR valve. 3. Inspect EGR valve and O-rings for damage. 4. Verify that the part number of the EGR valve removed is the correct part for the engine. 5. Inspect intake and exhaust passages for damage which would permit EGR flow with EGR valve closed. Were any problems found?	YES: Fix problem or replace incorrect EGR valve. GO TO 15 NO: GO TO 15 -- -1/1

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Trouble Code Diagnostics and Tests

15 Check EGR Valve Operation	1. Reconnect EGR valve connector and secure EGR valve to the engine. Do not permit valve to be suspended from wire harness. 2. Reconnect all other electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR while observing EGR valve. Did EGR valve open and close one time without generating any DTCs with SPN 002791?	YES: Reinstall EGR valve. GO TO 16 NO: DTC with SPN 002791 is now active. Discontinue test for 2659.15 and perform test for DTC with SPN 002791. NO: EGR valve did not open and close but no DTCs with SPN 002791 were generated. Replace EGR valve. GO TO 16 -- -1/1
16 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 17 NO: Step 2 or 3 was performed earlier during this procedure. GO TO 19 NO: Step 2 or 3 was NOT performed earlier during this procedure. GO TO 3 -- -1/1
17 Recreate Operating Point	Recreate the engine operating point where 002659.15 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.15 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 18 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. -- -1/1

Trouble Code Diagnostics and Tests

18 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 002659.15 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.15 active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
19 Recheck System	1. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure. 2. Replace EGR valve, if not already replaced during this procedure. 3. Download latest ECU payload and reprogram ECU, if not already performed during this procedure. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 17 NO: Open DTAC case. -- -1/1

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002659.17 — EGR Mass Flow Rate Data Slightly Low

The ECU does not detect exhaust gas recirculation flow when the EGR valve is open.

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002659.17 — EGR Mass Flow Rate Data Slightly Low Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 002791

Any DTC with SPN 000105

Any DTC with SPN 000412

Any DTC with SPN 002630

002659.17

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU calculates that there is insufficient EGR flow when the EGR valve is open.

There is no physical EGR flow sensor. The ECU uses the difference between manifold air temperature and charge air outlet temperature to calculate EGR flow.

This DTC may be caused by any condition that restricts actual EGR flow.

A false measurement obtained from one of the sensors used to calculate EGR flow may cause DTC 002659.17 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

The ECU will control the EGR/VGT system in open loop mode.

Additional References:

For further EGR valve information, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 3, 4.5L 12V ECU WIRING DIAGRAM 7
 - see 4.5L 24V ECU WIRING DIAGRAM 3, 4.5L 24V ECU WIRING DIAGRAM 7
 - see 6.8L 12V ECU WIRING DIAGRAM 3, 6.8L 12V ECU WIRING DIAGRAM 7
 - see 6.8L 24V ECU WIRING DIAGRAM 3, 6.8L 24V ECU WIRING DIAGRAM 7
- located in Section 06, Group 210 later in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on temperature sensor testing see TEMPERATURE SENSOR VALIDITY TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.
- Did any DTC with SPN 002791 become active?

YES: Discontinue test for 002659.17 and perform test for DTC with SPN 002791.

NO: GO TO 2

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Trouble Code Diagnostics and Tests

② Check for Swapped Sensor Connectors	<i>NOTE: The Charge Air Cooler Outlet Temperature sensor (connector T01) and the Manifold Air Temperature sensor (connector T02) are identical parts and are located close to each other on the intake manifold. The connectors for the two sensors can be inadvertently swapped on some applications.</i> 1. Inspect the wire harness to verify that the charge air outlet temperature sensor is connected to wire harness connector T01. 2. Inspect the wire harness to verify that the manifold air temperature sensor is connected to wire harness connector T02. <i>NOTE: If connector tag numbers are not present, disconnect the charge air cooler outlet temperature sensor and verify that DTC 0002630.03 is generated. If DTC 000105.03 is generated instead, the sensor connectors are swapped.</i> Were the sensors connected to the correct wire harness connectors?	YES: Engine is at ambient temperature and has not been operated in the past eight hours. GO TO 3 YES: Engine has been operated in the past eight hours. GO TO 4 NO: Connect the sensors to the correct wire harness connectors. GO TO 15 -- -1/1
③ Check Air Temperature Sensors on a Cold Engine	1. Ignition ON, engine OFF. 2. Monitor the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

④ Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Charge air cooler outlet sensor b. Manifold air temperature sensor c. EGR temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. <i>NOTE: The charge air cooler outlet sensor (connector T01) and the manifold air temperature sensor (connector T02) are identical parts and are located close to each other. Verify that the sensors are connected to the harness correctly.</i> 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. EGR Fresh Air Temperature b. Manifold Air Temperature c. EGR Temperature Are the temperatures reported by these data points within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 5 -- -1/1
⑤ Temperature Sensor Validity Test	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: EGR Fresh Air Temperature is higher or lower than the other two temperatures. GO TO 6 NO: Manifold Air Temperature is higher or lower than the other two temperatures. GO TO 8 NO: EGR Temperature is higher or lower than the other two temperatures. GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

⑥ Check Charge Air Cooler Outlet Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and charge air cooler outlet sensor connector. 3. Perform TERMINAL TEST on J3 and charge air cooler sensor connector. 4. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and the charge air cooler outlet sensor connector signal (T01-A). 5. On the harness, measure the resistance between the ECU charge air cooler outlet reference (J3-B2) and the charge air cooler outlet sensor connector reference (T01-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 7 NO: Fix problem. GO TO 5
⑦ Check Charge Air Cooler Outlet Circuit	1. Verify charge air cooler outlet sensor is disconnected. 2. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU charge air cooler outlet signal (J3-F2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU charge air cooler outlet signal (J3-F2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace charge air cooler outlet sensor. GO TO 12 NO: Fix problem. GO TO 5

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Trouble Code Diagnostics and Tests

8 Check Manifold Air Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and manifold air temperature sensor connector. 3. Perform TERMINAL TEST on J3 and manifold air temperature sensor connector. 4. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and the manifold air temperature sensor connector signal (T02-A). 5. On the harness, measure the resistance between the ECU manifold air temperature reference (J3-B2) and the manifold air temperature sensor connector reference (T02-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 9 NO: Fix problem. GO TO 5 -- -1/1
9 Check Manifold Air Temperature Circuit	1. Verify manifold air temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU manifold air temperature signal (J3-F1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU manifold air temperature signal (J3-F1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace manifold air temperature sensor. GO TO 12 NO: Fix problem. GO TO 5 -- -1/1
10 Check EGR Temperature Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and EGR temperature sensor connector. 3. Perform TERMINAL TEST on J3 and EGR temperature sensor connector. 4. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and the EGR temperature sensor connector signal (T03-A). 5. On the harness, measure the resistance between the ECU EGR temperature reference (J3-B2) and the EGR temperature sensor connector reference (T03-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 11 NO: Fix problem. GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

11 Check EGR Temperature Circuit	1. Verify EGR temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and reference (J3-B2). 3. On the harness, measure the resistance between the ECU EGR temperature signal (J3-E2) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU EGR temperature signal (J3-E2) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace EGR temperature sensor. GO TO 12 NO: Fix problem. GO TO 5
12 Retest Temperature Sensor Validity	Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors while monitoring the applicable data point: • Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) • Manifold air temperature sensor (Manifold Air Temperature data point) • EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 13
13 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: GO TO 14

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Trouble Code Diagnostics and Tests

14 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Perform TEMPERATURE SENSOR VALIDITY TEST on the following sensors: a. Charge air cooler outlet sensor (EGR Fresh Air Temperature data point) b. Manifold air temperature sensor (Manifold Air Temperature data point) c. EGR temperature sensor (EGR Temperature data point) Are the maximum temperatures recorded during the Temperature Sensor Validity Test within the following specifications? • EGR Fresh Air Temperature and Manifold Air Temperature within 5°C (9°F) of each other. • EGR Temperature within 7°C (13°F) of EGR Fresh Air Temperature or Manifold Air Temperature.	YES: GO TO 15 NO: Open DTAC case. -- -1/1
15 Check EGR Valve	<i>NOTE: For EGR valve removal and installation instructions, see REMOVE AND INSTALL EXHAUST GAS RECIRCULATION (EGR) VALVE in Section 02, Group 100 earlier in this manual.</i> 1. Ignition OFF, engine OFF. 2. Remove EGR valve. 3. Inspect EGR valve for damage or blockage. 4. Verify that the part number of the EGR valve removed is the correct part for the engine. 5. Inspect intake and exhaust passages for blockage which would restrict EGR flow. Were any problems found?	YES: Fix problem or replace incorrect EGR valve. GO TO 16 NO: GO TO 16 -- -1/1

Trouble Code Diagnostics and Tests

16 Check EGR Valve Operation	1. Reconnect EGR valve connector and secure EGR valve to the engine. Do not permit valve to be suspended from wire harness. 2. Reconnect all other electrical connectors. 3. Ignition ON, engine OFF. 4. Perform HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR while observing EGR valve. Did EGR valve open and close one time without generating any DTCs with SPN 002791?	YES: Reinstall EGR valve. GO TO 17 NO: DTC with SPN 002791 is now active. Discontinue test for 2659.17 and perform test for DTC with SPN 002791. NO: EGR valve did not open and close but no DTCs with SPN 002791 were generated. Replace EGR valve. GO TO 17 -- -1/1
17 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 18 NO: Step 3 or 4 was performed earlier during this procedure. GO TO 20 NO: Step 3 or 4 was NOT performed earlier during this procedure. GO TO 4 -- -1/1
18 Recreate Operating Point	Recreate the engine operating point where 002659.17 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.17 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 19 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. -- -1/1

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Trouble Code Diagnostics and Tests

19 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 002659.17 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002659.17 active?	YES: Open DTAC case. NO: Problem fixed. -- -1/1
20 Recheck System	1. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. 2. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure. 3. Check for restricted exhaust flow through EGR cooler. 4. Check for other restrictions between EGR valve and exhaust manifold. 5. Replace EGR valve, if not already replaced during this procedure. 6. Download latest ECU payload and reprogram ECU, if not already performed during this procedure. 7. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 18 NO: Open DTAC case. -- -1/1

002790.16 — Calculated Compressor Outlet Temperature Moderately High

The ECU senses a turbo compressor outlet temperature above specification.

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002790.16 — Calculated Compressor Outlet Temperature Moderately High

Troubleshooting Sequence:

Any DTC with SPN 000107
 Any DTC with SPN 001172
 Any DTC with SPN 000103
 Any DTC with SPN 000102
 Any DTC with SPN 000105
 Any DTC with SPN 000110
 Any DTC with SPN 000157
 Any DTC with SPN 000412
 Any DTC with SPN 000641
 Any DTC with SPN 002630
 Any DTC with SPN 002791

002795.07

002790.16

When DTC is Displayed:

The engine is running and the error condition is active.

Related Information:

The ECU calculates that the turbo compressor outlet air temperature is greater than a programmed value.

There is no physical compressor outlet temperature sensor. The ECU uses the compressor inlet air temperature and the turbo speed along with the calculated intake air flow rate to calculate the compressor outlet temperature.

The ECU uses information from several sensors to calculate the intake air flow rate.

Elevated compressor inlet air temperatures combined with high engine loads, especially at high altitudes, may cause high compressor outlet temperatures.

This DTC may be caused by any condition that limits intake air flow including intake air restrictions, charge air (boost) leaks, or turbo problems.

A false measurement obtained from one of the sensors used to calculate compressor outlet temperature may cause DTC 002790.16 to be falsely generated.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 50 percent.

Additional References:

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2, 4.5L 12V ECU WIRING DIAGRAM 3

- see 4.5L 24V ECU WIRING DIAGRAM 2, 4.5L 24V ECU WIRING DIAGRAM 3
 - see 6.8L 12V ECU WIRING DIAGRAM 2, 6.8L 12V ECU WIRING DIAGRAM 3
 - see 6.8L 24V ECU WIRING DIAGRAM 2, 6.8L 24V ECU WIRING DIAGRAM 3
 located in Section 06, Group 210 later in this manual.

For more information on charge air system test, see CHARGE AIR SYSTEM in Section 04, Group 150 earlier in this manual.

For more information on variable geometry turbo test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 04, Group 150 earlier in this manual.

For more information on air temperature and flow system test, see EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST in Section 04, Group 150 earlier in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: Do not force probes into connector

terminals or damage will result. Use JT07328

Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

1. Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs will also be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

Is 000103.00 or 000103.08 a stored DTC which occurred at nearly the same engine hours as 002790.16?

YES: Discontinue test for 002790.16 and perform test for 000103.00 or 000103.08.

NO: GO TO 2

-- -1/1

Trouble Code Diagnostics and Tests

② Check Air Intake System	1. Ignition OFF, engine OFF. 2. Check charge air system for loose clamps, damaged hoses, damaged charge air cooler, or other sources of charge air (boost) leaks. 3. Check for a restricted air filter element or other intake air flow restrictions. 4. Perform VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST. Did you find a problem?	YES: Fix problem. GO TO 12 NO: Engine has NOT been operated in the past eight hours. GO TO 3 NO: Engine has been operated in the past eight hours. GO TO 5 -- -1/1
③ Check Air Temperature Sensors on a Cold Engine	1. Ignition ON, engine OFF. 2. Monitor the following data points in Service ADVISOR: a. Turbo Compressor Inlet Air Temperature b. Exhaust Gas Recirculation Fresh Air Temperature Are temperatures indicated by these data points within 5°C (9°F) of each other?	YES: GO TO 12 NO: GO TO 4 -- -1/1
④ Recheck Air Temperature Sensors on a Cold Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Compressor inlet temperature sensor b. Charge air cooler outlet temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. Turbo Compressor Inlet Air Temperature b. Exhaust Gas Recirculation Fresh Air Temperature Are temperatures indicated by these data points within 5°C (9°F) of each other?	YES: GO TO 12 NO: GO TO 6 -- -1/1

Trouble Code Diagnostics and Tests

5 Check Air Temperature Sensors on a Warm Engine	1. Ignition OFF, engine OFF. 2. Remove the following sensors from the engine and permit sensors to cool to ambient temperature for 20 minutes: a. Compressor inlet temperature sensor b. Charge air cooler outlet temperature sensor 3. Reconnect each sensor to the respective harness connector. Do not permit sensor to contact warm engine components and do not touch the sensor probes during reconnection. 4. Ignition ON, engine OFF. 5. Monitor the temperature reported by the following data points in Service ADVISOR: a. Turbo Compressor Inlet Air Temperature b. Exhaust Gas Recirculation Fresh Air Temperature Are temperatures indicated by these data points within 5°C (9°F) of each other?	YES: GO TO 12 NO: GO TO 6 -- -1/1
6 Ambient Temperature Check	1. Ignition ON, engine OFF. 2. Compressor inlet temperature sensor removed from engine. 3. Monitor Turbo Compressor Inlet Air Temperature data point. Does Turbo Compressor Inlet Air Temperature data point indicate the actual ambient air temperature within 6°C (11°F)?	YES: GO TO 12 NO: GO TO 7 -- -1/1
7 Check Compressor Inlet Temperature Sensor Circuit Resistance	1. Ignition OFF, engine OFF. 2. Disconnect ECU J3 connector and compressor inlet temperature sensor connector. 3. Perform TERMINAL TEST on J3 and compressor inlet temperature sensor connector. 4. On the harness, measure the resistance between the ECU compressor inlet temperature signal (J3-D1) and the compressor inlet temperature sensor connector signal (T06-A). 5. On the harness, measure the resistance between the ECU compressor inlet temperature reference (J3-H3) and the compressor inlet temperature sensor connector reference (T06-B). Are Terminal Test results good and are both resistance measurements less than 10 ohms?	YES: GO TO 8 NO: Fix problem. GO TO 6 -- -1/1

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Trouble Code Diagnostics and Tests

8 Check Compressor Inlet Temperature Sensor Circuit	1. Verify compressor inlet temperature sensor is disconnected. 2. On the harness, measure the resistance between the ECU compressor inlet temperature signal (J3-D1) and reference (J3-H3). 3. On the harness, measure the resistance between the ECU compressor inlet temperature signal (J3-D1) and single point ground. 4. Ignition ON, engine OFF. 5. On the harness, measure the voltage between the ECU compressor inlet temperature signal (J3-D1) and single point ground. Are both resistance measurements greater than 10k ohms and is the voltage measurement less than 0.5V?	YES: Replace compressor inlet temperature sensor. GO TO 9 NO: Fix problem. GO TO 6 -- -1/1
9 Ambient Temperature Check	1. Ignition ON, engine OFF. 2. Compressor inlet temperature sensor removed from engine. 3. Monitor Turbo Compressor Inlet Air Temperature data point. Does Turbo Compressor Inlet Air Temperature data point indicate the actual ambient air temperature within 6°C (11°F)?	YES: GO TO 12 NO: GO TO 10 -- -1/1
10 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Reconnect all electrical connectors. 3. Download latest ECU payload and reprogram ECU. 4. Compressor inlet temperature sensor removed from engine. 5. Monitor Turbo Compressor Inlet Air Temperature data point. Does Turbo Compressor Inlet Air Temperature data point indicate the actual ambient air temperature within 6°C (11°F)?	YES: GO TO 12 NO: GO TO 11 -- -1/1

Trouble Code Diagnostics and Tests

11 Replace ECU	1. Ignition OFF, engine OFF. 2. Replace ECU. 3. Compressor inlet temperature sensor removed from engine. 4. Monitor Turbo Compressor Inlet Air Temperature data point. Does Turbo Compressor Inlet Air Temperature data point indicate the actual ambient air temperature within 6°C (11°F)?	YES: GO TO 12 NO: Open DTAC case. ---1/1
12 EGR-VGT System Temperature and Flow Test	1. Ignition OFF, engine OFF. 2. Reinstall all sensors. 3. Reconnect all electrical connectors. 4. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 13 NO: Step 3 or 5 was performed earlier during this procedure. GO TO 15 NO: Step 3 or 5 was NOT performed earlier during this procedure. GO TO 5 ---1/1
13 Recreate Operating Point	Recreate the engine operating point where 002790.16 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002790.16 active?	YES: ECU has NOT been reprogrammed during this procedure. GO TO 14 YES: ECU was reprogrammed during this procedure. Open DTAC case. NO: Problem fixed. ---1/1
14 Reprogram ECU	1. Ignition OFF, engine OFF. 2. Download latest ECU payload and reprogram ECU. 3. Recreate the engine operating point where 002790.16 became active as indicated by the snapshot capture and snapshot recording obtained in Step 1 and maintain for at least 10 minutes. Is 002790.16 active?	YES: Open DTAC case. NO: Problem fixed. ---1/1

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Trouble Code Diagnostics and Tests

15 Recheck System	1. Perform CHARGE AIR SYSTEM test. 2. Check the engine compartment for adequate fresh air supply to the engine for intake air and cooling. 3. Replace any sensor that does not appear to be responding correctly, if not already replaced during this procedure. 4. Download latest ECU payload and reprogram ECU, if not already performed during this procedure. 5. Perform EGR-VGT SYSTEM TEMPERATURE AND FLOW TEST after making any needed repairs. Were EGR-VGT System Temperature and Flow Test results good?	YES: GO TO 13 NO: Open DTAC case.

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002791.02 — EGR Valve Position Signal Invalid

The ECU detects the EGR valve is not able to achieve desired position.

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002791.02 - EGR Valve Position Signal Invalid Diagnostic Procedure

Troubleshooting Sequence:

003513.03 or 003513.04

002791.03 or 002791.04

000110.17

002791.02

When DTC is Displayed:

Only when the engine is running and the error is active.

Related Information

The ECU detects the EGR valve is not able to achieve desired position. The valve is being driven but the position signal returned to the ECU is not within specification.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7

- see 4.5L 24V ECU WIRING DIAGRAM 7

- see 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

IMPORTANT: When replacing EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Inspect intake manifold for debris and buildup.
- Clean O-ring lands if necessary with a non metallic instrument.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST for information on use.

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① Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh codes. Does diagnostic display show any DTC with and SPN of 002791 other than 002791.02 or 000110.17 DTC active ?	YES: Refer to Trouble Shooting Sequence earlier in this procedure. NO: Only DTC 002791.02 is active. GO TO 2 NO: No DTCs are active. GO TO 6

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Trouble Code Diagnostics and Tests

② EGR Valve Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 -- -1/1
③ EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Does diagnostic display show any DTC with and SPN of 002791 other than 002791.02 or 000110.17 DTC active ?	YES: Refer to Trouble Shooting Sequence earlier in this procedure. NO: GO TO 4. -- -1/1
④ Visual Inspection of EGR Valve	1. Remove EGR valve. 2. Perform a visual inspection of the valve looking for damaged or broken parts or the poppet not seated against the flange. Where any problems found?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Visual Inspection of EGR Valve Movement	1. Reconnect EGR valve connector and leave valve out so you can watch it move. IMPORTANT: Pinch hazard, keep hands away from valve while it cycles. 2. Ignition ON, Engine OFF. 3. Watch EGR valve for full opening (approximately 10 mm (0.393 in) and closure (flat against seat) and smooth movement. 4. Run HARNESS DIAGNOSTIC MODE TEST. Did valve move smoothly and open and close fully and 002791.02 reappear active?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Reinstall EGR valve. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
6 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 7. NO: GO TO 8. -- -1/1
7 EGR Valve Connector Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 8 -- -1/1
8 Engine Hours Between Failures Check	1. Ignition OFF, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter value. Is the difference greater than 50 hours?	YES: GO TO 9 NO: GO TO 10. -- -1/1

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Trouble Code Diagnostics and Tests

9 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did 002791.03 or 002791.04 appear active?	YES: Troubleshoot that DTC. NO: No DTCs appeared. Cleaning fixed problem. Return to service. NO: DTC 002791.02 appeared. Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1
10 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 11. NO: GO TO 12. -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did Code reappear active?	YES: GO TO 12. NO: GO TO 10 and review the data again. -- -1/1

Trouble Code Diagnostics and Tests

12 EGR Valve Cleaning Cycle

1. Reconnect EGR valve connector.
 2. Ignition ON, Engine ON.
 3. Warm engine to normal operating temperature.
 4. Run EGR VALVE CLEANING TEST.
 5. Ignition ON, Engine OFF.
 6. Run HARNESS DIAGNOSTIC MODE TEST.
 7. Refresh codes.
- Is 002791.02 active?

YES: Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION.

NO: Cleaning Test fixed problem. Return to service.

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002791.03 — EGR Valve Position Signal Out of Range High

The EGR valve position signal indicates a value that is out of the range of the expected highest value.

RG41221,000028D -19-03OCT07-1/1

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002791.03 — EGR Valve Position Signal Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003513.03

002791.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The EGR valve position signal indicates a value that is out of the range of the expected highest value.

Alarm Level:

Warning

Control Unit Response:

DTC 002791.07 will also set causing the ECU to derate the engine until it is running at 80% of full power.

Additional References:

For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
 - see 4.5L 24V ECU WIRING DIAGRAM 7
 - see 6.8L 12V ECU WIRING DIAGRAM 7
 - see 6.8L 24V ECU WIRING DIAGRAM 7
- located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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Continued on next page

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IMPORTANT: When replacing the EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Clean O-ring lands if necessary with a non metallic instrument.
- Inspect intake manifold for debris and buildup.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST for information on use.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.

4. Refresh codes.

Did 002791.03 reappear active?

YES: GO TO 2

NO: GO TO 19

-- -1/1

② Valve Position Check

Using Service ADVISOR read EGR valve position input voltage.

Is voltage below 5.5 volts?

YES: GO TO 3

NO: GO TO 16

-- -1/1

Trouble Code Diagnostics and Tests

③ EGR Valve Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR valve connector. 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem, reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 ---1/1
④ EGR Valve Reconnection Test	1. Reconnect the EGR valve connector. 2. Ignition ON, Engine OFF. 3. Refresh codes. Did 002791.03 reappear active?	YES: GO TO 5 NO: Problem fixed. Bad EGR valve connection. ---1/1
⑤ EGR Valve Position Circuit Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector. 3. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to ground (terminal 5) and write down the value. 4. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to position input (terminal 6) and write down the value. 5. On the EGR valve measure the resistance of the EGR valve position circuit ground (terminal 5) to position input (terminal 6) and write down the value. Are all values between 20k and 95k ohms?	YES: GO TO 6. NO: Bad position circuit in EGR valve. Replace valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. ---1/1
⑥ ECU - EGR Valve Position Input Circuit Resistance Test	Measure the resistance between the position input (terminal 6) and the position ground (terminal 5) in the EGR valve harness connector. Is the measurement between 9k and 11k ohms?	YES: GO TO 7. NO: GO TO 9. ---1/1
⑦ ECU - EGR Valve Position Supply Circuit Resistance Test	Measure the resistance between the position supply (terminal 1) and the position ground (terminal 5) in the EGR valve harness connector. Is the measurement between 109k and 111k ohms?	YES: GO TO 8. NO: GO TO 13. ---1/1

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Trouble Code Diagnostics and Tests

8 ECU Connector Check	1. Disconnect ECU connector J3 (blue face). 2. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem and reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
9 ECU Connector Check	1. Disconnect ECU connector J3 (blue face). 2. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem and reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 10. -- -1/1
10 EGR Valve Position Ground Circuit Harness Resistance Test	Measure the resistance between the position ground (terminal 5) in the EGR valve harness connector and the ECU harness connector position ground (terminal J3-A3). Is the measurement less than 2 ohms?	YES: GO TO 11. NO: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
11 EGR Valve Position Input Circuit Harness Resistance Test	Measure the resistance between the position input (terminal 6) in the EGR valve harness connector and the ECU connector position input (terminal J3-A4). Is the measurement less than 2 ohms?	YES: GO TO 12. NO: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
12 ECU - EGR Valve Position Input Circuit Resistance Test	Measure the resistance between the position input (terminal J3-A4) the position ground (terminal J3-A3) on the ECU. Is the measurement between 109k and 111k ohms?	YES: Reconnect all connectors. Check harness for melted, pinched or frayed areas. Run HARNESS DIAGNOSTIC MODE TEST. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1

Trouble Code Diagnostics and Tests

13 ECU Connector Check	1. Disconnect ECU connector J3 (blue face). 2. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 14. -- -1/1
14 EGR Valve Position Supply Circuit Harness Resistance Test Two	Measure the resistance between the position supply (terminal 1) in the EGR valve harness connector and the ECU harness connector position supply (terminal J3-A2). Is the measurement less than 2 ohms?	YES: GO TO 15. NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
15 ECU - EGR Valve Position Supply Circuit Resistance Test	Measure the resistance between the position supply (terminal J3-A2) and the position ground (terminal J3-A3) on the ECU. Is the measurement between 109K and 111K ohms?	YES: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: Remove and Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
16 ECU Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the ECU connector that has the EGR valve signal input wire connected to it, J3 (blue face). 3. Disconnect the EGR valve connector. 4. Perform a terminal test on ECU and EGR valve connectors, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST NO: GO TO 17 -- -1/1
17 EGR Valve Position Voltage Check	1. EGR valve and ECU connector J3 still disconnected. 2. Ignition ON, Engine OFF. 3. Using Service ADVISOR read Exhaust Gas Recirculation Valve Position Input Voltage. Is voltage above 5.5 volts?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST NO: GO TO 18 -- -1/1

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Trouble Code Diagnostics and Tests

18 Short To High Voltage Test	1. Ignition OFF, Engine OFF. 2. Measure resistance between the EGR valve signal input wire to all other wires in the ECU connector. Was a short found?	YES: Repair, reconnect. Run HARNESS DIAGNOSTIC MODE TEST. NO: Look at the harness and see if you can find any pinched, frayed or melted wiring. Repair, reconnect. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
19 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 20. NO: GO TO 21. -- -1/1
20 EGR Valve Connector Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 21. -- -1/1
21 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 22. NO: GO TO 25. -- -1/1
22 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 002791.03 reappear active?	YES: GO TO 23. NO: GO TO 23 and confirm the operating point. -- -1/1

Trouble Code Diagnostics and Tests

23 EGR Valve Connector Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 24. ---1/1
24 Engine Error Operating Point Test Two	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Set engine to operating point that caused error. Did 002791.03 reappear active?	YES: Replace EGR valve. Recalibrate EGR Valve using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Check wiring harness for pinched, frayed or melted wires. ---1/1
25 Engine Hours Between Failures Check	1. Ignition OFF, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter value. Is the difference greater than 50 hours?	YES: GO TO 26. NO: GO TO 27. ---1/1
26 EGR Valve Cleaning Cycle	1. Ignition ON, Engine ON. 2. Warm engine to normal operating temperature. 3. Run EGR VALVE CLEANING TEST. 4. Ignition ON, Engine OFF. 5. Run HARNESS DIAGNOSTIC MODE TEST. 6. Refresh codes. Did any 002791 code appear active?	YES: 002791.03 or 002791.04. Troubleshoot the active code. YES: Any other 002791 code. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Cleaning fixed problem. ---1/1

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Trouble Code Diagnostics and Tests

27 EGR Valve Connector Terminal Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 28. --1/1
28 EGR Valve Replacement / Recalibration Check	1. Replace EGR valve. 2. Recalibrate, use EXHAUST GAS RECIRCULATION VALVE CALIBRATION. 3. Refresh codes. Did 002791.03 reappear active?	YES: GO TO 29. NO: Problem fixed. Bad EGR valve. --1/1
29 ECU Connector Terminal Test	1. Disconnect ECU connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. --1/1

002791.04 — EGR Valve Position Signal Out of Range Low

The EGR valve position signal indicates a value that is out of the range of the expected lowest value.

RG41221,000028E -19-03OCT07-1/1

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002791.04 — EGR Valve Position Signal Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003513.04

002791.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The EGR valve position signal indicates a value that is out of the range of the expected lowest value.

Alarm Level:

Warning

Control Unit Response:

002791.07 will also set causing the ECU to derate the engine until it is running at 80% of full power.

Additional References:

For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

Continued on next page

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IMPORTANT: When replacing the EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Clean O-ring lands if necessary with a non metallic instrument.
- Inspect intake manifold for debris and buildup.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

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❶ Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh codes. Did 002791.04 reappear active?	YES: GO TO 2 NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

② EGR Valve Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR valve connector. 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 3 -- -1/1
③ EGR Valve Disconnected Test	1. Leave the EGR valve connector disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Did 002791.03 appear active?	YES: GO TO 4 NO: GO TO 5 -- -1/1
④ EGR Valve Position Circuit Resistance Test	1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector. 3. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to ground (terminal 5) and write down the value. 4. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to position input (terminal 6) and write down the value. 5. On the EGR valve measure the resistance of the EGR valve position circuit ground (terminal 5) to position input (terminal 6) and write down the value. Are all values between 20k and 95k ohms?	YES: Check wiring harness for melted, pinched, frayed wiring. Repair as needed. Run HARNESS DIAGNOSTIC MODE TEST. NO: Bad position circuit in EGR valve. Replace valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1
⑤ ECU - EGR Valve Position Input Circuit Resistance Test	Measure the resistance between the position input (terminal 6) and the position ground (terminal 5) in the EGR valve harness connector. Is the measurement less than 2 ohms?	YES: GO TO 6. NO: Recheck connector and wiring. Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1

Trouble Code Diagnostics and Tests

6 EGR Valve Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the ECU connector that has the EGR valve signal input wire connected to it, J3 (blue face). 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 7 ---1/1
7 Short To Ground Test	1. ECU J3 still disconnected. 2. Ignition ON, Engine OFF. 3. Refresh codes. Did 002791.04 go stored and 002791.03 become active??	YES: Repair short in harness. Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. ---1/1
8 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 9. NO: GO TO 10. ---1/1
9 EGR Valve Connector Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 10. ---1/1

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Trouble Code Diagnostics and Tests

10 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 11. NO: GO TO 13. -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 002791.04 reappear active?	YES: GO TO 12. NO: GO TO 10 and confirm the operating point. -- -1/1
12 EGR Valve Connector Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect EGR valve connector. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: Replace EGR valve. Recalibrate, see EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1
13 EGR Valve Connector Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect EGR valve connector. 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 14. -- -1/1

Trouble Code Diagnostics and Tests

14 EGR Valve Replacement/Recalibration Check	1. Replace EGR valve. 2. Ignition ON, Engine OFF 3. Recalibrate, use EXHAUST GAS RECIRCULATION VALVE CALIBRATION. 4. Refresh codes. Did 002791.04 reappear active?	YES: GO TO 15. NO: Problem fixed. Bad EGR valve. ---1/1
15 ECU Connector Terminal Test	1. Ignition OFF, Engine OFF 2. Disconnect ECU connector, J3 (blue face). 3. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. ---1/1

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002791.07 — EGR Valve Not Reaching Expected Position

The ECU detects that the exhaust gas recirculation valve is not responding or is out of adjustment.

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002791.07 - EGR Valve Not Reaching Expected Position Diagnostic Procedure

Troubleshooting Sequence:

003513.03 or 003513.04

002791.03 or 002791.04

002791.07

When DTC is Displayed:

Whenever the ignition is on and the error is active.

Related Information

The ECU detects that the exhaust gas recirculation valve is not responding or is out of adjustment.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location information see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

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IMPORTANT: When replacing EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Inspect intake manifold for debris and buildup.
- Clean O-ring lands if necessary with a non metallic instrument.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST for information on use.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Refresh codes.
- Did 002791.07 reappear active?

