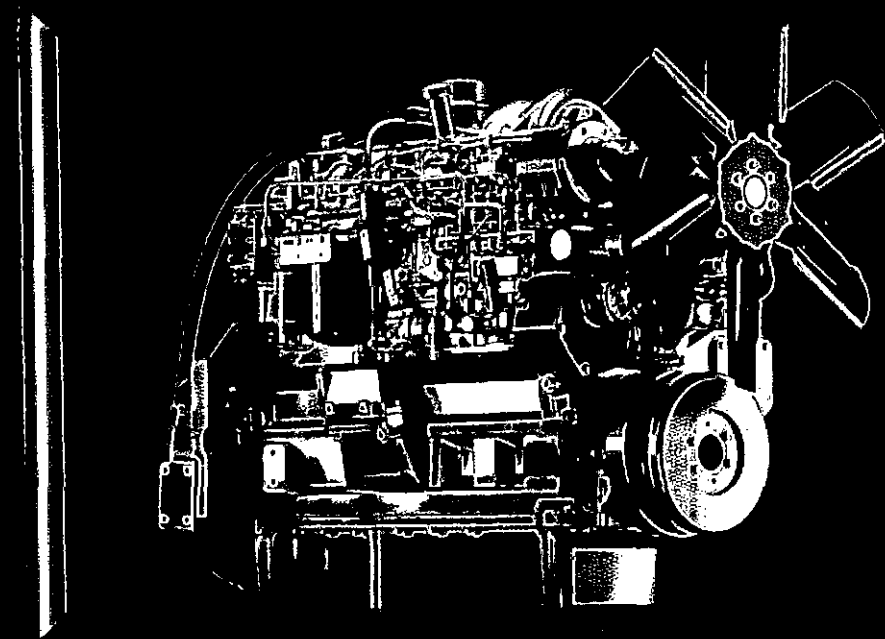


JOHN DEERE
POWERTECH
ENGINES



8.1 Liter

PRODUCT INFORMATION MANUAL



POWERTECH 8.1 L

Introduction

This product information manual provides basic marketing and product information on John Deere **POWERTECH 8.1 L** Diesel Engines. Its primary purpose is to help salespeople refresh and improve their product knowledge.

The information contained in this manual is intended for exclusive use by John Deere Company and John Deere Distributor/Dealer personnel.

All information is current as of March 1996. Design and specifications are subject to changes without notice.

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POWERTECH 8.1 L

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POWERTECH 8.1 L

The Building Blocks of a Modern Diesel Engine

Every quality structure begins with a good, strong foundation. It is the building above, however, that sets it apart from the rest. And diesel engines are no different.

The building blocks of the modern diesel engine — the cylinder block, head, crankshaft, pistons, valves, etc. — have gone relatively unchanged over the years. However, a foundation alone does not make a better structure. It's the manufacturer's value-added enhancement to the overall engine that creates the product excellence found in the **POWERTECH 8.1 L**. Endless hours of research and development, state-of-the-art manufacturing, and an extensive support organization contribute to the "Deere Advantage," the edge that places John Deere Diesel Engines above the competition.



....*Performance*



....*Durability*



....*Economy*



....*Environmental*



....*Reliability*



....*Serviceability*



....*Application Flexibility*

These benefits are the products of focused R & D and manufacturing. And a global service organization fully supports these benefits to ensure the quality attributed to the John Deere name. These product benefits and support are aimed at one of our highest priorities: total customer satisfaction.



POWERTECH 8.1 L



Cylinder Head (Page 29)

1. Heavy-deep cross section ... **Durability & Reliability**
2. U-flow ports ... **Economy & Serviceability**
3. Controlled intake air swirl ... **Performance & Environmental**



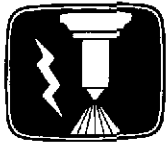
Cylinder Head Components (Page 31)

1. Integral valve guides ... **Economy & Durability**
2. Powered metal seats ... **Durability & Serviceability**
3. Valve wear caps ... **Durability & Serviceability**
4. Torque to yield head bolts ... **Durability & Reliability**



Cylinder Liners (Page 23)

1. Wet-sleeve cylinder liners ... **Durability & Serviceability**
2. Hardened - plateau honed walls ... **Reliability & Performance**



Fuel System

Electronic (Page 8)

1. Software configured ... **Serviceability & Convenience & Economy**
2. Power bulge ... **Performance & Economy**



Fuel System

Mechanical (Page 5)

1. Inline fuel pump ... **Reliability & Performance**
2. Integral transfer pump ... **Reliability**
3. Electric shutdown solenoid ... **Convenience**
4. Nozzle type injectors ... **Reliability & Performance**



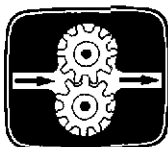
Camshaft and Valve Train Components (Page 35)

1. Large diameter high lift ... **Performance & Reliability**
2. Mushroom type followers ... **Economy & Serviceability**
3. Large solid core push rods ... **Durability & Serviceability**



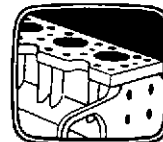
Power Train (Page 25)

1. Large crankshaft journals ... **Durability & Performance**
2. Seal wear sleeves ... **Reliability & Durability**
3. Angle rod caps ... **Durability & Performance**
4. New piston bowl design ... **Environmental & Performance**
5. High ring piston design ... **Performance & Environmental**



Lubrication System (Page 17)

1. Heavy gear pump ... **Reliability & Durability**
2. Full flow oil cooler ... **Reliability & Durability**
3. Precision piston cooling ... **Durability**
4. Oil filler/dip stick mounting ... **Serviceability**



Cylinder Block (Page 21)

1. Deep skirted design ... **Durability**
2. Large gear support ... **Reliability**
3. Large flywheel flange ... **Durability**
4. Large cam bore ... **Reliability**
5. Unique liner counterbore ... **Reliability**



POWERTECH 8.1 L

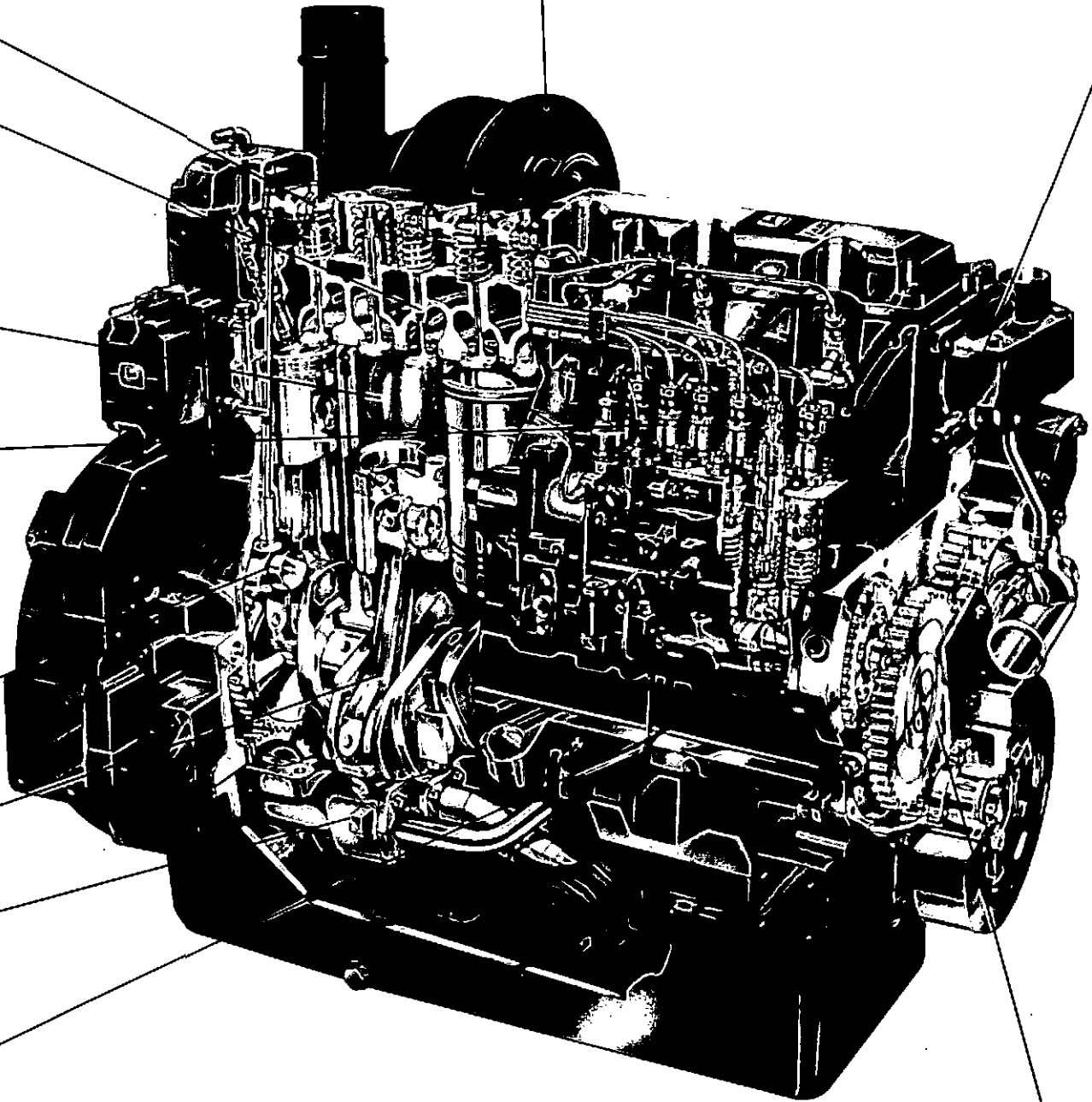
Air Intake and Exhaust System (Page 1)

1. Turbocharging ... **Performance**
2. Air-to-coolant aftercooling ... **Reliability**
3. Air-to-air aftercooling ... **Performance & Economy**



Cooling System (Page 15)

1. Cartridge water pump ... **Reliability**
2. Directed liner cooling ... **Reliability & Durability**



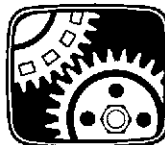
Application Flexibility (Page 38)

1. Fixed and adjustable fan drives... **Durability**
2. Both sides to oil service ... **Serviceability**



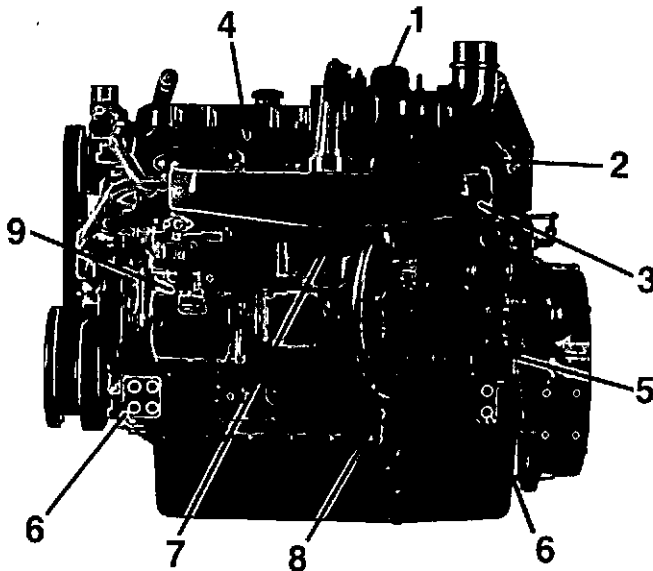
Gear Train (Page 37)

1. High contact spur gears ... **Durability & Reliability**
2. Heavy duty auxiliary drive ... **Reliability & Serviceability**





POWERTECH 8.1 L

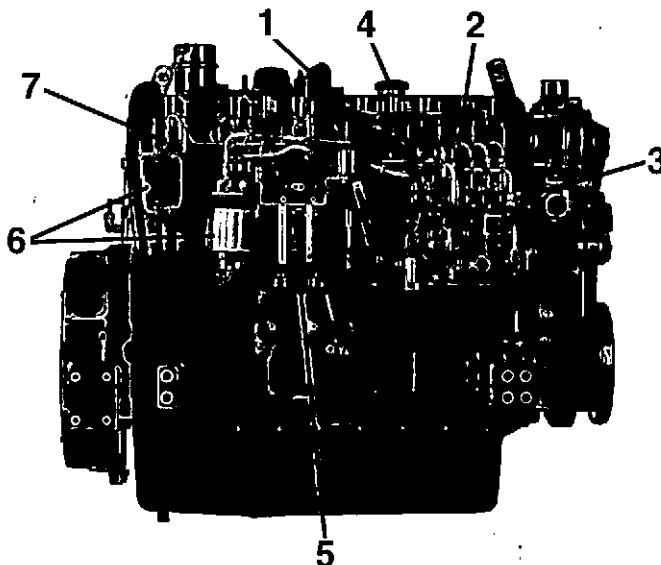


Engine Left Side

The right and left sides of all John Deere engines are viewed standing behind the flywheel and looking forward over the engine. Compared to most diesel engines, the left-hand side of the **POWERTECH 8.1 L** engine is extremely clean. The major components on the left-hand side of the engine are as follows:

1. Turbocharger
2. Turbocharger drain line
3. Intake manifold – Aftercooler
4. Exhaust manifold
5. Starter motor
6. Front and rear engine mounting pads
7. Oil Cooler
8. Oil Pan mounted dipstick and oil fill (optional)
9. Auxiliary Drive w/air compressor (optional)

Hydraulic pump not provided by Deere. Shown for illustration purposes only.



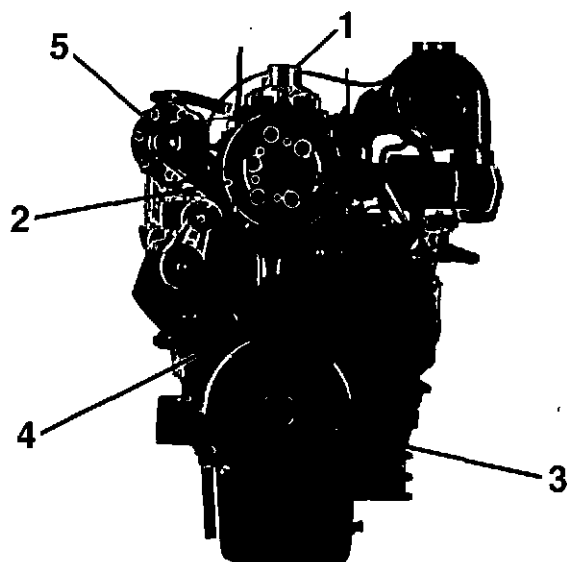
Engine Right Side

The right-hand side of the **POWERTECH 8.1 L** engine has all of the engine service points. The major components on the right-hand side of the engine are as follows:

1. Turbocharger oil supply line
2. Fuel lines
3. Injection pump
4. Rocker arm cover
5. Oil filter
6. Fuel filters
7. Fuel injectors



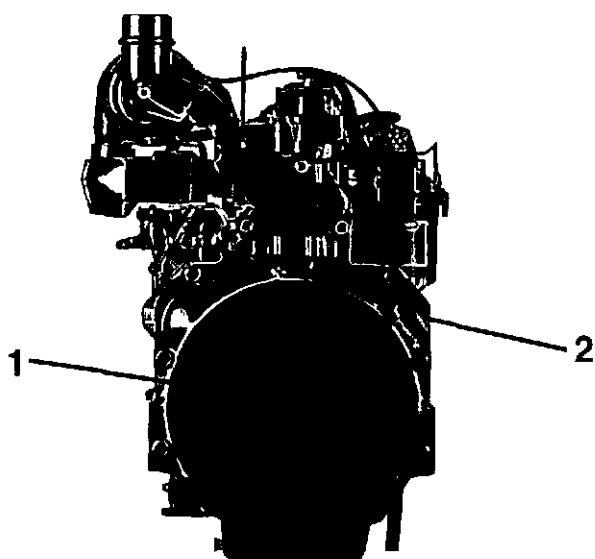
POWERTECH 8.1 L



Engine Front

The front of the engine mounts all of the drive accessories. The major components on the front of the engine are as follows:

1. Thermostat housing
2. Fan drive mount
3. Vibration damper
4. Gear housing cover
5. Alternator



Engine Rear

The rear of the engine mounts the flywheel and flywheel housing. The major components on the rear of the engine are as follows:

1. Flywheel
2. Flywheel housing

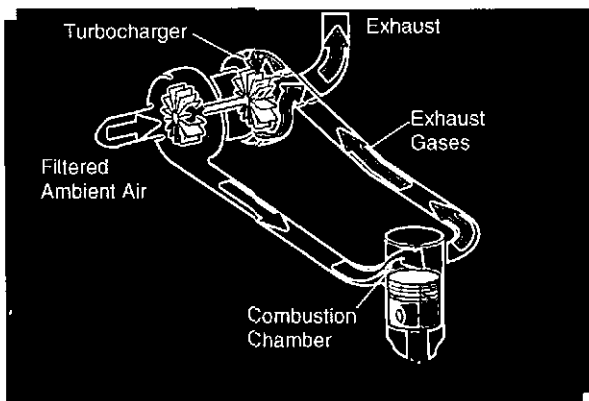


POWERTECH 8.1 L

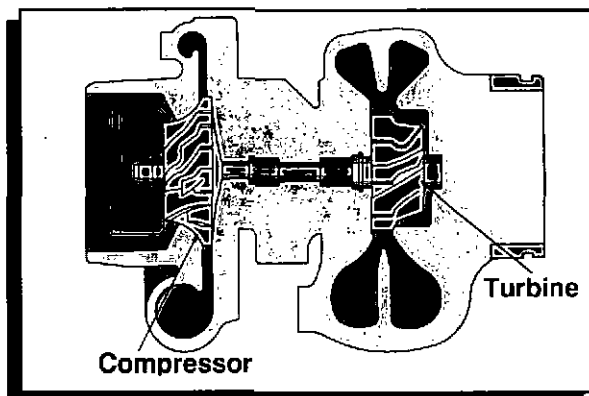
Air Intake and Exhaust System

Feature	Advantage	Benefit
1. Turbocharging	<i>Turbocharging improves engine performance, economy, emissions and reduces exhaust noise</i>	Performance Economy Environmental
2. Air-to-water aftercooling	<i>The air-to-water system is simple, compact and reliable</i>	Reliability Serviceability
3. Air-to-air aftercooling	<i>The air-to-air system is very efficient and provides the maximum engine performance gains</i>	Performance Economy Reliability Environmental

The new **POWERTECH 8.1 L** engines are turbocharged, turbocharged with water-to-air aftercooling and turbocharged with air-to-air aftercooling. The cylinder head features the U-flow port design which mounts both the intake and exhaust manifolds on the left side of the engine. This design provides for a very compact and efficient air and exhaust system.



