ComAp Electronic Engines Support

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ECU List version 5.8

Reference Guide

ComAp a.s.

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Principle of ECU support

Since the engines with electronic fuel injection became commonly used, ComAp has introduced a convenient solution for monitoring and management of such engines based on existing controllers InteliLite and InteliGen. These used to be fixed programmed and dedicated to a specific engine type, ECU or communication protocol. A separate module – I-CB (Communication Bridge) – was designed to interface InteliSys controller and ECU unique for its hardware or software features (e.g. communication speed).

Due to great development on the side of the engine manufacturers regarding electronic equipment and amount of transmitted data from the ECU/engine, ComAp had to react promptly and launched new system of ECU support in the controllers. This new approach described below was started by the InteliDrive DCU controller. Later on it was adopted by the InteliLite controller (since version 2.0) and nowadays is integrated into all ComAp controllers.

The new way of ECU support provides above all an easy and fast way how to integrate a new type of ECU. Although the engine manufacturers often declare that the unit provides standard J1939 communication, after deeper analysis many of them appear to use proprietary data frames. Therefore ComAp controllers are simply reconfigurable for such specific units using an external file – Engine Specific Code (ESC) – which contains all necessary information about transmitted values, commands and diagnostic messages. The contents of this file are downloaded to the controller which can afterwards provide complete data monitoring and engine control over the CAN bus.

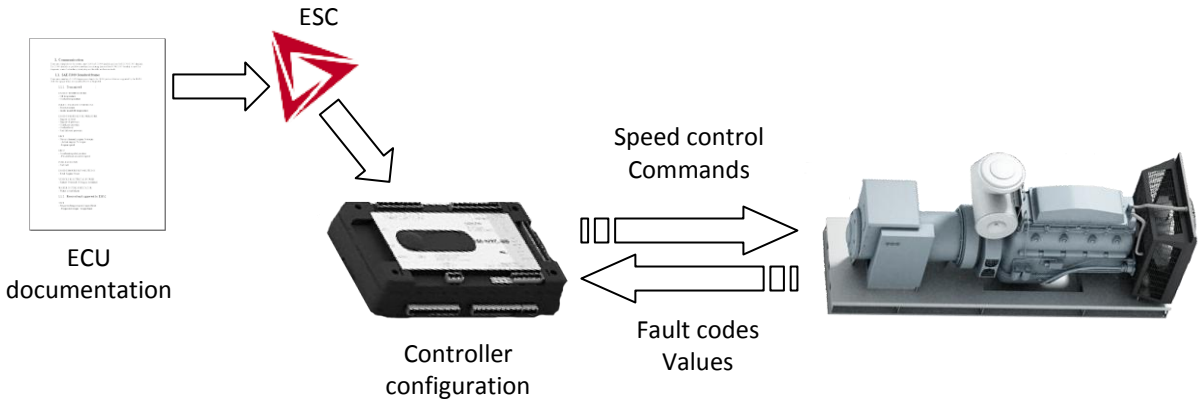
The above described procedure of implementation of an ECU support ensures easy to use and fast configuration however it doesn't reduce the controller's flexibility. The user should be aware that ComAp provides default configuration and the controller must be adapted and configured to particular application. Providing the most common adjustment doesn't eliminate the need to thoroughly test the functionality of the installed controller in conjuction with the genset and other equipment and advice the end user about the way of it's operation.

Due to quick development in this area it is strongly recommended to check up ComAp web pages (www.comap.cz) for software and documentation updates ahead of carrying on with projects comprising electronic engines.

What must be done to support a new ECU?

Lets say about units communicating over CAN bus and using J1939 protocol (we will leave out specific units - using RS232/RS485 or their own CAN bus lines, Modbus). As mentioned above we cannot rely on ECU brief specification which states that the unit supports J1939 protocol but we have to study a comprehensive specification describing all details of data communicated by the unit. Only then it is possible to create an ESC and test it with the engine. So the necessary steps are in brief:

- Study ECU documentation
- If the ECU is fully compatible with SAE J1939-71, an ESC for "Standard J1939 engine" can be used
- If the ECU is sufficiently but not fully consistent with SAE J1939-71, a new ESC has be created in ComAp
- The controller with new ESC has to be tested with the engine/ECU (without testing the functionality is only theoretical – operating conditions of ECUs can vary a lot (for example sequence of activating/deactivating of ECU inputs during starting/stopping of the engine))



What data can be transmitted to/from ECU?

There are generally four types of data communicated between the controller and ECU:

- Values read from the ECU (e.g. Engine coolant temperature, Lube oil pressure)
- Values/parameters written to ECU (e.g. Speed control, Frequency select)
- Commands written to ECU (e.g. Start/Stop, Fault reset)
- Fault codes

What is an ESL file?

ESL (ECU Specification List) file contains list of all supported ECUs and so list of ESC available for a given controller. This list appears in LiteEdit, DriveConfig, GenConfig, NanoEdit, ECUDiag as a list of available engine/ECU types. The ESL file also defines communication/diagnostic protocol used in the ECU.

What is the default ESL setting?

ComAp offers many kinds of controllers for various applications. Almost each of our controller supports electronic engines, but the configuration PC software and its settings are different. Therefore we have various ECU lists designed for each product family. In the table there is a description of recommended ESL across our products family.

	Controller's Family			
Allspeed.esl	InteliDrive DCU	InteliDrive Lite		
Gensets.esl	InteliGen^{NT}	InteliSys^{NT}		
InteliLite.esl	InteliLite^{NT} *	InteliComapct^{NT}		
Mobile.esl	InteliDrive Mobile			
InteliNano.esl	InteliNano^{NT}			
DriveNano.esl	InteliDrive Nano			

*except InteliLite^{NT} MRS3, MRS10, MRS11 and InteliLite^{NT} AMF8, AMF20

It is possible to use e.g. ECU list – Allspeed for InteliGen^{NT} or InteliSys^{NT} controller family. In that case the default settings and/or some values (fault codes) might be unavailable or different.