YES: GO TO 2
NO: GO TO 13

-- -1/1

Trouble Code Diagnostics and Tests

② EGR Valve Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR valve connector. 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 3 ---1/1
③ EGR Valve Reconnection Test	1. Reconnect the EGR valve connector. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Did 002791.07 reappear active?	YES: GO TO 4 NO: Problem fixed. Bad EGR valve connection. ---1/1
④ EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEAN CYCLE test. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did 002791.03 or 002791.04 appear active?	YES: Go troubleshoot that code. NO: GO TO Part 2
	Part 2 Is 002791.07 active?	YES: GO TO 5 NO: Cleaning cycle fixed problem. ---1/1

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Trouble Code Diagnostics and Tests

5 EGR Valve Stored Positions Values Check	1. Ignition ON, Engine OFF. 2. Monitor the following parameters: • EGR Learned Open Position Specification —Typical Open Values 84.0000 - 88.0000 • EGR Valve Learned Closed Position Specification —Typical Closed Values 18.0000 - 22.0000 Are the values within specifications?	YES: GO TO 19 NO: GO TO 6 -- -1/1
6 EGR Valve Drive Motor Resistance Test	1. Ignition OFF, Engine OFF. 2. Measure the resistance between the EGR valve PWM drive #1 (terminal 3) and EGR valve PWM drive #2 (terminal 4) on the EGR valve. Is resistance between 2.5 and 4.5 ohms?	YES: GO TO 7 NO: Bad drive motor in EGR valve. Replace valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1
7 EGR Valve Position Circuit Resistance Test	1. Disconnect EGR valve connector. 2. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to ground (terminal 5) and write down the value. 3. On the EGR valve measure the resistance of the EGR valve position circuit power (terminal 1) to position input (terminal 6) and write down the value. 4. On the EGR valve measure the resistance of the EGR valve position circuit ground (terminal 5) to position input (terminal 6) and write down the value. Are all values between 20k and 95k ohms?	YES: GO TO 8 NO: Bad position circuit in EGR valve. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1

Trouble Code Diagnostics and Tests

8 Visual Inspection of EGR Valve	1. Remove EGR valve. 2. Perform a visual inspection of the valve looking for damaged or broken parts. Were any problems found?	YES: Replace valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: GO TO 9 -- -1/1
9 Visual Inspection of EGR Valve Movement	1. Reconnect EGR valve connector and leave valve out so you can watch it move. IMPORTANT: Pinch hazard, keep hands away from valve while it cycles. 2. Ignition ON, Engine OFF. 3. Watch EGR valve for full closure and smooth movement. 4. Run HARNESS DIAGNOSTIC MODE TEST. Did valve move smoothly and close fully?	YES: GO TO Part 2 NO: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION.
	Part 2 Is 002791.07 active?	YES: GO TO 10 NO: Problem intermittent, check connector and wiring. -- -1/1
10 ECU Connectors Terminal Test	1. Disconnect ECU connectors J1 and J3. 2. Perform a terminal test on both connectors, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 11 -- -1/1
11 EGR Valve Motor Plus (+) Wire Harness Resistance Test	Measure the resistance between the EGR valve PWM drive #1 (terminal 3) in the EGR valve harness connector and the ECU harness connector J1, EGR valve PWM drive #1 (terminal J1-G3). Is resistance less than 2 ohms?	YES: GO TO 12 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
12 EGR Valve Motor Plus (-) Wire Harness Resistance Test	Measure the resistance between the EGR valve PWM drive #2 (terminal 4) in the EGR valve harness connector and the ECU harness connector J1, EGR valve PWM drive #2 (terminal J1-G4). Is resistance less than 2 ohms?	YES: GO TO 13 NO: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1

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Trouble Code Diagnostics and Tests

13 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 14 NO: GO TO 15 -- -1/1
14 EGR Valve Connector Terminal Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 15 -- -1/1
15 Engine Hours Between Failures Check	1. Ignition OFF, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter vlaue. Is the difference greater than 50 hours?	YES: GO TO 16 NO: GO TO 17 -- -1/1
16 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEAN CYCLE test. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did any 002791 code other than 002791.07 appear active?	YES: If code is 002791.03 or 002791.04 troubleshoot that code. Otherwise replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Cleaning fixed problem. Return to service. -- -1/1

Trouble Code Diagnostics and Tests

17 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 18 NO: GO TO 19 -- -1/1
18 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 002791.07 reappear active?	YES: GO TO 2 NO: GO TO 17 and confirm operating point. -- -1/1
19 EGR Valve Connector and ECU Connectors Terminal Test	1. Disconnect EGR valve connector and ECU J1 and J3 connectors. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 20 -- -1/1
20 Reprogram ECU	1. Download latest ECU software payload. 2. Reprogram ECU. 3. Run EGR VALVE CLEAN CYCLE test. 4. Refresh codes. Is 002791.07 active?	YES: Start a DTAC case. NO: Problem fixed. -- -1/1

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002791.13 — EGR Valve Calibration Change Error

This code indicates the EGR valve Open and Closed stored values have moved outside of programmed tolerance in a short period of time or the valve was replaced and not recalibrated.

RG41221,0000292 -19-03OCT07-1/1

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002791.13 — EGR Valve Calibration Change Error Diagnostic Procedure

Troubleshooting Sequence:

003513.03 or 003513.04

002791.03 or 002791.04

002791.07

002791.02

002791.13

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information

This code indicates the EGR valve Open and Closed learned values have moved out side of programmed tolerance in a short period of time or the EGR valve was replaced and not recalibrated.

The ECU detects the EGR valve position values are not within specification.

Alarm Level:

Warning

Control Unit Response:

Maximum engine power is derated up to 20 percent.

Additional References:

For more information on the EGR valve, see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 03, Group 140 earlier in this manual.

For derate and shutdown values see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7

- see 4.5L 24V ECU WIRING DIAGRAM 7

- see 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

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IMPORTANT: When replacing EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Inspect intake manifold for debris and buildup.
- Clean O-ring lands if necessary with a non metallic instrument.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.
2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
4. Run HARNESS DIAGNOSTIC MODE TEST.
5. Refresh codes.

Is 002791.13 still active?

YES: GO TO 2

NO: GO TO 8

-- -1/1

Trouble Code Diagnostics and Tests

2 Valve Change Inquiry	Has EGR valve been changed?	YES: GO TO Part 2. NO: GO TO 3
	Part 2. Was EGR valve calibrated?	YES: GO TO 3 NO: Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION.
3 EGR Valve Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR valve connector. 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4
4 EGR Valve Reconnection Test	1. Reconnect the EGR valve connector. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Did 002791.13 reappear active?	YES: GO TO 5 NO: Problem fixed. Bad EGR valve connection.

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Trouble Code Diagnostics and Tests

5 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did any DTC with an SPN of 002791 appear active other than 002791.13?	YES: Refer to Trouble Shooting Sequence earlier in this procedure. NO: No DTCs with an SPN or 002791 appeared active. Cleaning cycle fixed problem. Return to service NO: Only 002791.13 appeared active. GO TO 6 -- -1/1
6 Visual Inspection of EGR Valve	1. Remove EGR valve. 2. Perform a visual inspection of the valve looking for damaged or broken parts or the poppet not seated against the flange. 3. Check for an obstruction in the manifold that would keep the valve from opening all the way. Where any problems found?	YES: Damaged EGR valve. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. YES: Obstruction in manifold. Remove obstruction and clean manifold. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 7 -- -1/1
7 Visual Inspection of EGR Valve Movement	1. Reconnect EGR valve connector and leave valve out so you can watch it move. IMPORTANT: Pinch hazard, keep hands away from valve while it cycles. 2. Ignition ON, Engine OFF. 3. Watch EGR valve for full closure and smooth movement. 4. Run HARNESS DIAGNOSTIC MODE TEST. Did valve move smoothly, open and close fully and 002791.13 reappear active?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Moved smoothly and DTC 002791.31 did not reappear. Reinstall EGR valve. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1

Trouble Code Diagnostics and Tests

8 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 9 NO: GO TO 10 -- -1/1
9 EGR Valve Connector Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST on EGR valve, harness and connector. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 10. -- -1/1
10 Engine Hours Between Failures Check	1. Ignition OFF, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter value. Is the difference greater than 50 hours?	YES: GO TO 11 NO: GO TO 12 -- -1/1
11 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did 002791.03 or 002791.04 appear active?	YES: Troubleshoot that DTC. NO: No DTCs appeared. Cleaning fixed problem. Return to service. NO: DTC 002791.02 appeared. Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1

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Trouble Code Diagnostics and Tests

12 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 13 NO: GO TO 14 -- -1/1
13 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did Code reappear active?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: GO TO 12 and confirm operating point. -- -1/1
14 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Is 002791.13 active?	YES: Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Cleaning Test fixed problem. Return to service. -- -1/1

002791.31 — EGR Valve Calibration Change over a Long Time

This code indicates the EGR valve Open and Closed learned values have moved outside of programmed tolerance over a long period of time.

RG41221.0000294 -19-03OCT07-1/1

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002791.31 — EGR Valve Calibration Change over a Long Time Diagnostic Procedure

Troubleshooting Sequence:

003513.03 or 003513.04

002791.03 or 002791.04

002791.13

002791.07

002791.02

002791.31

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information

This code indicates the EGR valve Open and Closed learned values have moved out side of programmed tolerance over a long period of time.

The ECU detects the EGR valve end points are out of specification.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain the engine operating envelope.

Additional References:

For more information on the EGR valve see EXHAUST GAS RECIRCULATION VALVE in Section 03, Group 135 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7

- see 4.5L 24V ECU WIRING DIAGRAM 7

- see 6.8L 12V ECU WIRING DIAGRAM 7

- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST earlier in this Group.

For component location information see COMPONENT LOCATION in Section 3 Group 140 earlier in this manual.

Continued on next page

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IMPORTANT: When replacing EGR valve be sure to:

- Change gasket and O-rings.
- Lubricate O-rings with clean engine oil.
- Inspect intake manifold for debris and buildup.
- Clean O-ring lands if necessary with a non metallic instrument.
- Vacuum debris from intake manifold.

IMPORTANT: Ensure valve seats easily by hand when installing.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST or EXHAUST GAS RECIRCULATION VALVE CALIBRATION the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). These tests are located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur. See TERMINAL TEST for information on use.

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① Read DTCs and Store Snapshot Information	1. Ignition ON, engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 4. Refresh codes. Did 002791.31 reappear active?	YES: GO TO 2 NO: GO TO 7

-- -1/1

Trouble Code Diagnostics and Tests

② EGR Valve Connector Check	1. Ignition OFF, Engine OFF. 2. Disconnect the EGR valve connector. 3. Perform a terminal test, see TERMINAL TEST earlier in this Group. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 3 ---1/1
③ EGR Valve Reconnection Test	1. Reconnect the EGR valve connector. 2. Ignition ON, Engine OFF. 3. Run HARNESS DIAGNOSTIC MODE TEST. 4. Refresh codes. Did 002791.31 reappear active?	YES: GO TO 4 NO: Problem fixed. Bad EGR valve connection. ---1/1
④ EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did any DTC with an SPN of 002791 other than 002791.31 appear active?	YES: GO TO 5 NO: Cleaning cycle fixed problem. Return to service ---1/1

Trouble Code Diagnostics and Tests

5 Visual Inspection of EGR Valve	1. Remove EGR valve. 2. Perform a visual inspection of the valve looking for damaged or broken parts or poppet not seated against the flange. 3. Check for an obstruction in the manifold that would keep the valve from opening all the way. Where any problems found?	YES: Damaged EGR valve. Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. YES: Obstruction in manifold. Remove obstruction and clean manifold. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 6
6 Visual Inspection of EGR Valve Movement	1. Reconnect EGR valve connector and leave valve out so you can watch it move. IMPORTANT: Pinch hazard, keep hands away from valve while it cycles. 2. Ignition ON, Engine OFF. 3. Watch EGR valve for full closure and smooth movement. 4. Run HARNESS DIAGNOSTIC MODE TEST. Did valve move smoothly, open and close fully and 002791.31 reappear active?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Moved smoothly and DTC 002791.31 did not reappear. Reinstall EGR valve. Run HARNESS DIAGNOSTIC MODE TEST.
7 Occurrence Count Check	1. Ignition OFF, Engine OFF. 2. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 3. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 8 NO: GO TO 9
8 EGR Valve Connector Test	1. Disconnect EGR valve connector. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 9

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Trouble Code Diagnostics and Tests

9 Engine Hours Between Failures Check	1. Ignition OFF, Engine OFF 2. Using Service ADVISOR read and record the current Engine Hourmeter value. 3. Retrieve the latest saved snapshot capture and record the Engine Hourmeter hours. For instructions on retrieving a saved snapshot capture see, SNAPSHOT INSTRUCTIONS earlier in this group. 4. Subtract the stored Engine Hourmeter value from the current Engine Hourmeter value. Is the difference greater than 50 hours?	YES: GO TO 10 NO: GO TO 11 -- -1/1
10 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Did 002791.03 or 002791.04 appear active?	YES: Troubleshoot that DTC. NO: No DTCs appeared. Cleaning fixed problem. Return to service. NO: DTC 002791.31 appeared. Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. -- -1/1
11 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 12 NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

12 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did Code reappear active?	YES: Replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: GO TO 10 and confirm operating point. --1/1
13 EGR Valve Cleaning Cycle	1. Reconnect EGR valve connector. 2. Ignition ON, Engine ON. 3. Warm engine to normal operating temperature. 4. Run EGR VALVE CLEANING TEST. 5. Ignition ON, Engine OFF. 6. Run HARNESS DIAGNOSTIC MODE TEST. 7. Refresh codes. Is 002791.31 active?	YES: Remove and replace EGR valve. Recalibrate using EXHAUST GAS RECIRCULATION VALVE CALIBRATION. NO: Cleaning Test fixed problem. Return to service. --1/1

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002795.07 — VGT Actuator Not Reaching Expected Position

The ECU senses a mismatch between the actual and desired turbo actuator position.

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002795.07 — VGT Actuator Not Reaching Expected Position Diagnostic Procedure

Troubleshooting Sequence:

000641.12
002795.07

When DTC is Displayed:

Engine must be running (any speed).

Related Information:

The ECU receives a turbo actuator position that is different from the desired turbo actuator position.

Alarm Level:

Warning

Control Unit Response:

The ECU will derate the engine until it is running at 20% of full power.

Additional References:

For more turbo actuator information, see TURBOCHARGER ACTUATOR in Section 03, Group 135 earlier in this manual.

For more information on engine protection, see ENGINE DERATE AND SHUTDOWN PROTECTION in Section 04, Group 140 earlier in this manual.

For derate and shutdown information see APPLICATION SPECIFICATIONS in Section 06, Group 210 later in this manual.

NOTE: It has been discovered that condensation on the variable geometry turbo linkage can freeze during cold weather and cause turbo fault codes to appear at initial start-up. If this is occurring, letting the application warm up for approximately 2 minutes to thaw the linkage and the problem will resolve itself. If problem does not go away proceed with this troubleshooting procedure.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
 - see 4.5L 24V ECU WIRING DIAGRAM 7
 - see 6.8L 12V ECU WIRING DIAGRAM 7
 - see 6.8L 24V ECU WIRING DIAGRAM 7
- located in Section 06, Group 210 later in this manual.

For further information on connector and terminal testing see TERMINAL TEST earlier in this Group.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** or the **TURBOCHARGER ACTUATOR CALIBRATION** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

NOTE: If the temperature is extremely cold

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1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.
 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group.
 4. Ignition ON, Engine ON.
 5. Refresh DTC list.
- Is 002795.07 active?

YES: GO TO 2

NO: GO TO 4

-- -1/1

2 Actuator Linkage Test

1. Ignition OFF, Engine OFF.

 **CAUTION:** Turbo and linkage may be very hot.
 2. Perform actuator linkage movement test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 4 Group 150 earlier in this manual.
- Did test pass?

YES: GO TO 3

NO: Perform actuator linkage movement test, see VARIABLE GEOMETRY TURBOCHARGER (VGT) COMPONENT TEST in Section 4 Group 150 earlier in this manual.

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Trouble Code Diagnostics and Tests

3 Actuator Position Check	Monitor Turbo Actuator Position - Actual and Turbo Actuator Position - Desired. Are values within 5% of one another?	YES: GO TO 4 NO: Replace actuator, recalibrate using Service ADVISOR, TURBOCHARGER ACTUATOR CALIBRATION. ---1/1
4 Occurrence Count Check	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review occurrence counts in the snapshot capture information for this code. Is count greater than five?	YES: GO TO 5 NO: GO TO 6 ---1/1
5 VGT Actuator Connector Terminal Test	1. Disconnect VGT actuator connectors. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 6 ---1/1
6 Further Review of Snapshot Information	1. Retrieve snapshot information, see SNAPSHOT INSTRUCTIONS earlier in this Group. 2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active. Did you find a possible problem or the operating point at which the code becomes active?	YES: Found a possible problem. Repair possible problem. Run HARNESS DIAGNOSTIC MODE TEST. YES: Found operating point at which the code becomes active. GO TO 7. NO: GO TO 8 ---1/1
7 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point that caused error. Did 002795.07 appear active when engine got hot?	YES: GO TO 2 NO: GO TO 8 and confirm the operating point. ---1/1
8 Connector Terminal Test	1. Disconnect ECU J3 (blue face) and VGT connectors. 2. Perform TERMINAL TEST. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 9. ---1/1

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Trouble Code Diagnostics and Tests

**9 Actuator Removal
and Install**

1. Reconnect ECU connector.
 2. Remove and Install turbo actuator, see REMOVE AND INSTALL TURBOCHARGER ACTUATOR LINKAGE (6 CYLINDER ENGINE) in base engine manual. Recalibrate, see TURBOCHARGER ACTUATOR CALIBRATION in Service ADVISOR.
 3. Ignition ON, Engine ON.
 4. Refresh codes
- Were any problems found?

YES: Replace turbo.
Recalibrate, see
TURBOCHARGER
ACTUATOR
CALIBRATION in Service
ADVISOR.

NO: Return unit to
service.

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003509.03 — Sensor Supply #1 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

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003509.03 — Sensor Supply #1 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003509.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #1 circuit.

The output from this supply comes out of J3 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #1 Voltage:

Rail Pressure Sensor.

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more sensor supply #1 information, see POWER SUPPLY #1 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003509.03 reappear active?	YES: GO TO 2 NO: GO TO 5
❷ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. <i>NOTE: New error codes will appear in the next step. Disregard all codes except for 003509.03</i> 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003509.03 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3
❸ Wiring Harness Short to Battery Check	1. Ignition OFF, Engine OFF. 2. Measure voltage from power terminal (J3-G1) on the ECU harness connector to chassis ground. Was the voltage greater than 5.5 volts?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4

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Trouble Code Diagnostics and Tests

4 Wiring Harness Check	1. Disconnect all ECU connectors. 2. Measure resistance from power terminal (J3-G1) on the ECU harness connector to all other terminals of J3 and J2 on the ECU harness. Were any measurements less than 10 ohms?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
5 Occurrence Count Check	Review stored information and look at occurrence count for 003509.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 -- -1/1
6 Harness Check	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all ECU connectors. GO TO 7 -- -1/1
7 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 8 NO: GO TO 9 -- -1/1

Trouble Code Diagnostics and Tests

8 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003509.03 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 7 and confirm the operating point. -- -1/1
9 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003509.03 active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
10 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003509.03 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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003509.04 — Sensor Supply #1 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 volt supply circuit.

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003509.04 — Sensor Supply #1 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence: 003509.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #1 circuit.

Output from this supply comes from J1 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #1 Voltage:

Rail Pressure Sensor.

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more Sensor Supply #1 information, see POWER SUPPLY #1 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003509.04 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Disconnect Related Components	<i>NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3509.04.</i> Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • Rail Pressure Sensor 3. Ignition ON, Engine OFF. 4. Refresh codes. Has 003509.04 moved to the stored list?	YES: GO TO 3 NO: GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003509.04 still active?	YES: GO TO 6 NO: GO TO Part 1, Step 1. -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the component just disconnected. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Check For Shorted Component	Part 1 Measure the resistance between each of the terminals on the component. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the component to chassis ground. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 5 ---1/1
5 Wiring Harness Check	Check wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. ---1/1
6 No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. <i>NOTE: Many new codes will appear in the next step. Disregard all codes except 3509.04.</i> 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003509.04 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 7 ---1/1
7 Harness Resistance Check With ECU Disconnected	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Measure the resistance between power (terminal J3-G1) in the ECU harness connector, to all other terminals in the ECU harness connectors J1, J2 and J3. Were any of the measurements less than 10 ohms?	YES: Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. GO TO 2 ---1/1

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Trouble Code Diagnostics and Tests

8 Occurrence Count Check	Review stored information and look at occurrence count for 003509.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 9 NO: GO TO 10 -- -1/1
9 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. Inspect harness wiring for pinched or melted wires. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 10 -- -1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003509.04 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 10 and confirm the operating point. -- -1/1

Trouble Code Diagnostics and Tests

12 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003509.04 active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
13 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003509.04 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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003510.03 — Sensor Supply #2 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

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003510.03 — Sensor Supply #2 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence: 003510.03

When DTC is Displayed:

Whenever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #2 circuit.

There are two outputs from this supply. One from J1 and the other from J3. The outputs on J1 are currently not connected to any components.

Alarm Level:

Warning

Sensors Using Sensor Supply #2 Voltage from ECU connector J1:

Currently None.

Sensors Using Sensor Supply #2 Voltage from ECU connector J3:

Intake Manifold Air Pressure Sensor.

Engine Oil Pressure Sensor.

Low Pressure Fuel Pressure Sensor (optional).

Control Unit Response:

The ECU will try to operate normally. Engine performance may be affected.

Additional References:

For more Sensor Supply #2 information, see POWER SUPPLY #2 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

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IMPORTANT: When directed to run the **HARNESS DIAGNOSTIC MODE TEST** the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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① Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual.

4. Refresh Codes.

Did 003510.03 reappear active?

YES: GO TO 2

NO: GO TO 5

-- -1/1

② No Load Sensor Supply Voltage Check

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connectors J1 and J3.

3. Ignition ON, Engine OFF.

4. Refresh codes.

Is 003510.03 still active?

YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR.

NO: GO TO 3

-- -1/1

Trouble Code Diagnostics and Tests

③ Wiring Harness Short to Battery Check	Look for voltage on Sensor Power Supply #2 Terminal on ECU harness connector. Measure voltage from power terminal (J3-H4) on the ECU harness connector to chassis ground. Was voltage greater than 5.26 volts?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
④ Wiring Harness Check	- Ignition OFF, Engine OFF. - Look for shorted wire from Sensor Power Supply #2 to other wires in harness. - Measure resistance from power terminal (J3-H4) on the ECU harness connector to all other terminals of J1, J2 and J3 on the ECU harness. Were any measurements less than 10 ohms?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
⑤ Occurrence Count Check	Review stored information and look at occurrence count for 003510.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 -- -1/1
⑥ Harness Check	- Ignition OFF, Engine OFF. - Inspect ECU connectors and harness wiring for pinched or melted wiring. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 7 -- -1/1

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Trouble Code Diagnostics and Tests

7 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 8 NO: GO TO 9 -- -1/1
8 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003510.03 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 7 and confirm the operating point. -- -1/1
9 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003510.03 active?	YES: GO TO 2 NO: GO TO 10 -- -1/1
10 Software Updates	1. Download latest software and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003510.03 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

003510.04 — Sensor Supply #2 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 volt supply circuit.

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003510.04 — Sensor Supply #2 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003510.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #2 circuit.

The output from this supply comes from both ECU connectors, J1 (black face) and J3 (blue face). Currently there are not components connected to the output on J1.

Alarm Level:

Warning

Sensors Using Sensor Supply #2 Voltage from ECU connector J1:

Oil Pressure Sensor.

Sensors Using Sensor Supply #2 Voltage from ECU connector J3:

Oil Pressure Sensor.

Manifold Air Pressure.

Low Pressure Fuel Pressure (optional).

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more Sensor Supply #2 information, see POWER SUPPLY #2 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2 and 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 2 and 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 2 and 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 2 and 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

Continued on next page

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IMPORTANT: When directed to run the **HARNES**
DIAGNOSTIC MODE TEST the engine temperature
should be above freezing. It is recommended that the
engine temperature be at least room temperature 20°
C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector
terminals or damage will result. Use JT07328
Connector Adapter Test Kit to make measurements in
connectors. This will ensure that terminal damage
does not occur.

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**① Read DTCs and Store
Snapshot Information**

1. Ignition ON, Engine OFF.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.
2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual.
4. Refresh Codes.

Did 003510.04 reappear active?

YES: GO TO 2
NO: GO TO 8

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Trouble Code Diagnostics and Tests

② Disconnect Related Components	<i>NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3510.04.</i> Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • Oil Pressure Sensor • Manifold Air Pressure. • Low Pressure Fuel Pressure (optional). 3. Ignition ON, Engine OFF. 4. Refresh codes. Has 003510.04 moved to the stored list?	YES: GO TO 3 NO: GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003510.04 still active?	YES: GO TO 6 NO: GO TO Part 1, Step 1.
③ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4
④ Check For Shorted Component	Part 1 Measure the resistance between each of the terminals on the component just disconnected and record. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the component to chassis ground Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 5

Trouble Code Diagnostics and Tests

5 Wiring Harness Check	Check wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
6 No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors J1 and J3. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003510.04 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 8 -- -1/1
7 Harness Resistance Check With ECU Disconnected	1. Ignition OFF, Engine OFF. 2. Look for shorted wires from Sensor Supply #2 to other wires in ECU harness. • Measure resistance from power (terminal J1-H4) of ECU harness connector to all other terminals of harness connectors J1, J2 and J3. • Measure resistance from power (terminal J3-A3) of ECU harness connector to all other terminals of harness connectors J1, J2 and J3. Were any of the measurements less than 10 ohms?	YES: Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. GO TO 2 -- -1/1
8 Occurrence Count Check	Review stored information and look at occurrence count for 003510.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 9 NO: GO TO 10 -- -1/1

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Trouble Code Diagnostics and Tests

9 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors. Inspect wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 9 -- -1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 11 NO: GO TO 12 -- -1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003510.04 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 10 and confirm the operating point. -- -1/1
12 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003510.04 active?	YES: GO TO 2 NO: GO TO 13 -- -1/1

Trouble Code Diagnostics and Tests

13 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003510.04 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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003511.03 — Sensor Supply #3 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

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003511.03 — Sensor Supply #3 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003511.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #3 circuit.

The output from this supply comes out of J2 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #3 Voltage:

Primary Analog Throttle.

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more Sensor Supply #3 information, see POWER SUPPLY #3 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
- see 4.5L 24V ECU WIRING DIAGRAM 5
- see 6.8L 12V ECU WIRING DIAGRAM 5
- see 6.8L 24V ECU WIRING DIAGRAM 5

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003511.03 reappear active?	YES: GO TO 2 NO: GO TO 6 -- -1/1
❷ ECU Programming Harness Availability	Is the ECU programming harness available for use?	YES: GO TO 3 NO: GO TO 4 -- -1/1
❸ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. <i>NOTE: New error codes will appear in the next step. Disregard all codes except for 003511.03</i> 3. Connect ECU Programming Harness. 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003511.03 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
❹ Wiring Harness Short to Battery Check	1. Turn Programming Harness Key Switch to OFF and wait for the red LED to turn OFF. 2. Remove ECU Programming Harness. 3. Measure voltage from power terminal (J2-G2) on the ECU harness connector to chassis ground. Was the voltage greater than 5.5 volts?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 -- -1/1

Trouble Code Diagnostics and Tests

5 Wire Harness Check	Measure resistance from power terminal (J2-G2) on the ECU harness connector to all other terminals of J1, J2 and J3 on the ECU harness. Were any measurements less than 10 ohms?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
6 Occurrence Count Check	Review stored information and look at occurrence count for 003511.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 7 NO: GO TO 8 -- -1/1
7 Harness Check	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 8 -- -1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 9 NO: GO TO 10 -- -1/1

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Trouble Code Diagnostics and Tests

9 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003511.03 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 8 and confirm the operating point. -- -1/1
10 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003511.03 active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
11 Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003511.03 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

003511.04 — Sensor Supply #3 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 volt supply circuit.

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003511.04 — Sensor Supply #3 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003511.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #3 circuit.

The output of this supply comes from J2 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #3 Voltage:

Primary Analog Throttle.

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more Sensor Supply #3 information, see POWER SUPPLY #3 in Section 03, Group 140, earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5 and 4.5L 12V ECU WIRING DIAGRAM 6
- see 4.5L 24V ECU WIRING DIAGRAM 5 and 4.5L 24V ECU WIRING DIAGRAM 6
- see 6.8L 12V ECU WIRING DIAGRAM 5 and 6.8L 12V ECU WIRING DIAGRAM 6
- see 6.8L 24V ECU WIRING DIAGRAM 5 and 6.8L 24V ECU WIRING DIAGRAM 6

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160, earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160, earlier in this manual. 4. Refresh Codes. Did 003511.04 reappear active?	YES: GO TO 2 NO: GO TO 9
❷ Disconnect Related Components	<i>NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3511.04.</i> Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • <i>Primary Analog Throttle</i> 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #3 Voltage in Service ADVISOR. 5. Refresh codes. Has 003511.04 moved to the stored list?	YES: GO TO 3 NO: GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003511.04 still active?	YES: GO TO 6 NO: GO TO Part 1, Step 1.
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4

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Trouble Code Diagnostics and Tests

④ Check For Shorted Wires on Related Component	Part 1 Measure the resistance between each of the terminals on the sensor and record. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the sensor to chassis ground Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 5
⑤ Wiring Harness Check	Check wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST.
⑥ ECU Programming Harness Availability	Is the ECU programming harness available for use?	YES: GO TO 7 NO: GO TO 8
⑦ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Connect ECU Programming Harness. <i>NOTE: Many new codes will appear in the next step. Disregard all codes except 3511.04.</i> 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003511.04 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 8

Trouble Code Diagnostics and Tests

8 Harness Resistance Check With ECU Disconnected	1. Turn Programming Harness Key Switch to OFF and wait for red LED to turn OFF. 2. Disconnect ECU Programming Harness. 3. Disconnect ECU connector J2. 4. Measure resistance from signal (terminal J2-G2) of ECU harness connector to all other terminals of harness connectors J1, J2 and J3. Were any of the measurements less than 10 ohms?	YES: Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. GO TO 2 -- -1/1
9 Occurrence Count Check	Review stored information and look at occurrence count for 003511.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 10 NO: GO TO 11 -- -1/1
10 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. Inspect wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 11 -- -1/1
11 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 12 NO: GO TO 13 -- -1/1

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Trouble Code Diagnostics and Tests

12 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003511.04 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 10 ---1/1
13 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003511.04 active?	YES: GO TO 2 NO: GO TO 14 ---1/1
14 Software Updates	1. Download latest ECU payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003511.04 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. ---1/1

003512.03 — Sensor Supply #4 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

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003512.03 — Sensor Supply #4 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003512.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #4 circuit.

The output from this supply comes out of J2 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #4 Voltage:

Secondary Analog Throttle.

Control Unit Response:

The ECU will try to operate normally. Engine performance may be affected.

Additional References:

For more Sensor Supply #4 information, see POWER SUPPLY #4 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 2
- see 4.5L 24V ECU WIRING DIAGRAM 2
- see 6.8L 12V ECU WIRING DIAGRAM 2
- see 6.8L 24V ECU WIRING DIAGRAM 2

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003512.03 reappear active?	YES: GO TO 2 NO: GO TO 6 -- -1/1
❷ ECU Programming Harness Availability	Is the ECU programming harness available for use?	YES: GO TO 2 NO: GO TO 5 -- -1/1
❸ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. <i>NOTE: New error codes will appear in the next step. Disregard all codes except for 003512.03</i> 3. Connect ECU Programming Harness. 4. Turn Programming Harness Key Switch to ON. 5. Refresh codes. Is 003512.03 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1
❹ Wiring Harness Short to Battery Check	1. Turn Programming Harness Key Switch to OFF and wait for the red LED to turn OFF. 2. Remove ECU Programming Harness. 3. Measure voltage from power terminal (J2-G2) on the ECU harness connector to chassis ground. Was the voltage greater than 5.5 volts?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 5 -- -1/1

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Trouble Code Diagnostics and Tests

5 Wire Harness Check	Measure resistance from power terminal (J2-G2) on the ECU harness connector to all other terminals of J1, J2 and J3 on the ECU harness. Were any measurements less than 10 ohms?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
6 Occurrence Count Check	Review stored information and look at occurrence count for 003512.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 7 NO: GO TO 8 -- -1/1
7 Harness Check	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 8 -- -1/1
8 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 9 NO: GO TO 10 -- -1/1

Trouble Code Diagnostics and Tests

9 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003512.03 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 8 and confirm the operating point. -- -1/1
10 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003512.03 active?	YES: GO TO 2 NO: GO TO 11 -- -1/1
11 Software Updates	1. Download latest payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003512.03 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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003512.04 — Sensor Supply #4 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 volt supply circuit.

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003512.04 — Sensor Supply #4 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence: 003512.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #4 circuit.

Output from this supply comes from J2 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #4 Voltage:

Secondary Analog Throttle.

Control Unit Response:

The ECU will try to maintain the engine operating envelope. Engine performance may be affected.