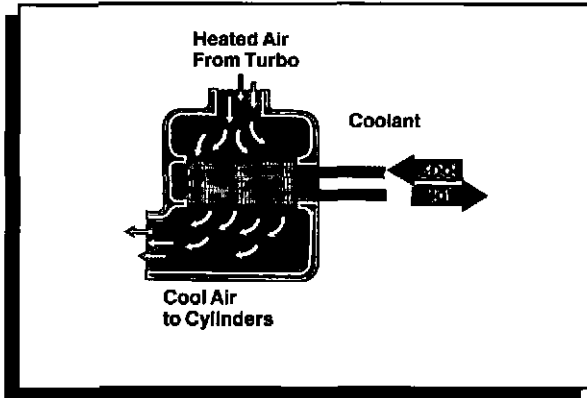
Turbocharging – The amount of fuel that can be injected during each power cycle is limited by the air available in the cylinder for combustion. In naturally aspirated engines, the amount of air in the cylinder is dependent on the swept volume of the cylinder. Thus, the maximum power output of this type engine is largely limited by displacement. If the density of air going into the cylinders is increased, the quantity of fuel injected can be increased resulting in increased power output.



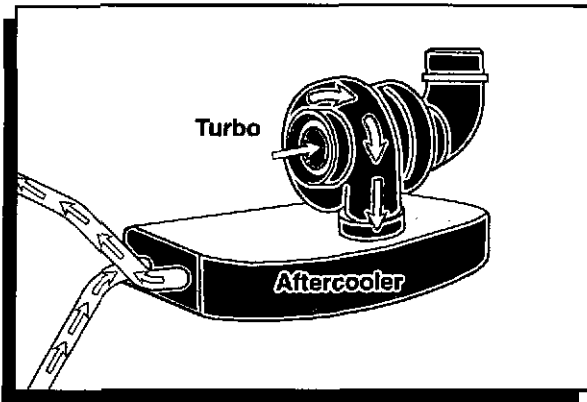
The turbocharger performs this function by compressing the intake air. The turbocharger utilizes a turbine to extract energy from the hot exhaust gases. The turbine then drives a compressor which is used to compress the intake air. As the intake air pressure increases, the density of the intake air is increased allowing more fuel to be injected.



POWERTECH 8.1 L

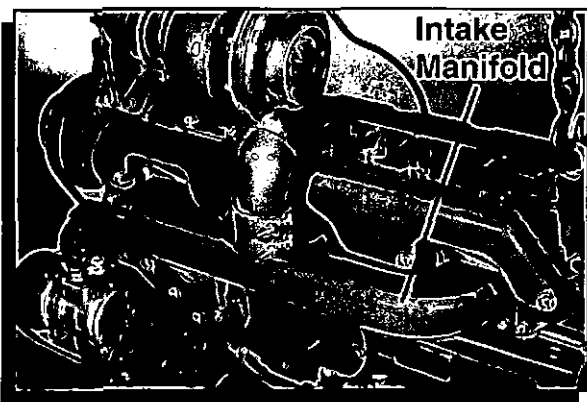


Aftercooling – Although turbocharging can easily increase the power output of the engine, it has a side effect that actually robs the engine of some power. As the turbocharger compresses the intake air, it also increases the temperature of the air. As air is heated, it expands and becomes less dense. Thin or less dense air has less oxygen to support combustion. Although the turbocharger increases engine power and efficiency, some of the increased efficiency is lost to heat. This is where aftercooling comes into play. The aftercooler acts like an air conditioner, cooling the intake air to increase its density. The effect is better engine performance, lower emissions and reduced internal temperature.



Turbocharging and aftercooling offer numerous benefits for the customer. In addition to the most obvious benefit of increased power, turbocharged engines will also have better fuel economy, better engine response and lower emissions. It sounds simple enough, however there is a little more to it than meets the eye. The turbocharger and components must be precisely matched to the engine.

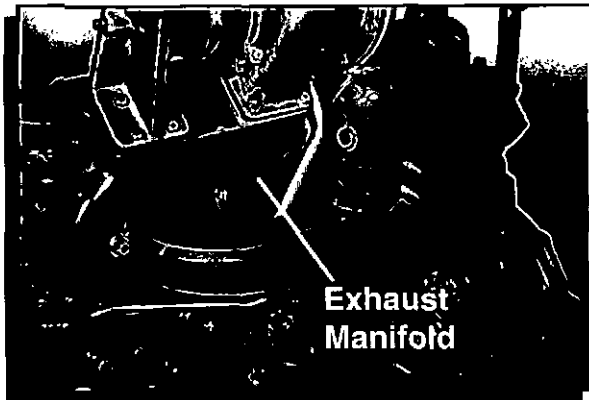
Summary: *John Deere engineers have done extensive research and development to ensure that the customer receives all the benefits of turbocharging and aftercooling.*



Intake manifold (Non aftercooled) – Several manifolds are available. The main difference is in the position of the air inlet. The manifold is designed to provide smooth, unrestricted air flow to all of the cylinders.

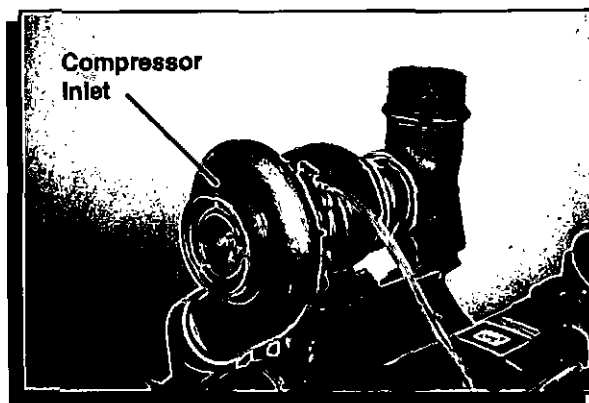


POWERTECH 8.1 L



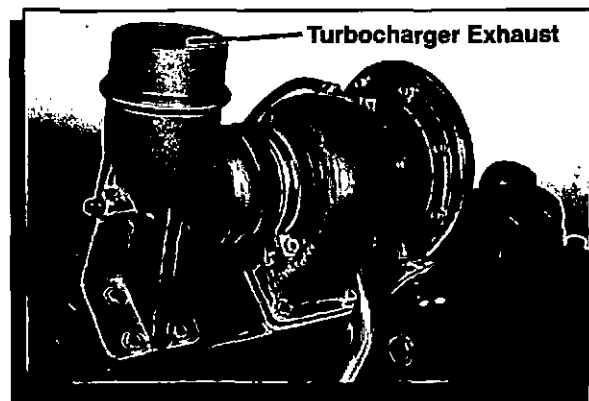
Exhaust manifold – The exhaust manifold is designed to separate the exhaust pulses as it directs the exhaust gases away from the cylinder head and into the turbocharger. The exhaust flow is divided between the front and rear of the engine and delivered to the divided turbine housing.

Summary: design of the exhaust manifold is extremely important to the overall efficiency of the exhaust system. The 8.1 L manifold is designed to deliver the highest possible amount of exhaust energy to the turbocharger, ensuring maximum performance and economy.



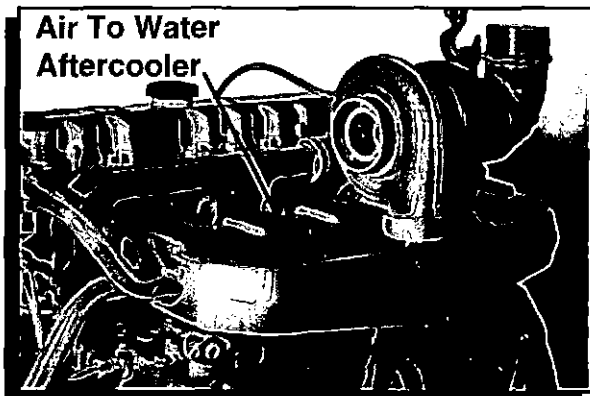
① **Turbocharger** – **POWERTECH 8.1 L** engines are turbocharged. The turbocharger exhaust turbine housing mounts to the exhaust manifold. The compressor outlet connects to the intake manifold or the aftercooler. Since proper lubrication is extremely important for the turbocharger, it receives cool filtered oil directly from the filter assembly. The turbocharger is precisely matched to the engine and intended power output.

*Summary: The turbocharger significantly increases the performance and economy of the engine while at the same time reduces exhaust noise and emissions. John Deere engineers have done extensive research and testing to insure that the turbocharger is precisely matched to the engine and application. The new **POWERTECH** air intake system is further testimony to John Deere's commitment to build high performance engines with out sacrificing reliability or efficiency.*



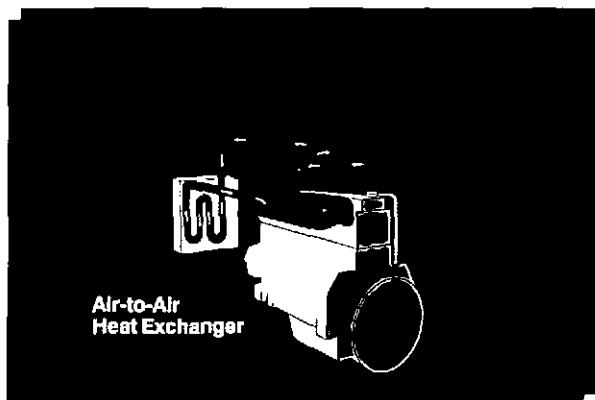


POWERTECH 8.1 L



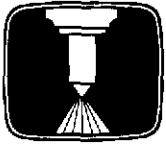
- ② **Aftercooler (Air-to-water)** – The air to water aftercooler system utilizes the engine coolant to cool the heated intake air from the turbocharger. This system consist of a liquid to air heat exchanger enclosed in a two piece intake manifold and cover. This combination replaces the conventional intake manifold. Cooled water from the engine radiator is circulated through this heat exchanger reducing the intake air temperature by as much as 30°C (100°F).

Summary: Air-to-coolant aftercooling is very compact and does not require additional intake plumbing or heat exchangers. In cold climates, it can aid starting and operation by warming the intake air.



- ③ **Aftercooler (Air-to-air)** – An air-to-air aftercooler system utilizes air to cool the heated intake air from the turbocharger. This system consists of an air-to-air heat exchanger located in front of the engine coolant radiator. This system provides the maximum intake air cooling with reductions in the air temperature to as much as 82 - 94°C (180 - 202°F).

Summary: Air-to-air aftercooling provides the most efficient method of cooling the intake air. Therefore it is always specified on the higher performance engines.



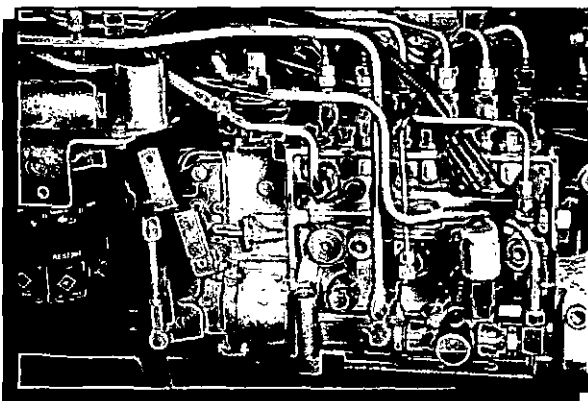
POWERTECH 8.1 L

Fuel System- Mechanical and Electronic

The **POWERTECH** has two available fuel systems, the proven Mechanical fuel system and an all in-line New Electronic fuel system. Both systems utilize the in-line style injection pump. The in-line style pump uses individual pumping plungers for each cylinder. Individual fuel lines connect the in-line pump ports with the injector in each cylinder. The fuel system includes a fuel filter and transfer pump.

Mechanical - Fuel System

Feature	Advantage	Benefit
1. High pressure in-line fuel pump	<i>Highest injection pressure for better power, torque and low emissions</i>	Reliability Performance Economy
2. Integral transfer pump	<i>Compact design, less plumbing and easy access for priming</i>	Reliability Serviceability
3. Electric shutdown solenoid	<i>Provides engine shutdown capabilities from a keyswitch</i>	Convenience
4. Nozzle type injectors	<i>Excellent fuel atomization for maximum power - low emissions</i>	Reliability Performance

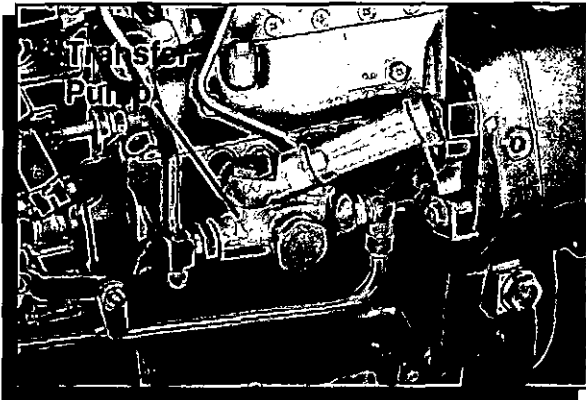


The **POWERTECH** uses the Bosch P3000 and P7100, as well as the Nippondenso AS2500 ① injection pumps. The Bosch and Nippondenso pumps are similar in design but are specified according to application and power output. Both the Bosch and the Nippondenso in-line pumps produce high injection pressures, which is necessary for performance characteristics of the engine. The pump mounts to the front block flange on the right side of the engine and is driven by the front gear train. The in-line pump has six outlets which are connected to the injectors by individual fuel lines.