How to import ESC - ESL package?

The “ECU list-x.y” package can be downloaded from ComAp website (www.comap.cz) and imported into a PC software in the same way as a standard firmware package.
It can also be part of an installation package, in this case it is not necessary to import it separately.

Why ESC and ESL have different versions?

Each ESC has a version which changes with each modification. For example if a new value or diagnostic message is added. An ESL version changes if any of ESC version is changed. It is not possible to issue a new ESC without a new ESL. In practice a whole “ESL-ESC” ("ECU list") package is released and it is distributed separately or included in the installation package of the controller.
The configuration softwares (LiteEdit, DriveConfig, GenConfig, NanoEdit) enable to import this package with IWE/IDC/IGC extension as any other firmware packages.

InteliNano^{NT} configuration,

- Open NanoEdit PC software
- Open controller configuration
- Go to ECU configuration window (Miscellaneous > Engine control unit)
- Choose the ECU from the list
- Write the configuration to the controller

InteliNano^{NT} controller does not provide configurable inputs/outputs for engine values or commands. The values are fixed and can not be changed by the service!

Default values for J1939 ECU				
	Analog from the ECU	**Binary from the ECU**	**Analog to the ECU ***	**Binary to the ECU ***
1	Engine speed		Requested Speed	Start command
2	Coolant Temperature		Accelerator Pedal Position	Stop command
3	Oil Pressure			Idle/Nominal Switch
4	Fuel Level			
5	Total Engine Hours			

* depends on the ECU capability

InteliNano^{NT} speed control,

InteliNano^{NT} is an easy to use AMF or MRS controller with no capability to speed variation. This function is not needed for that kind of application. The requested speed or accelerator pedal position is steady based on the Nominal Frequency setpoint.

Nominal Frequency	Requested Speed	Accelerator Pedal Position
50Hz	1500RPM	50%
60Hz	1800RPM	50%

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

InteliDrive Nano configuration,

- Open NanoDrive PC software
- Open controller configuration
- Go to ECU configuration window (Miscellaneous > Engine control unit)
- Choose the ECU from the list
- Write the configuration to the controller

InteliDrive Nano controller does not provide configurable inputs/outputs for engine values or commands. The values are fixed and can not be changed by the service!

Default values for J1939 ECU				
	Analog from the ECU	**Binary from the ECU**	**Analog to the ECU ***	**Binary to the ECU ***
1	Engine speed		Requested Speed	Start command
2	Coolant Temperature		Accelerator Pedal Position	Stop command
3	Oil Pressure			Idle/Nominal Switch
4	Fuel Level			
5	Total Engine Hours			

* depends on the ECU capability

InteliDrive Nano speed control,

InteliDrive Nano is an easy to use engine controller with capability to speed variation. The requested speed or accelerator pedal position is based on the configuration and application. Please refer to controller manual for more information about.

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

InteliLite^{NT}, InteliComapct^{NT}, InteliDrive Lite configuration,

Controllers **InteliLite^{NT} MRS3, InteliLite^{NT} MRS10 , InteliLite^{NT} MRS11 and InteliLite^{NT} AMF8, InteliLite^{NT} AMF20** don't support electronic engines (engines equipped with ECU).

- Open LiteEdit PC software
- Open controller configuration
- Enter controller password (controller > enter password)
- Open the modify window (controller > configuration > modify…)
- Click on ECU icon
- Check the "electronic engine is connected" check button
- Choose the ECU from the list below
- Confirm OK
- Write the configuration to the controller

InteliLite^{NT}, InteliComapct^{NT}, InteliDrive Lite controllers do not provide configurable inputs/outputs for engine values or commands. The values are fixed and can not be changed by the service!

Default values for J1939 ECU				
	Analog from the ECU	**Binary from the ECU**	**Analog to the ECU ***	**Binary to the ECU ***
1	Engine speed	Yellow Lamp	Requested Speed	Start command
2	Fuel Rate	Red Lamp	Accelerator Pedal Position	Stop command
3	Coolant Temperature	Wait to Start Lamp		Frequency Selector
4	Intake Temperature			Idle/Nominal Switch
5	Oil Pressure			Tier4 control

6	Percent Load			
7	Boost Pressure			
8	Total Engine Hours			
9	Reserved for future use			
10	Reserved for future use			

* depends on the ECU capability

InteliLite[NT], InteliComapct[NT] speed adjust and control,

InteliLite[NT] is an easy to use AMF or MRS gen-set controller with a limited capability to speed variation. The requested speed or accelerator pedal position is calculated from ECU FreqSelect and ECU SpeedAdj setpoints.
InteliCompact[NT] is an easy to use parallel (SPtM or MINT) controller with a capability to speed variation. The requested speed or accelerator pedal position is calculated from ECU FreqSelect and ECU SpeedAdj setpoints or base on load share or base load demand.

ECU FreqSelect = PRIMARY (DEFAULT)		
ECU SpeedAdj	**Requested Speed**	**Accelerator Pedal Position**
0%	1350RPM	0%
50%	1500RPM	50%
100%	1650RPM	100%
ECU FreqSelect = SECONDARY		
ECU SpeedAdj	**Requested Speed**	**Accelerator Pedal Position**
0%	1620RPM	0%
50%	1800RPM	50%
100%	1980RPM	100%

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

InteliLite[NT], InteliComapct[NT], InteliDrive Lite speed adjust and control,

InteliDrive Lite is an easy to use engine controller with capability to speed variation. The requested speed or accelerator pedal position is calculated base on the configuration. For more information please refer to controller manual.