Additional References:

For more Sensor Supply #4 information, see POWER SUPPLY #4 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 5
 - see 4.5L 24V ECU WIRING DIAGRAM 5
 - see 6.8L 12V ECU WIRING DIAGRAM 5
 - see 6.8L 24V ECU WIRING DIAGRAM 5
- located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003512.04 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Disconnect Related Components	<i>NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3512.04.</i> Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • <i>Secondary Analog Throttle</i> 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #4 Voltage in Service ADVISOR. 5. Refresh codes. Has 003512.04 moved to the stored list?	YES: GO TO 2 NO: GO TO Part 2.
	Part 2 Have all related sensors from step 1 been disconnected and 003512.04 still active?	YES: GO TO 6 NO: GO TO Part 1, Step 1. -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

④ Check For Shorted Wires on Related Component	Part 1 Measure the resistance between each of the terminals on the sensor. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the sensor to chassis ground. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 5 ---1/1
⑤ Wiring Harness Check	Check wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. ---1/1
⑥ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. <i>NOTE: Many new codes will appear in the next step. Disregard all codes except 3512.04.</i> 3. Ignition ON, Engine OFF. 4. Monitor Sensor Supply #4 Voltage in Service ADVISOR. 5. Refresh codes. Is 003512.04 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 7 ---1/1

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Trouble Code Diagnostics and Tests

7 Harness Resistance Check With ECU Disconnected	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. 3. Measure the resistance between signal (terminal J2-F3) in the ECU harness connector, to all other terminals in the ECU harness connectors J1, J2 and J3. Were any of the measurements less than 10 ohms?	YES: Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTIC MODE TEST. NO: Problem not found, reconnect all connectors. GO TO 2 and confirm your findings. Look closely at connectors, wiring and terminal numbers where measurements were made.
8 Occurrence Count Check	Review stored information and look at occurrence count for 003512.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 9 NO: GO TO 10
9 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J2. Inspect harness wiring for pinched or melted wires. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 10
10 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 11 NO: GO TO 12

Trouble Code Diagnostics and Tests

11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003512.04 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 10 -- -1/1
12 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003512.04 active?	YES: GO TO 2 NO: GO TO 13 -- -1/1
13 Software Updates	1. Download the latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003512.04 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. -- -1/1

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003513.03 — Sensor Supply #5 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 volt supply circuit.

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003513.03 — Sensor Supply #5 Voltage Out of Range High Diagnostic Procedure

Troubleshooting Sequence:

003513.03

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 volts on the Sensor Supply #5 circuit.

The output from this supply comes out of J3 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #5 Voltage:

EGR Valve Position.

Control Unit Response:

The ECU will try to operate normally. Engine performance may be affected.

Additional References:

For more sensor supply #5 information, see POWER SUPPLY #5 in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

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Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160 earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160 earlier in this manual. 4. Refresh Codes. Did 003513.03 reappear active?	YES: GO TO 2 NO: GO TO 5 -- -1/1
❷ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. <i>NOTE: New error codes will appear in the next step. Disregard all codes except for 003513.03</i> 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003513.03 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 3 -- -1/1
❸ Wiring Harness Short to Battery Check	1. Ignition OFF, Engine OFF. 2. Measure voltage from power (terminal J3-A2) on the ECU harness connector to chassis ground. Was the voltage greater than 5.26 volts?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: GO TO 4 -- -1/1

Trouble Code Diagnostics and Tests

4 Wiring Harness Check	1. Disconnect all ECU connectors. 2. Measure resistance from power terminal (J3-A2) on the ECU harness connector to all other terminals of J1, J2 AND J3 on the ECU harness. Were any measurements less than 10 ohms?	YES: Look for shorted wires in harness and repair wiring. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. -- -1/1
5 Occurrence Count Check	Review stored information and look at occurrence count for 003513.03. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 6 NO: GO TO 7 -- -1/1
6 Harness Check	1. Ignition OFF, Engine OFF. 2. Inspect ECU connectors and harness wiring for pinched or melted wiring. If necessary, remove connectors to get a better visual inspection. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all ECU connectors. GO TO 7 -- -1/1
7 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 8 NO: GO TO 9 -- -1/1

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Trouble Code Diagnostics and Tests

8 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003513.03 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 7 ---1/1
9 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003513.03 active?	YES: GO TO 2 NO: GO TO 10 ---1/1
10 Software Updates	1. Download latest ECU software payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003513.03 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. ---1/1

003513.04 — Sensor Supply #5 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 volt supply circuit.

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003513.04 — Sensor Supply #5 Voltage Out of Range Low Diagnostic Procedure

Troubleshooting Sequence:

003513.04

When DTC is Displayed:

When ever the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage lower than 4.59 volts on the Sensor Supply #5 circuit.

The output of this supply comes from J3 of the ECU.

Alarm Level:

Warning

Sensors Using Sensor Supply #5 Voltage:

EGR Valve.

Control Unit Response:

The ECU will try to operate normally. Engine performance may be affected.

Additional References:

For more Sensor Supply #5 information, see POWER SUPPLY #5 in Section 03, Group 140, earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see 4.5L 12V ECU WIRING DIAGRAM 7
- see 4.5L 24V ECU WIRING DIAGRAM 7
- see 6.8L 12V ECU WIRING DIAGRAM 7
- see 6.8L 24V ECU WIRING DIAGRAM 7

located in Section 06, Group 210 later in this manual.

For more information on connector and terminal testing see TERMINAL TEST in Section 04, Group 160 earlier in this manual.

IMPORTANT: When directed to run the HARNESS DIAGNOSTIC MODE TEST the engine temperature should be above freezing. It is recommended that the engine temperature be at least room temperature 20° C (68° F). This test is located in Service ADVISOR.

IMPORTANT: Do not force probes into connector terminals or damage will result. Use JT07328 Connector Adapter Test Kit to make measurements in connectors. This will ensure that terminal damage does not occur.

Trouble Code Diagnostics and Tests

❶ Read DTCs and Store Snapshot Information	1. Ignition ON, Engine OFF. <i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.</i> 2. Connect Service ADVISOR, see CONNECTING TO SERVICE ADVISOR in Section 04, Group 160, earlier in this manual. 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see SNAPSHOT INSTRUCTIONS in Section 04, Group 160, earlier in this manual. 4. Refresh Codes. Did 003513.04 reappear active?	YES: GO TO 2 NO: GO TO 8 -- -1/1
❷ Disconnect Related Components	<i>NOTE: New codes will appear as sensors are disconnected. Disregard all codes except 3513.04.</i> Part 1 1. Ignition OFF, Engine OFF. 2. Disconnect one of the related sensors/components listed below. • EGR Valve Position 3. Ignition ON, Engine OFF. 4. Refresh codes. Has 003513.04 moved to the stored list? Part 2 Have all related sensors from step 1 been disconnected and 003513.04 still active?	YES: GO TO 3 NO: GO TO Part 2. YES: GO TO 6 NO: GO TO Part 1, Step 1. -- -1/1
❸ Terminal Test	1. Ignition OFF, Engine OFF. 2. Perform TERMINAL TEST on the connector of the sensor just removed. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 4 -- -1/1

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Trouble Code Diagnostics and Tests

④ Check For Shorted Component	Part 1 Measure the resistance between each of the terminals on the sensor and record. Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO Part 2.
	Part 2 Measure the resistance from each terminal on the sensor to chassis ground Were any measurements less than 10 ohms?	YES: Replace sensor. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 5 -- -1/1
⑤ Wiring Harness Check	Check wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair wiring. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. Run HARNESS DIAGNOSTIC MODE TEST. -- -1/1
⑥ No Load Sensor Supply Voltage Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. 3. Ignition ON, Engine OFF. 4. Refresh codes. Is 003513.04 still active?	YES: Replace ECU. Run HARNESS DIAGNOSTIC MODE TEST. NO: GO TO 7 -- -1/1
⑦ Harness Resistance Check With ECU Disconnected	1. Ignition OFF, Engine OFF. 2. Look for shorted wires from Sensor Supply #5 to other wires in ECU harness. • Measure resistance from power (terminal J3-A2) of ECU harness connector to all other terminals of harness connectors J1, J2 and J3. Were any of the measurements less than 10 ohms?	YES: Check for melted or pinched wire in harness and repair. Run HARNESS DIAGNOSTIC MODE TEST. NO: Reconnect all connectors. GO TO 2 -- -1/1

Trouble Code Diagnostics and Tests

8 Occurrence Count Check	Review stored information and look at occurrence count for 003513.04. Is occurrence recorded in step 1 greater than 5?	YES: GO TO 9 NO: GO TO 10 -- --1/1
9 Harness Check	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector J3. Inspect wiring harness for pinched or melted wiring. Were any problems found?	YES: Repair problem. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. NO: Reconnect all connectors. GO TO 10 -- --1/1
10 Further Review of Snapshot Information	Review stored information collected in step 1. Does stored information lead to a possible problem or is there a certain operating point where error occurs?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: If a certain operating point exists when error occurs, GO TO 11 NO: GO TO 12 -- --1/1
11 Engine Error Operating Point Test	1. Ignition ON, Engine ON. 2. Set engine to operating point of failure and refresh codes. Did 003513.04 reappear when engine operating point was reached?	YES: Repair problem if found. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. YES: GO TO 2 NO: GO TO 10 and confirm operating point. -- --1/1

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Trouble Code Diagnostics and Tests

12 Retest	1. Ignition ON, Engine OFF. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. 3. Refresh codes. Is 003513.04 active?	YES: GO TO 2 NO: GO TO 13 ---1/1
13 Software Updates	1. Download latest ECU payload and reprogram ECU using Service ADVISOR. 2. Run HARNESS DIAGNOSTIC MODE TEST in Service ADVISOR. Is 003513.04 active?	YES: Start a DTAC case. NO: Problem fixed, bad ECU program. ---1/1

523792.04 — EPGDS LTC Pump Signal Out of Range Low

For troubleshooting procedures please see the application troubleshooting manual.

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524099.11 — EPGDS LTC Pump Blockage

For troubleshooting procedures please see the application troubleshooting manual.

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Section 05 Tools

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Repair and Adjustment Tools

NOTE: Order tools according to information given in the U.S. *SERVICEGARD™* Catalog or from the European Microfiche Tool Catalog (MTC).

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Universal Pressure Test Kit JT05412

Used for testing engine oil pressure, intake manifold pressure (turbo boost), and fuel transfer pump pressure.



JT05412

RG5162 -JUN-14OCT05

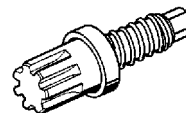
RE38635,000014B -19-04AUG07-2/10

NOTE: This kit at present contains SAE only adapters. Use of gauges in this kit requires that metric adapters be provided.

RE38635,000014B -19-04AUG07-3/10

Flywheel Turning Tool JDG820

Used to rotate engine flywheel to lock engine at "TDC" to check high pressure fuel pump timing. Use on flywheels with 129 teeth and 29.9 mm flywheel housing guide bore.



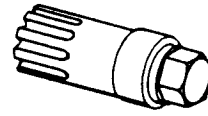
RG7056 -JUN-17JUN05

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RE38635,000014B -19-04AUG07-4/10

Flywheel Turning Tool JDE83

Used to rotate engine flywheel to lock engine at "TDC" to check high pressure fuel pump timing. Use on flywheels with 142 teeth and 26.5 mm flywheel housing guide bore.



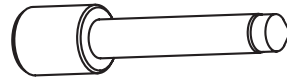
Flywheel Turning Tool

RG6251 -UN-22JUL92

RE38635.000014B -19-04AUG07-5/10

Timing Pin JDG1571

Used to lock engine at TDC.



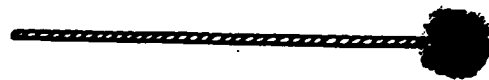
Timing Pin

RG12031 -UN-20DEC01

RE38635.000014B -19-04AUG07-6/10

Thread Cleaning Brush. D17030BR

Used to clean threads in cylinder head.



Thread Cleaning Brush

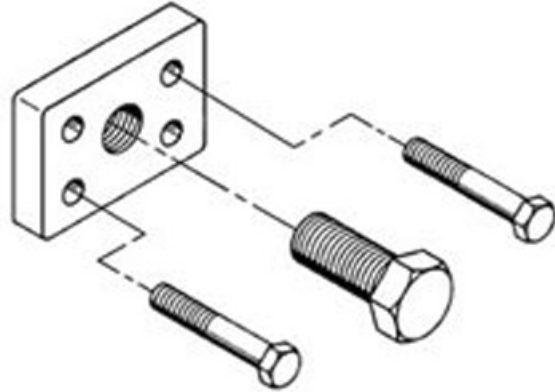
RG5099 -UN-23AUG88

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RE38635.000014B -19-04AUG07-7/10

High Pressure Pump Drive Gear Puller JDG1560

Remove drive gear from tapered shaft on Denso HP4 high pressure fuel pump.



RG15110 -UN-15SEP06

High Pressure Pump Drive Gear Puller

RE38635,000014B -19-04AUG07-8/10

Injector Removal Tool JDG1652A

Used to remove electronic injector from cylinder head.



RG12410 -UN-19JUN02

Injector Removal Tool

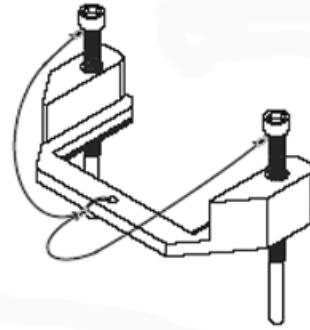
Continued on next page

RE38635,000014B -19-04AUG07-9/10

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EGR Removal Tool JDG10194

Used to remove EGR valve without damaging O-rings.



EGR Removal Tool

RG14880 -UN-08AUG06

RE38635,000014B -19-04AUG07-10/10

Connector Repair Tools

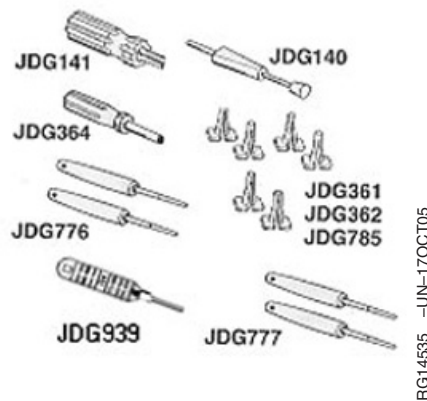
NOTE: Order tools according to information given in the U.S. SERVICEGARD™ Catalog or from the European Microfiche Tool Catalog (MTC).

SERVICEGARD is a trademark of Deere & Company

DB92450,000008F -19-04AUG07-1/8

Technician's Electrical Repair Kit JT07195B

This kit is assembled with the most commonly used tools used to repair wiring harnesses. This kit includes the following: **JDG140** - CPC and Metrimate terminal extraction tool, **JDG141** - CPC Blade Type terminal extraction tool, **JDG361** - Deutsch 12-14 gauge terminal extraction/insertion tool, **JDG362** - Deutsch 16-18 gauge terminal extraction/insertion tool, **JDG364** - WEATHERPACK terminal extraction tool, **JDG776** - Metripack terminal extraction tool - Wide, **JDG777** - METRI-PACK terminal extraction tool - Narrow, **JDG785** - Deutsch 6-8 gauge terminal extraction/insertion tool, and **JDG939** Metri-Pack Extraction Tool.

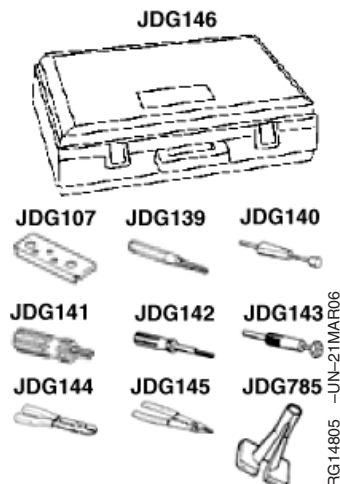


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DB92450,000008F -19-04AUG07-2/8

Technician's Electrical Repair Kit JDG155

This kit is assembled with the most commonly used terminal extraction tools used to repair wiring harnesses on John Deere applications. This kit includes the following: **JDG107** - Holding Plate, **JDG139** - Sure-Seal terminal insertion tool, **JDG140** - CPC and Metrimate terminal extraction tool, **JDG141** - CPC Blade Type terminal extraction tool, **JDG142** - Mate-N-Lock terminal extraction tool, **JDG143** - Mate-N-Lock terminal extraction tool, **JDG144** - Universal Crimping Pliers, **JDG145** - Electrician's Pliers, **JDG146** - Carrying Case, and **JDG785** - Deutsch 6-8 gauge terminal extraction/insertion tool.

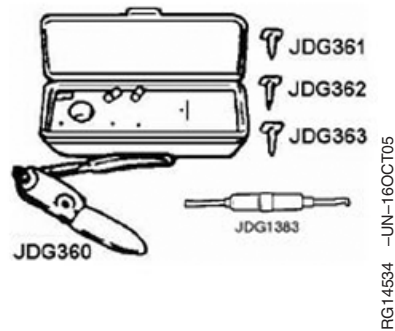


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DB92450,000008F -19-04AUG07-3/8

DEUTSCH™ Electrical Repair Tool Kit JDG359

Used to extract terminals from DEUTSCH™ electrical connectors. A special crimping tool is also included to crimp DEUTSCH terminals on wires. The following tools are included: **JDG360** - Deutsch Terminal Crimping Tool, **JDG361** - Deutsch 12-14 gauge terminal extraction/insertion tool (set of 2), **JDG362** - Deutsch 16-18 gauge terminal extraction/insertion tool (set of 2), **JDG363** - Deutsch 20-24 gauge terminal extraction/insertion tool (set of 2), and **JDG1383** - Deutsch Terminal Tool

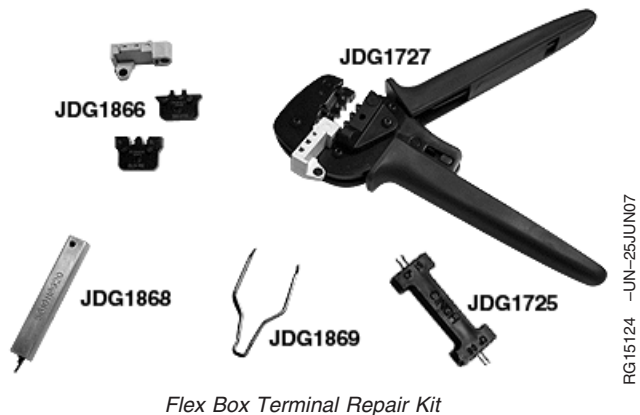


DEUTSCH is a trademark of Deutsch Co.

DB92450,000008F -19-04AUG07-4/8

Flex Box Terminal Repair Kit JDG1744

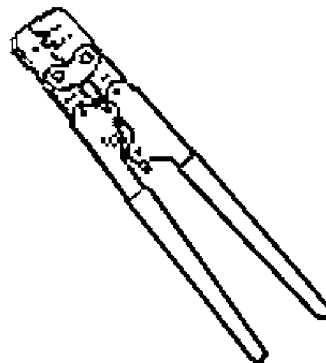
Used for extracting and crimping Cinch terminals from Flex Box ECU connectors. A tool is also provided to unlock the connector cover for removal. The following tools are included: **JDG1727** - Crimper Tool, **JDG 1725** - Removal Tool, **JDG 1866** - Additional Jaw Set for Crimper (3 Pieces), **JDG1868** - Terminal Extraction Tool, **JDG1869** - Connector Cover Unlock Tool (Set of Two).



DB92450,000008F -19-04AUG07-5/8

WEATHER PACK™ Crimping Tool JDG783

Used to crimp WEATHER PACK™ male and female terminals on 14-20 gauge wires. This tool crimps both the wire and the seal retainer at the same time.



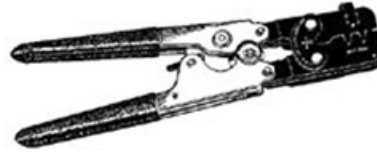
WEATHER PACK is a trademark of Packard Electric

Continued on next page

DB92450,000008F -19-04AUG07-6/8

METRI-PACK™ Crimping Tool JDG865

Used to crimp push-type METRI-PACK™ male and female terminals on 14-20 gauge wires.



RG14531 -UN-14OCT05

METRI-PACK is a trademark of Packard Electric Inc.

DB92450,000008F -19-04AUG07-7/8

Packard Crimper JDG707

Used to crimp WEATHER PACK, METRIPACK, SUMITOMO, and YAZAKI male and female terminals on 12-20 gauge wires. This tool crimps the wire and the seal retainer separately.



RG11679 -UN-05FEB01

DB92450,000008F -19-04AUG07-8/8

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Other Materials (Consumables)

Number	Name	Use
TY6333 (U.S.)	High Temperature Moly Grease	Sensor O-rings.
PM37418 (U.S.) PM38621 (Canadian) 242 (LOCTITE®)	Thread Lock and Sealer, medium strength (6 ml)	Applied to screw threads
AT66865 (U.S.)	Lubricant	Insulate electrical connectors.

LOCTITE is a registered trademark of Loctite Corp.

DB92450,0000090 -19-04AUG07-1/1

Electronic System Diagnostic Tools

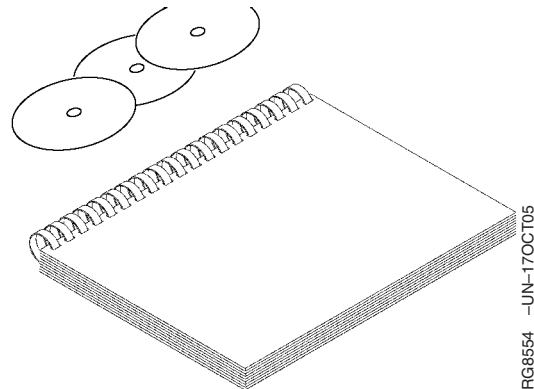
NOTE: ECU communication parts and kits are available from John Deere Distribution Service Center (DSC). **United States and Canadian**

Agricultural dealers DO NOT ORDER without first contacting your Branch or TAM.

DM59778,0000018 -19-04AUG07-1/8

ECU Communication Software

Please refer to your John Deere Dealer website for information on obtaining the latest version of software.

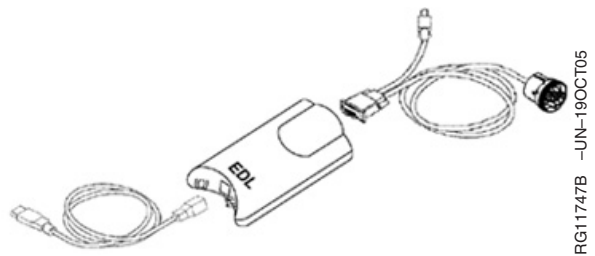


DM59778,0000018 -19-04AUG07-2/8

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ECU Communication Hardware Mini Kit DS10117

Used with ECU Communication Software Kit, this kit enables a Windows-compatible computer to read information from the Engine Control Unit (ECU). The computer must be at least a Pentium 1 with 512 of RAM and a USB port. This kit allows communication with applications that use the black 9-pin Deutsch diagnostic connector. Kit includes USB cable, Electronic Data Link (EDL), and cable to connect to the 9-pin diagnostic connector on the engine harness. Kit parts may be purchased separately.

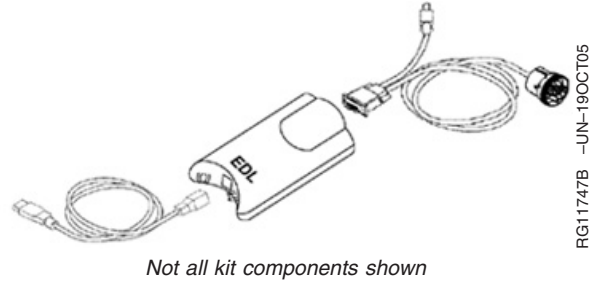


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DM59778,0000018 -19-04AUG07-3/8

ECU Communication Hardware Full Kit DS10118

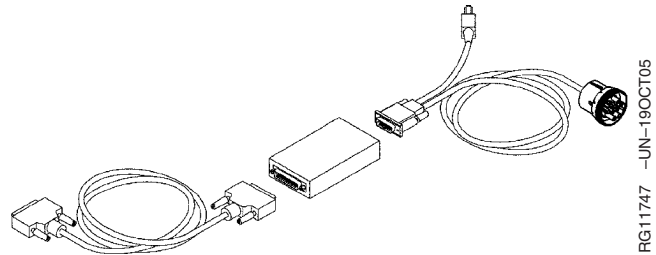
Used with ECU Communication Software Kit, this kit enables a Windows-compatible computer to read information from the Engine Control Unit (ECU). The computer must be at least a Pentium 1 with 512 MB of RAM and a USB port. In addition to the USB cable, Electronic Data Link (EDL), and cable to connect to the 9-pin diagnostic connector on the engine harness, this kit allows communication with applications that use the black 9-pin Deutsch diagnostic connector, gray 9-pin Deutsch diagnostic connector (early 8000 series tractors), and the flat 6-pin Weatherpack diagnostic connector (Lucas controllers). Kit parts may be purchased separately.



DM59778,0000018 -19-04AUG07-4/8

ECU Communication Hardware Kit DS10023

Used with ECU Communication Software Kit, this kit enables a Windows-compatible computer to read information from the Engine Control Unit (ECU). The computer must be at least a Pentium 1 with 512 of RAM and an IEEE 1284 compliant parallel port. This kit allows communication with applications that use the black 9-pin Deutsch diagnostic connector.



DM59778,0000018 -19-04AUG07-5/8

NOTE: ECU Communications Kit DS10023 can no longer be purchased. It will be supported on applications up to and including Tier III.

Continued on next page

DM59778,0000018 -19-04AUG07-6/8

Digital Multimeter JT07306

Measure voltage, current, resistance, and frequency of electronic circuits. Optional temperature probe is available. Display has backlight control and records Min/Max values. Operates with 9 volt battery.



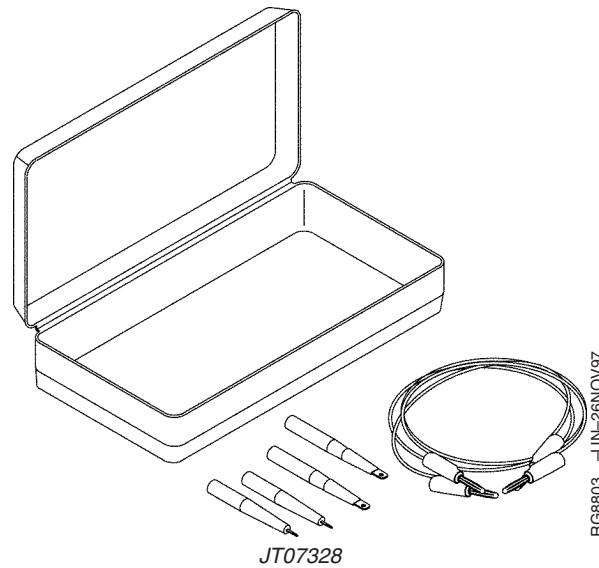
JT07306 - Digital Multimeter

RG11126 -UN-08JUN07

DM59778,0000018 -19-04AUG07-7/8

Connector Adapter Test Kit JT07328

Probes have mating terminals for harness and sensor connectors. Used with a digital multimeter to make voltage and resistance measurements in diagnostic procedures. Can also be used to test terminals for proper fit.



JT07328

RG8803 -UN-26NOV97

DM59778,0000018 -19-04AUG07-8/8

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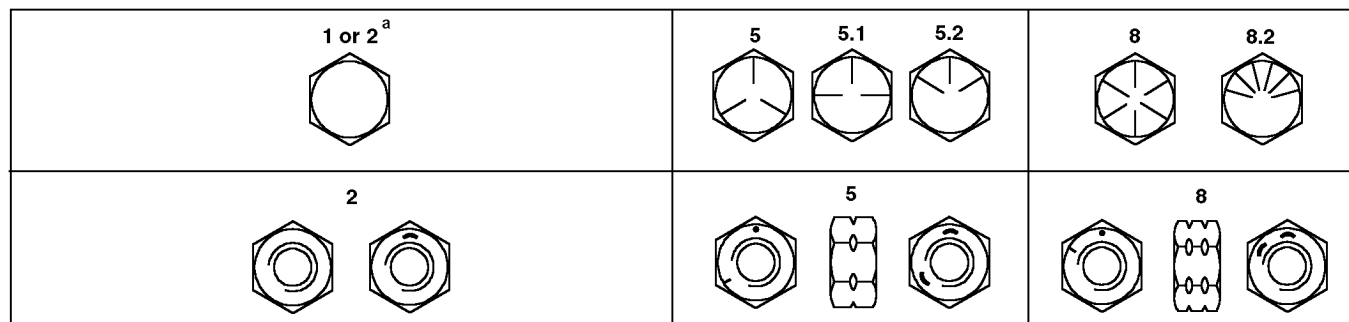
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Section 06 Specifications

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Unified Inch Bolt and Cap Screw Torque Values



Top, SAE Grade and Head Markings; Bottom, SAE Grade and Nut Markings

Size	Grade 1 (No Mark)		Grade 2 ^a (No Mark)		Grade 5, 5.1 or 5.2		Grade 8 or 8.2	
	Lubricated ^b N•m(lb-ft)	Dry ^c N•m(lb-ft)	Lubricated ^b N•m(lb-ft)	Dry ^c N•m(lb-ft)	Lubricated ^b N•m(lb-ft)	Dry ^c N•m(lb-ft)	Lubricated ^b N•m(lb-ft)	Dry ^c N•m(lb-ft)
1/4	3.8 (2.8)	4.7 (3.5)	6 (4.4)	7.5 (5.5)	9.5 (7)	12 (9)	13.5 (10)	17 (12.5)
5/16	7.7 (5.7)	9.8 (7.2)	12 (9)	15.5 (11.5)	19.5 (14.5)	25 (18.5)	28 (20.5)	35 (26)
3/8	13.5 (10)	17.5 (13)	22 (16)	27.5 (20)	35 (26)	44 (32.5)	49 (36)	63 (46)
7/16	22 (16)	28 (20.5)	35 (26)	44 (32.5)	56 (41)	70 (52)	80 (59)	100 (74)
1/2	34 (25)	42 (31)	53 (39)	67 (49)	85 (63)	110 (80)	120 (88)	155 (115)
9/16	48 (35.5)	60 (45)	76 (56)	95 (70)	125 (92)	155 (115)	175 (130)	220 (165)
5/8	67 (49)	85 (63)	105 (77)	135 (100)	170 (125)	215 (160)	240 (175)	305 (225)
3/4	120 (88)	150 (110)	190 (140)	240 (175)	300 (220)	380 (280)	425 (315)	540 (400)
7/8	190 (140)	240 (175)	190 (140)	240 (175)	490 (360)	615 (455)	690 (510)	870 (640)
1	285 (210)	360 (265)	285 (210)	360 (265)	730 (540)	920 (680)	1030 (760)	1300 (960)
1-1/8	400 (300)	510 (375)	400 (300)	510 (375)	910 (670)	1150 (850)	1450 (1075)	1850 (1350)
1-1/4	570 (420)	725 (535)	570 (420)	725 (535)	1280 (945)	1630 (1200)	2050 (1500)	2600 (1920)
1-3/8	750 (550)	950 (700)	750 (550)	950 (700)	1700 (1250)	2140 (1580)	2700 (2000)	3400 (2500)
1-1/2	990 (730)	1250 (930)	990 (730)	1250 (930)	2250 (1650)	2850 (2100)	3600 (2650)	4550 (3350)

^a Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

^b "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

^c "Dry" means plain or zinc plated without any lubrication.