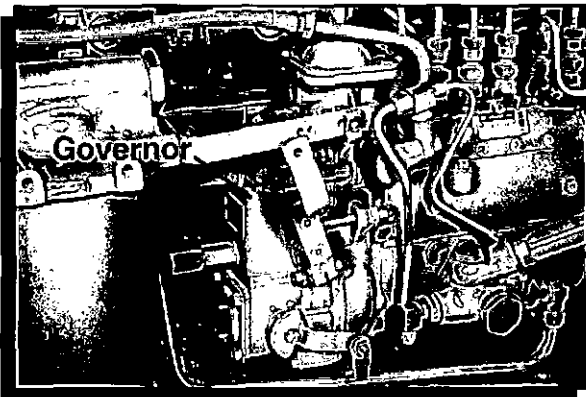
POWERTECH 8.1 L

Summary: The high injection pressure produced by the in-line style pump makes it an excellent choice for the high performance of **POWERTECH**. The high injection pressures of the in-line pump provide excellent power and torque characteristics. They also provide better operating economy and low emissions. It is also very durable and reliable. The in-line style pumps have been in use world wide for many years and have an excellent service record.



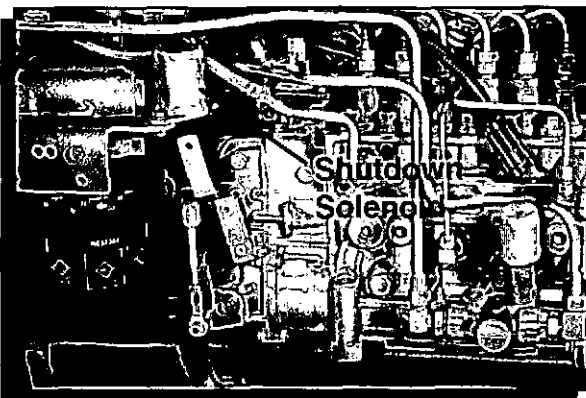
- ② **Transfer pump** – The fuel system is equipped with a piston type transfer pump to supply fuel to the injection pump. The transfer pump is mounted to the side of the in-line pump housing and is operated by the pump camshaft. The transfer pump includes a manual primer which is used to prime the system after a filter change or other system service.

Summary: The transfer pump is designed to be an integral part of the in-line injection pump, making it very compact, efficient and cost effective. It is also very accessible for priming the system.



- Governor** – The in-line pump uses the RSV style variable speed type mechanical governor. The governor housing includes the throttle lever, shut down lever and adjustment points. A constant speed, low droop type governor is available for generator set applications.

Summary: The RSV speed governor provides smooth, rapid response to load changes. It also has an excellent reliability record.



- ③ **Electric shutdown solenoid** – An electrical shutdown solenoid is used to shut down the engine. The electrical solenoid activates the governor mechanical shutdown lever.

Summary: Without an electrical shut down, the operator must activate a mechanical engine shut down device. The shutdown solenoid provides the convenience of shutting down the engine with the key switch.

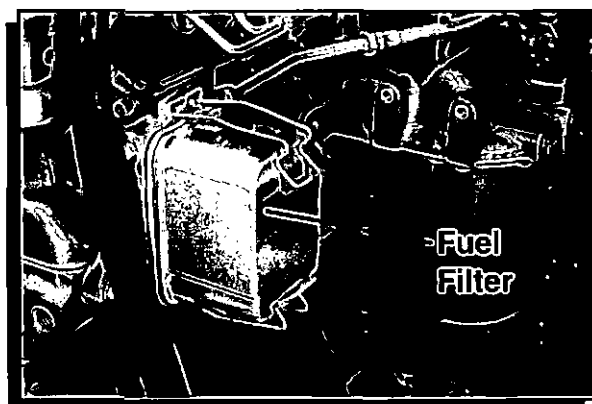


POWERTECH 8.1 L

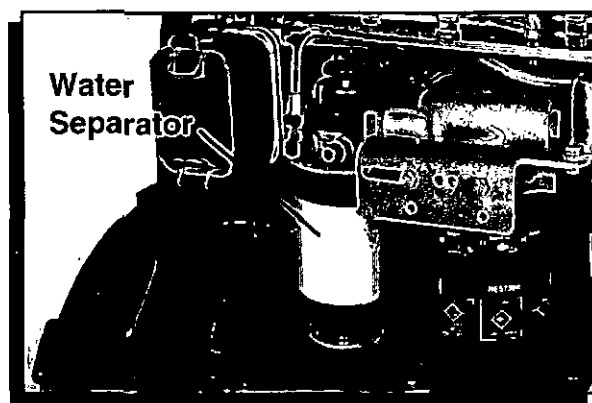


④ **Fuel injectors** – The **POWERTECH 8.1 L** uses 21 mm Bosch KDEL injector nozzles. The injector nozzle assembly has an edge filter which provides protection for the small nozzle holes. The injector nozzles are designed specifically to operate with the high fuel pressure produced by the in-line pumps.

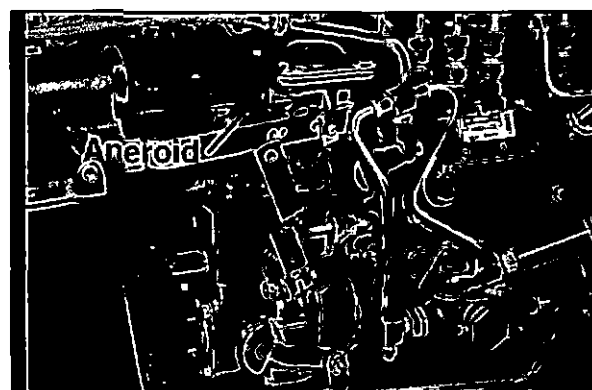
Summary: The nozzle type injectors are simple and reliable. The nozzle design also provides excellent fuel atomization for maximum combustion efficiency.



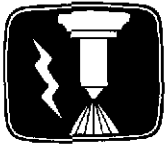
Fuel filters – The fuel filter is a rectangular canister type. The filter element has a water accumulator and drain valve on the lower side of the element canister. The rectangular filter can also be changed without tools.



Water Separator - There is an optional filter/water separator. It acts as a pre-filter and separates water from the fuel. The water collects in the bottom of the canister where it can be drained manually.



Aneroid – Most engine applications will use the governor equipped aneroid. The aneroid is a device that is controlled by turbocharger boost pressure. The aneroid prevents the fuel pump rack from moving to the fully open position until there is sufficient boost pressure to support complete combustion. This prevents black smoke emissions during engine acceleration.

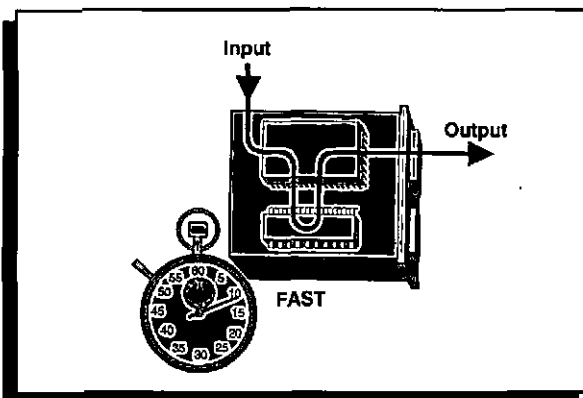
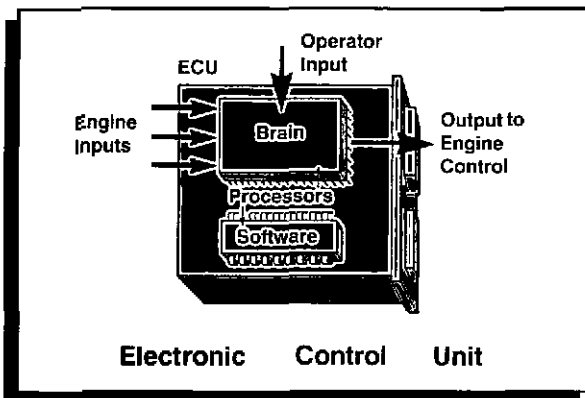


POWERTECH 8.1 L

Electronic – Fuel System

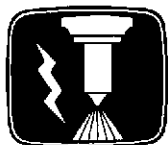
Feature	Advantage	Benefit
1. Software configured	Provides the ultimate in system configuration flexibility	Serviceability Convenience
2. Power bulge	Matches the output of larger engines for certain applications	Performance Economy

The new **POWERTECH 8.1 L** electronic fuel system combines the sophistication of computer electronics with the performance and dependability of the traditional in-line fuel systems. The new electronic fuel system consists of an electromechanical controller that takes the place of the fuel pump governor, the ECU (Electronic Control Unit), engine sensors and harness. The ECU contains a powerful, programmable microprocessor which controls the complete fuel system. The ECU monitors engine functions through remote mounted engine sensors.

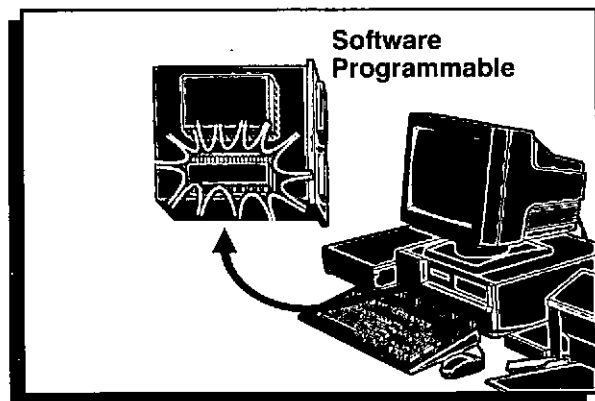


System Overview: The great advantage of electronic fuel control is that it is microprocessor based. The microprocessor (computer to most of us) processes information, makes decisions and then sends commands to the fuel pump to adjust the rack position many times each second. This speed allows the system to react to the slightest changes in load, boost, temperatures and a host of other inputs. Being microprocessor based, it is also programmable (usually referred to as software). This allows every element of the way it handles fuel control to be changed or modified by loading a new program into the system memory. Each engine receives its custom software program at the end of the assembly line.

① Finally, being software controlled, the microprocessor brings a level of intelligence to the fuel system. Unlike electronic governors that simply respond to operator input until they reach a physical limit, the microprocessor responds to an operator request only after processing all relative information and then deciding if the request is even possible or what implications it might have.

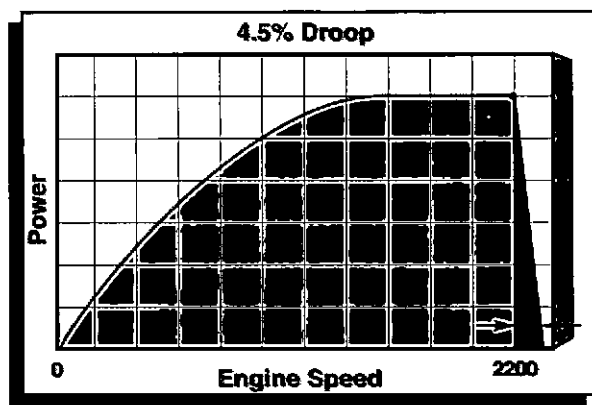


POWERTECH 8.1 L



Software programmability allows the ultimate in flexibility. Mechanical governor requires a unique configuration to provide a given power curve. The microprocessor however, can be programmed to provide any one of an infinite number of power curves. The system can even change power curves during engine operation, to provide additional power (See Power Bulge Feature) when needed or de-rated power (See decelerator feature) for special events. The benefits of electronic fuel control are almost too numerous to list, but just for a start, look at the following New features and Operating modes.

Operating Modes and Features – POWERTECH electronics have several new operating modes and features that will be of major significance for most applications. These new operating modes and features include: Normal Operation, Cruise Control, Decelerator, and Power Bulge.

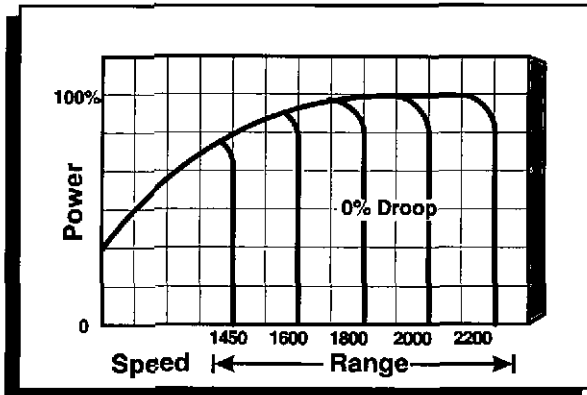


Normal Operation – In the normal operating mode, the engine will function similar to a typical mechanically governed engine. The throttle will control the engine speed from idle to rated rpm. *Remember however, the throttle is electronic and there is no mechanical connection to the fuel pump.* [The engine will have similar characteristics to a mechanically governed engine with a 4.5% governor droop, but will respond much faster. Depending on the application, the droop percentage may be different.]

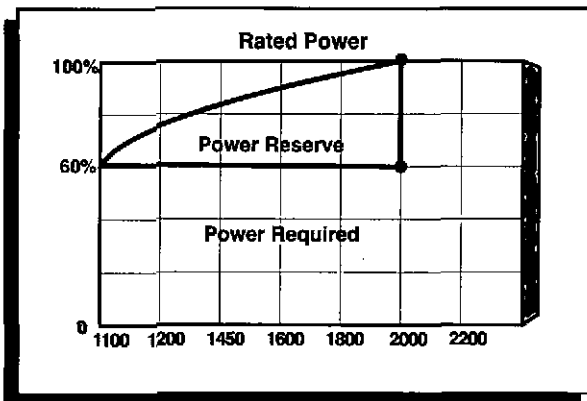
Summary: In the normal operating mode, the **POWERTECH** electronic governor will provide the same quick response and precise control as a Deere mechanical fueled engine.



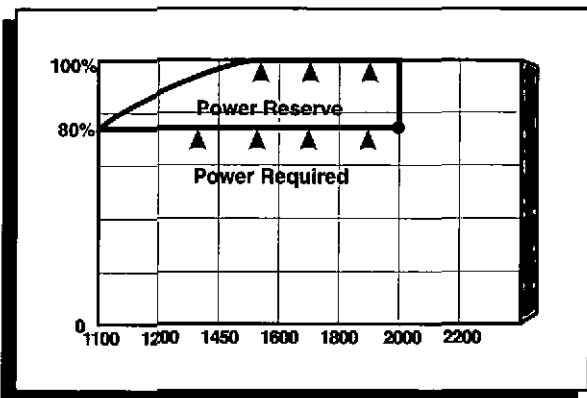
POWERTECH 8.1 L



Cruise Control – Cruise Control can provide constant engine speed for applications that do not require continuous full engine power. The recommended operating range is 1450 to 2200 rpm. Constant (rated) power is available from 2200 rpm down to about 1700 rpm. When Cruise Control is engaged, the ECU goes into an isochronous governing mode. In the isochronous mode, there is zero percentage droop. This means that there will be no variation in engine speed when additional load is applied until the engine reaches full rated power.



To illustrate this, let's look at an engine operating in the Cruise Control mode. For our illustration, let's assume that the application is requiring 60% of available engine power and operating at 2000 rpm. Looking at the chart, the top line represents the maximum power curve. The horizontal line at the 60% of rated power mark represents the application power requirements. The vertical line at 2000 rpm represents the engine speed. The part of the line from 60% to 100% or rated power represents the reserve power available.

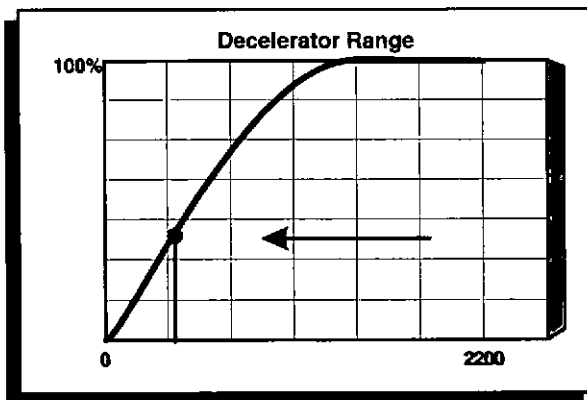


As the application operates, the engine speed will be maintained at 2000 rpm. If the engine encounters additional loading, the ECU will immediately signal the governor to increment the rack, increasing the fuel rate to maintain engine rpm. Looking at the second chart, we can see that the application is now requiring 80% of rated power. The engine will not lose rpm until the power required goes beyond 100%. 2000 rpm will be maintained if the power required drops below 60% as well. With the Cruise Control off, the system in normal operation, the engine will lose approximately 80 rpm before the system can respond to an increased load. With a typical mechanical governor, the engine would lose as much as 180 to 200 rpm before responding to the increased load.