ECU FreqSelect = PRIMARY (DEFAULT)		
ECU SpeedAdj	**Requested Speed**	**Accelerator Pedal Position**
0%	1350RPM	0%
50%	1500RPM	50%
100%	1650RPM	100%
ECU FreqSelect = SECONDARY		
ECU SpeedAdj	**Requested Speed**	**Accelerator Pedal Position**
0%	1620RPM	0%
50%	1800RPM	50%
100%	1980RPM	100%

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

InteliDrive DCU, InteliDrive Mobile configuration,

- Open DriveConfig PC software
- Open controller configuration
- Add ECU to the configuration (modules card > ECU, check the ECU-1 Used check box)
- Choose the ECU from the list
- Write the configuration to the controller

InteliDrive DCU and InteliDrive Mobile controllers provide configurable inputs/outputs for engine values or commands. The lists of supported values are available in I/O card of DriveConfig.
For list of supported values or commands refer to particulate ECU type in this manual.

Some values like Start request, Stop request have red background which means that these ECU values must have assigned a source value from the controller e.g. Starter, Stop pulse. This is checked by DriveConfig Consistency Check function.

InteliDrive DCU, InteliDrive Mobile speed control,

InteliDrive DCU, InteliDrive Mobile are engine controllers with a complex speed control capability. Please refer to InteliDrive DCU or InteliDrive Mobile Reference Guide for further information about engine speed control over CAN bus.

Speed Request	Requested Speed	Accelerator Pedal Position
0%	1350RPM	0%
50%	1500RPM	50%
100%	1650RPM	100%

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

InteliGen^{NT}, InteliSys^{NT} configuration,

- Open GenConfig PC software
- Open controller configuration
- Choose the ECU from the list (modules card > ECU)
- Click on Insert
- Write the configuration to the controller

InteliGen^{NT} and InteliSys^{NT} controllers provide configurable inputs/outputs for engine values or commands. The lists of supported values are available in I/O card of GenConfig.
For list of supported values or commands refer to particulate ECU type in this manual.

Some values like Start request, Stop request have red background which means that these ECU values must have assigned a source value from the controller e.g. Starter, Stop pulse. This is checked by GenConfig Consistency Check function.

InteliGen^{NT}, InteliSys^{NT} speed control,

InteliGen^{NT}, InteliSys^{NT} are paralleling gen-set controllers with an essential speed variation capability. The requested speed or accelerator pedal position is calculated from Nominal RPM setpoint and SpeedRegOut value.

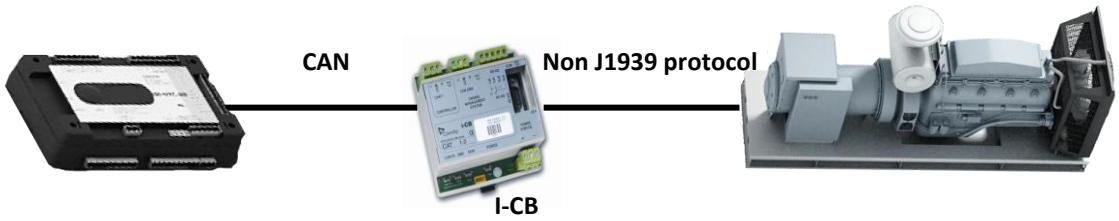
Nominal RPM = 1500		
Speed Gov Out	**Requested Speed**	**Accelerator Pedal Position**
0.000V	1350RPM	0%
5.000V	1500RPM	50%
10.000V	1650RPM	100%
Nominal RPM = 1800		
Speed Gov Out	**Requested Speed**	**Accelerator Pedal Position**
0.000V	1620RPM	0%
5.000V	1800RPM	50%
10.000V	1980RPM	100%

This function (speed adjust via CAN bus) has to be supported by the engine ECU. Without it supporting ComAp controllers can not adjust the engine speed.

Specific ECU/protocols,

Some ECUs do not offer J1939 communication protocol and so it is necessary to have a solution dedicated to each of these units. We recognize two groups:

- ECU communicating via Modbus using RS232/485 (e.g. some Cummins engines) – with controller, it is possible to connect such ECU directly (without I-CB unit),
- ECU with completely incompatible communication protocol and way of connection (e.g. MTU/MDEC CAN bus) – these units are supported with the use of an I-CB unit.



For more details about configuration and available values of I-CB refer to I-CB Reference Guide.

Tier 4 support (DPF only),

Emission standards are requirements that set specific limits to the amount of pollutants that can be released into the environment. Many emissions standards focus on regulating pollutants released by power plants, small equipment such as lawn mowers and diesel generators.
Tier4 emission standards are to be phased-in over the period of 2008 to 2015. The Tier 4 standards require that emissions of PM and NOx be further reduced by about 90%. Such emission reductions can be achieved through the use of control technologies—including advanced exhaust gas aftertreatment.
ComAp is continuously following this new emission trends in the industry. The investigation brings to ComAp controllers the ability to read the values related to the Tier4 emission standards (like Soot Load, Ash Load of DPF, etc.) as well as to control the engine aftertreatment directly by the controller or by service. The InteliVision 5 and InteliVision 8 offer in context with Tier4 user configurable icons to display the health of the engine. It is even more intuitive for the service or maintenance of the engine. InteliLite^{NT} does not support user configurable icons display.