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

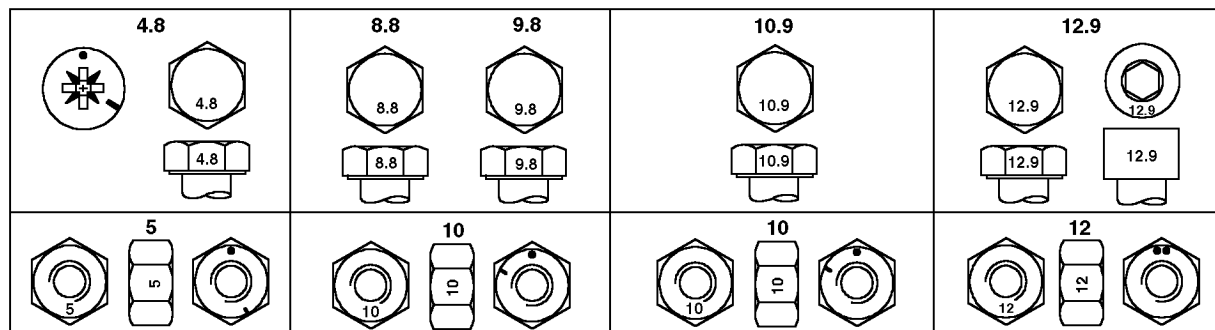
Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

TORQ1A -UN-27SEP99

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Metric Bolt and Cap Screw Torque Values



Top, Property Class and Head Markings; Bottom, Property Class and Nut Markings

	Class 4.8		Class 8.8 or 9.8		Class 10.9		Class 12.9	
Size	Lubricated ^a N•m(lb-ft)	Dry ^b N•m(lb-ft)	Lubricated ^a N•m(lb-ft)	Dry ^b N•m(lb-ft)	Lubricated ^a N•m(lb-ft)	Dry ^b N•m(lb-ft)	Lubricated ^a N•m(lb-ft)	Dry ^b N•m(lb-ft)
M6	4.7 (3.5)	6 (4.4)	9 (6.6)	11.5 (8.5)	13 (9.5)	16.5 (12.2)	15.5 (11.5)	19.5 (14.5)
M8	11.5 (8.5)	14.5 (10.7)	22 (16)	28 (20.5)	32 (23.5)	40 (29.5)	37 (27.5)	47 (35)
M10	23 (17)	29 (21)	43 (32)	55 (40)	63 (46)	80 (59)	75 (55)	95 (70)
M12	40 (29.5)	50 (37)	75 (55)	95 (70)	110 (80)	140 (105)	130 (95)	165 (120)
M14	63 (46)	80 (59)	120 (88)	150 (110)	175 (130)	220 (165)	205 (150)	260 (190)
M16	100 (74)	125 (92)	190 (140)	240 (175)	275 (200)	350 (255)	320 (235)	400 (300)
M18	135 (100)	170 (125)	265 (195)	330 (245)	375 (275)	475 (350)	440 (325)	560 (410)
M20	190 (140)	245 (180)	375 (275)	475 (350)	530 (390)	675 (500)	625 (460)	790 (580)
M22	265 (195)	330 (245)	510 (375)	650 (480)	725 (535)	920 (680)	850 (625)	1080 (800)
M24	330 (245)	425 (315)	650 (480)	820 (600)	920 (680)	1150 (850)	1080 (800)	1350 (1000)
M27	490 (360)	625 (460)	950 (700)	1200 (885)	1350 (1000)	1700 (1250)	1580 (1160)	2000 (1475)
M30	660 (490)	850 (625)	1290 (950)	1630 (1200)	1850 (1350)	2300 (1700)	2140 (1580)	2700 (2000)
M33	900 (665)	1150 (850)	1750 (1300)	2200 (1625)	2500 (1850)	3150 (2325)	2900 (2150)	3700 (2730)
M36	1150 (850)	1450 (1075)	2250 (1650)	2850 (2100)	3200 (2350)	4050 (3000)	3750 (2770)	4750 (3500)

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

^b "Dry" means plain or zinc plated without any lubrication.

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

TORQ -UN-07SEP99

Electronic Air system Repair and Adjustment Specifications

Item	Measurement	Specification
EGR Valve-to-Intake Manifold	Torque	15 N•m (11 lb-ft)
EGR Exhaust Tube Cap	Torque	35 N•m (25 lb-ft)
EGR Exhaust Tube P-Clamp	Torque	25 N•m (18 lb-ft)
EGR Coolant Inlet Tube	Torque	35 N•m (25 lb-ft)
EGR Coolant Inlet Tube P-Clamp	Torque	25 N•m (18 lb-ft)
EGR Coolant Outlet Tube	Torque	35 N•m (25 lb-ft)
EGR Rear Support Bushing	Torque	35 N•m (25 lb-ft)
EGR Cooler-to-Exhaust Manifold	Torque	35 N•m (25 lb-ft)
Turbocharger-to-Exhaust Manifold Nuts	Torque	70 N•m (52 lb-ft)
Center Housing-to-Turbine Housing Cap Screw	Torque	20 N•m (15 lb-ft)
Turbocharger Oil Return Pipe Cap Screws	Torque	24 N•m (18 lb-ft)
Turbocharger Oil Inlet Line (At Turbocharger)	Torque	24 N•m (18 lb-ft)
Turbocharger Oil Inlet Line (At Oil Filter Header)	Torque	24 N•m (18 lb-ft)
Turbocharger Air Inlet Hose Clamp	Torque	6 N•m (4.5 lb-ft) (53 lb-in.)
Exhaust Adapter-to-Turbocharger Clamp	Torque	7.5 N•m (5.5 lb-ft) (66 lb-in.)
Turbocharger Exhaust Elbow	Torque	47 N•m (35 lb-ft)

DM59778,000001E -19-04AUG07-1/1

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Electronic Fuel System Repair and Adjustment Specifications

Item	Measurement	Specification
Fuel Filter Mounting Bracket-to-Cylinder Head Cap Screws	Torque	70 N•m (52 lb-ft)
Fuel Filter Base-to-Bracket Cap Screws	Torque	50 N•m (37 lb-ft)
Fittings, Plugs or Accessories-to-Fuel Filter Base	Torque	10 N•m (7 lb-ft)
Inlet and Outlet Fitting-to-Fuel Transfer Pump	Torque	10 N•m (7 lb-ft)
Fuel Transfer Pump Cap Screws	Torque	30 N•m (22 lb-ft)
Electronic Fuel Transfer Pump Cap Screws	Torque	50 N•m (37 lb-ft)
High Pressure Fuel Pump to Adapter Plate	Torque	40 N•m (29.5 lb-ft)
High Pressure Fuel Pump Gear Nut	Torque	70 N•m (52 lb-ft)
Pump Position Sensor-to-adapter plate	Torque	15 N•m (11 lb-ft)
Fuel Supply Elbow Fitting Nut-to-High Pressure Pump	Torque	20 N•m (15 lb-ft)
Fuel Leak-off Fitting Nut-to-High Pressure Pump	Torque	15 N•m (11 lb-ft)
High Pressure Fuel Pump Adapter Plate-to-Engine Front Plate	Torque	40 N•m (30 lb-ft)
High Pressure Fuel Lines (both ends)	Torque	30 N•m (22 lb-ft)
Plug to access Gear Timing Mark	Torque	50 N•m (37 lb-ft)
Suction Control Valve-to-Pump Housing	Torque	10 N•m (7 lb-ft)
High Pressure Common Rail Bracket to Engine	Torque	70 N•m (52 lb-ft)

Continued on next page

RG41221,00001CE -19-26SEP07-1/2

Repair Specifications

Item	Measurement	Specification
High Pressure Common Rail to Bracket	Torque	70 N•m (52 lb-ft)
High Pressure Delivery Lines to Rail	Torque	30 N•m (22 lb-ft)
High Pressure Delivery Lines to Pump	Torque	30 N•m (22 lb-ft)
Flow Damper	Torque	176 N•m (130 lb-ft)
High Pressure Injector Line (both ends)	Torque	30 N•m (22 lb-ft)
Pressure Limiter	Torque	176 N•m (130 lb-ft)
High Pressure Common Rail Leak Off Line	Torque	6 N•m (4 lb-ft), (53 lb-in.)
Injector Terminal Nut	Torque	2.2 N•m (19.5 lb-in.)
Injector Connector	Torque	2.2 N•m (19.5 lb-in.)
Rocker Arm Cover	Torque	10 N•m (7 lb-in.)
Side Feed Tube Fitting, First Torque	Torque	5 N•m (3.7 lb-ft) (44 lb-in.)
Electronic Injector Clamp Screw	Torque	47 N•m (35 lb-ft)
Side Feed Tube Fitting, Second Torque	Torque	35 N•m (26 lb-ft)
HPCR Delivery Line	Torque	27 N•m (20 lb-ft)
Injector Solenoid Wire Retaining Nut	Torque	2 N•m (1.5 lb-ft) (18 lb-in.)
Heat Shield Cylinder Head Cap Screw	Torque	60 N•m (44 lb-ft)
Heat Shield-to-Rocker Arm Cover	Torque	10 N•m (7 lb-ft)
Suction Control Valve to Pump Housing	Torque	9 N•m (7 lb-in.)

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RG41221.00001CE -19-26SEP07-2/2

Electronic Engine Control Repair and Adjustment Specifications

Item	Measurement	Specification
ECU-to-Bracket	Torque	15 N•m (11 lb-ft)
ECU Isolator-to-Adapter	Torque	35 N•m (26 lb-ft)
Adapter/Isolator assembly-to-Cylinder Block	Torque	40 N•m (30 lb-ft)
ECU Bracket to Adapter	Torque	35 N•m (26 lb-ft)
Engine Coolant Temperature Sensor	Torque	10 N•m (7 lb-ft)
Fuel Temperature Sensor	Torque	10 N•m (7 lb-ft)
EGR Exhaust Temperature Sensor	Torque	10 N•m (7 lb-ft)
Charge Air Cooler Outlet Temperature Sensor	Torque	10 N•m (7 lb-ft)
Manifold Air Temperature (MAT) Sensor	Torque	10 N•m (7 lb-ft)
Oil Pressure Sensor	Torque	10 N•m (7 lb-ft)
Fuel Rail Pressure Sensor	Torque	100 N•m (74 lb-ft)
Fuel Transfer Pump Pressure Sensor	Torque	10 N•m (7 lb-ft)
Manifold Air Pressure (MAP) Sensor	Torque	10 N•m (7 lb-ft)
Crankshaft Position Sensor	Torque	15 N•m (11 lb-ft)
Pump Position Sensor	Torque	15 N•m (11 lb-ft)
Turbo Speed Sensor	Torque	12 N•m (9 lb-ft)
Turbo Inlet Compressor Temperature Sensor	Torque	10 N•m (7 lb-ft)
Water in Fuel (WIF) Sensor	Torque	14 N•m (10 lb-ft)
Glow Plugs	Torque	15 N•m (11 lb-ft)

Fuel System Diagnostic Specifications

Item	Measurement	Specification
Minimum Fuel Transfer Pump Pressure	Cranking	30 kPa (0.3 bar) (4.4 psi)
	Running (Low Idle)	40 kPa (0.4 bar) (5.8 psi)
Minimum Fuel Rail Pressure	Cranking	20 MPa (200 bar) (2900 psi)
	Running (Low Idle)	35 MPa (350 bar) (5076 psi)

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Application Specifications

Below is an overview of the specifications listed for applications in the next few pages.

- **OEM Engines**

- Torque Curve Selection - See OEM ENGINES - TORQUE CURVE SELECTION later in this Group.
- Governor Mode Selection - See OEM ENGINES - GOVERNOR MODE SELECTION later in this Group.

- Electronic Control System Wiring Diagrams - See OEM ENGINES - WIRING DIAGRAMS later in this Group.
- John Deere Instrument Panel/Engine Start Components Electrical Wiring Diagram - See OEM ENGINES - OEM INSTRUMENT PANEL / ENGINE START COMPONENTS ELECTRICAL WIRING DIAGRAM later in this Group.

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OEM Engines - Derate Specifications

NOTE: The PEAK POWER LEVEL of an application is identified on the Emissions Information Label located near the valve cover. See INFORMATION RELATIVE TO EMISSIONS REGULATIONS in section 01, Group 001 earlier in this manual.

Listed below are the parameters that the Engine Control Unit (ECU) uses to derate the engine.

Continued on next page

RG41221,00001D2 -19-13SEP07-1/3

Diagnostic Specifications

Parameter	SPN-FMI	Value that Triggers Fault	Derate Limit (% Power or RPM)
Air Filter Restriction Switch. (Customer Trim Option)	000107.31	Air Filter Restriction Switch Active.	50%
Charged Air Cooler Outlet Temperature.	002630.16	89.5°C (193°F)	20%
Charged Air Cooler Outlet Temperature.	002630.00	91°C (196°F)	60%
Crankshaft Sensor Faults.	000637.02 000637.08 000637.10	Noise, Invalid Pattern, or Missing Pulse.	50%
Engine Control Unit (ECU) Temperature.	001136.00	135°C (275°F)	1200 rpm
Engine Coolant Level Switch. (Customer Trim Option)	000111.01	Engine Coolant Level Low Switch Active.	50%
Engine Coolant Temperature (ECT) For 4.5L. Peak Power Level Above 110kw(148hp).	000110.16	111°C (232°F)	20%
Engine Coolant Temperature (ECT) For 4.5L. Peak Power Under 110kw (148hp).	000110.16	114°C (237°F)	20%
Engine Coolant Temperature (ECT) For 6.8L. Peak Power Above 177kw (236hp).	000110.16	111°C (232°F)	20%
Engine Coolant Temperature (ECT) For 6.8L. Peak Power Under 177kw (236hp).	000110.16	114°C (237°F)	20%
Engine Coolant Temperature (ECT) For 4.5L. Peak Power Above 110kw(148hp).	000110.00	113°C (235°F)	60%
Engine Coolant Temperature (ECT) For 4.5L. Peak Power Under 110kw (148hp).	000110.00	116°C (241°F)	60%
Engine Coolant Temperature (ECT) For 6.8L. Peak Power Above 177kw (236hp).	000110.00	113°C (235°F)	60%
Engine Coolant Temperature (ECT) For 6.8L. Peak Power Under 177kw (236hp)	000110.00	116°C (241°F)	60%
Exhaust Gas Recirculation (EGR) Temperature.	000412.15	280°C (536°F)	5%
Exhaust Gas Recirculation (EGR) Temperature.	000412.16	290°C (554°F)	50%
Exhaust Gas Recirculation (EGR) Temperature.	000412.00	299°C (570°F)	50%
Exhaust Gas Recirculation (EGR) Valve.	002659.17 002791.02 002791.13	No EGR Flow, EGR Position Mismatch, EGR Invalid Position, or EGR Disabled.	20%
Fuel Temperature.	000174.00	100°C (212°F)	20%
Manifold Air Temperature (MAT).	000105.16	121°C (250°F)	20%
Manifold Air Temperature (MAT).	000105.00	123°C (253°F)	60%

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RG41221.00001D2 -19-13SEP07-2/3

Diagnostic Specifications

Oil Pressure.	000100.18	Less than 1kPa (0.14psi) @770 rpm. Less than 132kPa (19psi) @ 775 rpm Less than 212kPa (31psi) @ 1500 rpm: Less than 256kPa (37psi) @ 2000 rpm. Less than 291kPa (42psi) @2500 rpm	20%
Oil Pressure.	000100.01	Less than 1kPa (0.14psi) @770 rpm Less than 118kPa (17psi) @ 775 rpm Less than 205kPa (29psi) @ 1500 rpm Less than 240kPa (35psi) @2000 rpm	60%
Fuel Rail Pressure	000157.03 000157.04	Out of Range Code Detected.	50%
Turbocharger Speed.	000103.00	155,000 rpm	50%
Turbocharger Compressor Outlet Temperature.	002790.16	260°C (500°F) Aluminum Housing. TBD Cast Iron Housing.	50%
Variable Geometry Turbo (VGT) Actuator Position.	002795.07	Position Not Controllable.	50%
Water-in-Fuel	000097.16	Water Detected.	50%

RG41221,00001D2 -19-13SEP07-3/3

OEM Engines - Glow Plug Specifications

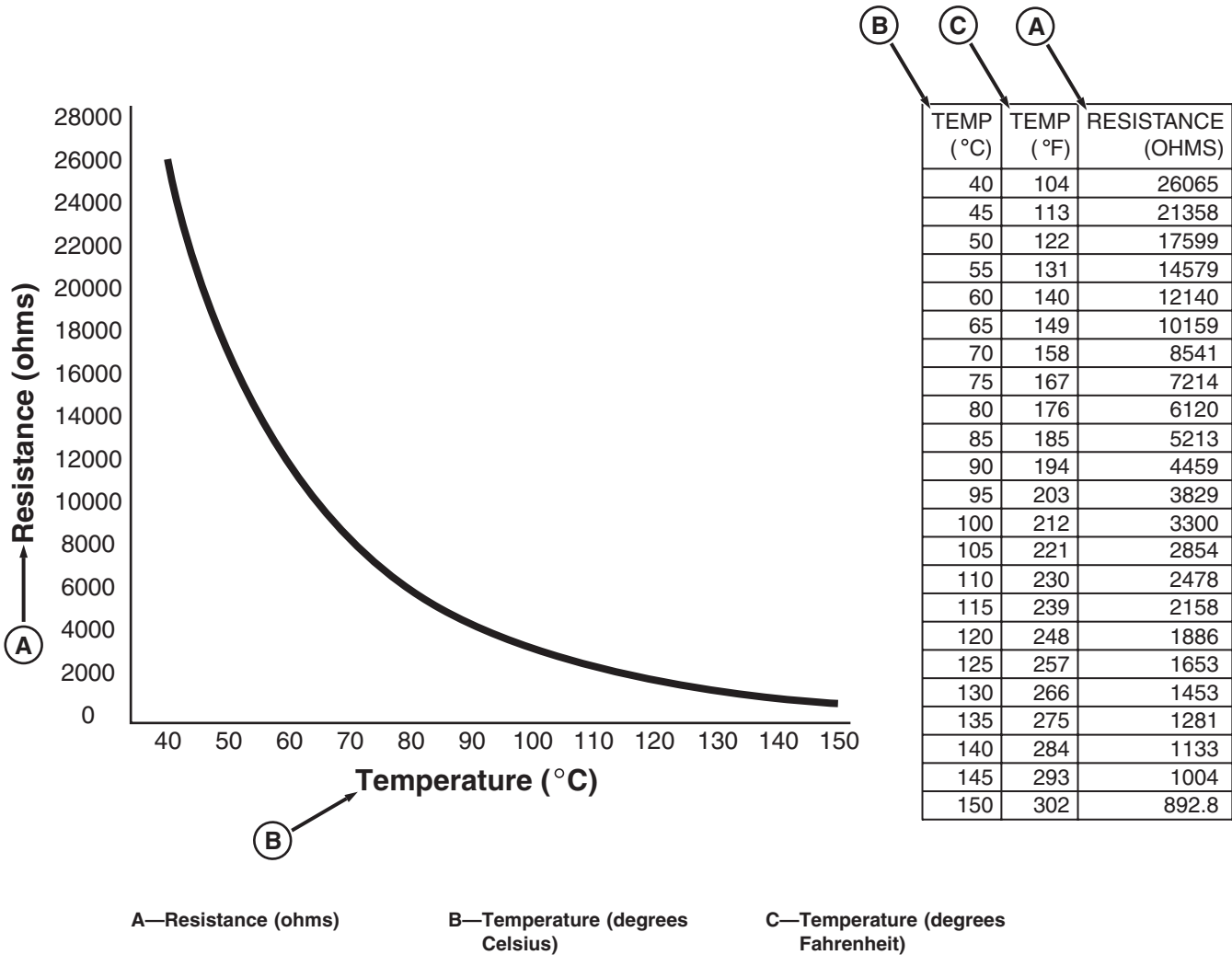
NOTE: Preheat time has an additional 5 seconds after the light turns off.

Glow Plug and Air Heater Operating Conditions - OEM		
-Glow Plug Operation - OEM		
Fuel Temperature	Preheat Time	Reheat Time
-20°C (-4°F)	15 seconds	10 seconds
-15°C (5°F)	15 seconds	10 seconds
-10°C (14°F)	10 seconds	10 seconds
-5°C (23°F)	5 seconds	10 seconds
0°C (32°F)	0 seconds	0 seconds

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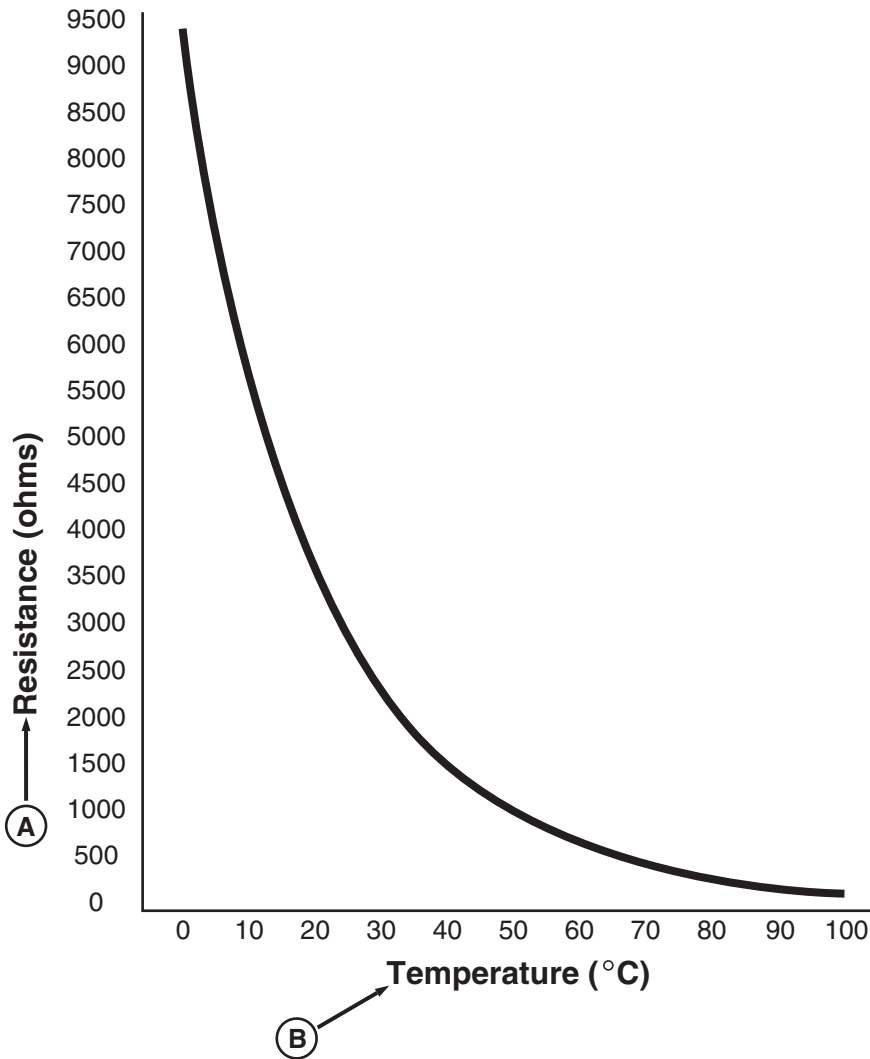
EGR Temperature Sensor Characteristics



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Compressor Inlet Air Temperature Sensor Characteristics



TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
0	32	9399
5	41	7263
10	50	5658
15	59	4441
20	68	3511
25	77	2795
30	86	2240
35	95	1806
40	104	1465
45	113	1195
50	122	980.3
55	131	808.8
60	140	670.9
65	149	559.4
70	158	468.7
75	167	394.6
80	176	333.8
85	185	283.5
90	194	241.8
95	203	207.1
100	212	178.0

A—Resistance (ohms)

B—Temperature (degrees Celsius)

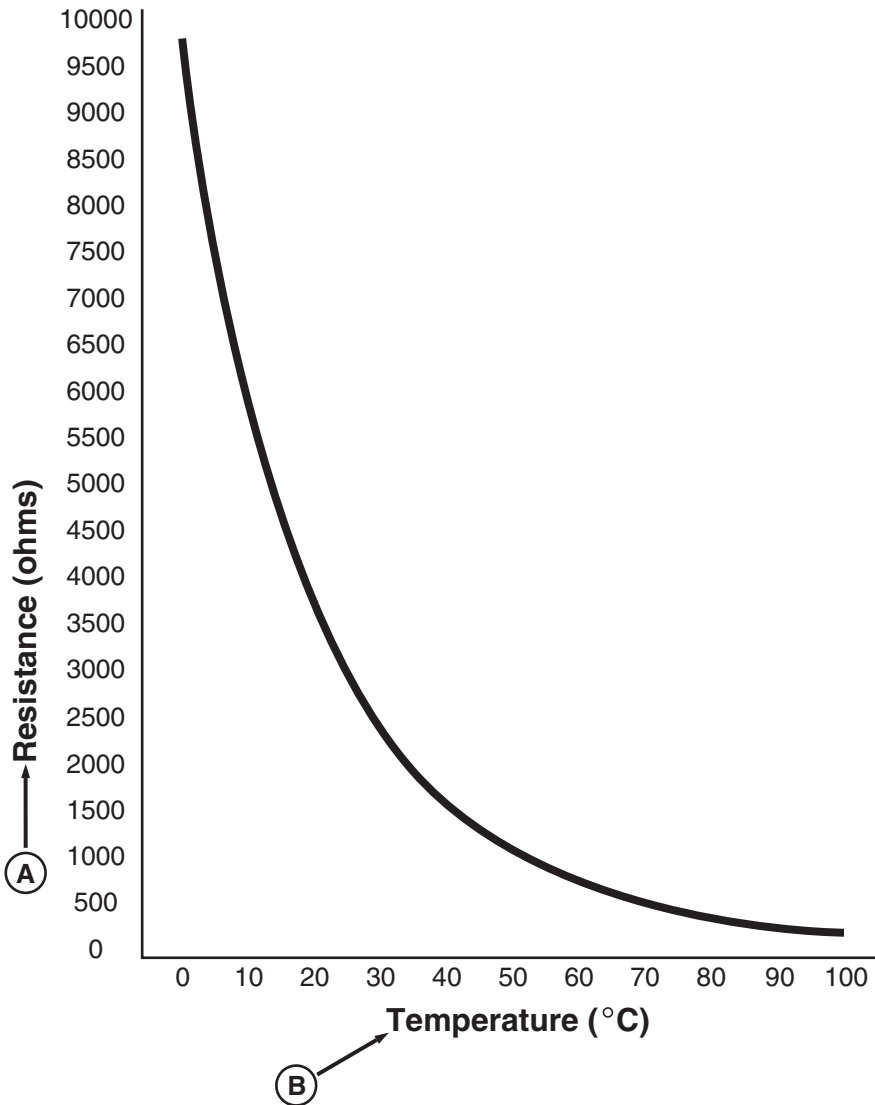
C—Temperature (degrees Fahrenheit)

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Manifold Air Temperature Sensor and Charged Air Cooler Outlet Temperature Sensor Characteristics



TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
0	32	9795
5	41	7616
10	50	5970
15	59	4712
20	68	3747
25	77	3000
30	86	2417
35	95	1959
40	104	1598
45	113	1311
50	122	1081
55	131	895.9
60	140	746.4
65	149	624.9
70	158	525.6
75	167	444.4
80	176	377.4
85	185	321.7
90	194	275.3
95	203	236.6
100	212	204.0

A—Resistance (ohms)

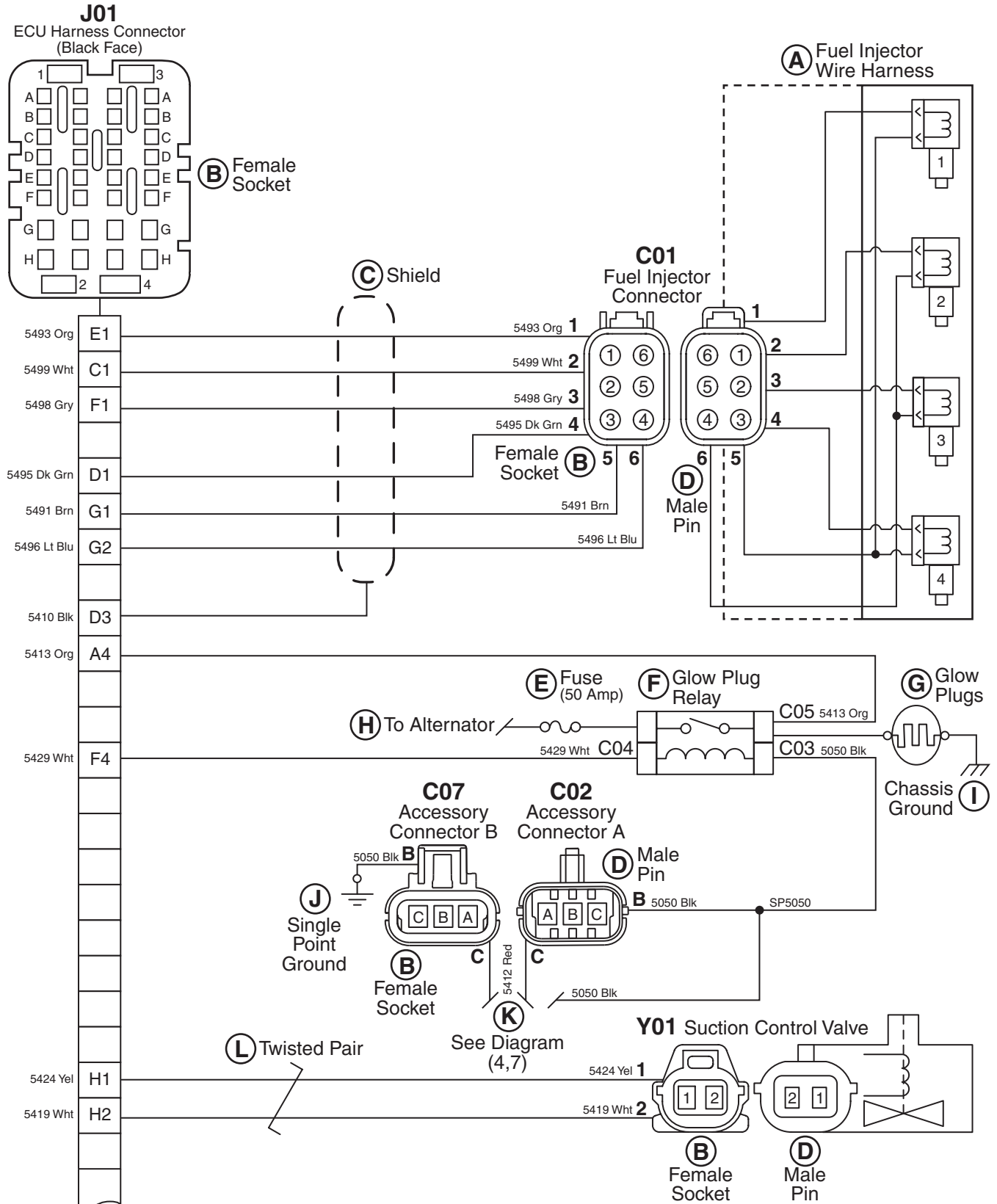
B—Temperature (degrees Celsius)

C—Temperature (degrees Fahrenheit)

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4.5L 12V ECU Wiring Diagram 1

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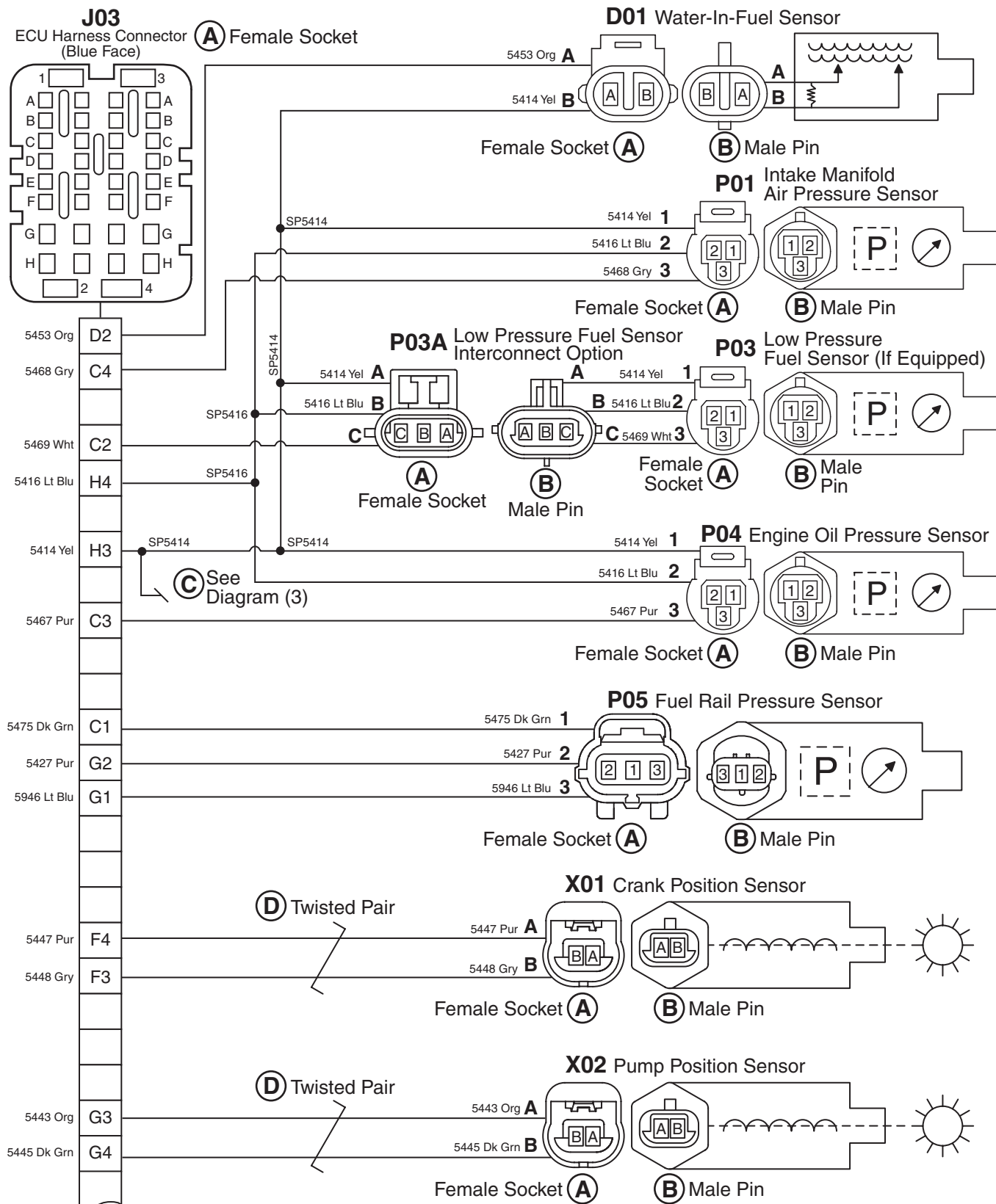
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Diagnostic Specifications