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Summary: For applications requiring constant speed but not requiring full rated power, Field Cruise is the perfect solution. Unlike mechanical systems, the ECU can recognize minute changes in power demand and make corrections in fuel flow to assure constant rpm. Cruise Control can provide precise engine speed for the most demanding applications.

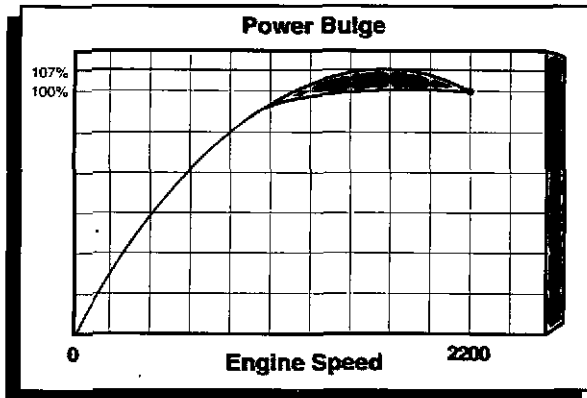


Decelerator – In applications where the engine must operate at full rpm but decelerate to a lower speed for certain functions, the decelerator feature provides the perfect answer. Through an OEM interface/control the ECU can be adjusted to any decelerated rpm between idle and rated rpm. By activating a switch or control, the ECU will decelerate the engine to the predetermined rpm. When full rpm is again desired, the control is activated (or deactivated) signaling the ECU to return the engine to full rpm.

Summary: Decelerating the engine to a precise rpm time after time can be tedious and time consuming. For applications requiring this kind of speed change, the decelerator feature provides a simple, efficient means of selecting a precise intermediate rpm. Since this feature is completely electronic, the controls can be an integral part of the OEM interface.



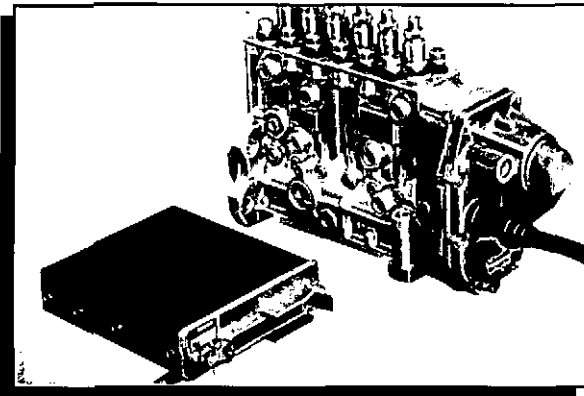
POWERTECH 8.1 L



② **Power Bulge** – Power bulge is a very effective method of providing additional intermittent power to maintain engine speed and application efficiency. Many applications, like tub grinders, trenchers and harvesters, have short peak power demands in their work cycle. During the short peak demand, the system will need all available power. But, after the peak the power demand will drop significantly until the next peak. An application like this, utilizing a competitor's engine with a somewhat higher hp rating, could very effectively be replaced with the **POWERTECH 8.1 L**. Although the **POWERTECH** may be rated at lower hp, the "Power Bulge" feature will give the engine an additional level of power for intermittent periods, allowing it to handle the peak power demands of the application with ease.

Summary: *Power Bulge is a dynamic feature that allows the **POWERTECH** to take charge and control the most demanding, power hungry applications.*

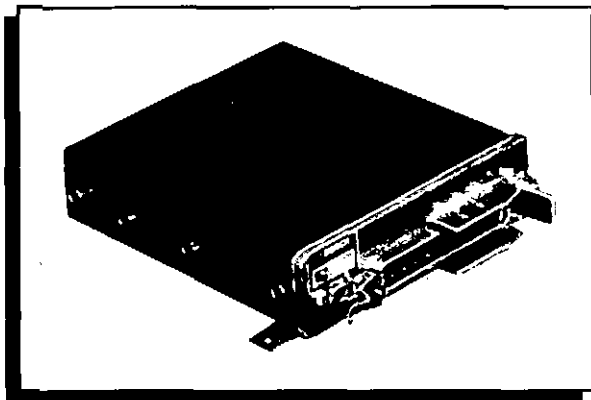
More efficient engine operation, less initial cost and better fuel economy are just a few of the benefits of the Power Bulge feature.



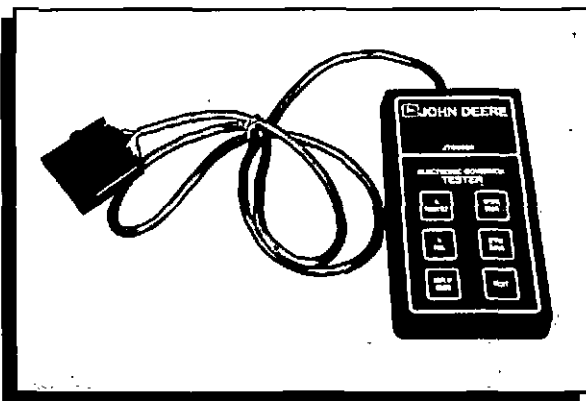
Electromechanical controller – The electromechanical controller takes the place of the governor on the in-line fuel pump. The controller utilizes a solenoid which responds to a signal from the ECU to control the positioning of the fuel pump rack. The solenoid provides very accurate and quick positioning of the rack. The pump controller connects to the ECU through a wiring harness.



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ECU – The Electronic Control Unit (ECU) is the system brain. It contains a powerful, programmable microprocessor, memory and connections for communications with the engine systems. Since the system contains re-programmable memory, the ECU is programmed at the factory to provide the precise torque curve, horsepower rating and options required for the application. The ECU continuously monitors the complete electronic system for potential problems. If a problem occurs, a fault code will be stored in the ECU memory and the fault lamp will light or flash when a system fault is present.

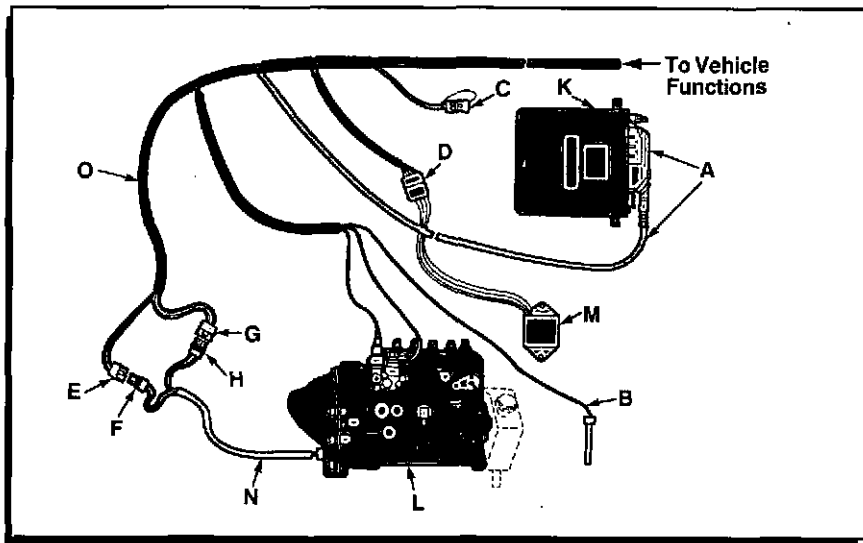


Diagnostic reader – The diagnostic reader connects to the ECU and displays fault codes stored in the ECU memory.



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Sensors and harness – The ECU is connected to the electromechanical controller and sensors by a harness assembly. Weather resistant electrical connectors are used at each connection to the harness. The engine sensors and system components consist of the following:



Sensors, Components and Harness

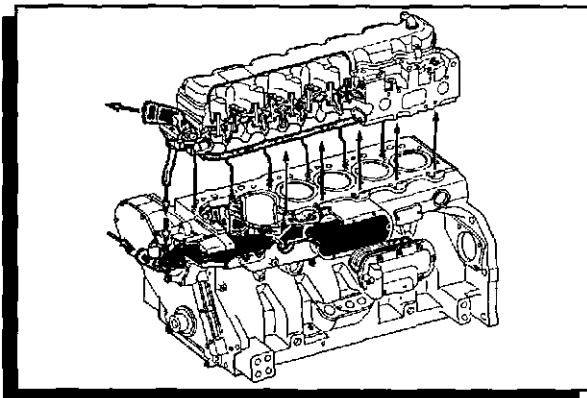
A. Engine Controller Connector	I. Fuel Temp. Sensor Connector
B. Auxiliary Speed Sensor	J. Fuel Shutoff Solenoid Terminal
C. Diagnostic Voltages Connector	K. Engine Controller
D. TVP Connector	L. Fuel Injection Pump
E. In-Line Connector	M. TVP Module
F. In-Line Connector	N. Pump Wiring Harness
G. In-Line Connector	O. Wiring Harness
H. In-Line Connector	



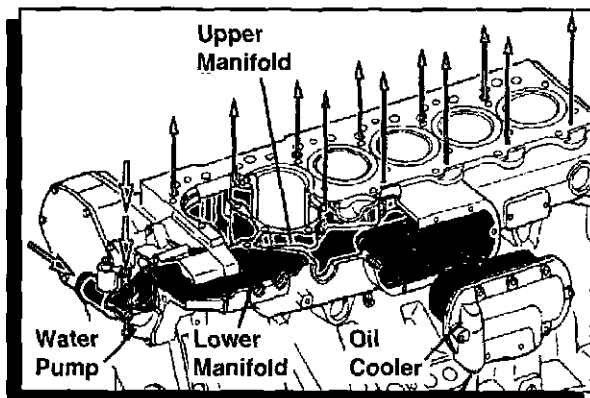
POWERTECH 8.1 L

Cooling System

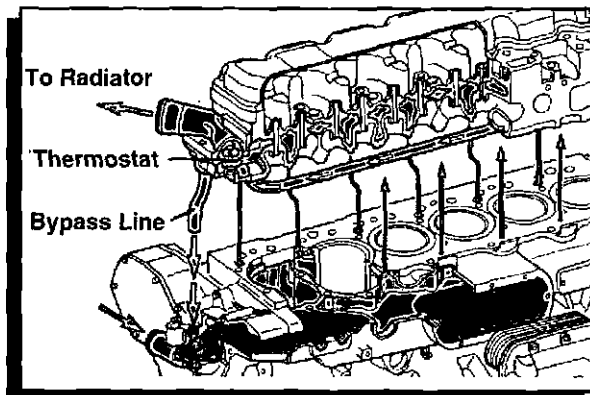
Feature	Advantage	Benefit
1. New cartridge type water pump	The pump is simple, efficient, compact, and is easy to service	Reliability Serviceability
2. Directed top liner cooling	Improved upper cylinder component reliability by controlling upper liner temperatures	Reliability Durability Economy



The **POWERTECH** cooling system is designed to provide consistent temperature management in the most extreme conditions. The engine cooling system consists of the water pump, block manifold, oil cooler, cylinder head, thermostat assembly, water-to-air aftercooler (if equipped), radiator fan and the radiator. Some systems may have additional components such as a deaeration tank, recovery tank or block heater.



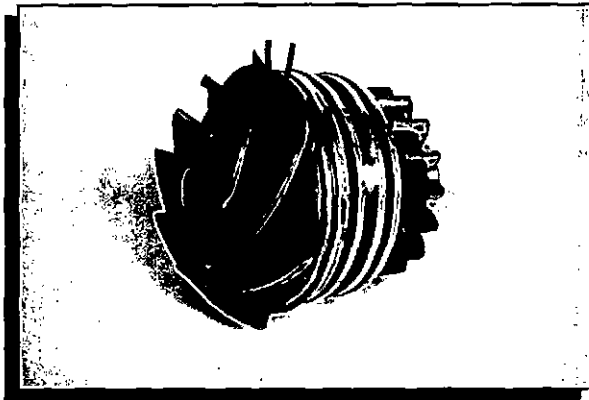
Coolant System flow – Coolant flow starts with the water pump. From the water pump, coolant flow is directed into the coolant manifold on the left hand side of the block. The coolant manifold has two channels. The lower channel connects the pump directly to the oil cooler element cavity. In the oil cooler cavity, coolant flows around the cooler element and then into the upper channel of the manifold.



This area of the manifold supplies the cylinder liners and the directed top liner cooling feature. In the block, the coolant flows around the liners and through a series of small ports into the cylinder head. In the cylinder head, the coolant flows around the valve ports and into the thermostat housing which is attached to the front of the head. If the coolant temperature is below the normal operating range, the thermostats direct the coolant through the bypass line back to the water pump. When the coolant temperature reaches operating temperature, the thermostats will open and direct part or all of the coolant flow to the radiator.

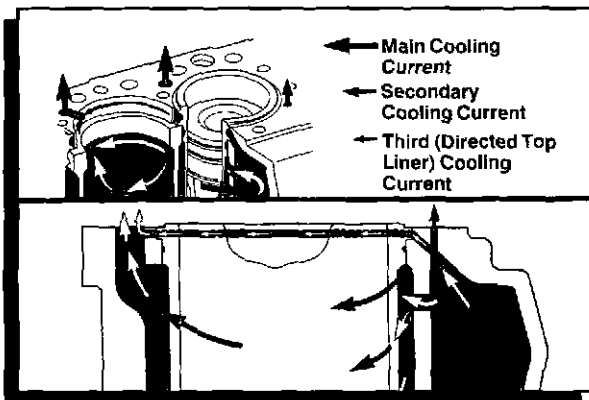


POWERTECH 8.1 L



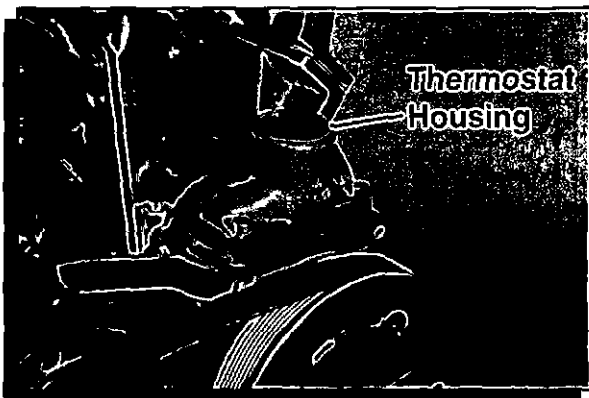
① **Water pump** – The **POWERTECH** features a new high efficiency cartridge type water pump. It is gear driven and is an integral part of the front gear housing. The pump impeller has a precision three dimensional blade profile which results in lower parasitics and improved fuel economy. The pump is compact, light weight and is easily removed should service ever be necessary.

Summary: *The new cartridge type water pump is simple and easy to service. It is gear driven, making it very efficient and totally unsusceptible to belt failure.*



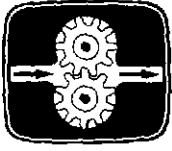
② **Directed top liner cooling** – The directed top liner cooling feature provides a flow of coolant around the liner flange to reduce upper cylinder component temperatures. This small but positive flow of coolant reduces upper liner temperature by as much as 30°C (100°F). As a result, head gasket, cylinder head and piston ring temperatures are also significantly reduced.

Summary: *Today's high performance engines must operate with increasingly high combustion pressures and temperatures. The upper liner area of the combustion chamber receives the brunt of this pressure and heat punishment. Directed liner cooling greatly improves upper cylinder component reliability by controlling upper liner temperatures. The Directed top liner cooling feature is also completely contained within the cylinder block. There are no external lines or connections.*



Thermostats – The thermostat housing contains two thermostats. The thermostats are the type that fully block the radiator outlet when closed, but only partially block the bypass when open. Normal operating temperature for the thermostats is 82° - 94° C (180° -202° F).