ComAp controller	Tier 4 support		
	Monitoring	Control	Icons
InteliNano^{NT}	NO	NO	NO
InteliLite^{NT}	YES	YES	YES
InteliComapct^{NT}	NO	NO	NO
InteliGen^{NT}	YES	YES	YES *
InteliSys^{NT}	YES	YES	YES *
InteliDrive Lite	NO	NO	NO
InteliDrive DCU	YES	YES	NO
InteliDrive Mobile	YES	YES	NO

Tier4 emission standard has to be supported by the engine ECU. Without it supporting ComAp controllers can not read related data, show the icon on the InteliVision 5 or InteliVision 8 or control the aftertreatment.

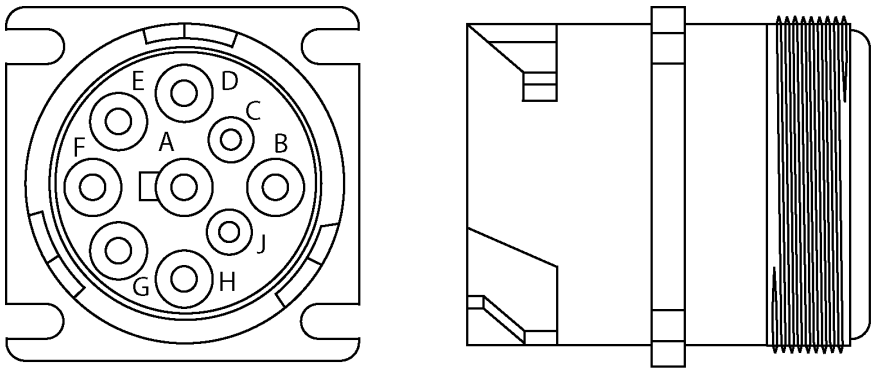
* Only if InteliVision 5 or InteliVision 8 is used.

Name	SPN	Icon	
		InteliVision 5	InteliVision 8
Diesel Particulate Filter Lamp Command	3697		
Exhaust System High Temperature Lamp Command	3698		
Diesel Particulate Filter Status	3701		
Diesel Particulate Filter Active Regeneration Inhibit Status	3702		
Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch	3703		
Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Low Level Indicator	5245		
Red Stop Lamp	0623		
Amber Warning Lamp	0624		

For further information about icon configuration please refer to GenConfig manual.

SAE – J1939 diagnostic connector,

A Description of Off-Board diagnostic connector suppose to be used on engine to get the access to the engine communication links.



Pin label	Meaning
A	Battery negative
B	Battery positive - unswitched
C	CAN H
D	CAN L
E	CAN SHLD
F	SAE J1708 +
G	SAE J1708 -
H	Proprietary OEM use
J	Proprietary OEM use

Fault codes – FMI table,

To inform a service about engine failure sends the ECU a fault code to the controller viac CAN bus (SAE J1939-73). The Fault codes is shown either in text form or as a code. The code (the text for as well) consists of

- SPN number (suspect parameter number) – is a particular code for each fault,
- FMI number (failure mode) – is a particular code for each cause of fault,
- OC number (occurrence count) – is an ECU internal counter for each combination of SPN and FMI.

The table describes the cause of fault base on the FMI code:

FMI	Meaning	FMI	Meaning
0	Data valid but above normal operational range – most severe level	16	Data valid but above normal oerating range – moderately severe level
1	Data valid but below normal operational range – most severe level	17	Data valid but below normal operating range – least severe level
2	Data erratic, intermittent or incorrect	18	Data valid but below normal oerating range – moderately severe level
3	Voltage above normal or shorted to high source	19	Received network data in error
4	Voltage below normal or shorted to low source	20	Data drifted high
5	Current below normal or open circuit	21	Data drifted low
6	Current above normal or grounded circuit	22	Reserved for SAE assignment
7	Mechanical system not responding or out of adjustment	23	Reserved for SAE assignment
8	Above frequency or pulse width or period	24	Reserved for SAE assignment

9	Abnormal update rate	25	Reserved for SAE assignment
10	Abnormal rate of change	26	Reserved for SAE assignment
11	Root cause not known	27	Reserved for SAE assignment
12	Bad intelligent device or component	28	Reserved for SAE assignment
13	Out of calibration	29	Reserved for SAE assignment
14	Special instructions	30	Reserved for SAE assignment
15	Data valid but above normal operating range – least severe level	31	Condition exists

How to create an constant for ECU control,

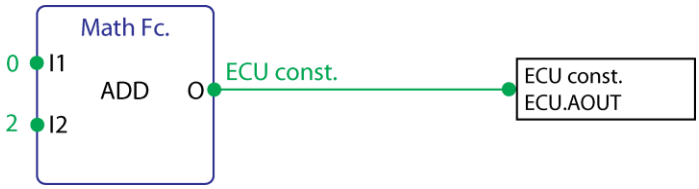
There are at least two ways in GenConfig software:

1. By math function ADD in PLC where first input is a required analog value (constant) and the second input is zero value. The output of the function is a constant which can be used as a source for ECU control. In this example is created constant = 2.