A—Fuel Injector Wire Harness	L—Twisted Pair	J1-D3—[5410A Black] Wiring Shield	J1-G2—[5496 Light Blue] Injector #2 & #3 Power
B—Female Socket	C01—Fuel Injector Connector	J1-E1—[5493 Orange] Injector #1 Inject Pulse	J1-H1—[5424 Yellow] HP Pump Suction Control Valve High Drive
C—Shield	C02 —Accessory Connector A	J1-F1—[5498 Gray] Injector #3 Inject Pulse	J1-H2—[5419 White] HP Pump Suction Control Valve Low Drive
D—Male Pin	C07—Accessory Connector B	J1-F4—[5429 White] Glow Plug Relay Control	Y01—Suction Control Valve
E—Fuse (50 Amp)	J01—ECU Harness Connector (Black Face)	J1-G1—[5491 Brown] Injector #1 & #4 Power	
F—Glow Plug Relay	J1-A4—[5413 Orange] Glow Plug Relay Signal		
G—Glow Plugs	J1-C1—[5499 White] Injector #2 Inject Pulse		
H—To Alternator	J1-D1—[5495 Dark Green] Injector #4 Inject Pulse		
I—Chassis Ground			
J—Single Point Ground			
K—See Diagram (4,7)			

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4.5L 12V ECU Wiring Diagram 2

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4.5 Liter 12 Volt ECU Wiring Diagram 2 (PT+)

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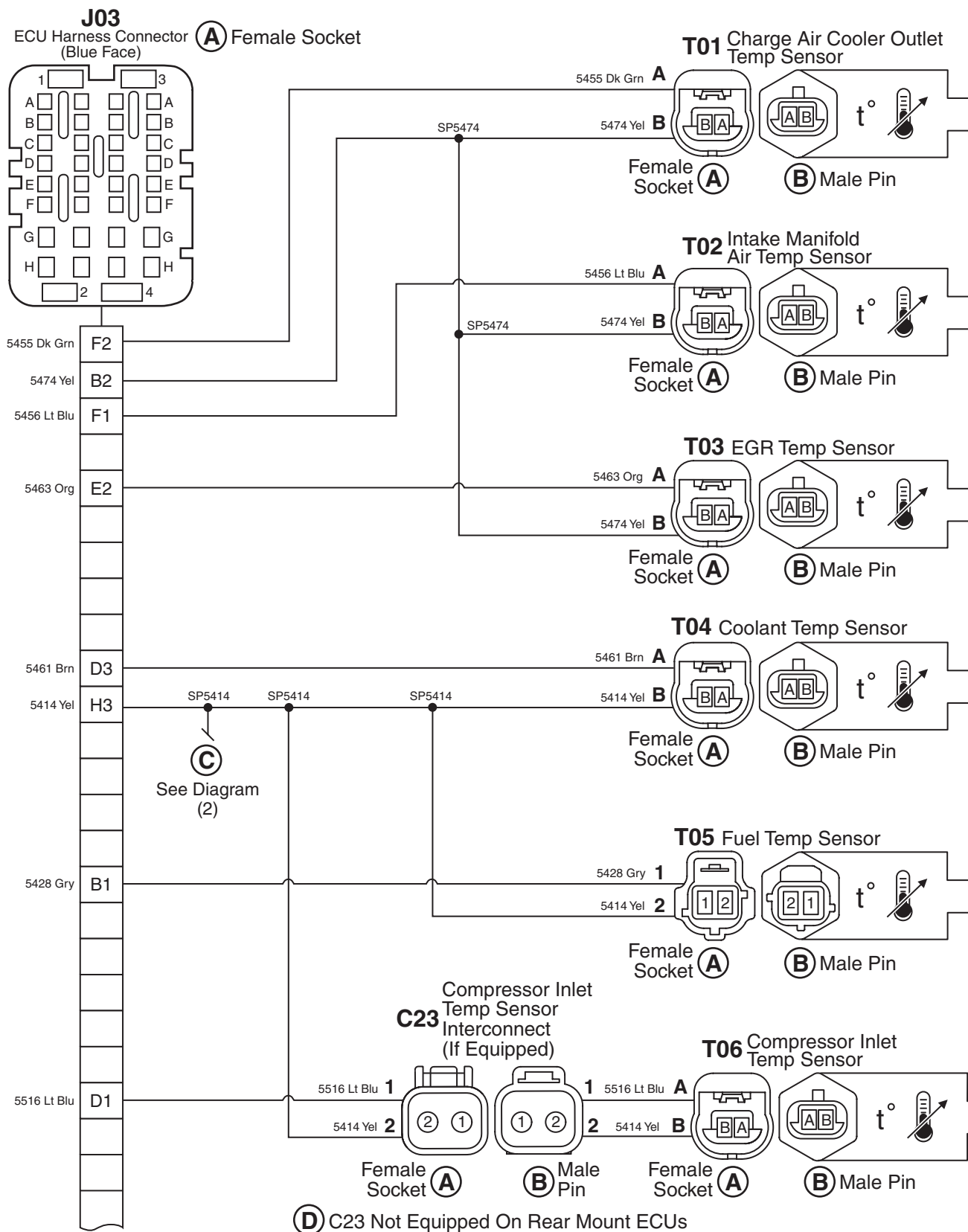
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Diagnostic Specifications

A—Female Socket	J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal	J3-G3—[5443 Orange] Pump Position Return	P03—Low Pressure Fuel Sensor (If Equipped)
B—Male Pin		J3-G4—[5445 Dark Green] Pump Position Pulse	P03A—Low Pressure Fuel Sensor Interconnect Option
C—See Diagram (3)	J3-D2—[5453 Orange] Water In Fuel Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Negative	P04—Engine Oil Pressure Sensor
D—Twisted Pair	J3-F3—[5448 Gray] Crank Position Return	J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive	P05—Fuel Rail Pressure Sensor
D01—Water In Fuel Sensor	J3-F4—[5447 Purple] Crank Position Pulse	P01—Intake Manifold Air Pressure Sensor	X01—Crank Position Sensor
J03—ECU Harness Connector (Blue Face)	J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive		X02—Pump Position Sensor
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal	J3-G2—[5427 Purple] 5 Volt Power Supply #1 Negative		
J3-C2—[5469 White] Low Pressure Fuel Signal			
J3-C3—[5467 Purple] Engine Oil Pressure Signal			

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4.5L 12V ECU Wiring Diagram 3

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4.5 Liter 12 Volt ECU Wiring Diagram 3 (PT+)

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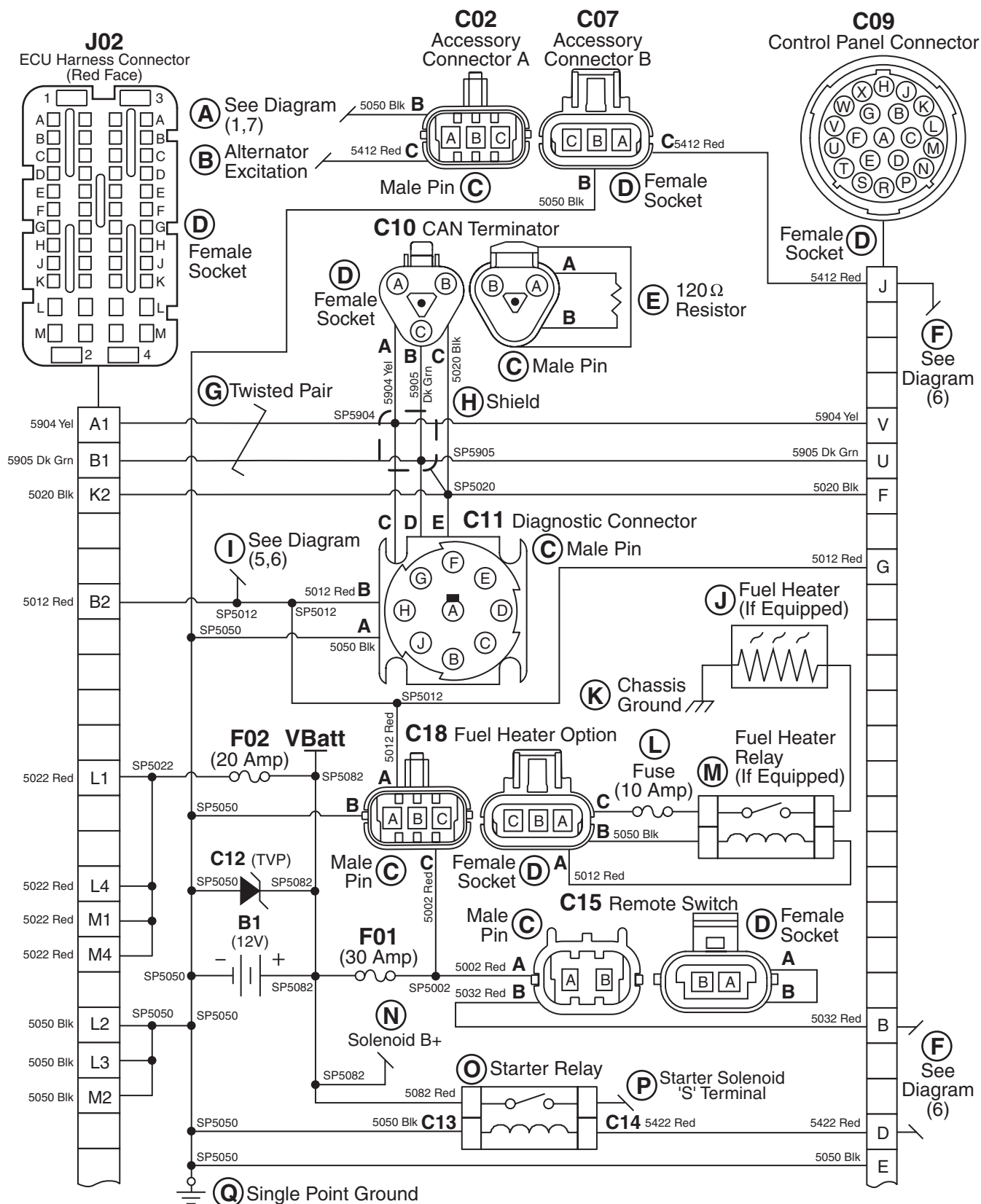
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Diagnostic Specifications

A—Female Socket	J3-B2—[5474A Yellow] Precision Sensor Return	J3-F2—[5455 Dark Green] Charged Air Cooler Outlet Temperature Signal	T03—EGR Temperature Sensor
B—Male Pin			T04—Coolant Temperature Sensor
C—See Diagram (2)			T05—Fuel Temperature Sensor
D—C23 Not Equipped On Rear Mount ECUs	J3-D1—[5516 Light Blue] Compressor Inlet Temperature Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Negative	T06—Compressor Inlet Temperature Sensor
C23—Compressor Inlet Temperatures Sensor Interconnect (If Equipped)	J3-D3—[5461 Brown] Coolant Temperature Signal	T01—Charge Air Cooler Outlet Temperature Sensor	
J03—ECU Harness Connector (Blue Face)	J3-E2—[5463 Orange] EGR Temperature Signal	T02—Intake Manifold Air Temperature Sensor	
J3-B1—[5428 Gray] Fuel Temperature Signal	J3-F1—[5456 Light Blue] Intake Manifold Air Temperature Signal		

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4.5L 12V ECU Wiring Diagram 4



Diagnostic Specifications

A—See Diagram (1,7)	O—Starter Relay	C15—Remote Switch	J2-L2—[5050A Black] Battery Negative
B—Alternator Excitation	P—Starter Solenoid 'S' Terminal	C18—Fuel Heater Option	J2-L3—[5050B Black] Battery Negative
C—Male Pin	Q—Single Point Ground	F01—30 Amp	J2-L4—[5022B Red] Battery Positive
D—Female Socket	B1—12 Volt	F02—20 Amp	J2-M1—[5022C Red] Battery Positive
E—120 Resister	C02—Accessory Connector A	J02—ECU Harness Connector (Red Face)	J2-M2—[5050C Black] Battery Negative
F—See Diagram (6)	C07—Accessory Connector B	J2-A1—[5904A Yellow] CAN High	J2-M4—[5022D Red] Battery Positive
G—Twisted Pair	C09—Control Panel Connector	J2-B1—[5905A Dark Green] CAN Low	VBatt—Battery Positive
H—Shield	C10—CAN Terminator	J2-B2—[5012A Red] Ignition Key Start/Run Switch	
I—See Diagram (5,6)	C11—Diagnostic Connector	J2-K2—[5020A Black] CAN Shield	
J—Fuel Heater (If Equipped)	C12—Transient Voltage Protection (TVP)	J2-L1—[5022A Red] Battery Positive	
K—Chassis Ground	C13—Starter Relay Coil Return		
L—Fuse (10 Amp)	C14—Starter Relay Coil Control		
M—Fuel Heater Relay (If Equipped)			
N—Solenoid B+			

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CTM320 (22FEB08)

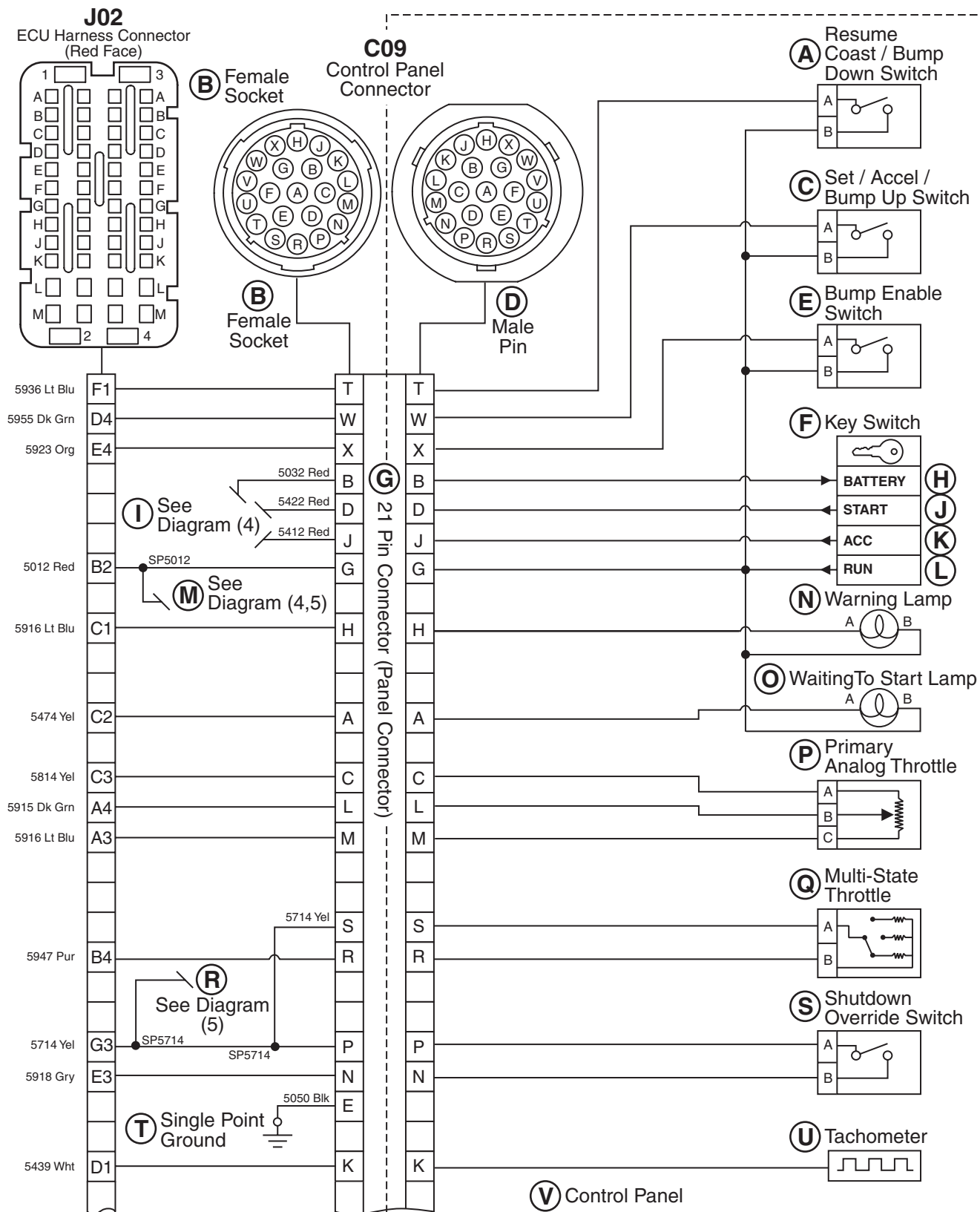


Diagnostic Specifications

A—Loss of Coolant Switch	M—See Diagram (4,6)	J2-D2—[5473 Orange] Stop Engine Lamp Return	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return
B—Female Socket	N—Cruise Brake Switch	J2-D3—[5436 Light Blue] Air Filter Restriction Switch	J2-G4—[5948 Gray] Low Coolant Level Switch
C—Air Filter Restriction Switch	O—Secondary Analog Throttle	J2-E1—[5943 Orange] Cruise Brake Switch	J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
D—External Shutdown Switch	P—Single Point Ground	J2-F2—[5954 Yellow] Cruise On/Off Switch	J2-J1—[5939 White] External Derate Switch
E—Male Pin	Q—Drop/Isoc (Isochronous) Governor Switch	J2-F3—[5913 Orange] Secondary Analog Throttle Signal	J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
F—External Derate Switch	C08—23 Pin Connector (Auxiliary Connector)	J2-G2—[5911 Brown] 5 Volt Power Supply #4 Positive	J2-K1—[5941 Brown] External Shutdown Switch
G—Cruise Cancel/Resume Switch	J02—ECU Harness Connector (Red Face)		
H—See Diagram (6)	J2-B2—[5012A Red] Ignition Key Start/Run Switch		
I—Cruise On Switch	J2-B3—[5917 Purple] Remote Cruise On/Off Switch		
J—23 Pin Connector (Auxiliary Connector)			
K—Remote Cruise Switch			
L—Stop Engine Lamp			

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4.5L 12V ECU Wiring Diagram 6



4.5 Liter 12 Volt ECU Wiring Diagram 6 (PT+)

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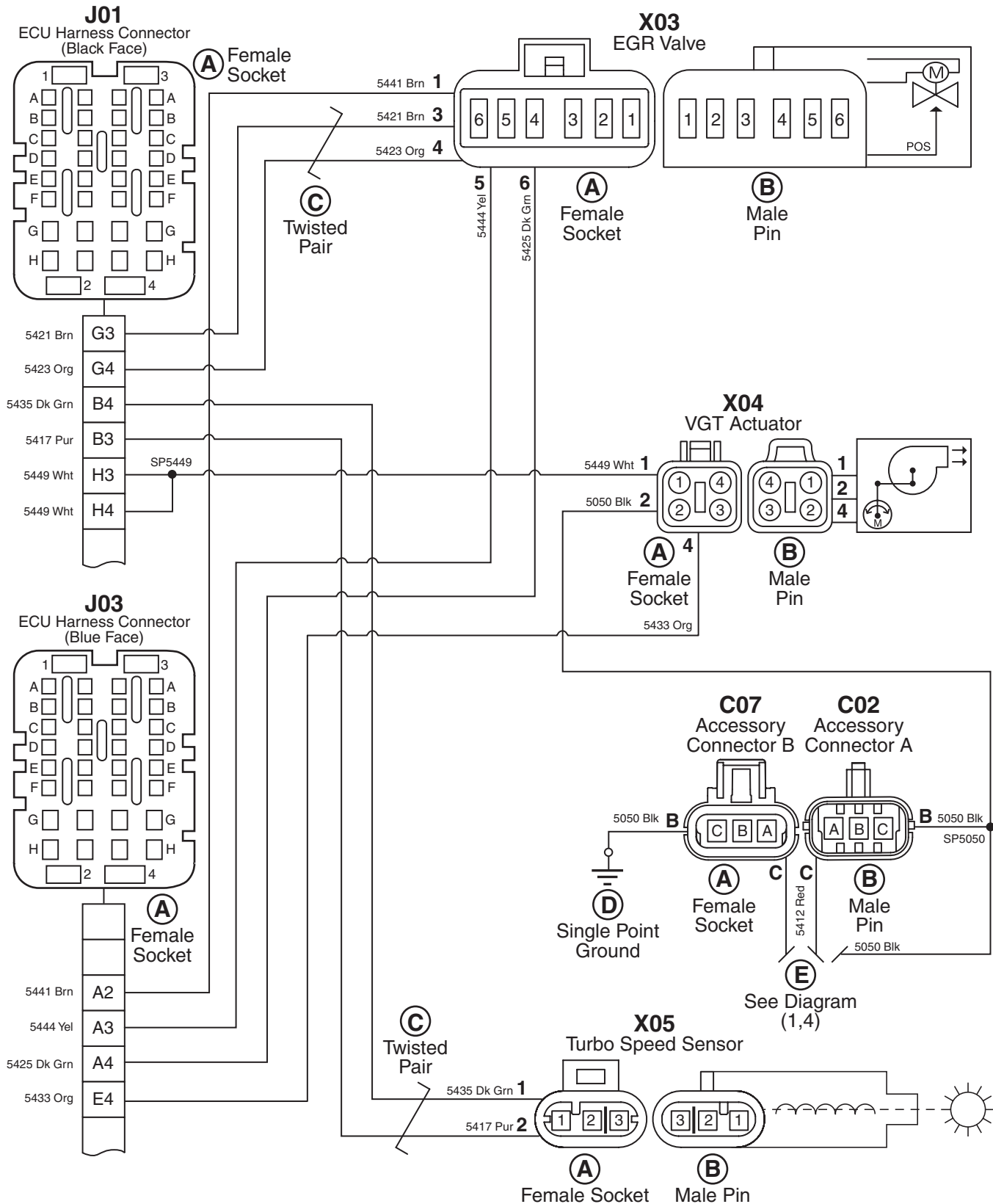
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Diagnostic Specifications

A—Resume Coast/Bump Down Switch	P—Primary Analog Throttle	J2-B2—[5012A Red] Ignition Key Start/Run Switch	J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
B—Female Socket	Q—Multi-State Throttle	J2-B4—[5947 Purple] Multistate Throttle Signal	J2-E3—[5913 Orange] Secondary Analog Throttle Signal
C—Set Accel/Bump Up Switch	R—See Diagram (5)	J2-C1—[5916 Light Blue] Warning Lamp Drive Return	J2-E4—[5923 Orange] Bump Enable Switch
D—Male Pin	S—Shutdown Override Switch	J2-C2—[5474 Yellow] Wait To Start Lamp Drive Return	J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
E—Bump Enable Switch	T—Single Point Ground	J2-C3—[5814 Yellow] 5 Volt Power Supply #3 Return	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return
F—Key Switch	U—Tachometer	J2-D1—[5439 White] Tachometer Pulse Output	
G—21 Pin Connector (Panel Connector)	V—Control Panel		
H—Battery	C09—21 Pin Connector (Panel Connector)		
I—See Diagram (4)	J02—ECU Harness Connector (Red Face)		
J—Start	J2-A3—[5616 Light Blue] 5 Volt Power Supply #3 Positive		
K—Accessory	J2-A4—[5915 Dark Green] Primary Analog Throttle Signal		
L—Run			
M—See Diagram (4,5)			
N—Warning Lamp			
O—Wait to Start Lamp			

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4.5L 12V ECU Wiring Diagram 7



4.5 Liter 12 Volt ECU Wiring Diagram 7 (PT+)

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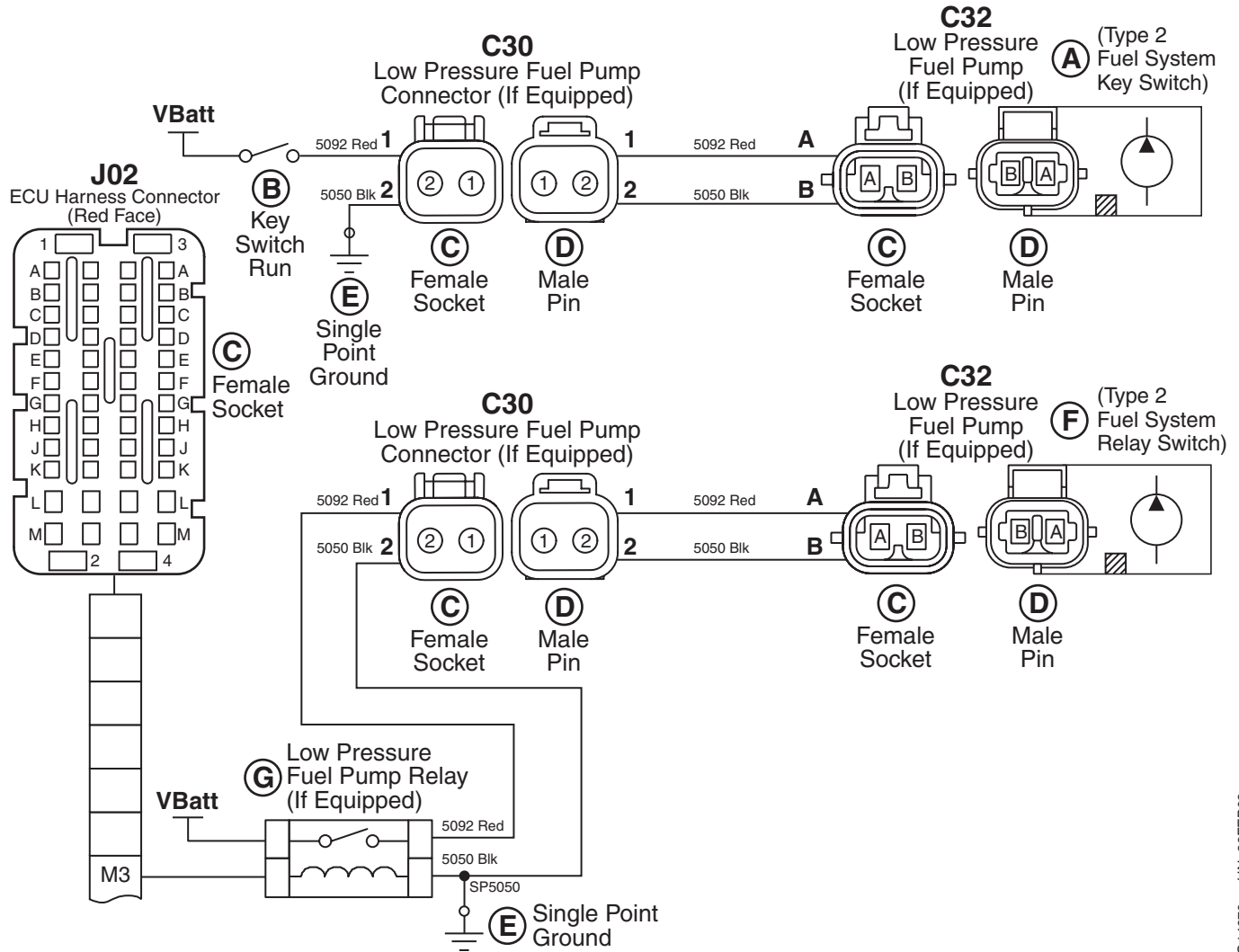
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Diagnostic Specifications

A—Female Socket	J1-B4—[5435 Dark Green] Turbo Speed Pulse	J03—ECU Harness Connector (Blue Face)	J3-E4—[5433 Orange] VGT Actuator Communications Signal
B—Male Pin	J1-G3—[5421 Brown] EGR Valve PWM Drive #1	J3-A2—[5511 Brown] 5 Volt Power Supply #5 Positive	X03—EGR Valve
C—Twisted Pair	J1-G4—[5423 Orange] EGR Valve PWM Drive #2	J3-A3—[5444 Yellow] 5 Volt Power Supply #5 Return	X04—VGT Actuator
D—Single Point Ground	J1-H3—[5449B White] VGT Actuator Power #1 Positive	J3-A4—[5425 Dark Green] EGR Valve Position Signal	X05—Turbo Speed Sensor
E—See Diagram (1,4)	J1-H4—[5449A White] VGT Actuator Power #2 Positive		
C02—Accessory Connector A			
C07—Accessory Connector B			
J01—ECU Harness Connector (Black Face)			
J1-B3—[5417 Purple] Turbo Speed Return			

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4.5L 12V ECU Wiring Diagram 8



4.5 Liter 12 Volt ECU Wiring Diagram 8 (PT+)

A—(Type 2 Fuel System, Key Switch)
 B—Key Switch Run
 C—Female Socket
 D—Male Pin

E—Single Point Ground
 F—(Type 2 Fuel System, Relay Switch)
 G—Low Pressure Fuel Pump Relay (If Equipped)

C30—Low Pressure Fuel Pump Connector (If Equipped)
 C32—Low Pressure Fuel Pump (If Equipped)
 J02—ECU Harness Connector (Red Face)

J2-M3—Low Pressure Fuel Pump Relay Drive
 VBatt—Battery Positive

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CTM320 (22FEB08)	06-210-26	4.5 L and 6.8 L Level 14 Electronic Fuel System

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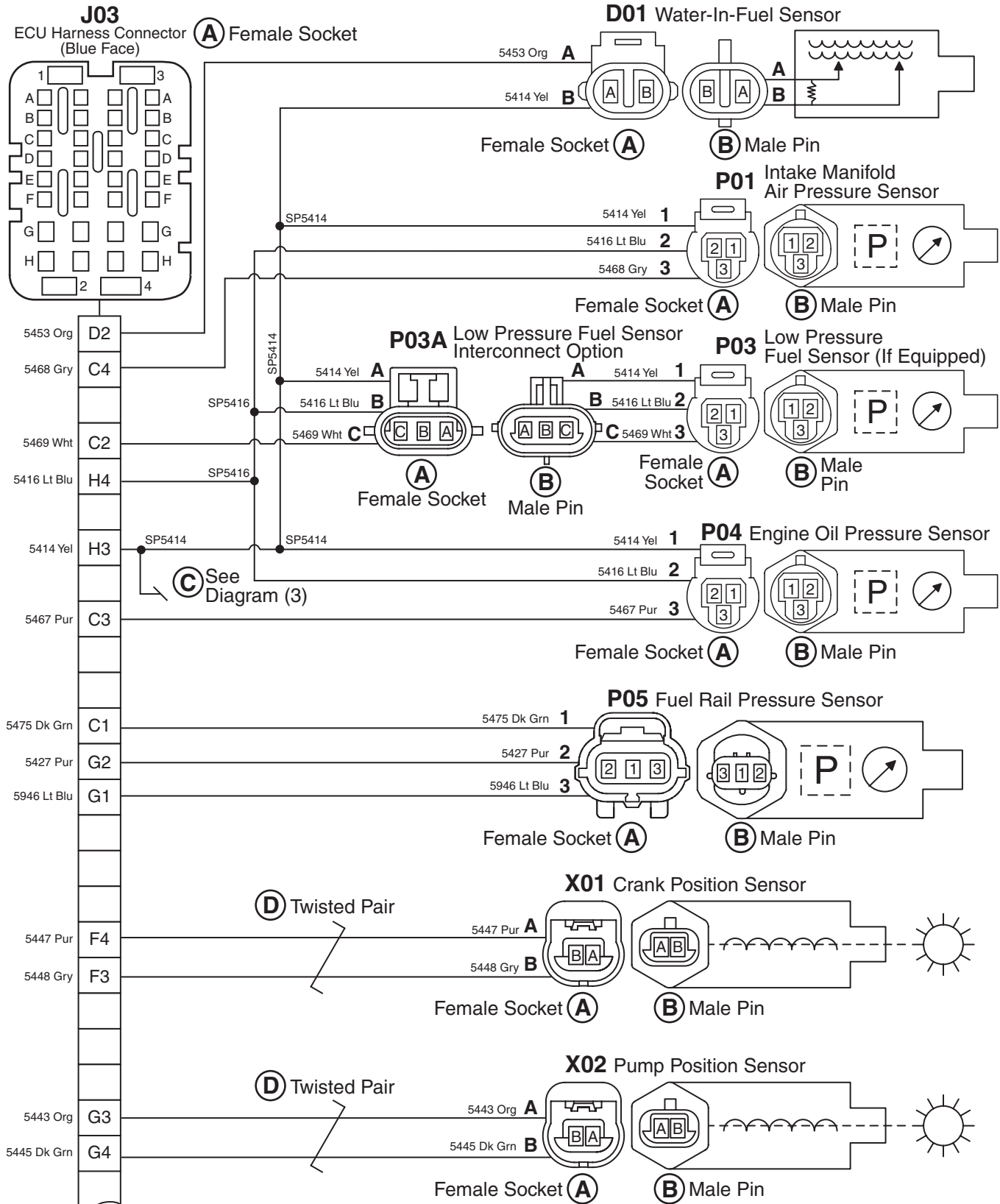
Diagnostic Specifications

A—Fuel Injector Wire Harness	M—Twisted Pair For Engine Mount ECU	J1-D1—[5495 Dark Green] Injector #4 Inject Pulse	J1-G2—[5496 Light Blue] Injector #2 & #3 Power
B—Female Socket	C01—Fuel Injector Connector	J1-D3—[5410A Black] Wiring Shield	J1-H1—[5424 Yellow] HP Pump Suction Control Valve High Drive
C—Shield	C02 —Accessory Connector A	J1-E1—[5493 Orange] Injector #1 Inject Pulse	J1-H2—[5419 White] HP Pump Suction Control Valve Low Drive
D—Male Pin	C07—Accessory Connector B	J1-F1—[5498 Gray] Injector #3 Inject Pulse	Y01—Suction Control Valve
E—Fuse (50 Amp)	J01—ECU Harness Connector (Black Face)	J1-F4—[5429 White] Glow Plug Relay Control	
F—Glow Plug Relay	J1-A4—[5413 Orange] Glow Plug Relay Signal	J1-G1—[5491 Brown] Injector #1 & #4 Power	
G—Glow Plugs	J1-C1—[5499 White] Injector #2 Inject Pulse		
H—To Alternator			
I—Chassis Ground			
J—Single Point Ground			
K—See Diagram (4,7)			
L—Shield For Remote Mount ECU			