Summary: *The thermostats are a very popular design, used by many engine manufacturers because of their simplicity and reliability.*

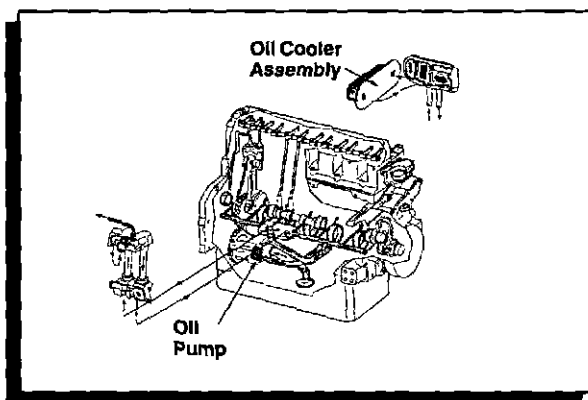


POWERTECH 8.1 L

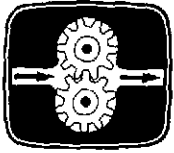
Lubrication System

Feature	Advantage	Benefit
1. Heavy duty gear type pump	<i>The heavy duty gear pump is very efficient and its low mounting assures immediate pressure</i>	Reliability Durability
2. Full flow oil cooler	<i>System provides full pump flow to oil cooler for maximum cooling</i>	Reliability Durability
3. Precision piston cooling flow	<i>Directed oil flow to the piston crown assures maximum cooling and component lubrication</i>	Durability Performance
4. Three valve protection	<i>System has cooler, filter and regulation valves for max protection and precise control</i>	Reliability Performance

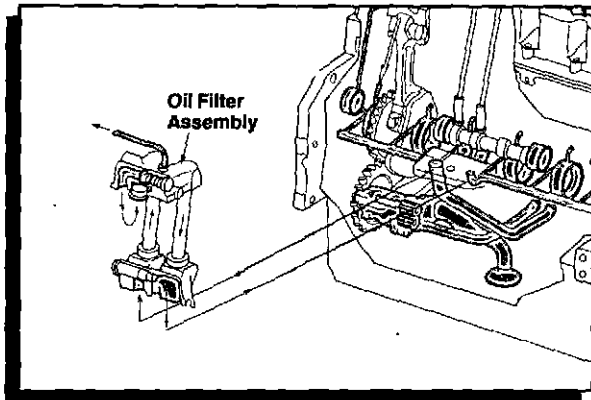
Lubrication is the life blood of the engine. No other engine system plays a more important role in engine protection than the lubrication system. In keeping with Deere tradition, the new **POWERTECH 8.1 L** has a very simple, yet highly efficient lubrication system.



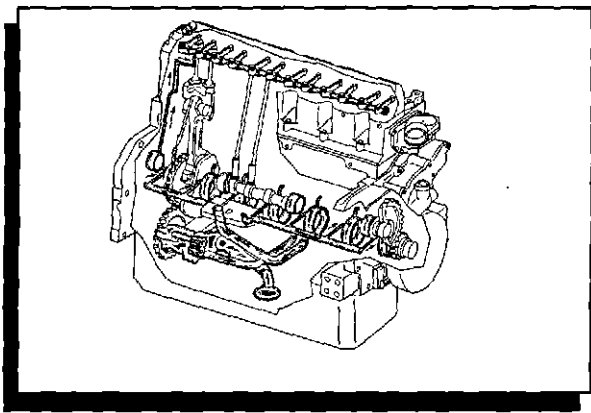
Lubrication system flow— The lubrication flow starts with the oil pump. The oil pump is mounted at the rear of the engine below the crankshaft. Flow starts as the pump picks up oil from the oil pan. From the pump, oil flow is directed to the oil cooler assembly on the left hand side of the engine. The oil cooler assembly has an integral cooler bypass valve. The cooler bypass valve is normally closed, directing the oil flow through the cooler element. The valve will open and allow the oil to bypass the cooler element when the oil is cold and viscous. From the cooler element or bypass valve, the oil flows to the filter assembly on the right hand side of the engine.



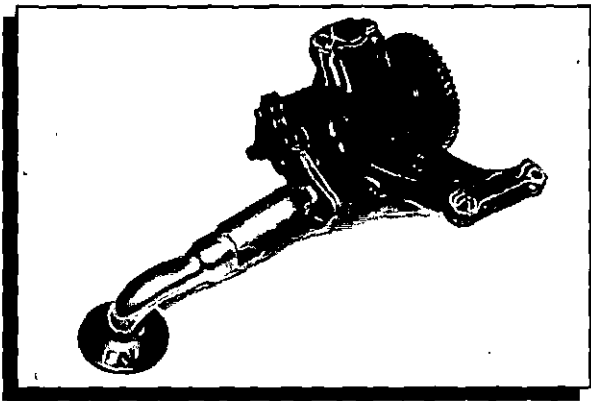
POWERTECH 8.1 L



④ The filter assembly has two integral valves that control oil flow. The first valve the oil flow encounters is the oil filter bypass valve. The bypass valve functions in a similar manner to the cooler bypass valve, protecting the filter element from over pressurization when the oil is cold. The valve also bypasses oil if the filter element becomes plugged from contaminants. From the filter bypass valve the oil flows to the filter element. The second valve in the filter assembly is the system pressure regulator valve. The pressure regulator valve controls the engine oil pressure. The oil pump is designed to produce more flow than the system needs to maintain sufficient oil pressure and provide lubrication for options like air compressors. The regulator valve maintains consistent pressure by continuously dumping a small amount of flow back to the oil pan.

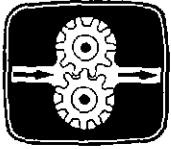


From the filter assembly, the oil flows into the main oil gallery. Seven drillings connecting with the main oil gallery provide oil flow for the main bearings, connecting rod bearings, cam bushings and the piston cooling nozzles. The rocker arm shaft receives oil flow from a groove around the rear camshaft bushing. The turbocharger receives flow through a hose connecting directly to the oil cooler/filter housing.

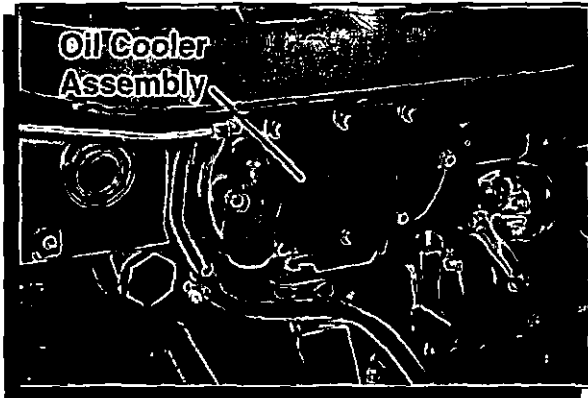


① **Oil Pump** – The oil pump is mounted at the rear of the block below the crankshaft. The pump is a gear type and is driven by a gear welded on the rear of the crankshaft. The gear type pump is extremely reliable and simple. The pump is mounted close to the oil level requiring a short pick-up tube. This low mounting with short pick-up tube ensures immediate oil pressure as the engine is started.

Summary: Some manufacturers locate their oil pump high in the engine, even above the center of the crank. During cold starts, these high mounted pumps can experience a delay before oil pressure is established. High demand components like the turbocharger can suffer when there is a delay in sufficient oil pressure at start up.

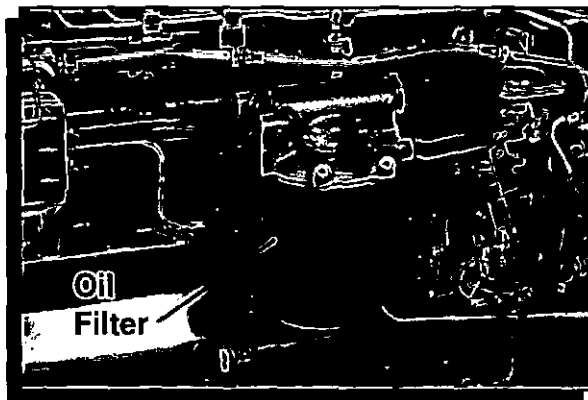


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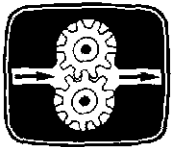
- ② **Cooler assembly** – The oil cooler assembly is mounted on the left hand side of the engine. The cooler assembly consists of the cover with cooler
- ④ by-pass valve and the cooler element. The element is a plate type and is positioned in the coolant manifold where it receives full coolant flow directly from the water pump. The exterior of the element is exposed to the engine coolant. Hot oil circulating through the interior of the element quickly gives up its heat to the coolant. Gaskets located between the block and element and the element and the cooler cover seal the coolant and oil passages.

***Summary:** The plate type cooler is a very efficient, compact and simple heat transfer medium. Mounting the element in the coolant manifold immediately after the water pump, allows it to receive the lowest temperature coolant ensuring efficient oil cooling. It also allows full coolant flow high velocity and maximum heat transfer.*

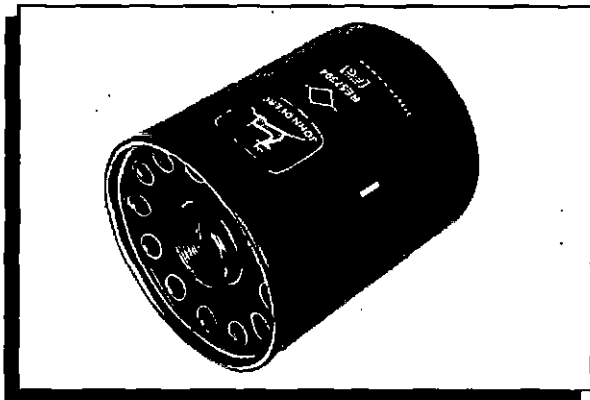


- Filter assembly** – The oil filter assembly is located on the right side of the block. It contains the filter bypass valve, pressure regulator valve and the vertical mount for the spin-on oil filter element. The vertical mounted filter allows easy and mess free filter element changes. The turbo-charger oil supply port is on top of the assembly and located after the filter. The oil filter housing has plugs to measure differential pressure for shut down systems.

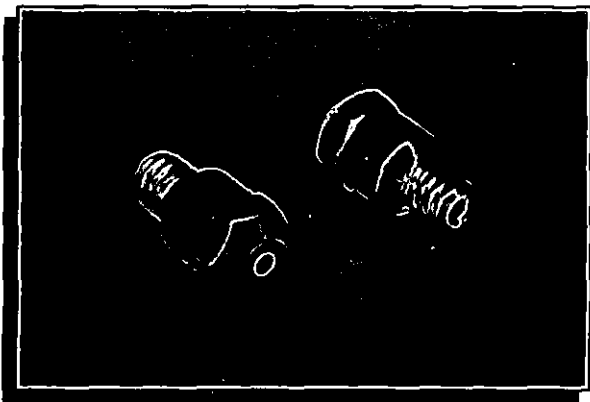
***Summary:** The filter base is also simple in design. All of the valves are externally mounted for ease of service. Some engine manufacturers locate critical valves internally. If a problem occurs, the engine must be disassembled for service.*



POWERTECH 8.1 L



Oil filter – The **POWERTECH** has a high capacity, full flow filtration system. The system has a ④bypass valve to protect the engine from oil starvation should a filter element become plugged. It also protects the element from over pressurization when the oil is cold. The filter element is a high capacity, high efficiency spin-on type. When changing the oil and filter, always insist on genuine John Deere replacement filter elements.



③ **Piston cooling nozzle** – Each cylinder has a piston cooling nozzle located below the liner. It receives oil flow from the drilling connecting the main oil gallery and main bearing. The nozzle provides a continuous stream of oil into the cylinder under the piston to cool the piston crown and lubricate the piston pin. The nozzle is threaded and fits into a threaded port in the block. The nozzle orifice is precision machined to direct a concentrated flow of oil to a precise spot on the underside of the piston.

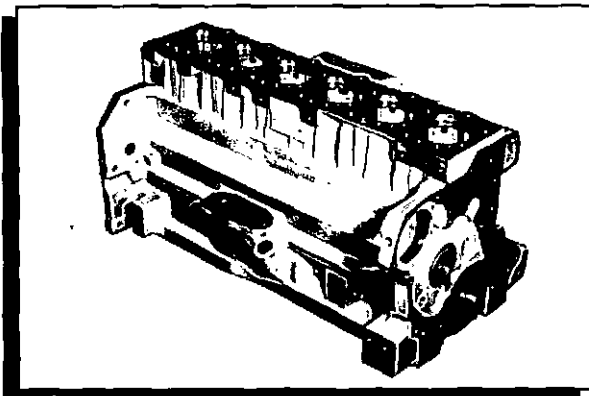
Summary: *Piston cooling is essential in high performance diesel engines. It allows the higher combustion pressures necessary for maximum power and good operating economy. It also provides better lubrication of the piston pin and cylinder walls. Some engine manufacturers use small tube nozzles that curve under the liners. Others actually use plastic nozzles. These designs are very prone to damage during service and are generally unreliable. The **POWERTECH** cooling nozzles, are small, compact precision machined steel units that thread into the block ports ... not small tubes and not plastic.*



POWERTECH 8.1 L

Cylinder Block

Feature	Advantage	Benefit
1. Heavy deep skirted block	<i>Excellent lower end strength and quiet operation</i>	Durability Environmental
2. Large front gear support	<i>Provides excellent overall strength and quiet operation</i>	Durability & Environmental
3. Large flywheel housing flange	<i>Maximum strength for flywheel housing mountings</i>	Durability Reliability
4. Large cam bore	<i>Heavy duty camshaft - extended camshaft and tappet life</i>	Durability Performance
5. Unique liner counterbore design	<i>Strength and unequaled head to block joint integrity</i>	Reliability



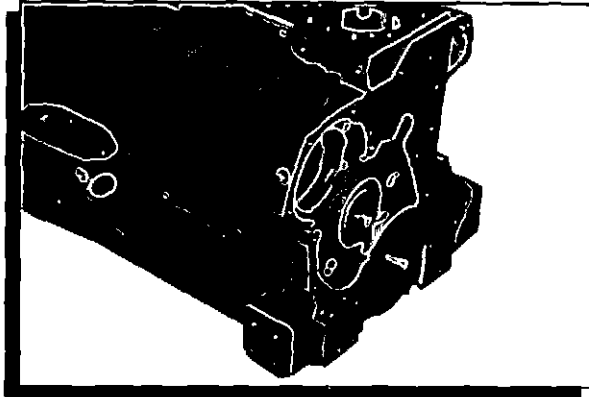
The foundation of the **POWERTECH** engine is a strong, precision cylinder block. John Deere engineers have designed the block for mechanical integrity, carefully putting material where it is needed for maximum strength and durability and not just creating a heavy weight. This excellence in design continues in the foundry, where rigorous quality control, sophisticated equipment and the highest quality materials insure a quality block casting every time. Before assembly, the block is machined to exacting tolerances and then carefully inspected.



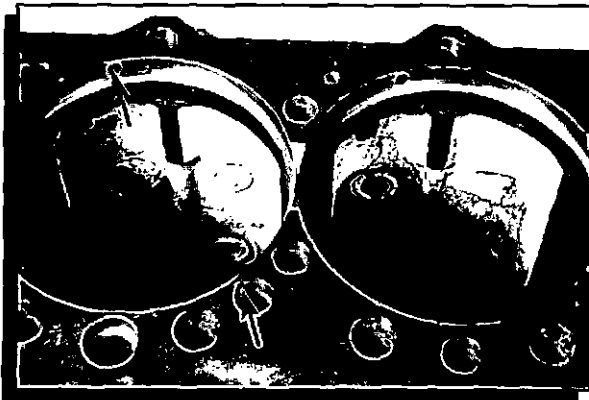
Lower End – The lower area of the block has a ① deep skirt with a wide pan rail. Integral webs connect the pan rail and skirt to the main bearing supports. The raised, boxed sections between the cylinders on the exterior provide additional rigidity to the lower end while reducing overall weight. The strong lower end design and the large main bearings would compare to many larger engines. It also produces a much quieter engine.



POWERTECH 8.1 L

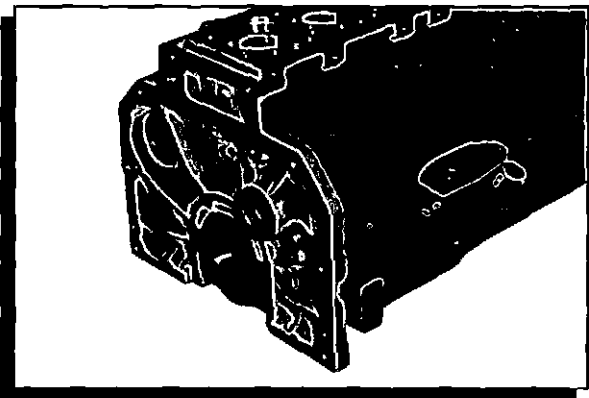


- ② **Front** – At the front of the block is a heavy integral gear support for the injection pump, and the gear housing. Large cam bores with replaceable
- ④ bushings support a strong and durable camshaft. An integral water manifold and oil cooler cavity are located on the left side of the block.