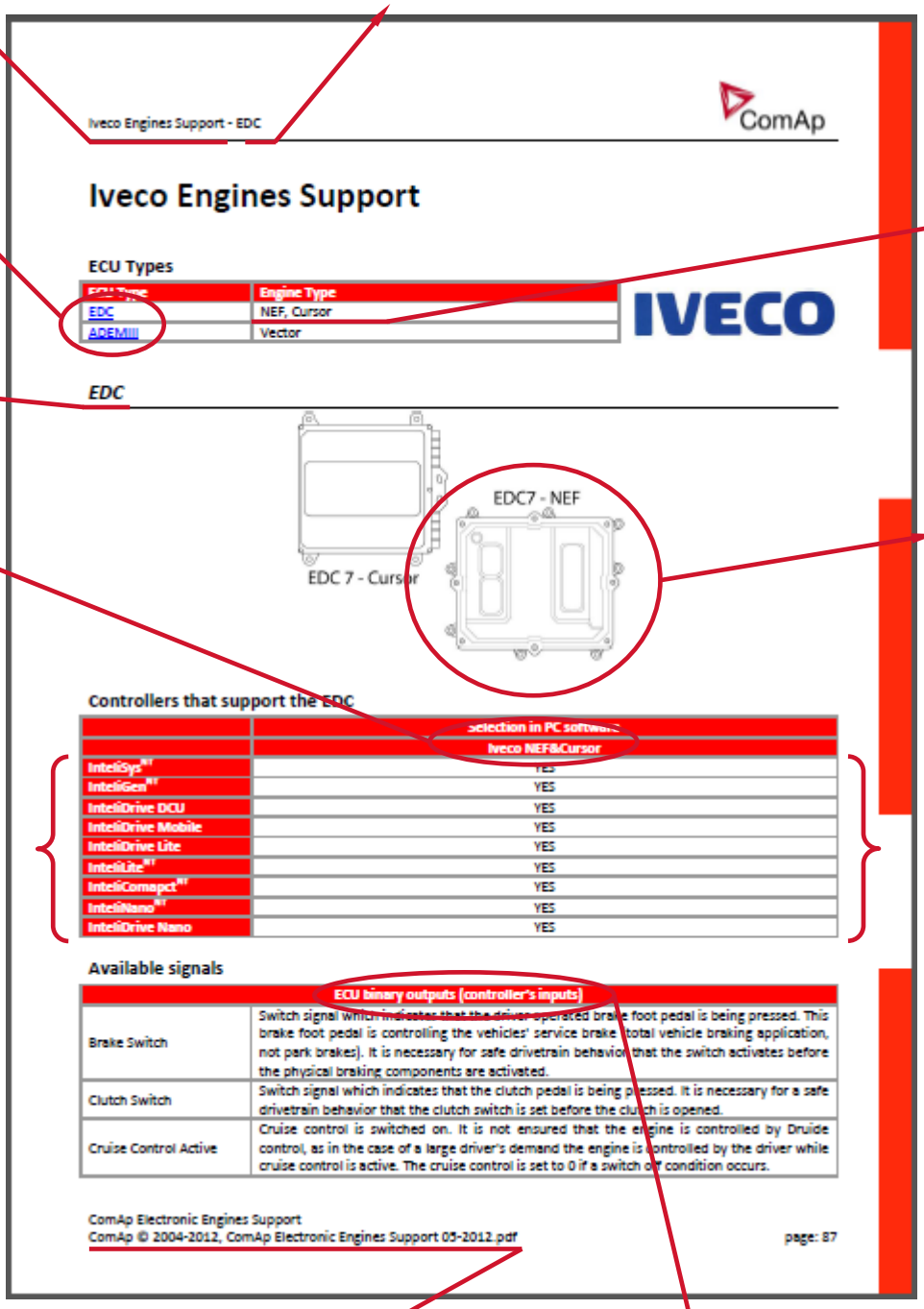
2. By any of not used ExtValue1deflt - ExtValue4deflt setpoint. The value of an ExtValueXdeflt setpoint can be used as a source for ECU control. It is recommended to use a source Logical 1 for a particular ExtValueXreset (in LBI card).

There is a recommended way in DriveConfig software:

3. By math function ADD in PLC where first input is a required analog value (constant) and the second input is zero value. The output of the function is a constant which can be used as a source for ECU control. In this example is created constant = 2.