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4.5L 24V ECU Wiring Diagram 2



4.5 Liter 24 Volt ECU Wiring Diagram 2 (PT+)

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Diagnostic Specifications

A—Female Socket	J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal	J3-G3—[5443 Orange] Pump Position Return	P03—Low Pressure Fuel Sensor (If Equipped)
B—Male Pin		J3-G4—[5445 Dark Green] Pump Position Pulse	P03A—Low Pressure Fuel Sensor Interconnect Option
C—See Diagram (3)	J3-D2—[5453 Orange] Water In Fuel Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	P04—Engine Oil Pressure Sensor
D—Twisted Pair	J3-F3—[5448 Gray] Crank Position Return	J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive	P05—Fuel Rail Pressure Sensor
D01—Water In Fuel Sensor	J3-F4—[5447 Purple] Crank Position Pulse	P01—Intake Manifold Air Pressure Sensor	X01—Crank Sensor
J03—ECU Harness Connector (Blue Face)	J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive		X02—Pump Position Sensor
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal	J3-G2—[5427 Purple] 5 Volt Power Supply #1 Return		
J3-C2—[5469 White] Low Pressure Fuel Signal			
J3-C3—[5467 Purple] Engine Oil Pressure Signal			

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4.5L 24V ECU Wiring Diagram 3

J03
ECU Harness Connector
(Blue Face)

A Female Socket

T01 Charge Air Cooler Outlet Temp Sensor

T02 Intake Manifold Air Temp Sensor

T03 EGR Temp Sensor

T04 Coolant Temp Sensor

T05 Fuel Temp Sensor

C23 Compressor Inlet Temp Sensor Interconnect (If Equipped)

T06 Compressor Inlet Temp Sensor

D C23 Not Equipped On Rear Mount ECUs

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CTM320 (22FEB08)	06-210-30	4.5 L and 6.8 L Level 14 Electronic Fuel System 022808 PN=1432

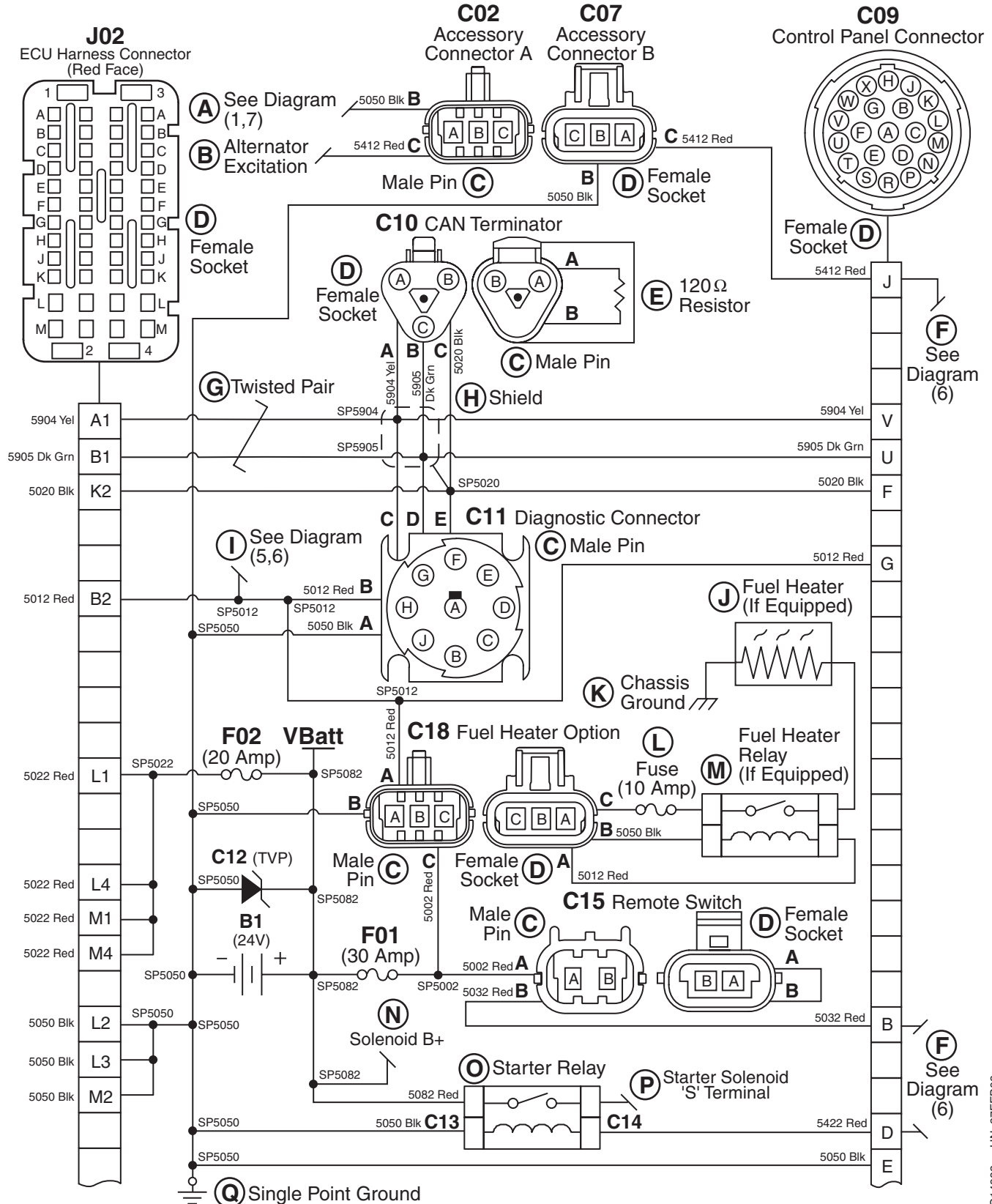
Diagnostic Specifications

A—Female Socket	J3-B2—[5474A Yellow] Precision Sensor Return	J3-F2—[5455 Dark Green] Charged Air Cooler Outlet Temperature Signal	T03—EGR Temperature Sensor
B—Male Pin	J3-D1—[5516 Light Blue] Compressor Inlet Temperature Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	T04—Coolant Temperature Sensor
C—See Diagram (2)	J3-D3—[5461 Brown] Coolant Temperature Signal	T01—Charge Air Cooler Outlet Temperature Sensor	T05—Fuel Temperature Sensor
D—C23 Not Equipped on Rear Mount ECUs	J3-E2—[5463 Orange] EGR Temperature Signal	T02—Intake Manifold Air Temperature Sensor	T06—Compressor Inlet Temperature Sensor
C23—Compressor Inlet Temperatures Sensor Interconnect	J3-F1—[5456 Light Blue] Intake Manifold Air Temperature Signal		
J03—ECU Harness Connector (Blue Face)			
J3-B1—[5428 Gray] Fuel Temperature Signal			

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4.5L 24V ECU Wiring Diagram 4



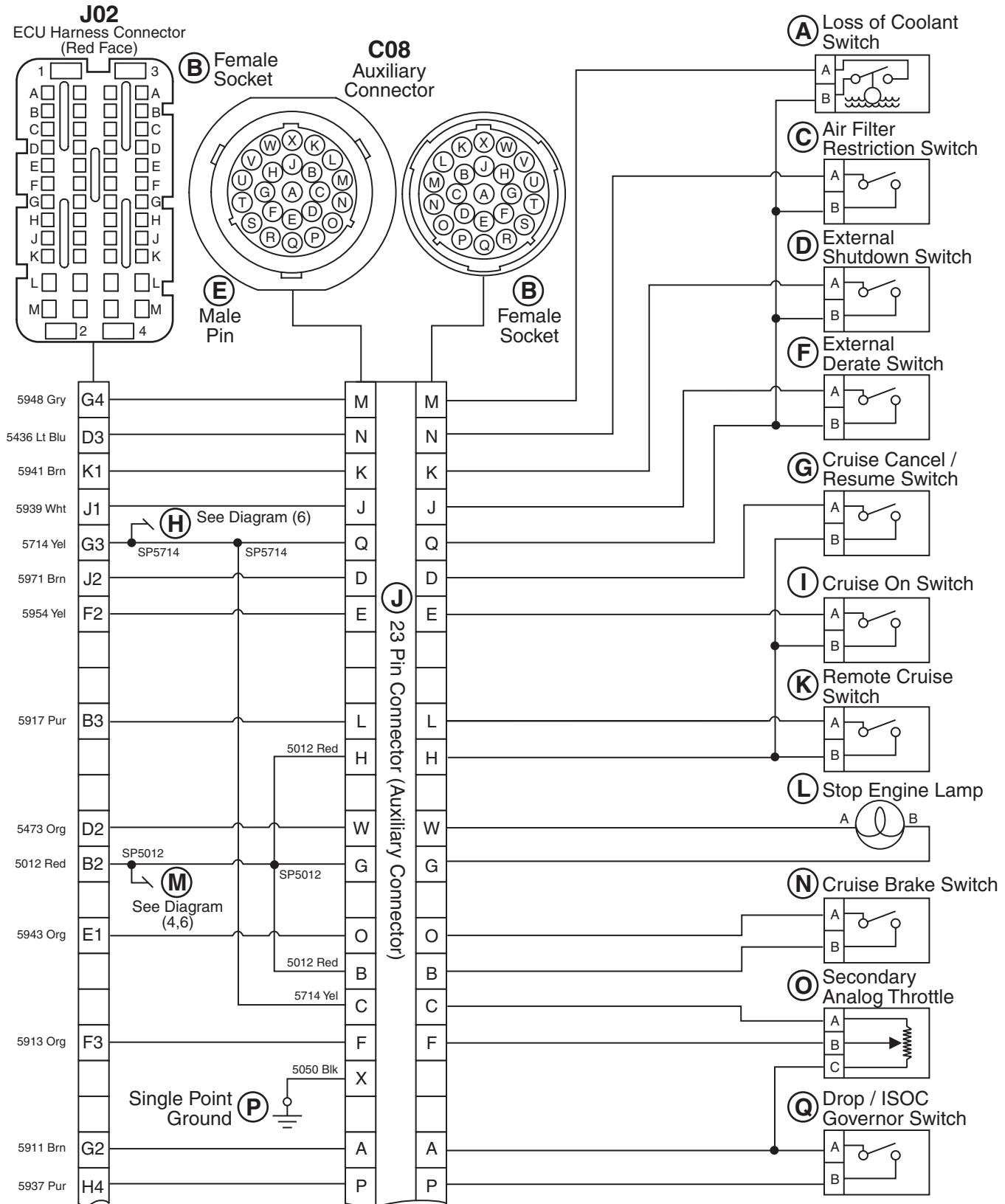
Diagnostic Specifications

A—See Diagram (1,7)	O—Starter Relay	C15—Remote Switch	J2-L2—[5050A Black] Battery Negative
B—Alternator Excitation	P—Starter Solenoid 'S' Terminal	C18—Fuel Heater Option	J2-L3—[5050B Black] Battery Negative
C—Male Pin	Q—Single Point Ground	F01—30 Amp	J2-L4—[5022B Red] Battery Positive
D—Female Socket	B1—24 Volt	F02—20 Amp	J2-M1—[5022C Red] Battery Positive
E—120 Resister	C02—Accessory Connector A	J02—ECU Harness Connector (Red Face)	J2-M2—[5050C Black] Battery Negative
F—See Diagram (6)	C07—Accessory Connector B	J2-A1—[5904A Yellow] CAN High	J2-M4—[5022D Red] Battery Positive
G—Twisted Pair	C09—Control Panel Connector	J2-B1—[5905A Dark Green] CAN Low	VBatt—Battery Positive
H—Shield	C10—CAN Terminator	J2-B2—[5012A Red] Ignition Key Start/Run Switch	
I—See Diagram (5,6)	C11—Diagnostic Connector	J2-K2—[5020A Black] CAN Shield	
J—Fuel Heater (If Equipped)	C12—Transient Voltage Protection (TVP)	J2-L1—[5022A Red] Battery Positive	
K—Chassis Ground	C13—Starter Relay Coil Return		
L—Fuse (10 Amp)	C14—Starter Relay Coil Control		
M—Fuel Heater Relay (If Equipped)			
N—Solenoid B+			

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4.5L 24V ECU Wiring Diagram 5



4.5 Liter 24 Volt ECU Wiring Diagram 5 (PT+)

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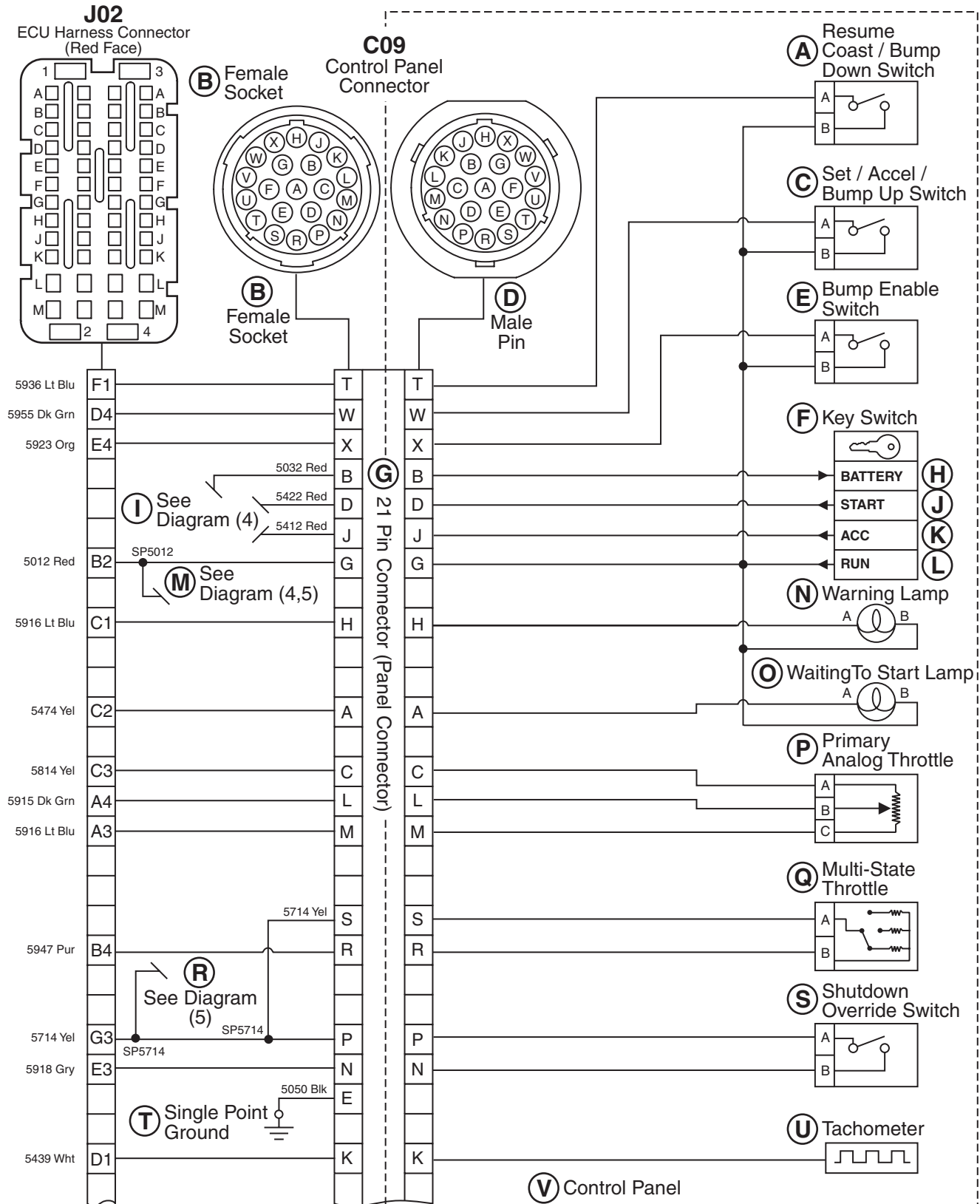
Diagnostic Specifications

A—Loss of Coolant Switch	M—See Diagram (4,6)	J2-D3—[5436 Light Blue] Air Filter Restriction Switch	J2-G4—[5948 Gray] Low Coolant Level Switch
B—Female Socket	N—Cruise Brake Switch	J2-E1—[5943 Orange] Cruise Brake Switch	J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
C—Air Filter Restriction Switch	O—Secondary Analog Throttle	J2-F2—[5954 Yellow] Cruise On/Off Switch	J2-J1—[5939 White] External Derate Switch
D—External Shutdown Switch	P—Single Point Ground	J2-F3—[5913 Orange] Secondary Analog Throttle Signal	J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
E—Male Pin	Q—Drop/Isoc (Isochronous) Governor Switch	J2-G2—[5911 Brown] 5 Volt Power Supply #4 Positive	J2-K1—[5941 Brown] External Shutdown Switch
F—External Derate Switch	C08—(Auxiliary Connector J02—ECU Harness Connector (Red Face)	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return	
G—Cruise Cancel/Resume Switch	J2-B2—[5012A Red] Ignition Key Start/Run Switch		
H—See Diagram (6)	J2-B3—[5917 Purple] Remote Cruise On/Off Switch		
I—Cruise On Switch	J2-D2—[5473 Orange] Stop Engine Lamp Return		
J—23 Pin Connector (Auxiliary Connector)			
K—Remote Cruise Switch			
L—Stop Engine Lamp			

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4.5L 24V ECU Wiring Diagram 6



4.5 Liter 24 Volt ECU Wiring Diagram 6 (PT+)

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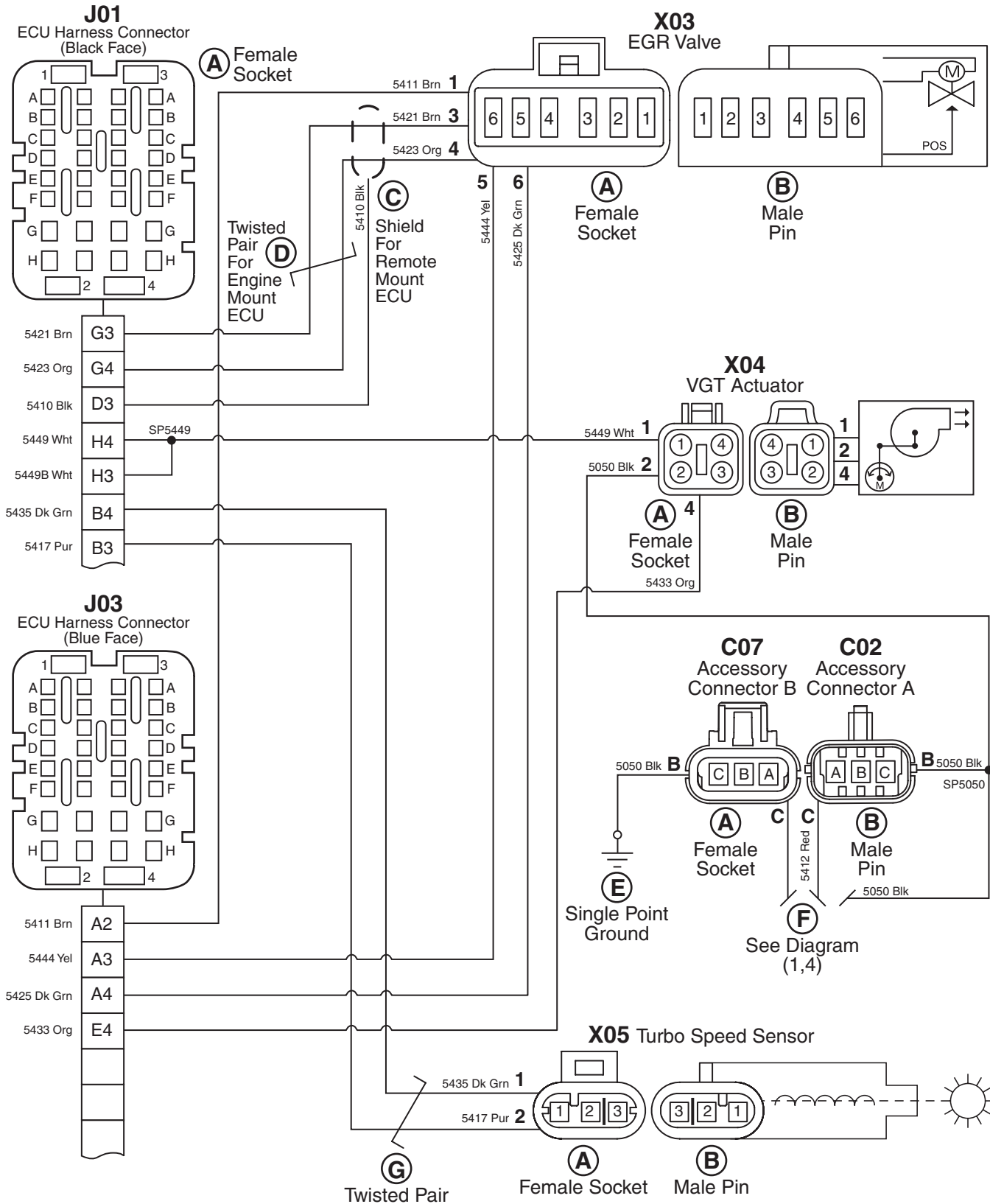
Diagnostic Specifications

A—Resume Coast/Bump Down Switch	O—Wait to Start Lamp	J2-B2—[5012A Red] Ignition Key Start/Run Switch	J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
B—Female Socket	P—Primary Analog Throttle	J2-B4—[5947 Purple] Multistate Throttle Signal	J2-E3—[5913 Orange] Secondary Analog Throttle Signal
C—Set Accel/Bump Up Switch	Q—Multi-State Throttle	J2-C1—[5916 Light Blue] Warning Lamp Drive Return	J2-E4—[5923 Orange] Bump Enable Switch
D—Male Pin	R—See Diagram (5)	J2-C2—[5474 Yellow] Wait To Start Lamp Drive Return	J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
E—Bump Enable Switch	S—Shutdown Override Switch	J2-C3—[5814 Yellow] 5 Volt Power Supply #3 Return	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return
F—Key Switch	T—Single Point Ground	J2-D1—[5439 White] Tachometer Pulse Output	
G—21 Pin Connector (Panel Connector)	U—Tachometer		
H—Battery	V—Control Panel		
I—See Diagram (4)	C09—Control Panel Connector		
J—Start	J02—ECU Harness Connector (Red Face)		
K—Accessory	J2-A3—[5616 Light Blue] 5 Volt Power Supply #3 Positive		
L—Run	J2-A4—[5915 Dark Green] Primary Analog Throttle Signal		
M—See Diagram (4,5)			
N—Warning Lamp			

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4.5L 24V ECU Wiring Diagram 7



4.5 Liter 24 Volt ECU Wiring Diagram 7 (PT+)

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Diagnostic Specifications

A—Female Socket	J1-B3—[5417 Purple] Turbo Speed Return	J1-H4—[5449A White] VGT Actuator Power #2 Positive	J3-A4—[5425 Dark Green] EGR Valve Position Signal
B—Male Pin	J1-B4—[5435 Dark Green] Turbo Speed Pulse	J03—ECU Harness Connector (Blue Face)	J3-E4—[5433 Orange] VGT Actuator Communications Signal
C—Shield For Remote Mount ECU	J1-D3—[5410A Black] Wiring Shield	J3-A2—[5511 Brown] 5 Volt Power Supply #5 Positive	X03—EGR Valve
D—Twisted Pair For Engine Mount ECU	J1-G3—[5421 Brown] EGR Valve PWM Drive #1	J3-A3—[5444 Yellow] 5 Volt Power Supply #5 Negative	X04—VGT Actuator
E—Single Point Ground	J1-G4—[5423 Orange] EGR Valve PWM Drive #2		X05—Turbo Speed Sensor
F—See Diagram (1,4)	J1-H3—[5449B White] VGT Actuator Power #1 Positive		
G—Twisted Pair			
C02—Accessory Connector A			
C07—Accessory Connector B			
J01—ECU Harness Connector (Black Face)			

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The image contains two detailed wiring diagrams for the fuel system of a 2000-2001 Honda Civic. Both diagrams show the connection between the ECU harness connector (J02) and the fuel system components.

Top Diagram: Key Switch Run

- ECU Harness Connector (Red Face):** Shows pins 1, 2, 3, 4, A, B, C, D, E, F, G, H, J, K, L, M.
- Low Pressure Fuel Pump Connector (If Equipped):** C30, with pins 1 (5092 Red) and 2 (5050 Blk).
- Fuel Pump Socket (C) and Male Pin (D):** Connected to the C30 connector.
- Fuel System Key Switch (A):** (Type 2) Connected to the Male Pin (D) and a single point ground (E).
- Key Switch Run:** Connected to the 5092 Red wire (pin 1 of C30) and a single point ground (E).
- Voltage Reducer (C31):** (If Equipped) Connected to the 5060 Blk wire (pin A of C30) and the 5050 Blk wire (pin B of C30).

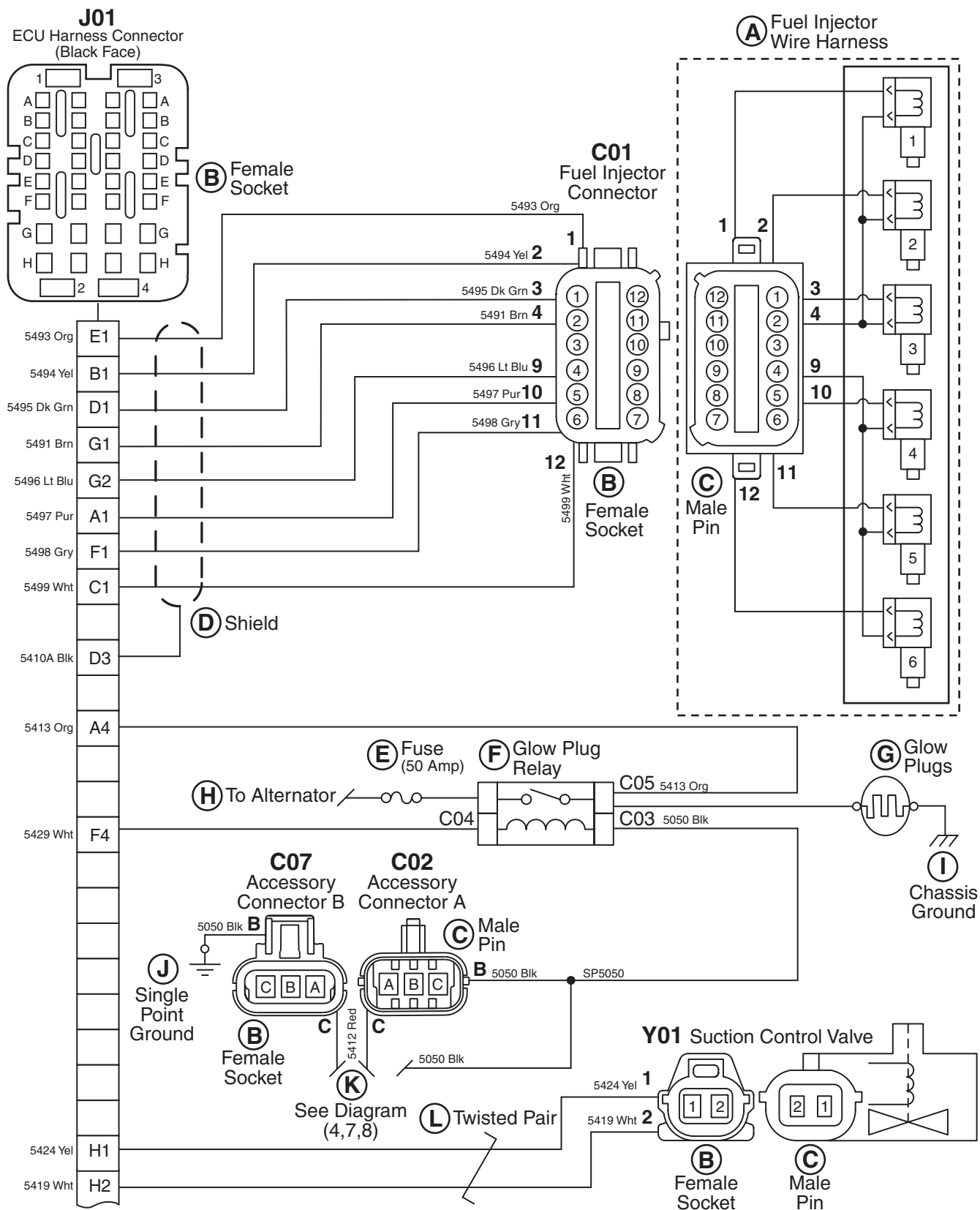
Bottom Diagram: Fuel System Relay Switch

- ECU Harness Connector (Red Face):** Shows pins 1, 2, 3, 4, A, B, C, D, E, F, G, H, J, K, L, M.
- Low Pressure Fuel Pump Connector (If Equipped):** C30, with pins 1 (5092 Red) and 2 (5050 Blk).
- Fuel Pump Socket (C) and Male Pin (D):** Connected to the C30 connector.
- Fuel System Relay Switch (F):** (Type 2) Connected to the Male Pin (D) and a single point ground (E).
- Low Pressure Fuel Pump Relay (If Equipped):** Connected to the 5092 Red wire (pin 1 of C30) and the 5050 Blk wire (pin 2 of C30).
- Voltage Reducer (C31):** (If Equipped) Connected to the 5060 Blk wire (pin A of C30) and the 5050 Blk wire (pin B of C30).
- Single Point Ground (E):** Connected to the Male Pin (D) and the relay coil.