- ⑤ **Cylinders** – The liner counter-bore ledge is machined with a slight upward angle instead of being flat. This angle controls stress in the block to liner joint. The liner counter-bore also includes additional clearance and drillings for the directed liner cooling feature. The threaded head bolt holes are located in deep support columns for strength.

*Summary: The thickness of the head deck surface and unique counter-bore design afford the **POWERTECH** unequaled joint integrity. The rigid lower liner mounting helps eliminate liner vibration, pitting and cavitation.*



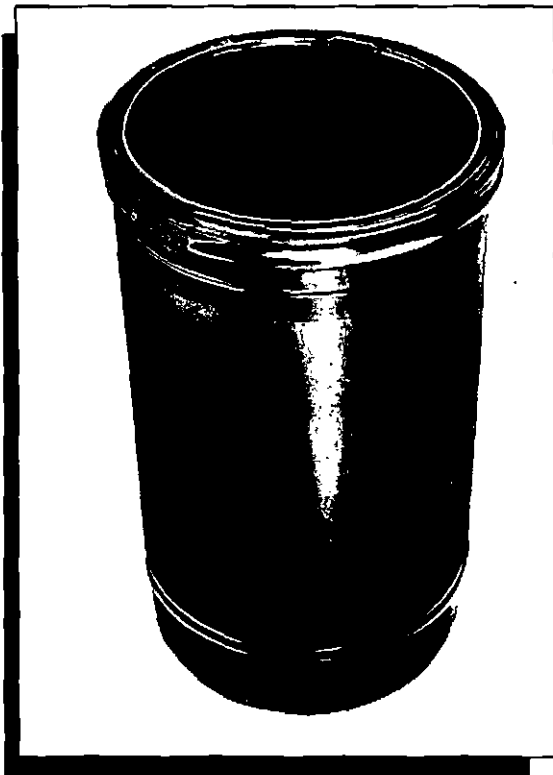
- Rear** – The rear of the block has an integral starter mount and large machined flange for
- ③ mounting the flywheel housing. This rear block flange provides exceptional rigidity to the rear of the block. This rear block strength is not found in competitor's engines.



POWERTECH 8.1 L

Cylinder Liner

Feature	Advantage	Benefit
1. Wet-sleeve cylinder liners	<i>Long service life and efficient operation - Service replacement brings engine back to original specifications</i>	Durability Reliability Serviceability Economy
2. Hardened and plateau honed walls	<i>Maximum resistance to wear and provides excellent oil control and combustion sealing</i>	Reliability Performance



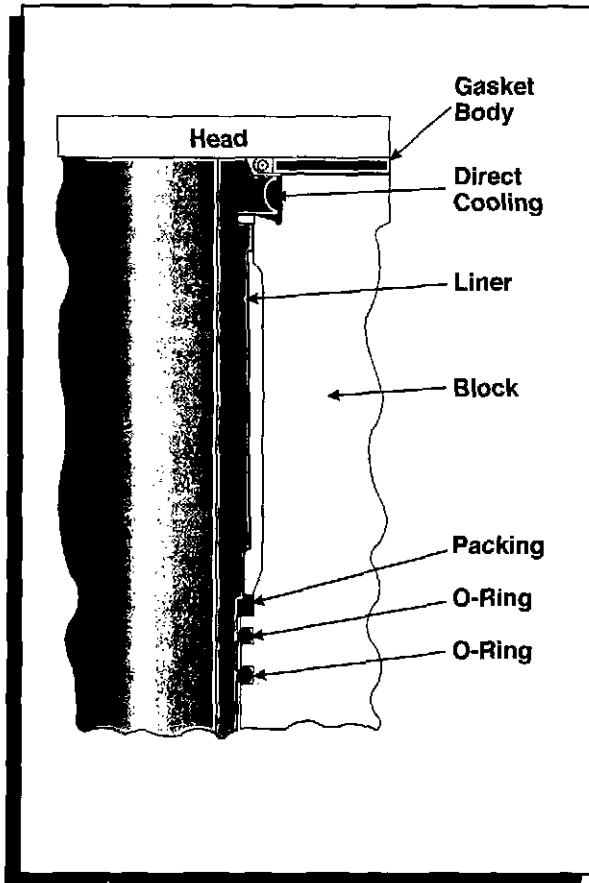
John Deere engineers have known for years that wet-sleeve liners mean reliability in high performance diesel engines. The engineers, however, did not stop with just wet liners. The **POWERTECH** wet liners incorporate many unique features that set them apart from the pack...features that provide unequalled reliability and durability as well as performance.

① **Liner** – The wet-sleeve cylinder liners are made from an alloy iron material. The liners are centrifugally cast to assure the quality of the liner surface. Centrifugal casting forces any impurities in the molten material to the outside where they are machined away. This process also affords the liner better heat transfer capabilities and an excellent bore surface.

The wet-sleeve liner has a flange which fits into the counterbores in the cylinder block. Combustion sealing is provided by metal-to-metal compression of the fire ring and coolant sealing is provided by head gasket crush. The design of the liner flange in conjunction with the angle of the block counterbore and long head bolts with "torque-to-yield" tightening procedure provides the ultimate in head to block joint integrity.



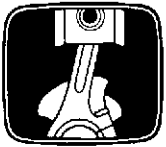
POWERTECH 8.1 L



The liners are induction hardened to ensure maximum resistance to wear. The plateau honing process provides an excellent sealing surface for the piston rings. Piston and liner kits are provided for service replacements to bring the engine back to original specifications.

Liner seal – The lower liner seals provide coolant sealing and dampen some vibration. Three lower liner seals are used. The top seal is a square type neoprene packing. The lower two seals are special compound o-rings.

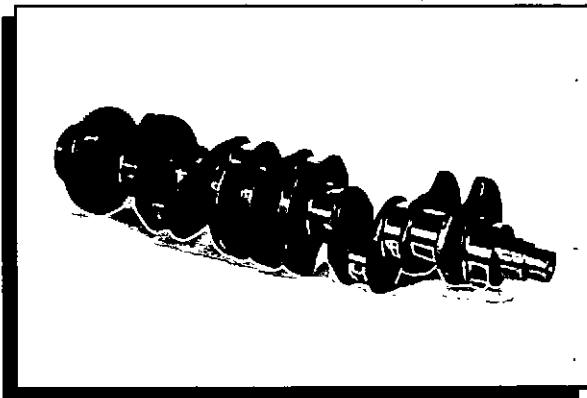
*Summary: Some manufacturers depend on integral bore blocks, others use dry type liners...only slightly better. Several popular engine models that do use wet liners don't bother to harden the liners. Some engine manufacturers use only one liner seal. Compared to the competition, the **POWERTECH** has all of the features necessary for high performance and reliability.*



POWERTECH 8.1 L

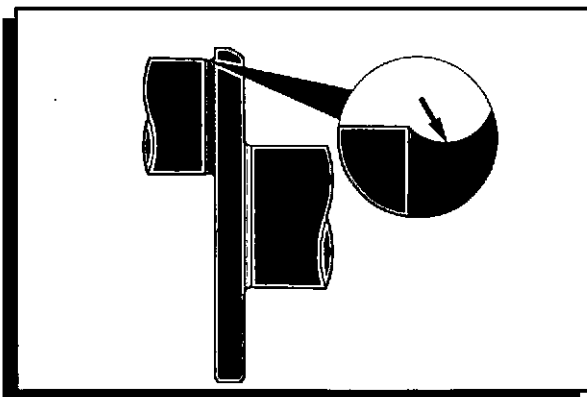
Power Train

Feature	Advantage	Benefit
1. Heavy duty crank with large journals	Strong lower end necessary for high torque and long service life	Durability Performance
2. Front and rear seal wear sleeves	Eliminates seal produced wear grooves and increases the service life of the crankshaft	Reliability Durability
3. Angle mounted rod caps	Allows larger diameter rod journal and reduces stress on bolts	Durability Performance
4. Piston with new bowl design	The re-entrant design bowl with ceramic fiber provides better combustion and is more durable	Environmental Performance Economy
5. High ring design piston	Higher performance, better fuel economy and low emissions	Performance Environmental

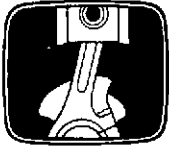


The power train matches the high performance specifications of the **POWERTECH** in every respect. John Deere engineers have designed the **POWERTECH** power train to meet the most demanding applications.

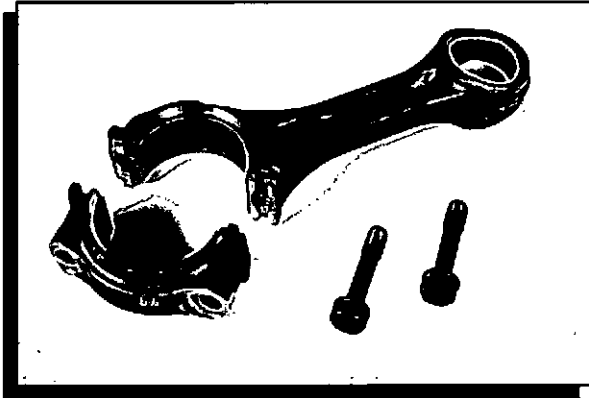
- ① **Crankshaft** – The crankshaft in the **POWERTECH** is machined from a high quality steel forging. The large diameter of the main and rod journals allows overlap of the two diameters. This overlap increases the strength of the crankshaft. The crank design includes counterweights to balance the rotating mass of the crankshaft and large end of the connecting rods. Additionally, the crankshaft is dynamically balanced for smooth vibration free power through the complete RPM range. To insure maximum service life, the main journal and rod radii are induction hardened and then shot peened. The rod journals have a unique
- ② undercut radii. Also, front and rear seal areas of the crank have wear sleeves which prevent seal wear on the crankshaft.



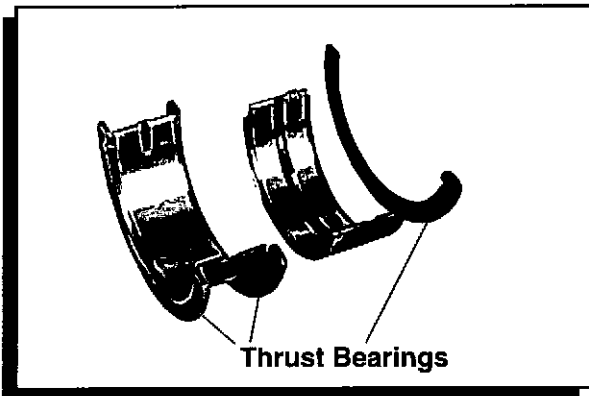
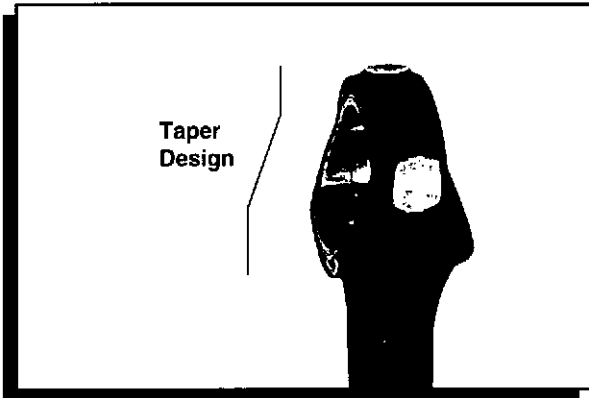
Summary: The counterweighted and balanced crankshaft with induction hardened large main and rod bearings classifies as a heavy-weight in every respect.



POWERTECH 8.1 L

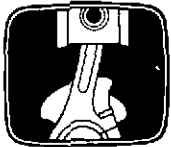


Connecting rods – Like the crankshaft, the connecting rods are also machined from a high strength steel forging. The rod utilizes a split angle mounted cap. The angle mounted rod cap allows a much larger rod journal diameter than possible with a straight mounted cap. To insure positive cap to rod alignment, a tongue and groove mounting surface is used. The piston pin end of the rod is tapered. This taper design places the large bearing contact area under the piston to transfer the combustion force to the crankshaft during the power stroke. It also positions the pin so that more piston area rests there, reducing stress on this contact point.

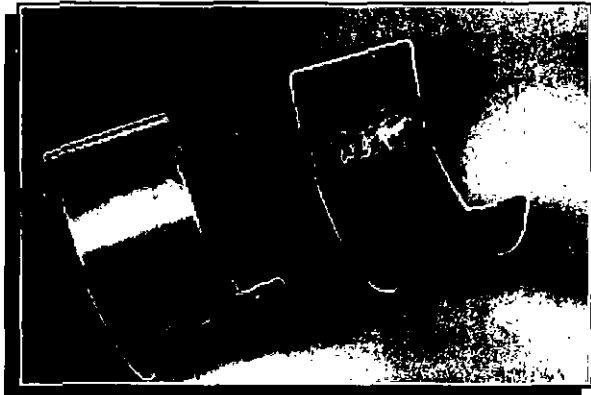


Main and thrust bearings – The main bearings are steel-backed and aluminum-lined. The upper bearing shell has an internal oil groove which connects with the oil drilling. The oil groove continues into either side of the lower bearing shell. This extension of the oil groove insures distribution of the oil over the complete bearing surface for continuous lubrication to the rod bearings. The oil groove does not however extend into the high load area of the lower bearing shell.

To cover all potential thrust loads that may be applied to the crankshaft, the **POWERTECH** engine is equipped with a unique five piece combination thrust and main bearing. The thrust bearing is located between the fourth and fifth cylinders on main #5. Since most thrust loading on the crankshaft is in the forward direction, two thrust bearing halves are located on the rear side of the crankshaft and one half on the front side.

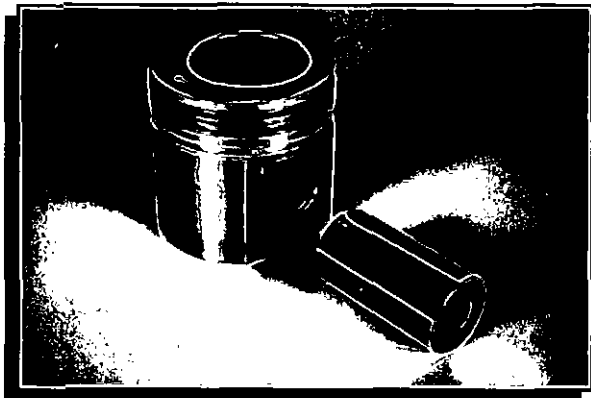


POWERTECH 8.1 L



Rod bearings – The rod bearings have the new patented WEAR-GARD bearing surface material. This new bearing material is extremely durable and provides excellent bearing and crankshaft journal life. The rod bearings also have a built-in oil pocket in the bearing surface. This pocket area insures a uniform oil film over the journal at all times. It also reduces peak oil film pressure and increases film thickness for better fatigue resistance and longer life.

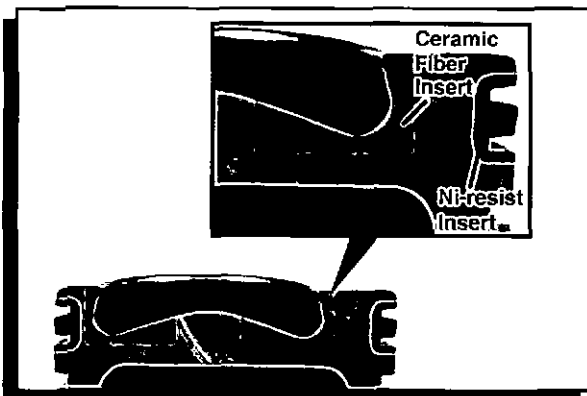
Summary: The new rod bearings provide the ultimate in durability and long service life.

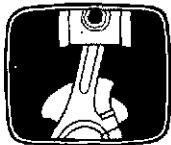


④ **Pistons** – The piston combustion bowl is a re-entrant design that enhances the fuel/air mixing in the combustion chamber. This provides a very efficient combustion for maximum power and low emissions. The “H” piston is cast from high quality aluminum alloy using a new “squeeze cast” technique. It has a ceramic fiber insert that provides additional crown reinforcement for the high engine power output. The “A” piston is squeeze cast, but not reinforced with a ceramic insert, and the “T” piston is gravity cast.