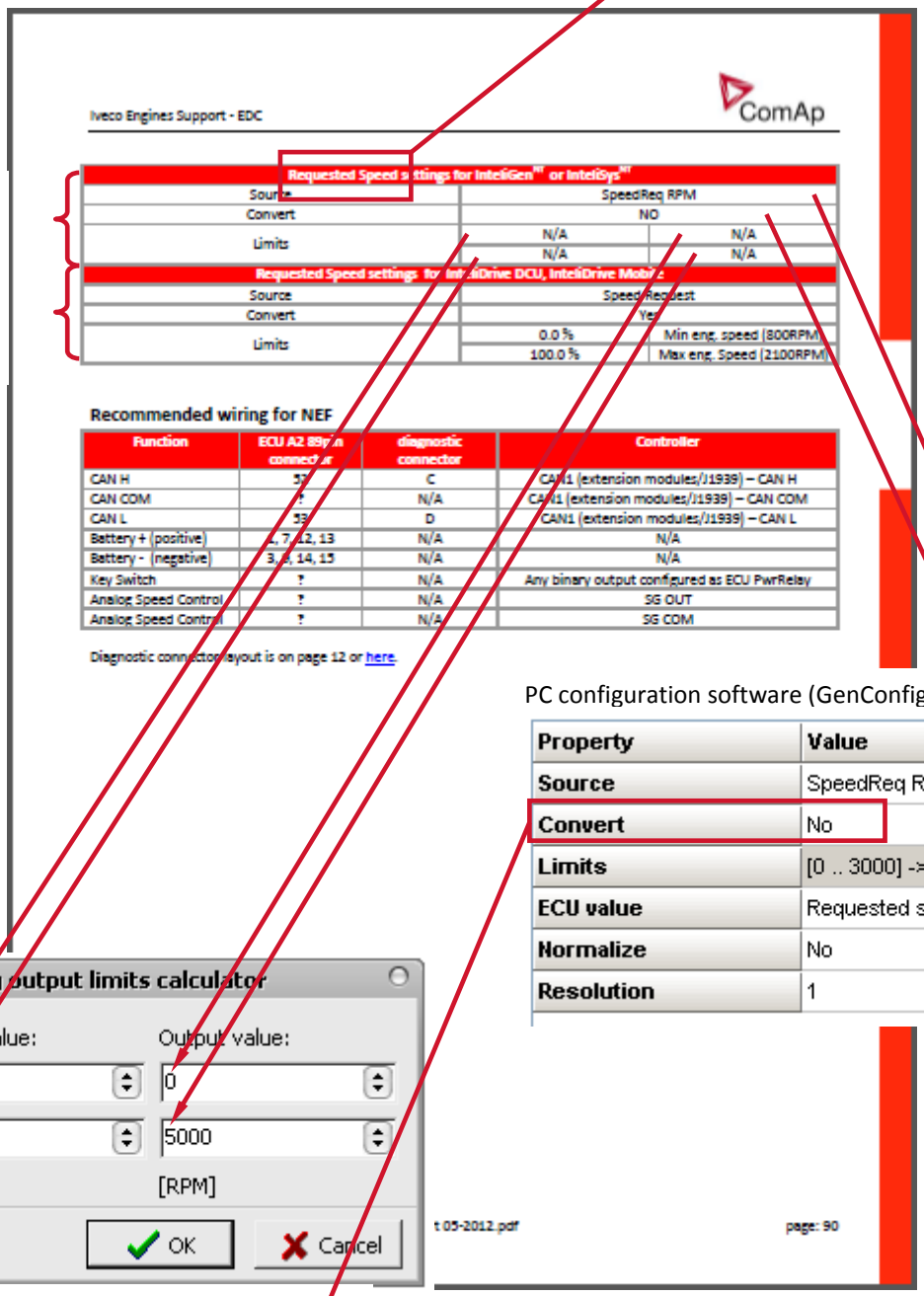


How to read this document,



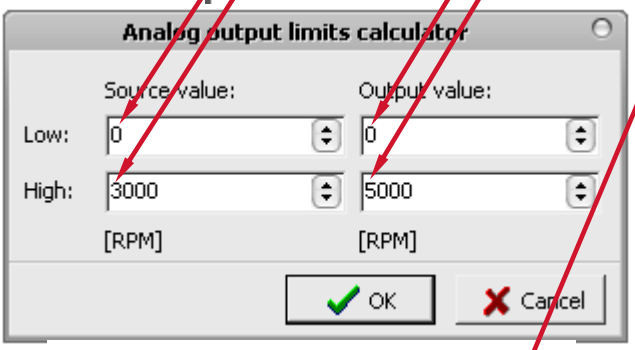
Kind of speed request
(*Requested speed [RPM]*
Accelerator Pedal Position [%])

Proper adjusting speed control in GenConfig
Proper adjusting speed control in Drive Config



PC configuration software (GenConfig)

Property	Value
Source	SpeedReq RPM
Convert	No
Limits	[0 .. 3000] -> [0 .. 0]
ECU value	Requested speed
Normalize	No
Resolution	1



If Convert = YES
Analog output limit calculatr (GenConfig)

Comparison table

Engine manufacturer	ECU Type	InteliSys NT	InteliGen NT	InteliDrive DCU	InteliDrive Mobile	InteliDrive Lite	InteliLite NT	InteliComapct NT	InteliNano NT	InteliDrive Nano	ID	Selection in PC software
Caterpillar	EMCP2 + CCM	YES	YES	YES	NO	NO	NO	NO	NO	NO	N/A	I-CB unit
	EMCP2 + PL1000	YES	YES	YES	NO	NO	NO	NO	NO	NO	N/A	I-CB unit
	ADEM + EMCP	YES	YES	NO	NO	NO	NO	NO	NO	NO	17	Caterpillar ADEM&EMCP
	ADEM	YES	YES	YES	YES	YES	YES	YES	YES	YES	10	Caterpillar J1939
Cummins	CM500	YES	YES	YES	NO	NO	NO	NO	NO	YES	57	Cummins CM500
	CM558	YES	YES	YES	NO	NO	NO	NO	NO	NO	33	Cummins CM558
	CM570	YES	YES	YES	YES	YES	YES	YES	YES	YES	4	Cummins CM570
	CM800	YES	YES	NO	NO	NO	NO	NO	NO	YES	67	Cummins CM800
	CM850	YES	YES	YES	YES	YES	YES	YES	YES	YES	26	Cummins CM850
	CM850 / CM2150 / CM2250	YES	YES	YES	YES	YES	YES	NO	YES	YES	43	Cummins CM850/CM2150/CM2250
	CM2250 industrial	NO	YES	YES	NO	NO	NO	NO	NO	YES	59	Cummins CM2250
	GCS	YES	YES	YES	YES	YES	YES	YES	NO	NO	5	Cummins MODBUS
Daimler Chrysler	ADM2	NO	YES	YES	YES	YES	YES	NO	YES	YES	24	Daimler Chrysler ADM2
	ADM3	NO	YES	YES	NO	NO	NO	NO	NO	YES	42	Daimler Chrysler ADM3
Detroit Diesel	DDEC IV	YES	YES	YES	YES	YES	YES	YES	YES	YES	9	DDC DDEC IV/V
	DDEC V	YES	YES	YES	YES	YES	YES	YES	YES	YES	9	DDC DDEC IV/V
Deutz	EMR2	YES	YES	YES	YES	YES	YES	YES	YES	YES	8	Deutz EMR2
	EMR3	YES	YES	YES	YES	YES	YES	YES	YES	YES	25	Deutz EMR3
	EMR4	YES	YES	NO	NO	NO	YES	NO	YES	NO	70	Deutz EMR4
Ford	TEM Evolution	YES	YES	YES	NO	NO	NO	NO	NO	NO	N/A	I-CB unit
	E - control	YES	YES	NO	NO	NO	NO	NO	NO	NO	95	Ford e-control
GM	MEFI4B / MEFI5B	YES	YES	YES	YES	YES	YES	NO	YES	YES	34	GM MEFI4B / MEFI5B
	MEFI6	YES	YES	NO	YES	YES	YES	YES	YES	YES	71	GM MEFI6
	SECM	YES	YES	YES	YES	YES	YES	YES	YES	NO	35	GM SECM
	E - control	YES	YES	YES	YES	YES	YES	NO	YES	YES	44	GM e-control
	E - control LCI	YES	YES	NO	NO	NO	YES	NO	NO	NO	58	GM e-control LCI
Iveco	EDC	YES	YES	YES	YES	YES	YES	YES	YES	YES	14	Iveco NEF & Cursor
	ADEM III	YES	YES	YES	YES	YES	YES	YES	YES	YES	28	Iveco Vector
Isuzu	ECM	YES	YES	YES	YES	YES	YES	YES	YES	YES	36	Isuzu ECM
JCB	Delphi DCM	NO	YES	YES	YES	YES	YES	NO	NO	YES	23	JCB Delphi DCM
Jenbacher	DIA.NE	YES	NO	NO	NO	NO	NO	NO	NO	NO	22	Jenbacher Diane
Joh Deere	JDEC	YES	YES	YES	YES	YES	YES	YES	YES	YES	7	John Deere
MAN	EDC / MFR	YES	YES	YES	YES	YES	YES	YES	NO	YES	29	MAN MFR
MTU	MDEC	YES	YES	YES	YES	NO	NO	NO	NO	NO	N/A	I-CB unit
	ADEC & SAM	YES	YES	YES	YES	YES	YES	YES	YES	NO	20	MTU ADEC J1939
	ADEC & SMART connect	YES	YES	YES	NO	NO	YES	YES	YES	YES	60	MTU SMART Connect