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A—(Type 2 Fuel System, Key Switch)	F—(Type 2 Fuel System, Relay Switch)	C31—Voltage Reducer (If Equipped)	J2-M3—Low Pressure Fuel Pump Relay Control
B—Key Switch Run	G—Low Pressure Fuel Pump Relay (If Equipped)	C32—Low Pressure Fuel Pump (If Equipped)	VBatt—Battery Positive
C—Female Socket	C30—Low Pressure Fuel Pump Connector (If Equipped)	J02—ECU Harness Connector (Red Face)	
D—Male Pin			
E—Single Point Ground			

6.8L 12V ECU Wiring Diagram 1



6.8 Liter 12 Volt ECU Wiring Diagram 1 (PT+)

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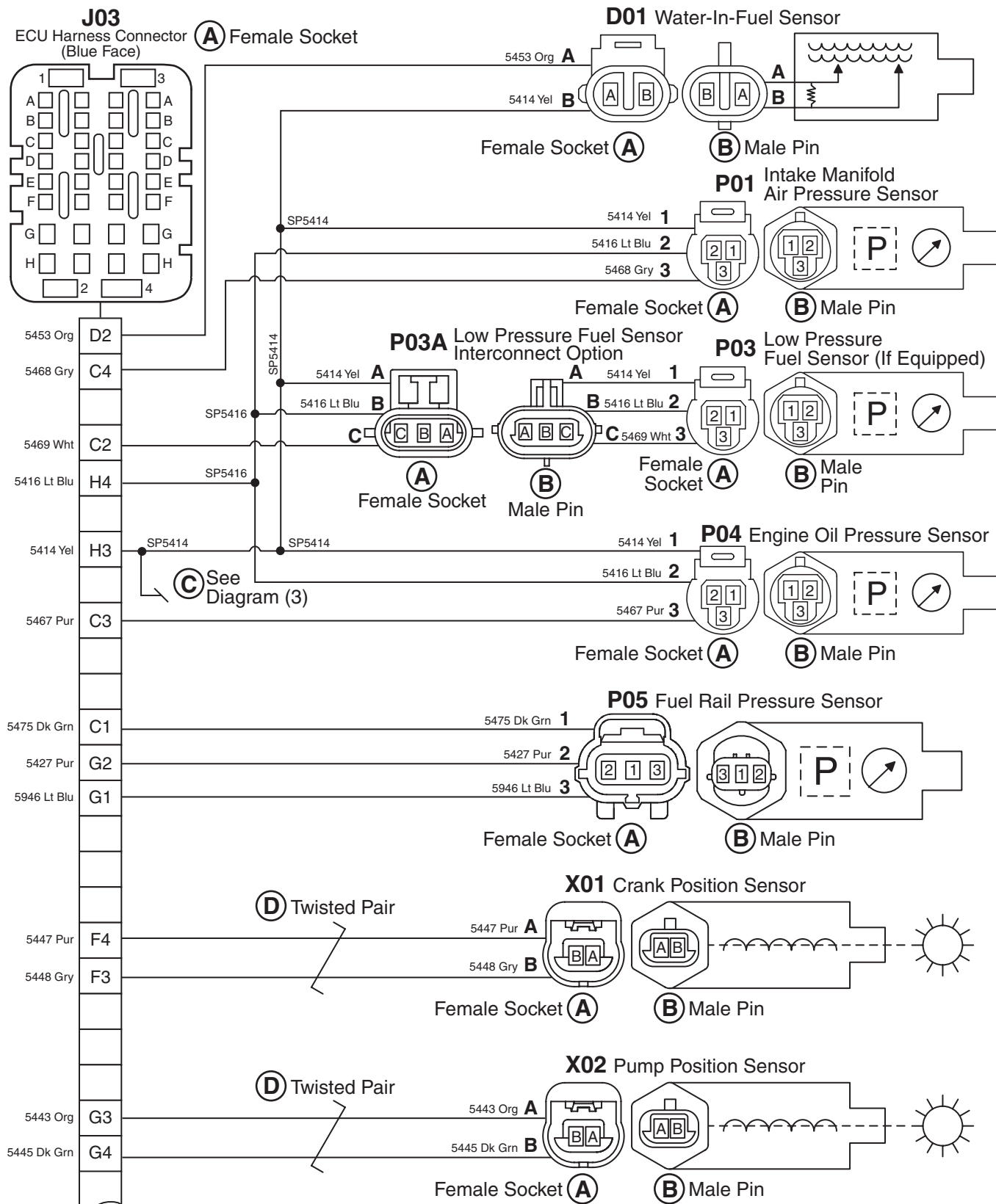
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Diagnostic Specifications

A—Fuel Injector Wire Harness	C01—Fuel Injector Connector	J1-D1—[5495 Dark Green] Injector #3 Inject Pulse	J1-G2—[5496 Light Blue] Injector #4 & #5 & #6 Power
B—Female Socket	C02 —Accessory Connector A	J1-D3—[5410A Black] Wiring Shield	J1-H1—[5424 Yellow] HP Pump Suction Control Valve High Drive
C—Male Pin	C07—Accessory Connector B	J1-E1—[5493 Orange] Injector #1 Inject Pulse	J1-H2—[5419 White] HP Pump Suction Control Valve Low Drive
D—Shield	J01—ECU Harness Connector (Black Face)	J1-F1—[5498 Gray] Injector #5 Inject Pulse	Y01—Suction Control Valve
E—Fuse (50 Amp)	J1-A1—[5497 Purple] Injector #4 Inject Pulse	J1-F4—[5429 White] Glow Plug Relay Control	
F—Glow Plug Relay	J1-A4—[5413 Orange] Glow Plug Relay Signal	J1-G1—[5491 Brown] Injector #1 & #2 & #3 Power	
G—Glow Plugs	J1-B1—[5494 Yellow] Injector #2 Inject Pulse		
H—To Alternator	J1-C1—[5499 White] Injector #6 Inject Pulse		
I—Chassis Ground			
J—Single Point Ground			
K—See Diagram (4,7,8)			
L—Twisted Pair			

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6.8L 12V ECU Wiring Diagram 2



6.8 Liter 12 Volt ECU Wiring Diagram 2 (PT+)

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Diagnostic Specifications

A—Female Socket	J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal	J3-G3—[5443 Orange] Pump Position Return	P03—Low Pressure Fuel Sensor (If Equipped)
B—Male Pin		J3-G4—[5445 Dark Green] Pump Position Pulse	P03A—Low Pressure Fuel Sensor Interconnect Option
C—See Diagram (3)	J3-D2—[5453 Orange] Water In Fuel Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	P04—Engine Oil Pressure Sensor
D—Twisted Pair	J3-F3—[5448 Gray] Crank Position Return	J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive	P05—Fuel Rail Pressure Sensor
D01—Water In Fuel Sensor	J3-F4—[5447 Purple] Pump Position Pulse	P01—Intake Manifold Air Pressure Sensor	X01—Crank Position Sensor
J03—ECU Harness Connector (Blue Face)	J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive		X02—Pump Position Sensor
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal	J3-G2—[5427 Purple] 5 Volt Power Supply #1 Return		
J3-C2—[5469 White] Low Pressure Fuel Signal			
J3-C3—[5467 Purple] Engine Oil Pressure Signal			

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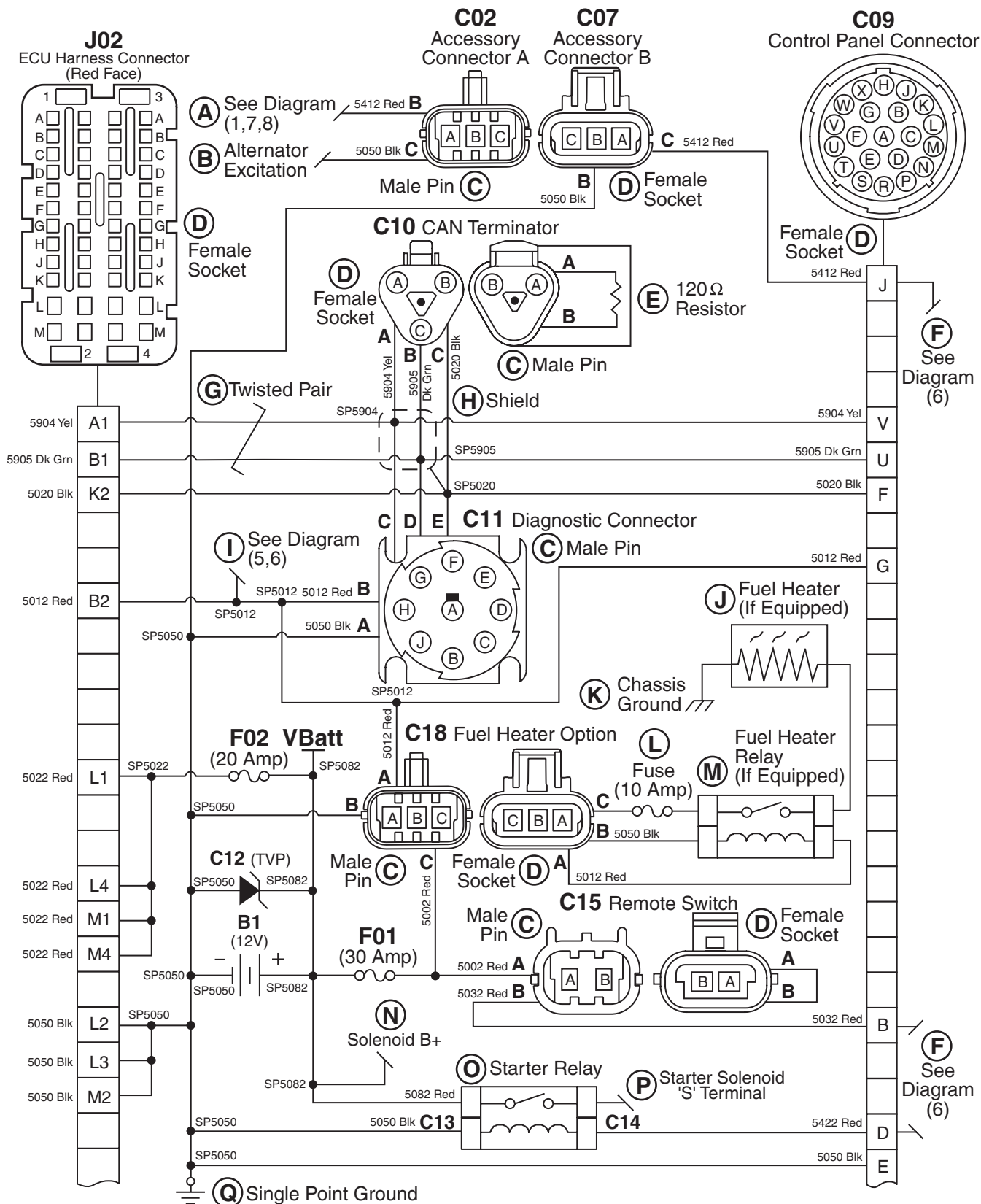


Diagnostic Specifications

A—Female Socket	J3-D1—[5516 Light Blue] Compressor Inlet Temperature Signal	J3-F2—[5455 Dark Green] Charged Air Cooler Outlet Temperature Signal	T03—EGR Temperature Sensor
B—Male Pin	J3-D3—[5461 Brown] Coolant Temperature Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	T04—Coolant Temperature Sensor
C—See Diagram (2)	J3-E2—[5463 Orange] EGR Temperature Signal	T01—Charge Air Cooler Outlet Temperature Sensor	T05—Fuel Temperature Sensor
C23—VGT Interconnect (If Equipped)	J3-F1—[5456 Light Blue] Intake Manifold Air Temperature Signal	T02—Intake Manifold Air Temperature Sensor	T06—Compressor Inlet Temperature Sensor
J03—ECU Harness Connector (Blue Face)			
J3-B1—[5428 Gray] Fuel Temperature Signal			
J3-B2—[5474A Yellow] Precision Sensor Return			

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6.8L 12V ECU Wiring Diagram 4

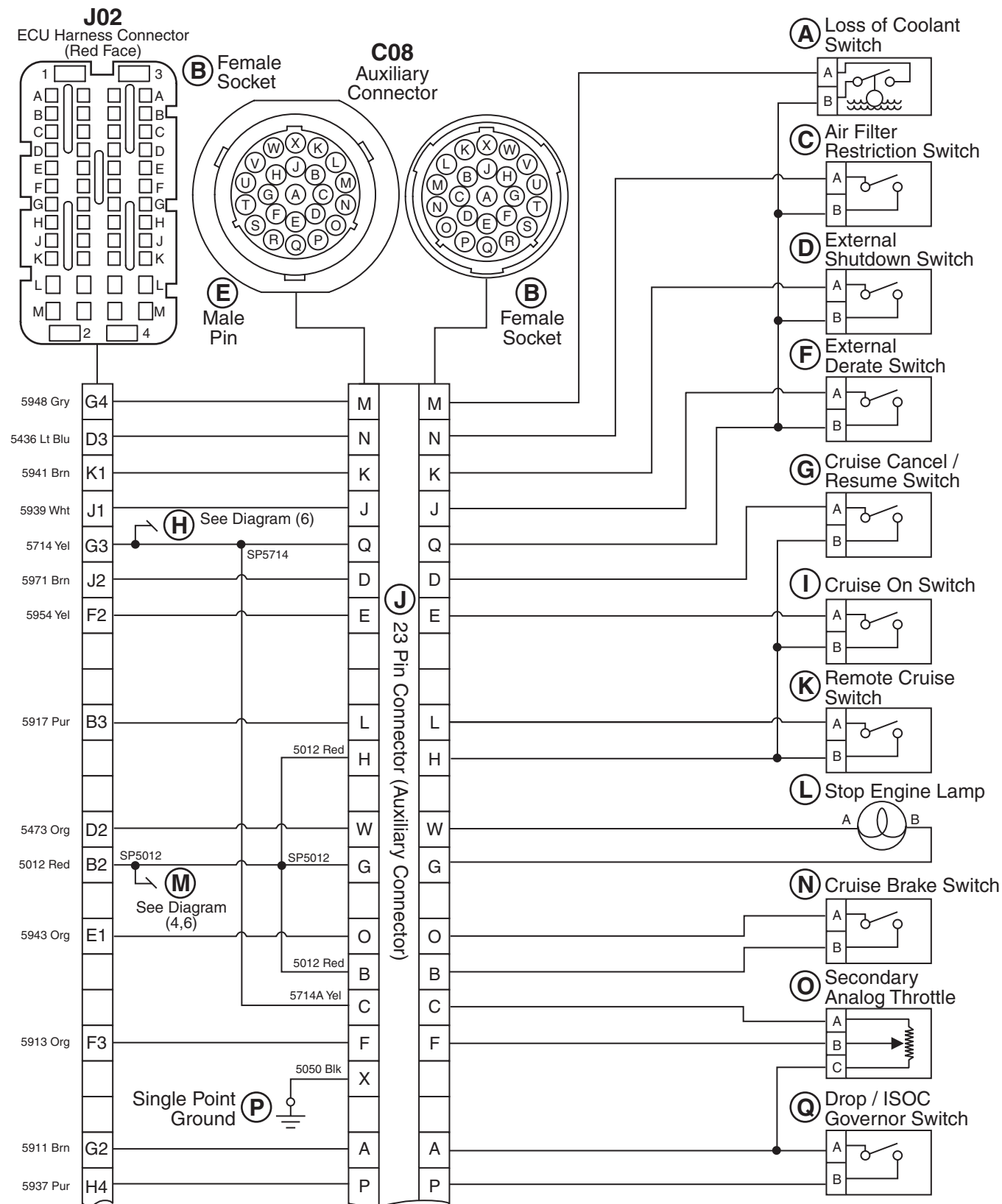


Diagnostic Specifications

A—See Diagram (1,7,8)	O—Starter Relay	C15—Remote Switch	J2-L2—[5050A Black] Battery Negative
B—Alternator Excitation	P—Starter Solenoid 'S' Terminal	C18—Fuel Heater Option	J2-L3—[5050B Black] Battery Negative
C—Male Pin	Q—Single Point Ground	F01—30 Amp	J2-L4—[5022B Red] Battery Positive
D—Female Socket	B1—12 Volt	F02—20 Amp	J2-M1—[5022C Red] Battery Positive
E—120 Resister	C02—Accessory Connector A	J02—ECU Harness Connector (Red Face)	J2-M2—[5050C Black] Battery Negative
F—See Diagram (6)	C07—Accessory Connector B	J2-A1—[5904A Yellow] CAN High	J2-M4—[5022D Red] Battery Positive
G—Twisted Pair	C09—Control Panel Connector	J2-B1—[5905A Dark Green] CAN Low	VBatt—Battery Positive
H—Shield	C10—CAN Terminator	J2-B2—[5012A Red] Ignition Key Start/Run Switch	
I—See Diagram (5,6)	C11—Diagnostic Connector	J2-K2—[5020A Black] CAN Shield	
J—Fuel Heater (If Equipped)	C12—Transient Voltage Protection (TVP)	J2-L1—[5022A Red] Battery Positive	
K—Chassis Ground	C13—Starter Relay Coil Return		
L—Fuse (10 Amp)	C14—Starter Relay Coil Control		
M—Fuel Heater Relay (Optional)			
N—Solenoid B+			

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6.8L 12V ECU Wiring Diagram 5



6.8 Liter 12 Volt ECU Wiring Diagram 5 (PT+)

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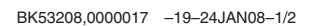
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Diagnostic Specifications

A—Loss of Coolant Switch	M—See Diagram (4,6)	J2-D3—[5436 Light Blue] Air Filter Restriction Switch	J2-G4—[5948 Gray] Low Coolant Level Switch
B—Female Socket	N—Cruise Brake Switch	J2-E1—[5943 Orange] Cruise Brake Switch	J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
C—Air Filter Restriction Switch	O—Secondary Analog Throttle	J2-F2—[5954 Yellow] Cruise On/Off Switch	J2-J1—[5939 White] External Derate Switch
D—External Shutdown Switch	P—Single Point Ground	J2-F3—[5913 Orange] Secondary Analog Throttle Signal	J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
E—Male Pin	Q—Drop/Isoc (Isochronous) Governor Switch	J2-G2—[5911 Brown] 5 Volt Power Supply #4 Positive	J2-K1—[5941 Brown] External Shutdown Switch
F—External Derate Switch	C08—Auxiliary Connector	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return	
G—Cruise Cancel/Resume Switch	J02—ECU Harness Connector (Red Face)		
H—See Diagram (6)	J2-B2—[5012A Red] Ignition Key Start/Run Switch		
I—Cruise On Switch	J2-B3—[5917 Purple] Remote Cruise On/Off Switch		
J—23 Pin Connector (Auxiliary Connector)	J2-D2—[5473 Orange] Stop Engine Lamp Return		
K—Remote Cruise Switch			
L—Stop Engine Lamp			

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Diagnostic Specifications

A—Resume Coast/Bump Down Switch	P—Primary Analog Throttle	J2-B2—[5012A Red] Ignition Key Start/Run Switch	J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
B—Female Socket	Q—Multi-State Throttle	J2-B4—[5947 Purple] Multistate Throttle Signal	J2-E3—[5913 Orange] Secondary Analog Throttle Signal
C—Set Accel/Bump Up Switch	R—See Diagram (5)	J2-C1—[5916 Light Blue] Warning Lamp Drive Return	J2-E4—[5923 Orange] Bump Enable Switch
D—Male Pin	S—Shutdown Override Switch	J2-C2—[5474 Yellow] Wait To Start Lamp Drive Return	J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
E—Bump Enable Switch	T—Single Point Ground	J2-C3—[5814 Yellow] 5 Volt Power Supply #3 Return	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return
F—Key Switch	U—Tachometer	J2-D1—[5439 White] Tachometer Pulse Output	
G—21 Pin Connector (Panel Connector)	V—Control Panel		
H—Battery	C09—Control Panel Connector		
I—See Diagram (4)	J02—ECU Harness Connector (Red Face)		
J—Start	J2-A3—[5616 Light Blue] 5 Volt Power Supply #3 Positive		
K—Accessory	J2-A4—[5915 Dark Green] Primary Analog Throttle Signal		
L—Run			
M—See Diagram (4,5)			
N—Warning Lamp			
O—Wait to Start Lamp			

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CTM320 (22FEB08)



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4.5 L and 6.8 L Level 14 Electronic Fuel System

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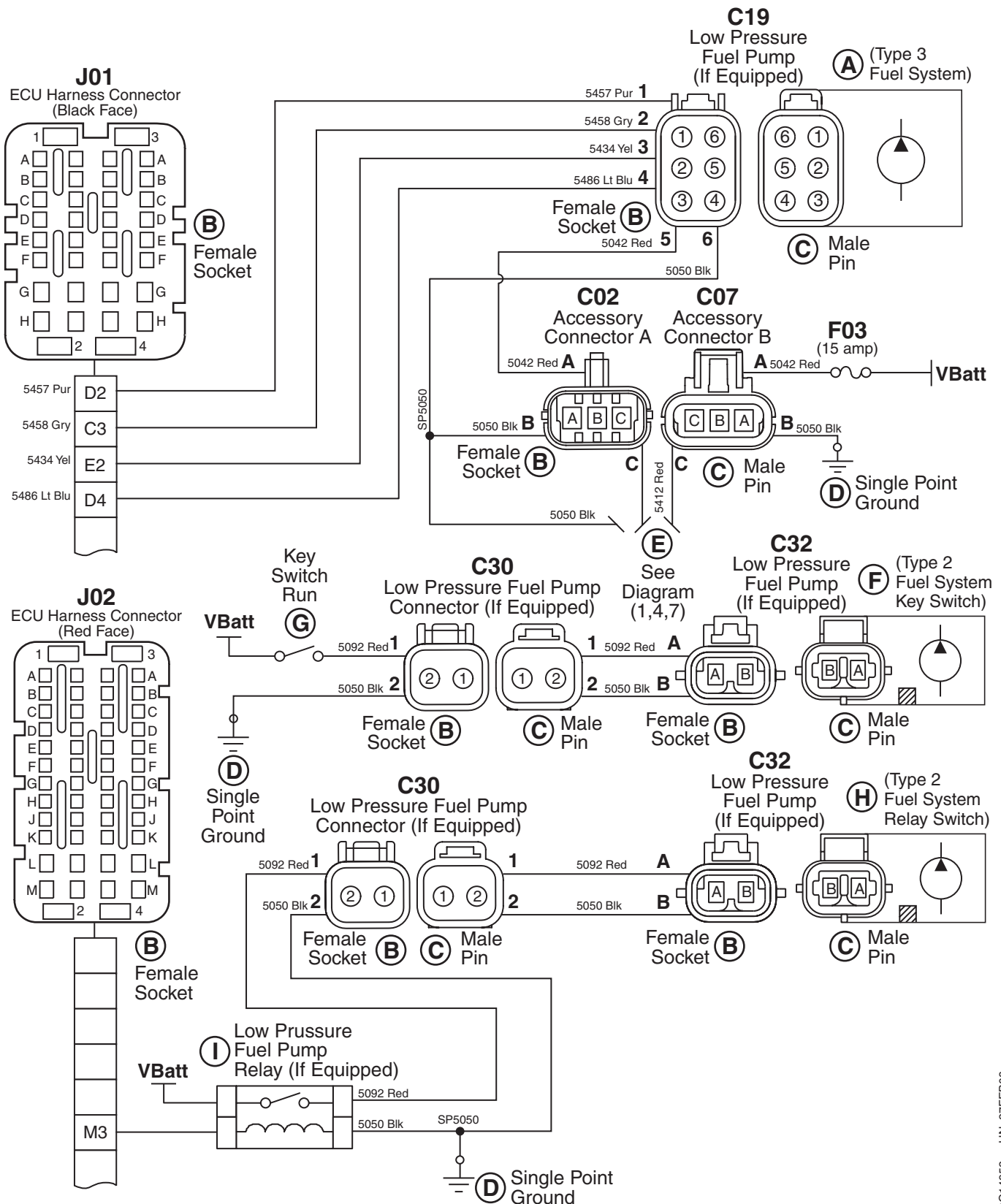
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Diagnostic Specifications

A—Female Socket	J1-B4—[5435 Dark Green] Turbo Speed Pulse	J03—ECU Harness Connector (Blue Face)	J3-E4—[5433 Orange] VGT Actuator Communications Signal
B—Male Pin	J1-G3—[5421 Brown] EGR Valve PWM Drive #1	J3-A2—[5511 Brown] 5 Volt Power Supply #5 Positive	X03—EGR Valve
C—Twisted Pair	J1-G4—[5423 Orange] EGR Valve PWM Drive #2	J3-A3—[5444 Yellow] 5 Volt Power Supply #5 Return	X04—VGT Actuator
D—Single Point Ground	J1-H3—[5449B White] VGT Actuator Power #1 Positive	J3-A4—[5425 Dark Green] EGR Valve Position Signal	X05—Turbo Speed Sensor
E—See Diagram (1,4,8)	J1-H4—[5449A White] VGT Actuator Power #2 Positive		
C02—Accessory Connector A			
C07—Accessory Connector B			
C23—VGT Interconnect			
J01—ECU Harness Connector (Black Face)			
J1-B3—[5417 Purple] Turbo Speed Return			

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6.8L 12V ECU Wiring Diagram 8



6.8 Liter 12 Volt ECU Wiring Diagram 8 (PT+)

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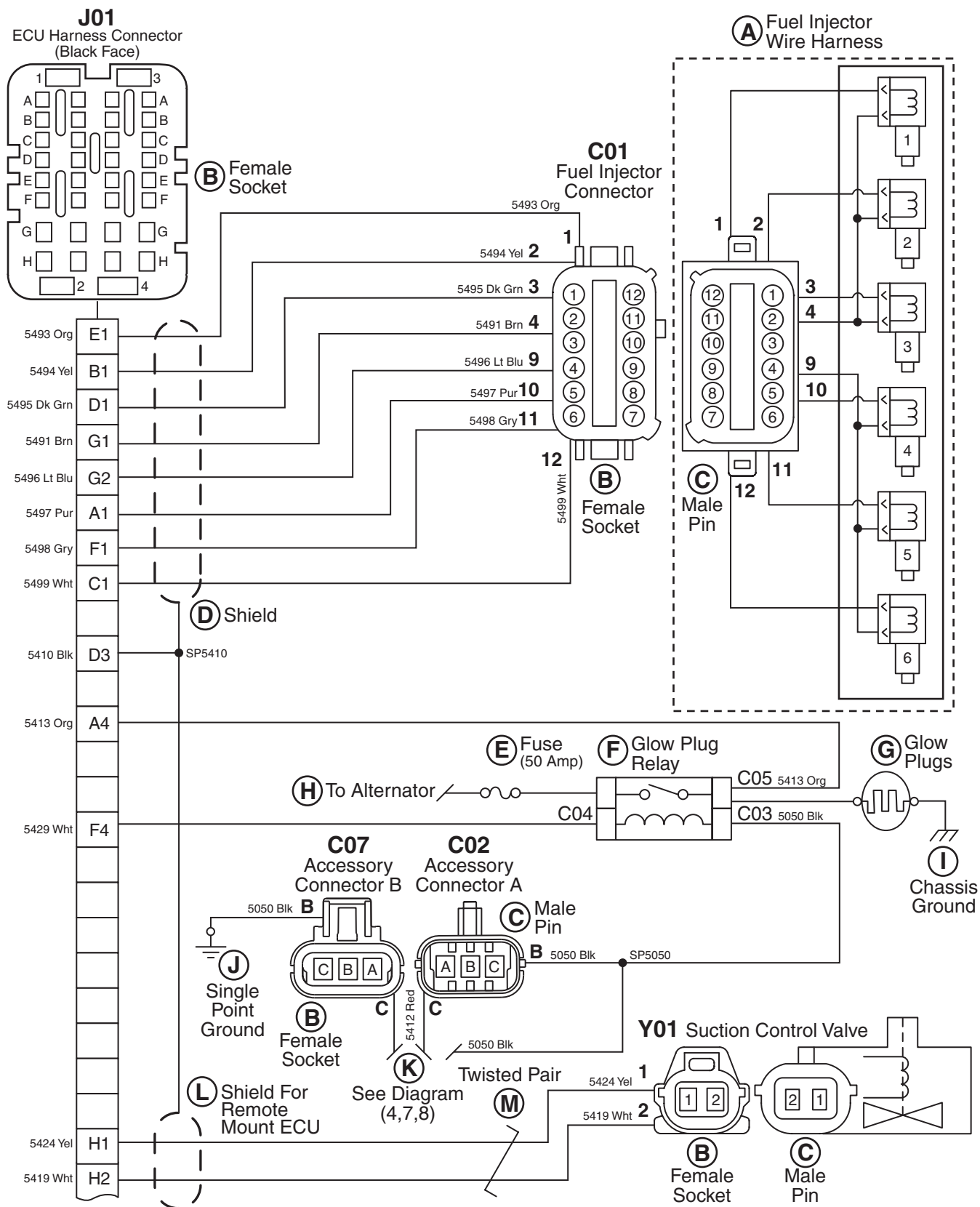
BK53208.0000019 -19-11FEB08-1/2

Diagnostic Specifications

A—(Type 3 Fuel System)	I—Low Pressure Fuel Pump Relay (If Equipped)	F03—15 Amp	J1-E2—[5434 Yellow] Low Pressure Fuel Pump Status
B—Female Socket	C02—Accessory Connector A	J01—ECU Harness Connector (Black Face)	J02—ECU Harness Connector (Red Face)
C—Male Pin	C07—Accessory Connector B	J1-C3—[5458 Gray] Low Pressure Fuel Pump Current Feedback	J2-M3—Low Pressure Fuel Pump Relay Drive
D—Single Point Ground	C19—Low Pressure Fuel Pump (If Equipped)	J1-D2—[5457 Purple] Low Pressure Fuel Pump Speed Command	VBatt—Battery Positive
E—See Diagram (1,4,7)	C30—Low Pressure Fuel Pump Connector (If Equipped)	J1-D4—[5486 Light Blue] Low Pressure Fuel Pump On Command	
F—(Type 2 Fuel System, Key Switch)	C32—Low Pressure Fuel Pump (If Equipped)		
G—Key Switch Run			
H—(Type 2 Fuel System, Relay Switch)			

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6.8L 24V ECU Wiring Diagram 1



6.8 Liter 24 Volt ECU Wiring Diagram 1 (PT+)

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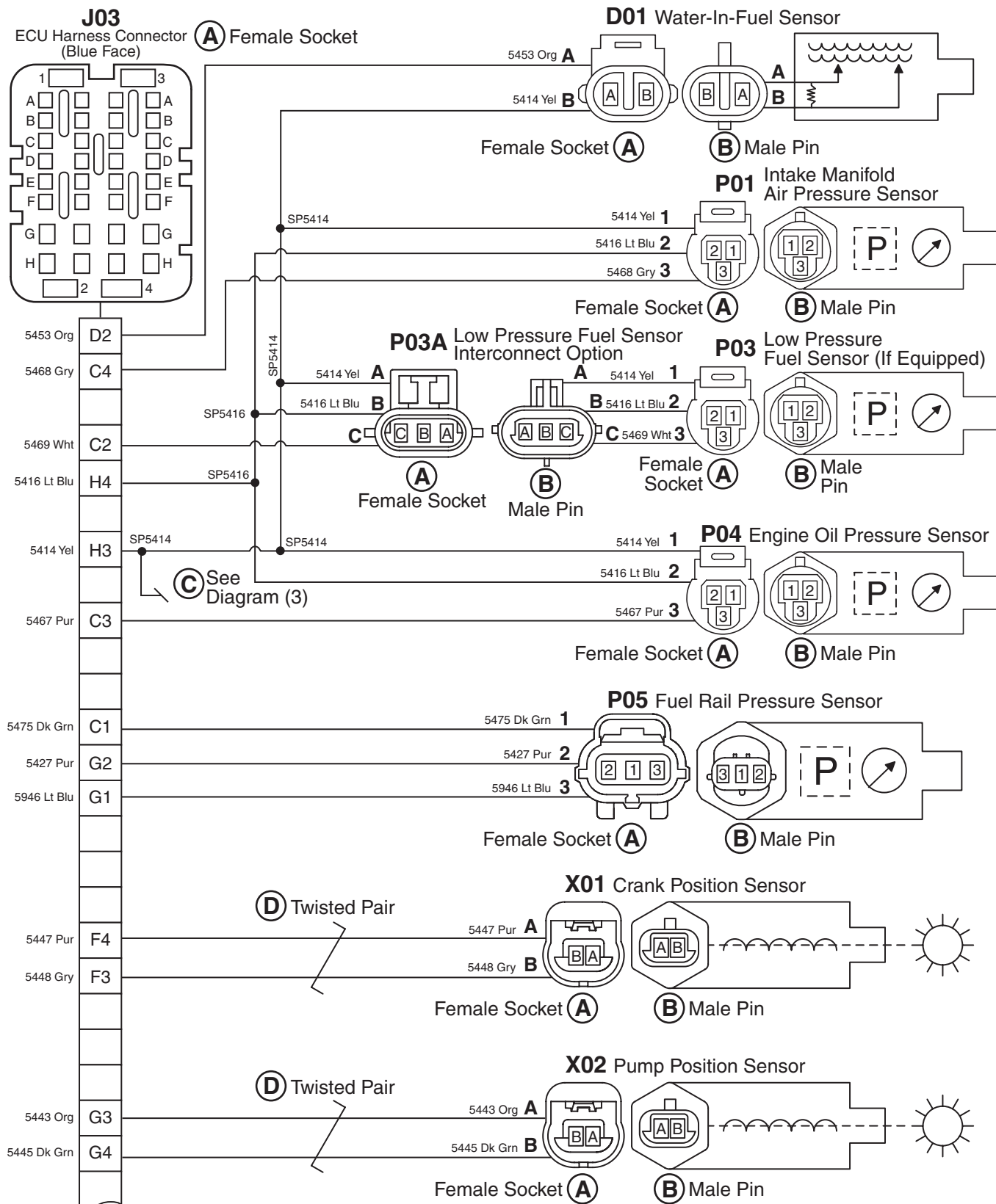
BK53208,000001A -19-26JAN08-1/2

Diagnostic Specifications

A—Fuel Injector Wire Harness	M—Twisted Pair	J1-C1—[5499 White] Injector	J1-G1—[5491 Brown] Injector
B—Female Socket	C01—Fuel Injector Connector	#6 Inject Pulse	#1 & #2 & #3 Power
C—Male Pin	C02 —Accessory Connector A	J1-D1—[5495 Dark Green]	J1-G2—[5496 Light Blue]
D—Shield	C07—Accessory Connector B	Injector #3 Inject Pulse	Injector #4 & #5 & #6
E—Fuse (50 Amp)	J01—ECU Harness Connector	J1-D3—[5410A Black] Wiring	Power
F—Glow Plug Relay	(Black Face)	Shield	J1-H1—[5424 Yellow] HP Pump
G—Glow Plugs	J1-A1—[5497 Purple] Injector	J1-E1—[5493 Orange] Injector	Suction Control Valve
H—To Alternator	#4 Inject Pulse	#1 Inject Pulse	High Drive
I—Chassis Ground	J1-A4—[5413 Orange] Glow	J1-F1—[5498 Gray] Injector #5	J1-H2—[5419 White] HP Pump
J—Single Point Ground	Plug Signal	Inject Pulse	Suction Control Valve
K—See Diagram (4,7,8)	J1-B1—[5494 Yellow] Injector	J1-F4—[5429 White] Glow Plug	Low Drive
L—Shield For Remote Mount	#2 Inject Pulse	Relay Control	Y01—Suction Control Valve
ECU			

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6.8L 24V ECU Wiring Diagram 2

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6.8 Liter 24 Volt ECU Wiring Diagram 2 (PT+)

Continued on next page

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Diagnostic Specifications

A—Female Socket	J3-C4—[5468 Gray] Intake Manifold Air Pressure Signal	J3-G3—[5443 Orange] Pump Position Return	P03—Low Pressure Fuel Sensor (If Equipped)
B—Male Pin		J3-G4—[5445 Dark Green] Pump Position Pulse	P03A—Low Pressure Fuel Sensor Interconnect Option
C—See Diagram (3)	J3-D2—[5453 Orange] Water In Fuel Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	P04—Engine Oil Pressure Sensor
D—Twisted Pair	J3-F3—[5448 Gray] Crank Position Return	J3-H4—[5416A Light Blue] 5 Volt Power Supply #2 Positive	P05—Fuel Rail Pressure Sensor
D01—Water In Fuel Sensor	J3-F4—[5447 Purple] Crank Position Pulse	P01—Intake Manifold Air Pressure Sensor	X01—Crank Position Sensor
J03—ECU Harness Connector (Blue Face)	J3-G1—[5946 Light Blue] 5 Volt Power Supply #1 Positive		X02—Pump Position Sensor
J3-C1—[5475 Dark Green] Fuel Rail Pressure Signal	J3-G2—[5427 Purple] 5 Volt Power Supply #1 Return		
J3-C2—[5469 White] Low Pressure Fuel Signal			
J3-C3—[5467 Purple] Engine Oil Pressure Signal			