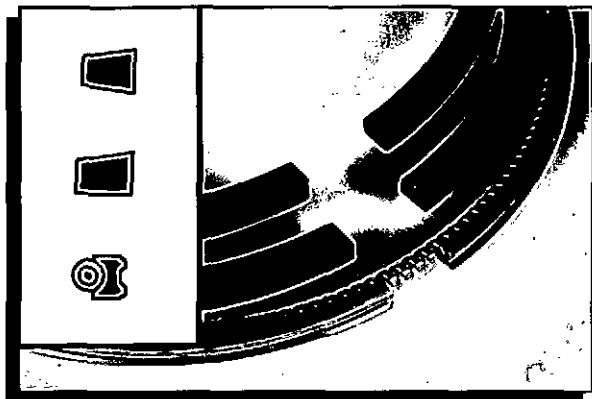
⑤ The high ring design piston utilizes three piston rings. The object of the high ring placement is to reduce dead space between the top ring and the piston crown. This reduced dead space allows a more complete combustion for better performance, economy, and emissions. It also provides better engine starting characteristics. The top two rings are mounted in a Ni-resist insert. The Ni-resist “cast iron” insert is cast into the piston and provides excellent wear characteristics for the rings and grooves. The pistons have full floating pins which are offset to one side for reduced side forces.

Summary: The new design piston provides the ultimate in combustion efficiency for maximum power and low emissions.





POWERTECH 8.1 L

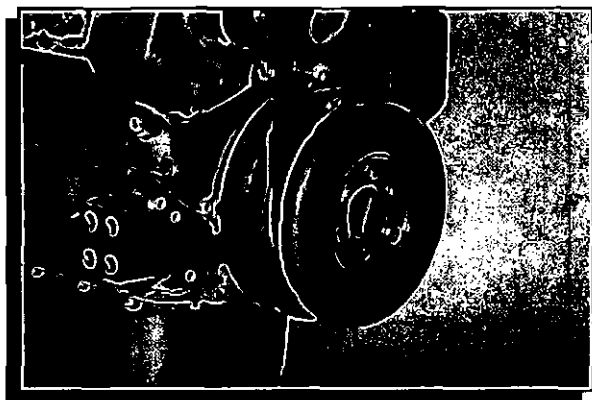


Piston rings – The top ring is a keystone shaped ring with a barrel faced plasma coated surface. The keystone shape provides excellent ring and groove wear characteristics. It is self cleaning and resists sticking. The barrel shape and plasma coating resist liner wall scuffing and provide excellent sealing.

The second ring is a new 1/2 keystone design. It provides better combustion sealing as well as good oil control.

The lower oil control ring is a new chrome-plated conformable steel type. The ring is very flexible which insures total contact with the cylinder liner wall for the excellent oil control.

***Summary:** The new ring pack provides combustion sealing and oil control efficiency necessary for high power ratings of the engine.*



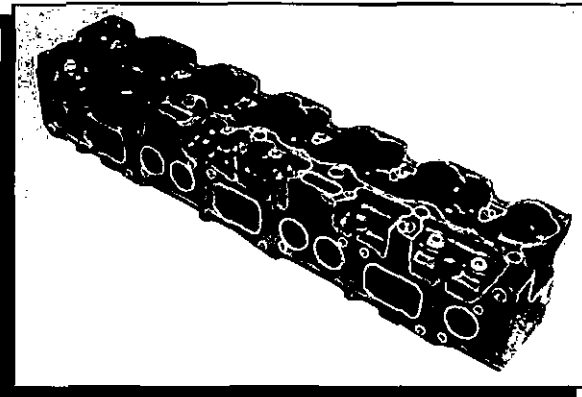
Crankshaft damper – The vibration damper is mounted on the front of the crankshaft. It is used to absorb and dampen torsional vibration present in all six cylinder diesel engines. The damper is a rubber mounted inertia ring type. A dual damper is used for the higher horsepower models.



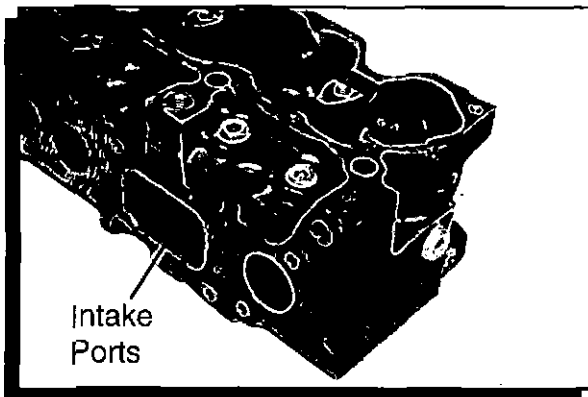
POWERTECH 8.1 L

Cylinder Head

Feature	Advantage	Benefit
1. Heavy, deep cross section	<i>Excellent strength and unequaled head to block joint integrity</i>	Durability Reliability
2. U-flow ports	<i>Simple and compact intake and exhaust layout</i>	Economy Serviceability
3. Controlled intake air swirl	<i>Highly efficient combustion and reduced emissions</i>	Performance Environmental



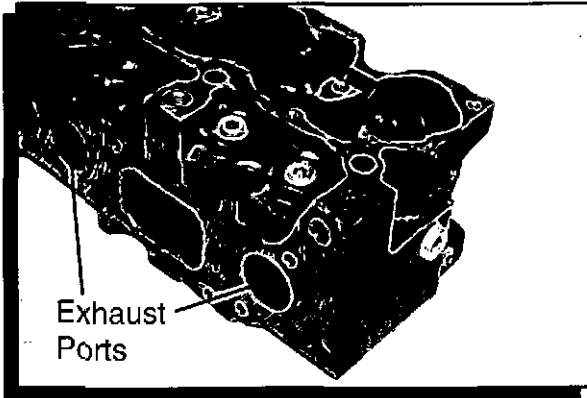
① The **POWERTECH** head is a heavy-duty one piece design with a deep cross section. The heavy and deep cross section design provides excellent head to block strength. The U-flow port design positions both intake and exhaust components of the left side of the head for a very compact efficient air handling system. The offset position of the injector plus the valve reliefs in the head deck surface promote extremely efficient combustion.



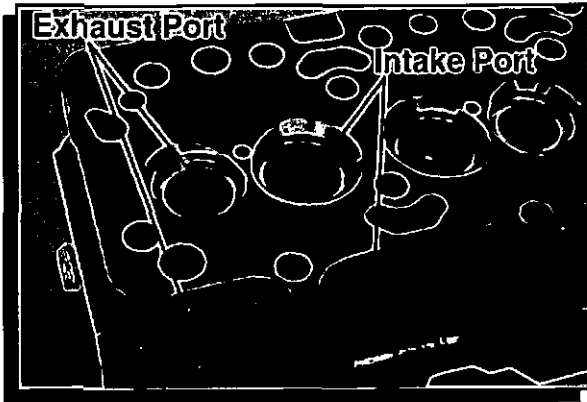
② **Intake ports** – The cylinder head has three large intake ports which allow high air flow to the cylinders. The correct air swirl ratio in the combustion chamber is critical to efficient combustion. Thus, ③ the intake air swirl is precisely controlled by the design of the port, valve seats and the relief in the head deck surface.



POWERTECH 8.1 L



Exhaust ports – The cylinder head has individual exhaust ports. The design of the head and valve components allows unrestricted flow of the exhaust into the exhaust manifold. The reliefs in the head deck surface also reduce the potential for thermal cracking between the valves.

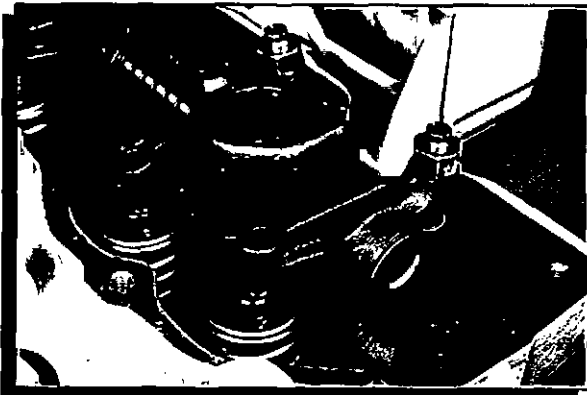




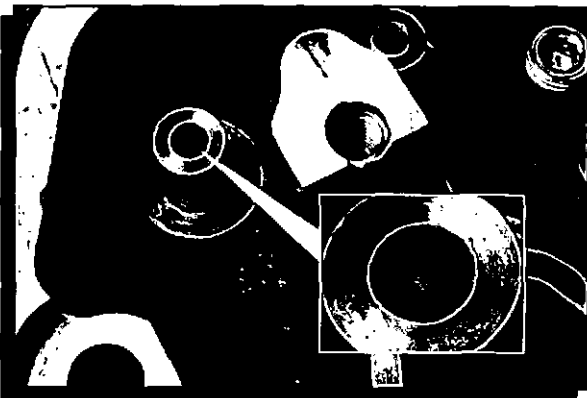
POWERTECH 8.1 L

Cylinder Head Components

Feature	Advantage	Benefit
1. Integral valve guides	<i>Simple, economical and very efficient</i>	Economy Durability
2. New powdered metal seats	<i>Extended valve and head life - reduced emissions</i>	Durability Serviceability
3. Valve wear caps	<i>Extended valve adjustment intervals and valve and rocker life</i>	Durability Serviceability
4. Torque to yield head bolts	<i>Produces uniform clamping force on cylinder head for long head gasket life</i>	Durability Reliability Economy



Valve Assemblies – Since the cylinder head and valve train are so critical to engine performance, John Deere engineers have done extensive research and development to perfect the **POWERTECH** valve train. Each of the valve components has been designed to become an integral part of the overall head design.

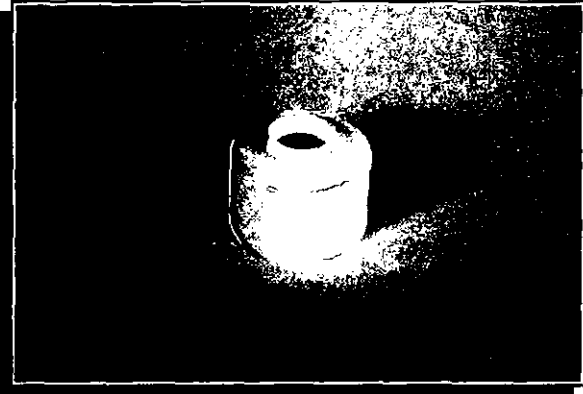


① **Valve guides** – The **POWERTECH 8.1 L** cylinder head utilizes integral valve guides for simplicity and economy. The guide bores are threaded to retain oil for valve stem lubrication and cooling. In the unlikely event that a guide must be renewed, several techniques are available.

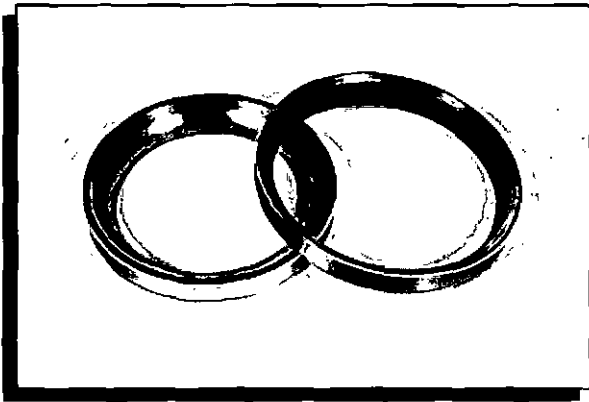
Summary: *The John Deere designed integral guides with threading are simple yet extremely durable.*



POWERTECH 8.1 L

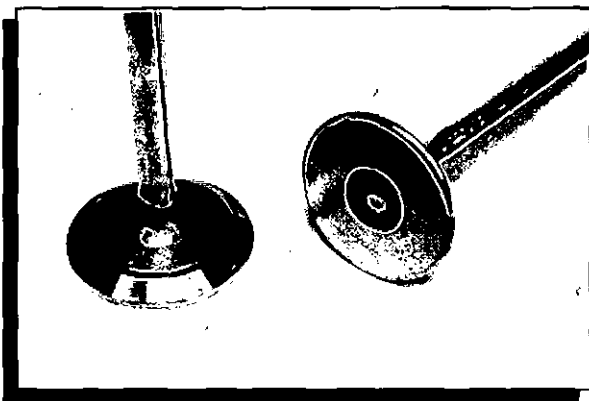


Valve seals – Valve seals are used on all exhaust valves to control stem lubrication. The valve seal also enhances the engine's clean emissions and control unnecessary oil consumption.



② **Valve seats** – The cylinder heads have replaceable valve seats for both intake and exhaust valves. The valve seats have been designed to match the flow contours of the ports and the valves to assure smooth air and exhaust flow. The seats are made by a new powdered metal process that creates a micro structure capable of trapping lubricants. The material although hard and durable is similar to a sintered bearing material. The benefit of this new seat is that it will not allow carbon build-up on the seat or valve.

Summary: These new seats have been so successful that the John Deere engineers have determined that valve rotators are no longer needed.



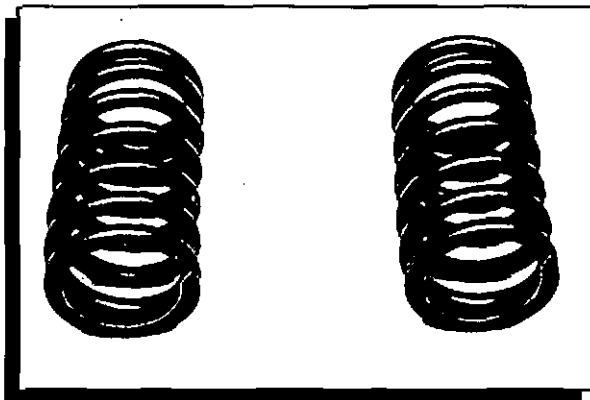
Valves – Large valves are used in both the intake and exhaust to insure unrestricted air and exhaust flow through the engine. The exhaust valves are a bi-metal design. The valve head has a high alloy content which resists the high temperatures of turbocharging and provides good wear characteristics. The valve stems are a low carbon material and are chrome plated to prevent scuffing. The large diameter intake valves are contoured to promote high air flow.



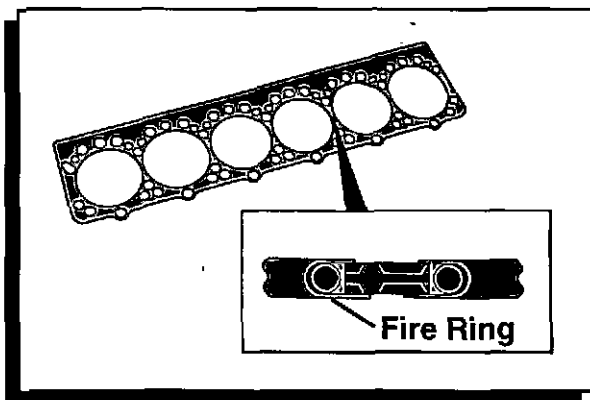
POWERTECH 8.1 L



③ **Valve caps** – Valve caps are also an exclusive on the *POWERTECH* engines. The valve caps increase the contact area between the valve and the rocker to reduce friction and wear. The valve caps practically eliminate wear to the valve stem top. This results in longer intervals between valve adjustment and longer valve and rocker life.



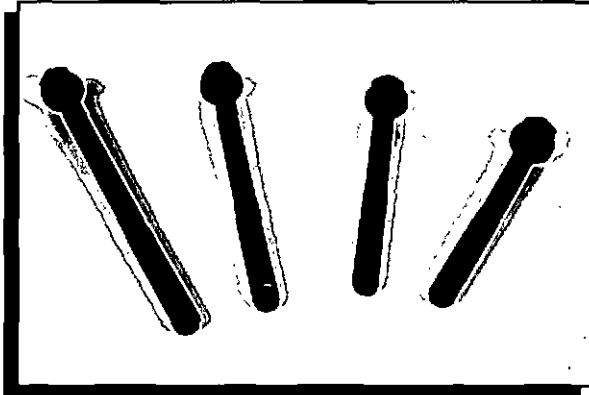
Valve springs – The valve springs are designed specifically to operate with the *POWERTECH* valve train. The same spring is used on both the intake and exhaust valves.