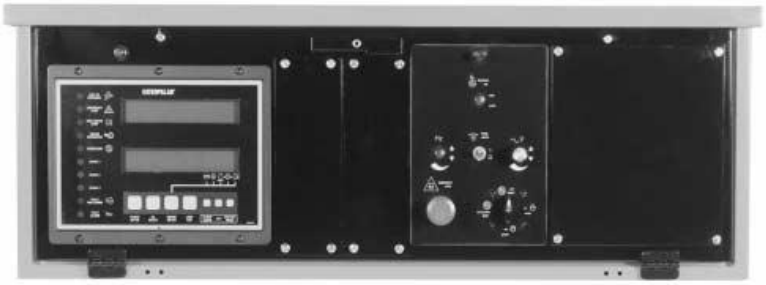
Engine manufacturer	ECU Type	InteliSys NT	InteliGen NT	InteliDrive DCU	InteliDrive Mobile	InteliDrive Lite	InteliLite NT	InteliComapct NT	InteliNano NT	InteliDrive Nano	ID	Selection in PC software
Perkins	A4E2	YES	YES	YES	YES	YES	YES	YES	YES	YES	12	Perkins ECM
	ECM	YES	YES	YES	YES	YES	YES	YES	YES	YES	12	Perkins EMC
Scania	S6	YES	YES	YES	YES	YES	YES	YES	YES	NO	3/16	Scania S6 Singlespeed
	S6	NO	YES	YES	YES	YES	NO	NO	NO	YES	6/11	Scania S6 Allspeed
	S8	YES	YES	YES	NO	NO	YES	NO	YES	YES	68	Scania S8 Singlespeed
	S8	NO	YES	YES	NO	NO	NO	NO	NO	YES	69	Scania S8 Allspeed
Sisu	EEM2	NO	YES	YES	YES	YES	NO	NO	NO	YES	19	Sisu EEM3 Propulsion
	EEM3	YES	YES	YES	YES	YES	YES	YES	YES	NO	18	Sisu EEM3 Gen-set
Steyr	M1	NO	YES	YES	YES	NO	NO	NO	NO	YES	66	Steyr M1
VM	EDC	YES	YES	YES	YES	YES	YES	YES	YES	YES	32/31	VM Industrial / VM Maine
Volvo	EDC3 / EMS1 / EMS2	YES	YES	YES	YES	YES	YES	YES	YES	YES	1	Volvo EMS 1 Singlespeed
	EDC3 / EMS1 / EMS2	YES	YES	YES	YES	YES	NO	NO	NO	YES	2	Volvo EMS 1 Allspeed
	EDC4	YES	YES	YES	YES	YES	YES	YES	YES	YES	8	Deutz EMR2
Waukesha	ESM	YES	YES	NO	NO	NO	NO	NO	NO	NO	15	Waukesha ESM
Yanmar	TNV	NO	YES	YES	YES	NO	NO	NO	NO	YES	89	Yanmar TNV

Caterpillar Engines Support

ECU Types

ECU Type	Engine Type
EMCP2 + CCM	35xx
EMCP2+PL1000	35xx, C9
ADEM + EMCP	34xx, Cx
ADEM	C15,C18, C4.4

EMCP2 + CCM



Configuration

For connection to CAT CCM module it is necessary to use an I-CB module. Configuration of the controller and I-CB has to be done separately using GenConfig or DriveConfig and ICBEdit software. For further information see I-CB manual.