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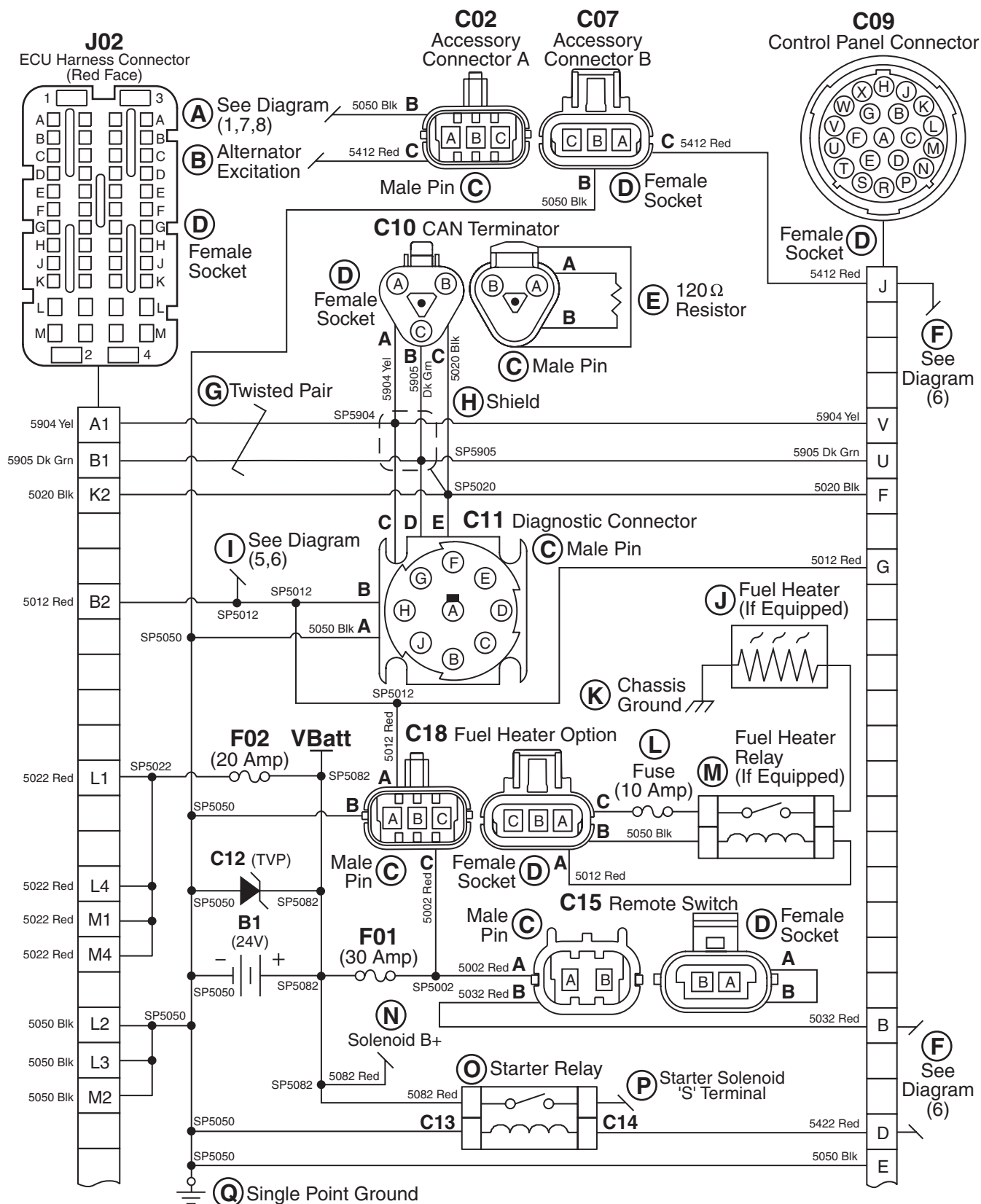


Diagnostic Specifications

A—Female Socket	J3-D1—[5516 Light Blue] Compressor Inlet Temperature Signal	J3-F2—[5455 Dark Green] Charge Air Cooler Outlet Temperature Signal	T03—EGR Temperature Sensor
B—Male Pin	J3-D3—[5461 Brown] Coolant Temperature Signal	J3-H3—[5414A Yellow] 5 Volt Power Supply #2 Return	T04—Coolant Temperature Sensor
C—See Diagram (2)	J3-E2—[5463 Orange] EGR Temperature Signal	T01—Charge Air Cooler Outlet Temperature Sensor	T05—Fuel Temperature Sensor
C23—VGT Interconnect (If Equipped)	J3-F1—[5456 Light Blue] Intake Manifold Air Temperature Signal	T02—Intake Manifold Air Temperature Sensor	T06—Compressor Inlet Temperature Sensor
J03—ECU Harness Connector (Blue Face)			
J3-B1—[5428 Gray] Fuel Temperature Signal			
J3-B2—[5474A Yellow] Precision Sensor Return			

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6.8L 24V ECU Wiring Diagram 4



Diagnostic Specifications

A—See Diagram (1,7,8)	O—Starter Relay	C15—Remote Switch	J2-L2—[5050A Black] Battery Negative
B—Alternator Excitation	P—Starter Solenoid 'S' Terminal	C18—Fuel Heater Option	J2-L3—[5050B Black] Battery Negative
C—Male Pin	Q—Single Point Ground	F01—30 Amp	J2-L4—[5022B Red] Battery Positive
D—Female Socket	B1—24 Volt	F02—20 Amp	J2-M1—[5022C Red] Battery Positive
E—120 Resister	C02—Accessory Connector A	J02—ECU Harness Connector (Red Face)	J2-M2—[5050C Black] Battery Negative
F—See Diagram (6)	C07—Accessory Connector B	J2-A1—[5904A Yellow] CAN High	J2-M4—[5022D Red] Battery Positive
G—Twisted Pair	C09—Control Panel Connector	J2-B1—[5905A Dark Green] CAN Low	VBatt—Battery Positive
H—Shield	C10—CAN Terminator	J2-B2—[5012A Red] Ignition Key Start/Run Switch	
I—See Diagram (5,6)	C11—Diagnostic Connector	J2-K2—[5020A Black] CAN Shield	
J—Fuel Heater (If Equipped)	C12—Transient Voltage Protection (TVP)	J2-L1—[5022A Red] Battery Positive	
K—Chassis Ground	C13—Starter Relay Coil Return		
L—Fuse (10 Amp)	C14—Starter Relay Coil Control		
M—Fuel Heater Relay (If Equipped)			
N—Solenoid B+			

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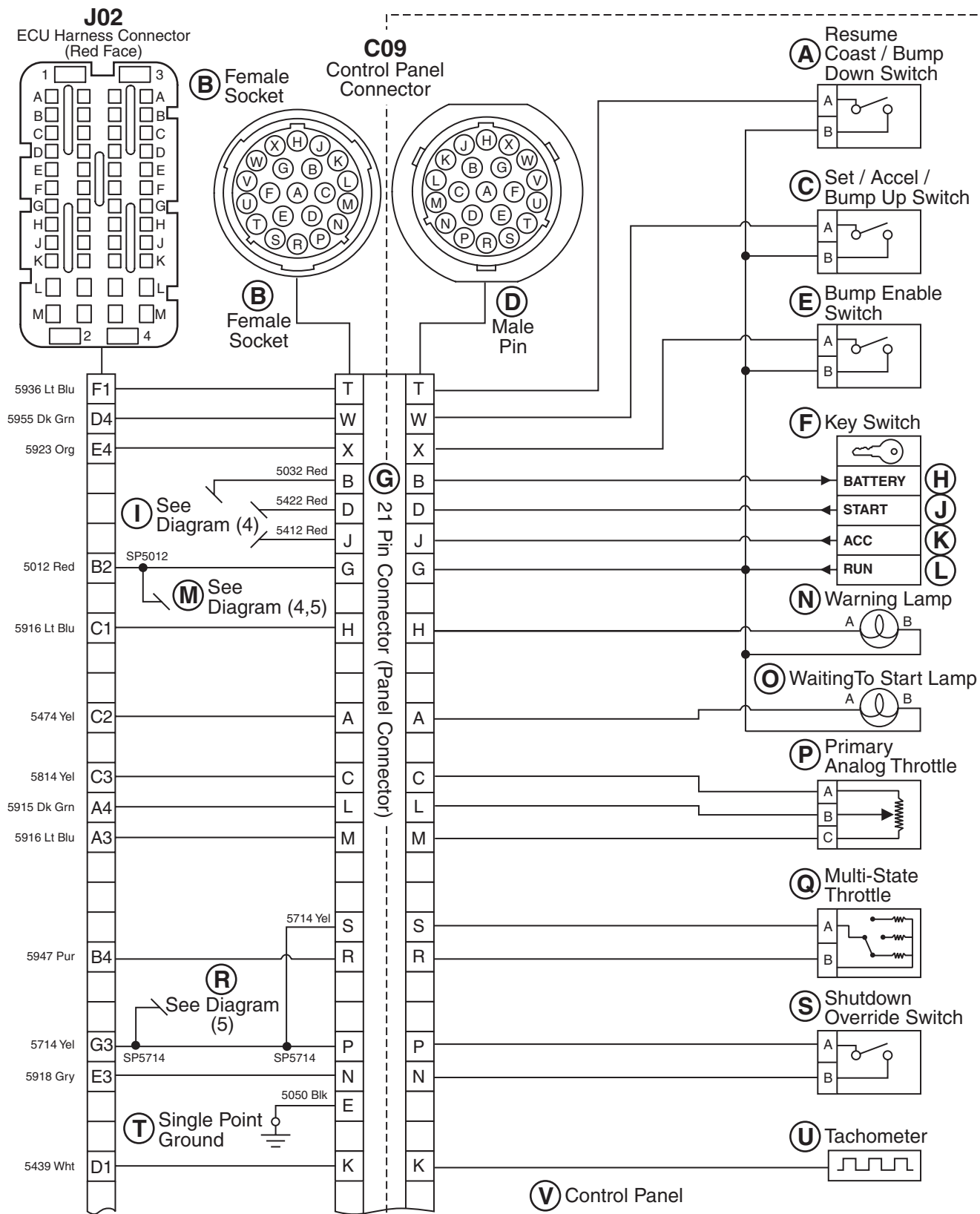


Diagnostic Specifications

A—Loss of Coolant Switch	M—See Diagram (4,6)	J2-D3—[5436 Light Blue] Air Filter Restriction Switch	J2-G4—[5948 Gray] Low Coolant Level Switch
B—Female Socket	N—Cruise Brake Switch	J2-E1—[5943 Orange] Cruise Brake Switch	J2-H4—[5937 Purple] Droop/Isochronous Governor Switch
C—Air Filter Restriction Switch	O—Secondary Analog Throttle	J2-F2—[5954 Yellow] Cruise On/Off Switch	J2-J1—[5939 White] External Derate Switch
D—External Shutdown Switch	P—Single Point Ground	J2-F3—[5913 Orange] Secondary Analog Throttle Signal	J2-J2—[5971 Brown] Cruise Cancel/Resume Switch
E—Male Pin	Q—Drop/Isoc (Isochronous) Governor Switch	J2-G2—[5911 Brown] 5 Volt Power Supply #4 Positive	J2-K1—[5941 Brown] External Shutdown Switch
F—External Derate Switch	C08—Auxiliary Connector	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return	
G—Cruise Cancel/Resume Switch	J02—ECU Harness Connector (Red Face)		
H—See Diagram (6)	J2-B2—[5012A Red] Ignition Key Start/Run Switch		
I—Cruise On Switch	J2-B3—[5917 Purple] Remote Cruise On/Off Switch		
J—23 Pin Connector (Auxiliary Connector)	J2-D2—[5473 Orange] Stop Engine Lamp Return		
K—Remote Cruise Switch			
L—Stop Engine Lamp			

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6.8L 24V ECU Wiring Diagram 6



6.8 Liter 24 Volt ECU Wiring Diagram 6 (PT+)

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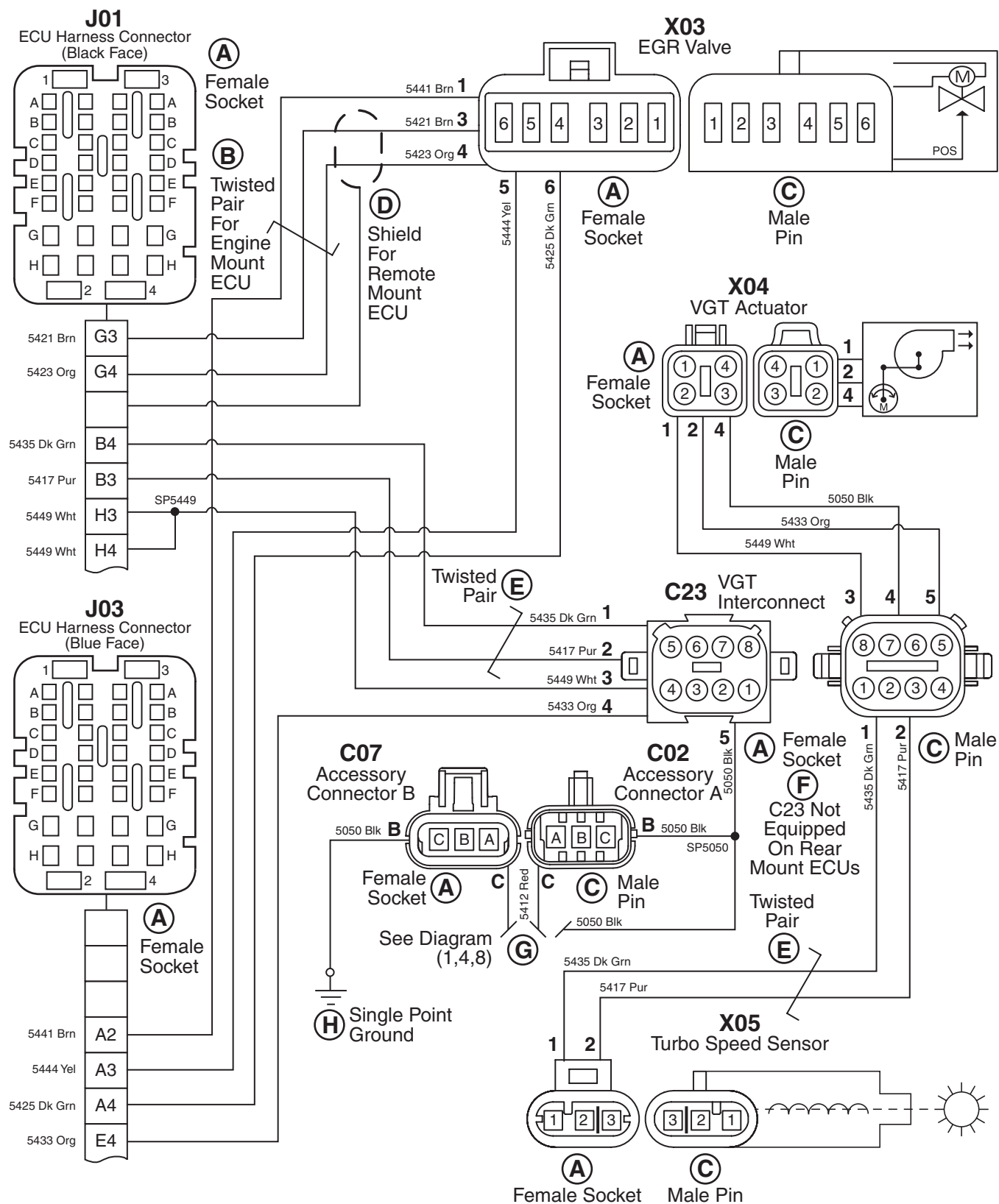
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Diagnostic Specifications

A—Resume Coast/Bump Down Switch	O—Wait to Start Lamp	J2-B2—[5012A Red] Ignition Key Start/Run Switch	J2-D4—[5955 Dark green] Set/Accel/Bump Up Switch
B—Female Socket	P—Primary Analog Throttle	J2-B4—[5947 Purple] Multistate Throttle Signal	J2-E3—[5913 Orange] Secondary Analog Throttle Signal
C—Set Accel/Bump Up Switch	Q—Multi-State Throttle	J2-C1—[5916 Light Blue] Warning Lamp Drive	J2-E4—[5923 Orange] Bump Enable Switch
D—Male Pin	R—See Diagram (5)	J2-C2—[5474 Yellow] Wait To Start Lamp Drive Return	J2-F1—[5936 Light Blue] Resume Coast/Bump Down Switch
E—Bump Enable Switch	S—Shutdown Override Switch	J2-C3—[5814 Yellow] 5 Volt Power Supply #3 Return	J2-G3—[5714A Yellow] 5 Volt Power Supply #4 Return
F—Key Switch	T—Single Point Ground	J2-D1—[5439 White] Tachometer Pulse Output	
G—21 Pin Connector (Panel Connector)	U—Tachometer		
H—Battery	V—Control Panel		
I—See Diagram (4)	C09—Control Panel Connector		
J—Start	J02—ECU Harness Connector (Red Face)		
K—Accessory	J2-A3—[5616 Light Blue] 5 Volt Power Supply #3 Positive		
L—Run	J2-A4—[5915 Dark Green] Primary Analog Throttle Signal		
M—See Diagram (4,5)			
N—Warning Lamp			

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6.8L 24V ECU Wiring Diagram 7



6.8 Liter 24 Volt ECU Wiring Diagram 7 (PT+)

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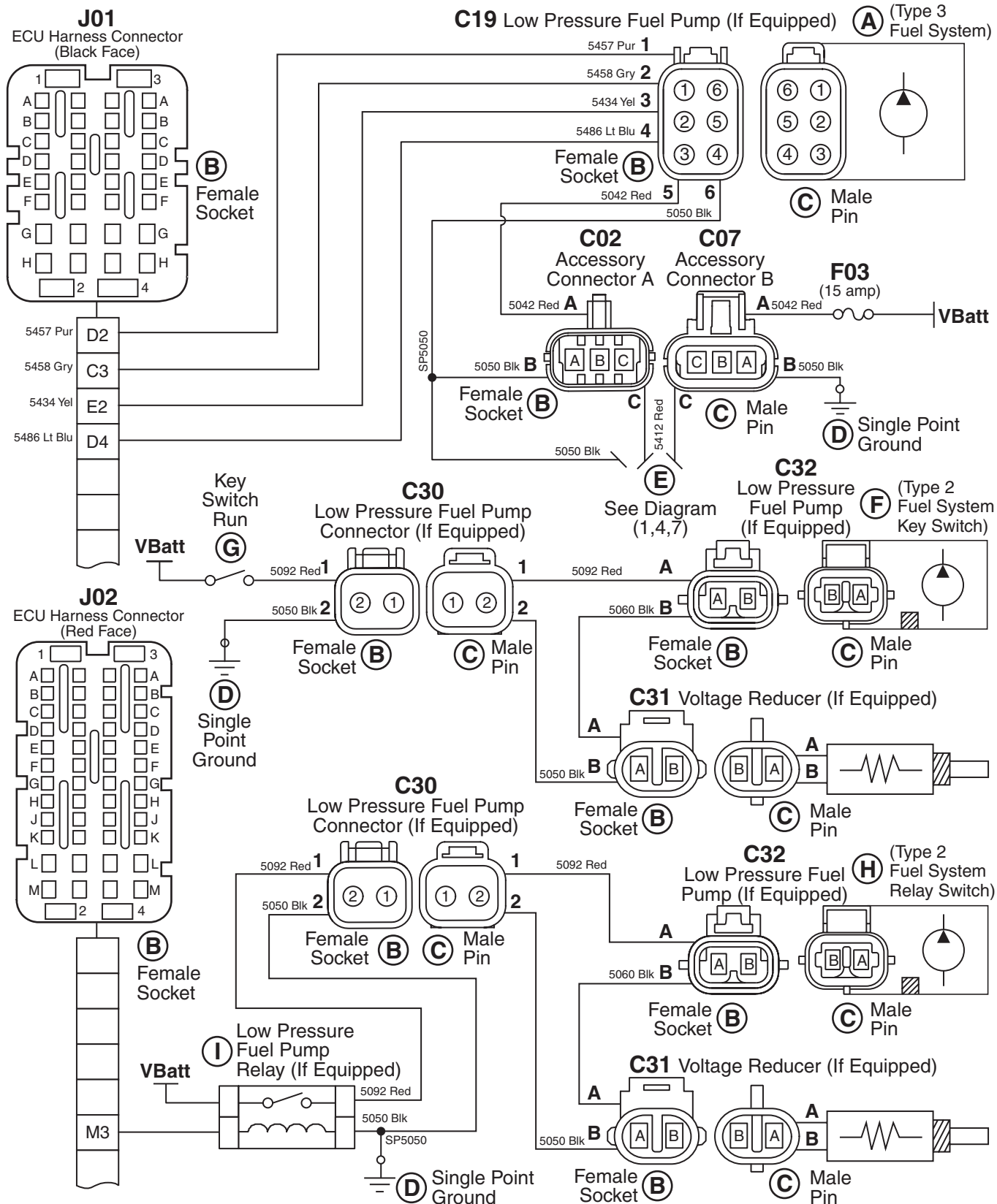
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Diagnostic Specifications

A—Female Socket	C23—VGT Interconnect	J1-H3—[5449B White] VGT Actuator Power #1 Positive	J3-A4—[5425 Dark Green] EGR Valve Position Signal
B—Twisted Pair For Engine Mount ECU	J01—ECU Harness Connector (Black Face)	J1-H4—[5449A White] VGT Actuator Power #2 Positive	J3-E4—[5433 Orange] VGT Actuator Communications Signal
C—Male Pin	J1-B3—[5417 Purple] Turbo Speed Return	J03—ECU Harness Connector (Blue Face)	X03—EGR Valve
D—Shield For Remote Mount ECU	J1-B4—[5435 Dark Green] Turbo Speed Pulse	J3-A2—[5511 Brown] 5 Volt Power Supply #5 Positive	X04—VGT Actuator
E—Twisted Pair	J1-D3—[5410A Black] Wiring Shield	J3-A3—[5444 Yellow] 5 Volt Power Supply #5 Return	X05—Turbo Speed Sensor
F—C23 Not Equipped on Rear Mount ECU	J1-G3—[5421 Brown] EGR Valve PWM Drive #1		
G—See Diagram (1,4,8)	J1-G4—[5423 Orange] EGR Valve PWM Drive #2		
H—Single Point Ground			
C02—Accessory Connector A			
C07—Accessory Connector B			

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6.8L 24V ECU Wiring Diagram 8



6.8 Liter 24 Volt ECU Wiring Diagram 8 (PT+)

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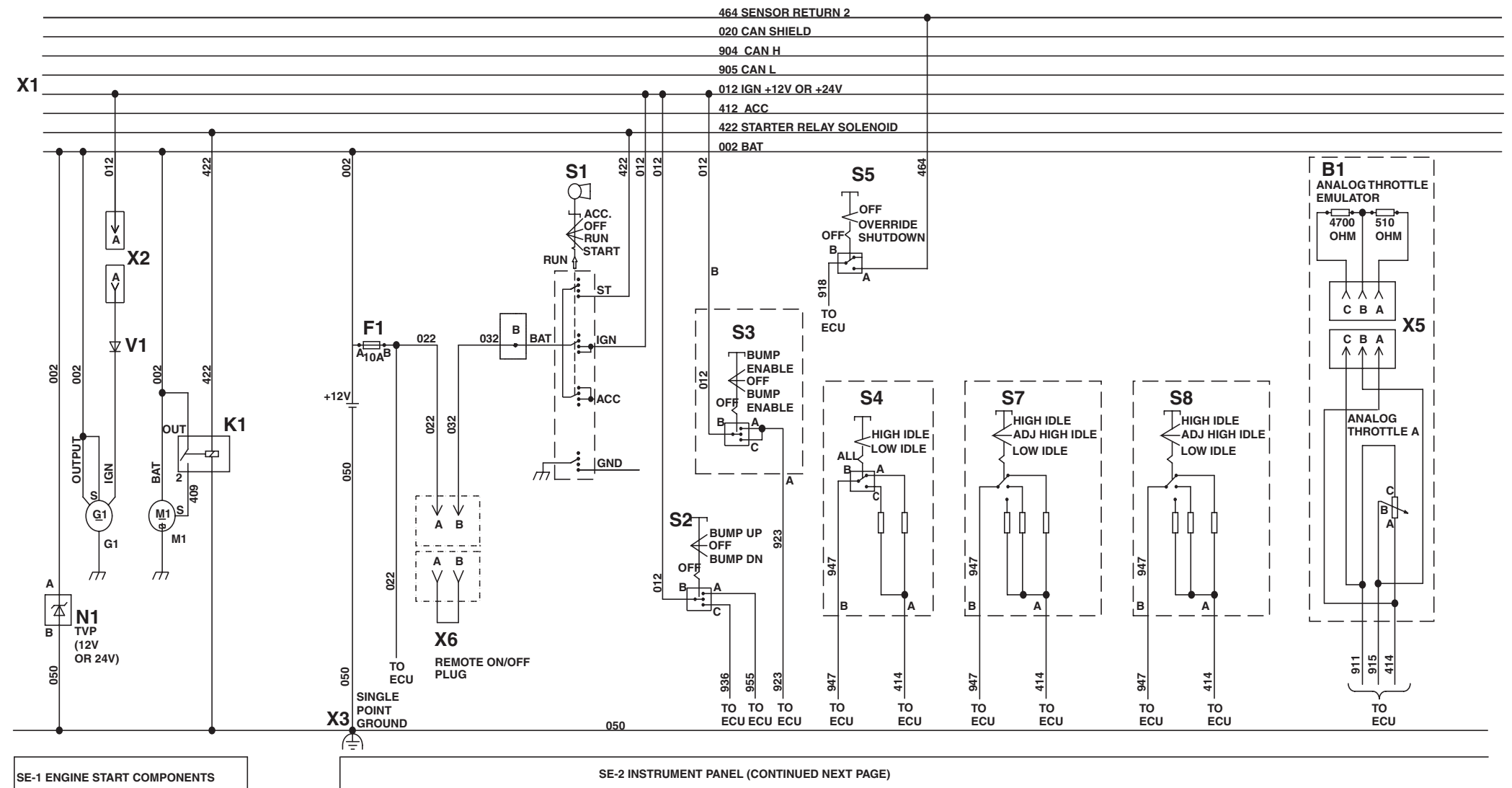
Diagnostic Specifications

A—(Type 3 Fuel System)	C02—Accessory Connector A	F03—15 Amp	J1-E2—[5434 Yellow] Low Pressure Fuel Pump Status
B—Female Socket	C07—Accessory Connector B	J01—ECU Harness Connector (Black Face)	J02—ECU Harness Connector (Red Face)
C—Male Pin	C19—Low Pressure Fuel Pump (If Equipped)	J1-C3—[5458 Gray] Low Pressure Fuel Pump Current Feedback	J2-M3—Low Pressure Fuel Pump Relay Drive
D—Single Point Ground	C30—Low Pressure Fuel Pump Connector (If Equipped)	J1-D2—[5457 Purple] Low Pressure Fuel Pump Speed Command	VBatt—Battery Positive
E—See Diagram (1,4,7)	C31—Voltage Reducer (If Equipped)	J1-D4—[5486 Light Blue] Low Pressure Fuel Pump On Command	
F—(Type 2 Fuel System, Key Switch)	C32—Low Pressure Fuel Pump Connector (If Equipped)		
G—Key Switch Run			
H—(Type 2 Fuel System, Relay Switch)			
I—Low Pressure Fuel Pump Relay (If Equipped)			

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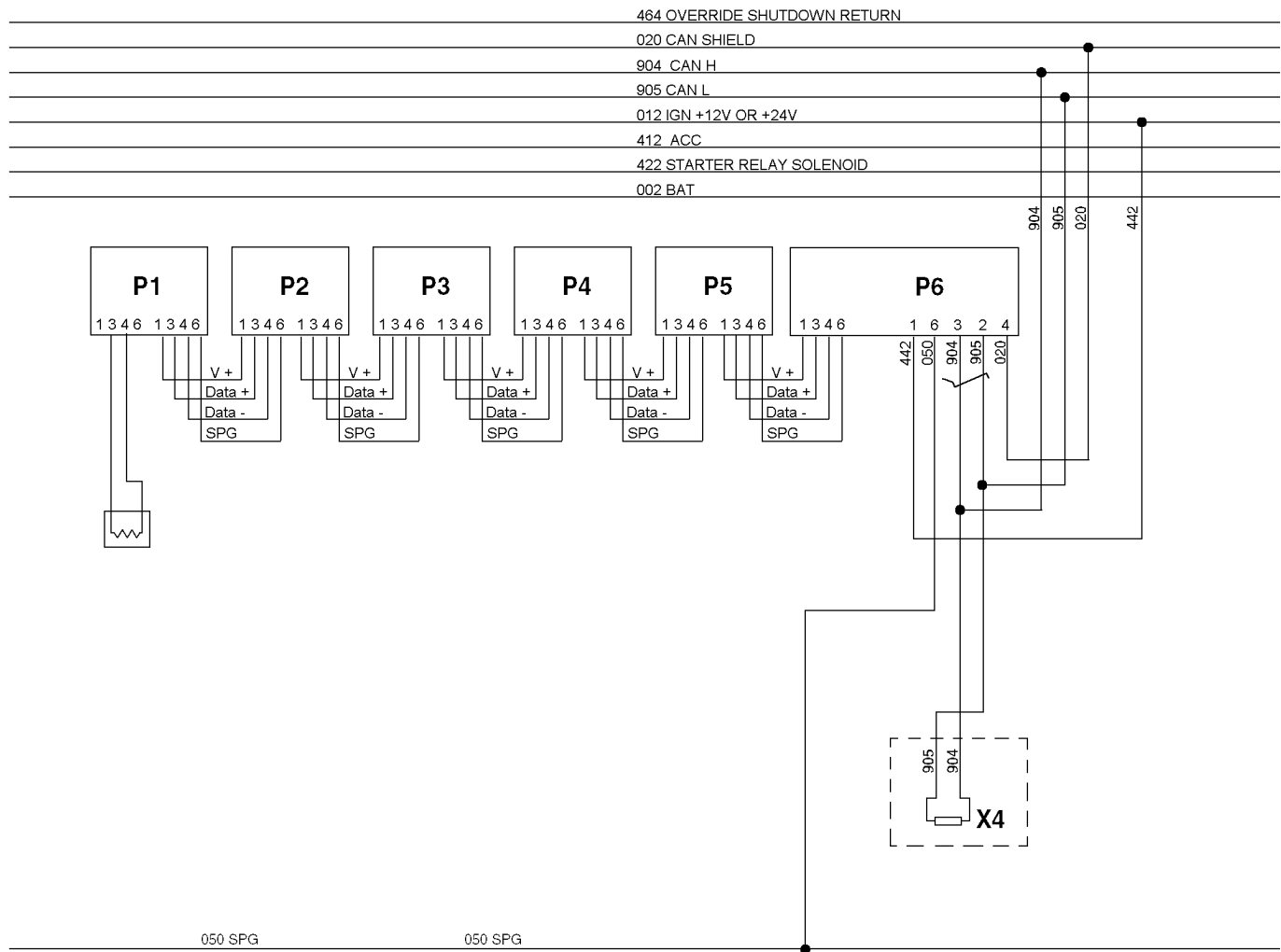
OEM Instrument Panel / Engine Start Components Electrical Wiring Diagram

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B1—Analog Throttle Emulator	P1—Optional Gauge	S3—Bump Enable Switch	X1—Vehicle Harness
E1—Back Light Regulator (24V) or Plug (12V)	P2—Optional Gauge	(Momentary)	Connector
F1—Fuse (10 Amp)	P3—Oil Pressure Gauge	S4—Dual State Throttle Switch	X2—Alternator Harness
F2—Fuse (5 Amp)	P4—Coolant Temperature	S5—Override Shutdown	Connector
G1—Alternator	Gauge	Switch (Momentary)	X3—Single Point Ground
K1—Starter Relay	P5—Tachometer Display	S6—Dimmer Control or	X4—CAN Terminator
M1—Starter Motor	P6—Hourmeter/Diagnostic	Jumper Plug	X5—Analog Throttle
N1—Transient Voltage	Meter	S7—Tri-state Throttle Switch	Connector
Protector	S1—Ignition Key Switch	S8—Ramp Throttle Switch	X6—Remote On/Off Plug
N2—Voltage Regulator (for 24V Operation)	S2—Speed Select Switch (Momentary)	V1—Diode	

OEM Instrument Panel / Engine Start Components Electrical Wiring Diagram - Continued



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SE-2 INSTRUMENT PANEL (CONTINUED)

OEM Instrument Panel Wiring Diagram

- P1—Optional Gauge
- P2—Optional Gauge
- P3—Oil Pressure Gauge
- P4—Coolant Temperature Gauge
- P5—Tachometer Display
- P6—Hourmeter/Diagnostic Meter
- X4—CAN Terminator

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