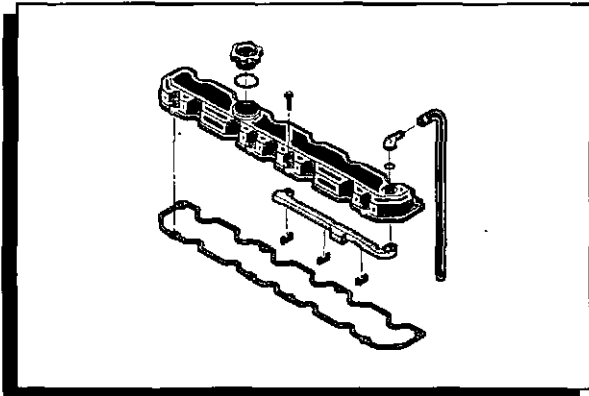
Head gasket – The head gasket is a new, advanced five layer steel and graphite type with stainless steel fire rings. The graphite provides excellent sealing of fluids with extremely high temperature capability for exceptional life. The solid steel core provides support for the fire ring, the graphite, and for handling.



POWERTECH 8.1 L



④ **Head bolts** – The cylinder head utilizes 26 head bolts. To insure maximum and consistent clamping force on the head, the head bolts use a torque-to-yield method for tightening. This method of tightening provides the most consistent clamping force possible. It allows the high combustion pressures necessary for high engine output and increases head gasket and component life.



Rocker cover – The *POWERTECH* has a new rocker cover made from a high strength composite material. The cover has a rigid gasket carrier which provides improved sealing. The gasket is also a reusable type.

***Summary:** The new composite cover will not corrode, has excellent sound absorption characteristics and a leak resistant gasket.*

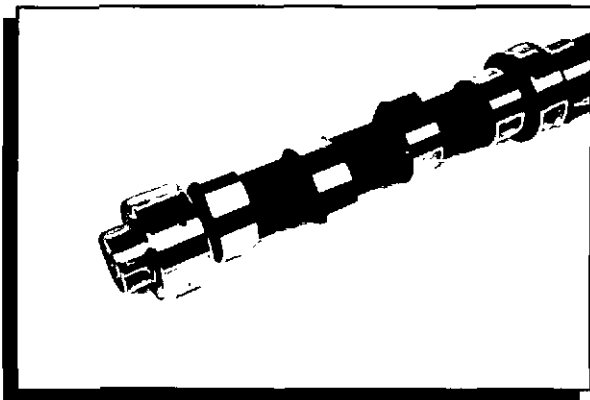


POWERTECH 8.1 L

Camshaft and Valve Train Components

Feature	Advantage	Benefit
1. Large diameter high lift camshaft	<i>Resists flex at high RPM - allows higher lift for performance and emission control</i>	Performance Reliability
2. Mushroom type followers	<i>Simple design, yet very efficient and durable</i>	Economy Durability
3. Large diameter solid core push rods	<i>Resist flex at high RPM and provides longer adjustment intervals</i>	Durability Serviceability

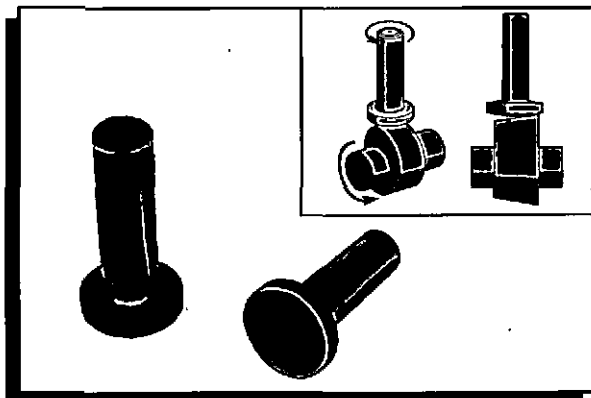
John Deere engineers spared no effort in achieving their goals for camshaft and valve train performance. The **POWERTECH** camshaft and valve train is heavy duty throughout. It provides the valve lift and duration necessary for high engine output and low emissions.



① **Camshaft** – The **POWERTECH** camshaft is located low in the heavy structural part of the cylinder block and rotates in replaceable bushings. The camshaft design utilizes large diameter, high lift lobes with four oversized bearing journals. It is machined from a chilled iron casting containing a high percentage of carbide. Additionally, the cam lobes are hardened and precision ground to provide the maximum resistance to wear. The nose of the camshaft, where the gears are press-fit into place, is also hardened.

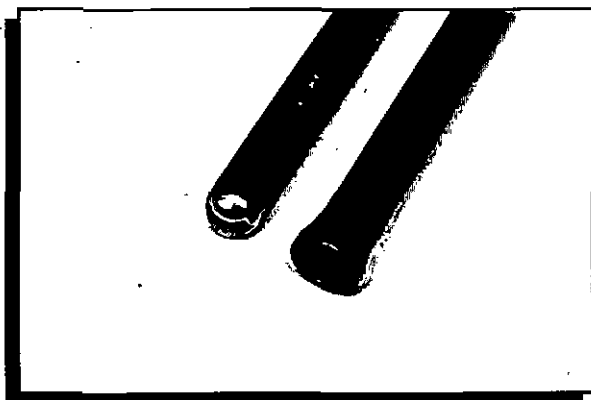


POWERTECH 8.1 L



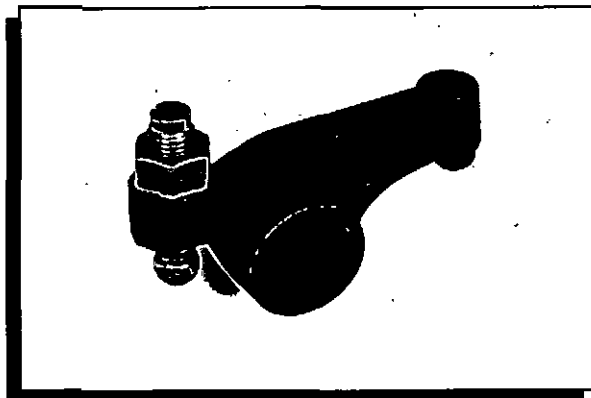
② **Cam followers** – Like the camshaft, the followers are made from material containing a high percentage of carbide to resist wear. The mushroom type cam followers are mounted in bores in the cylinder block above the camshaft and have spherical ground faces to promote positive rotation.

Summary: Rotating the follower extends both the camshaft and cam follower service life.



③ **Push rods** – The **POWERTECH 8.1 L** has large diameter solid core push rods with heat treated balls and sockets to resist wear. The large diameter push rods resist flex at higher engine speeds.

Summary: Most engine manufacturers use push tubes or small diameter solid rods, both of which will flex at higher engine speeds.



Rocker arm assembly – The rocker arms are made from a high tensile strength nodular iron casting. All of the engine rocker arms pivot on a single hardened steel shaft. The adjusting screw has a hardened ball that mates with the push rod. The nose of the rocker that contacts the valve cap has a hardened insert. The rockers are pressure lubricated through a drilling in the rocker shaft.

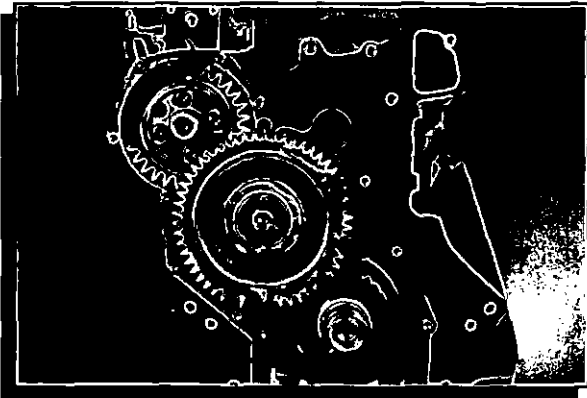
Summary: The POWERTECH rocker arm is designed to allow more valve travel and provide longer intervals between valve adjustment.



POWERTECH 8.1 L

Gear Train

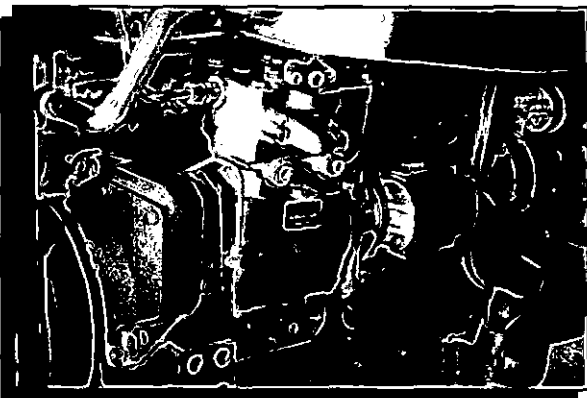
Feature	Advantage	Benefit
1. High contact spur gears	<i>Provides excellent power transmission and quiet operation</i>	Durability Reliability
2. Heavy duty auxiliary gear drive	<i>Both factory and field mountings with SAE "A" and "B" flanges</i>	Reliability Serviceability Reliability



Front gear train – The **POWERTECH** gear train is located on the front of the engine and drives the camshaft, fuel pump, water pump and accessories. The gears are a high contact spur type, which are both strong and quiet. The camshaft has two gears. The larger outer camshaft gear is driven by the crankshaft gear. The camshaft gear drives the water pump gear. The smaller inner camshaft gear drives the fuel pump.

Summary: Compared with other engines in its size class, the 8.1 L offers a very heavy duty and quiet gear train.

Rear gear train – The rear gear train operates the lubricating oil pump.
(See *Oil pump* for details.)



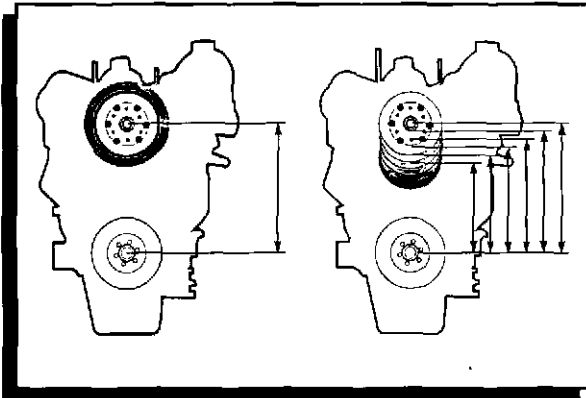
② **Auxiliary gear drive** – Only the **POWERTECH** with its large heavy duty gear train is able to offer an integral auxiliary gear drive that can handle 60HP (45kW) intermittent output. Additionally, the auxiliary drive can be factory or field mounted. Both left and right drives are available. SAE "A" and "B" mounting flanges are available for all mountings.



POWERTECH 8.1 L

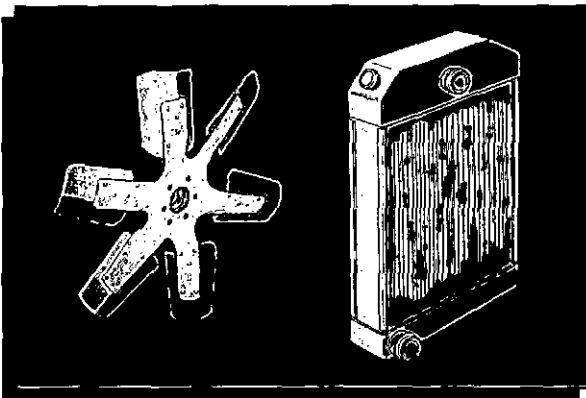
Application Flexibility

Feature	Advantage	Benefit
1. 22 different fan drives	<i>Provides excellent installation flexibility</i>	Serviceability
2. New eight rib "poly-vee" drive belt	<i>Excellent power transfer for the fan as well as an alternator and freon compressor.</i>	Reliability Performance
3. Both side and top oil service	<i>Allows the engine to be placed in very tight and restricted compartments</i>	Serviceability



① **Fan drives** – The 8.1 L has been designed for application flexibility, offering both fixed and adjustable height fan mount options. Mounting heights range from 12.5 to 19.6 inches above the crank centerline. Drives ratios range from 0.72:1, 1:1 and 1.2:1 for the adjustable to 1:1, 1.13:1 and 1.2:1 for the fixed mount. Both adjustable and fixed fan drives have belt arrangements options that can accommodate an alternator and a freon compressor.

② The new fan drives feature an eight rib "poly-vee" belt and an automatic belt tensioner. The automatic tensioner assures proper belt tension even when the belt is worn. A second belt idler is used when both alternator and freon compressor options are selected.



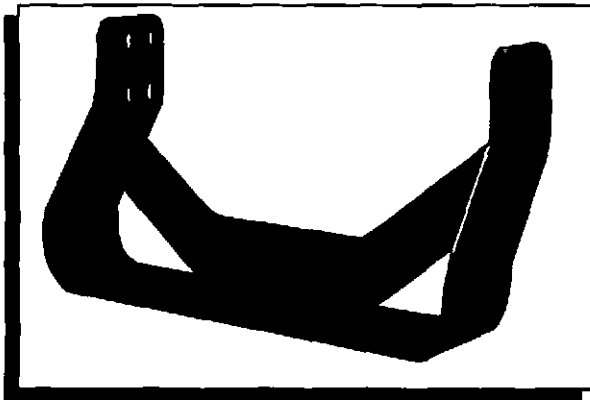
Radiator and fan – The radiator and fan are application specific. Several radiators and fans specifically designed to match the power output and application are available as field installed accessories.



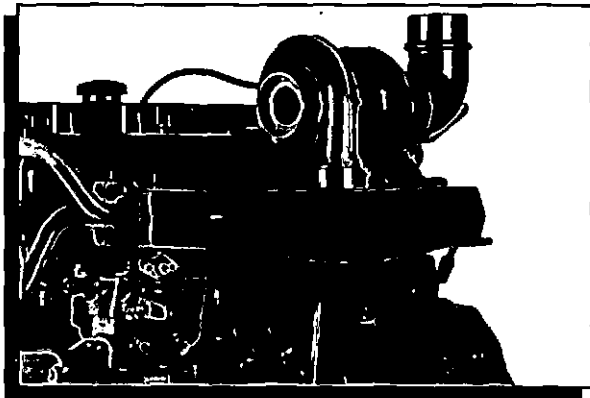
POWERTECH 8.1 L



③ **Dipstick and oil fill** – For convenience, the oil dipstick and filler port are combined and can be mounted on either side of the engine to accommodate any application. An extra large oil fill opening has been provided for ease when adding oil to the engine. There are also the left-hand pan mounted and top-service dipsticks available as options.



Other application features –The 8.1 L now offers three point engine mounting with a new single pad front engine mount. There are low-profile turbocharger options for tight engine components.



Summary: *The 8.1 L affords unmatched application flexibility. A total of 22 different fan drive arrangements are available. The "poly-vee" belt drive system provides excellent durability. All components are driven by the ribbed side of the belt. Several manufacturer's actually drive powered components off the back (smooth Side) of the belt. And finally, simple conveniences like the new combined dipstick/oil fill that can be mounted on either side of the engine are just a small part of the POWERTECH 8.1 L story.*



POWERTeCH 8.1 L

Engine Identification Plate

- **RG** Factory Produced By
RG = Waterloo, Iowa
 - **6081** Number of Cylinders and Total Displacement
6076-6 Cylinders, 7.6 liters
6081-6 Cylinders, 8.1 liters
6466-6 Cylinders, 466 cu. in.
 - **T** Fuel and Air Intake System
D = Diesel Naturally Aspirated
T = Turbocharged
A = Turbocharged and Aftercooled, Air to Water
H = Turbocharged and Aftercooled, Air to Air
 - **000000** Engine Serial Number
000000
- JOHN DEERE**
Engine Serial Number
RG 6081 T 000000
6 081 T F0 01
DEERE & COMPANY Moline, ILLINOIS Made in USA
- **6** Engine Serial Number
4 - Four Cylinders
6 - Six Cylinders
 - **081** Displacement
8.1 - liters
 - **T** Fuel and Air Intake System
D = Diesel Naturally Aspirated
T = Turbocharged
A = Turbocharged and Aftercooled, Air to Water
H = Turbocharged and Aftercooled, Air to Air
 - **F0** User
F - OEM (Deere Power Systems Group)
T - John Deere Dubuque Works
N - John Deere Des Moines Works
RW - John Deere Waterloo Works
R - John Deere Waterloo Works, early models
H - John Deere Harvester Works
E - John Deere Ottumwa Works
DW - John Deere Davenport Works
L - John Deere Werke Manheim
Z - John Deere Werke Zweibrucken
 - **01** Engine Application Version
01 - User factory's 1st application
02 - User factory's 2nd application, etc...



DEERE
POWER

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