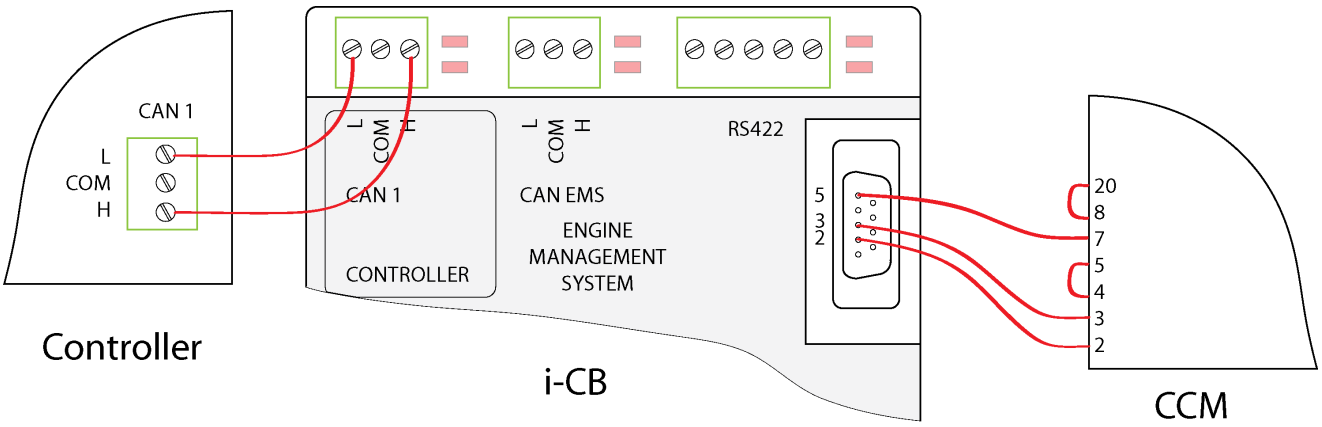
Controllers that support the EMCP2 + CCM

	Selection in PC software	
	Diesel	Gas
InteliSys NT	Legacy I-CB/CAT-Diesel	Legacy I-CB/CAT-Gas
InteliGen NT	Legacy I-CB/CAT-Diesel	Legacy I-CB/CAT-Gas
InteliDrive DCU	ICB module + I/O modules	ICB module + I/O modules
InteliDrive Mobile	ICB module + I/O modules	ICB module + I/O modules
InteliDrive Lite	No	No
InteliLite NT	No	No
InteliComapct NT	No	No
InteliNano NT	No	No
InteliDrive Nano	No	No

Available commands

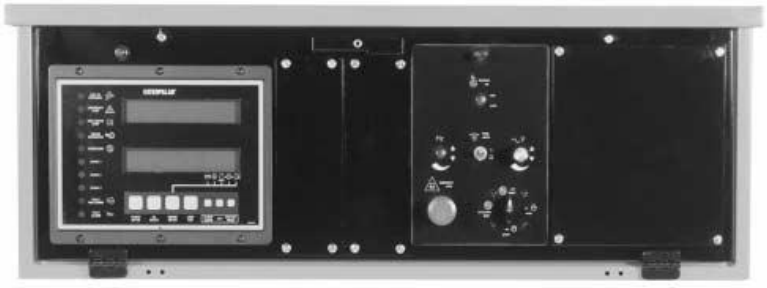
For more information about available values and signals, please refer to I-CB manual or ICBEdit PC software.

Recommended wiring



Check that CAN bus terminating resistors or appropriate jumpers are connected.

EMCP2 + PL1000



Configuration

For connection to CAT PL1000 module it is necessary to use an I-CB module. Configuration of the controller and I-CB has to be done separately using GenConfig or DriveConfig and ICBEdit software. For further information see I-CB manual.

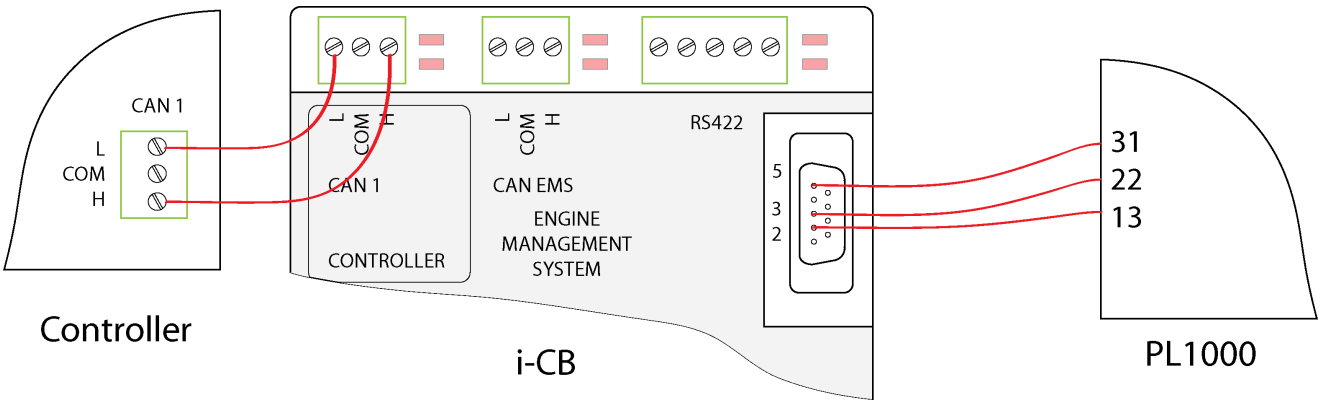
Controllers that support the EMCP2 + PL1000

	Selection in PC software	
	Diesel	**Gas**
InteliSys NT	Legacy I-CB/CAT-Diesel	Legacy I-CB/CAT-Gas
InteliGen NT	Legacy I-CB/CAT-Diesel	Legacy I-CB/CAT-Gas
InteliDrive DCU	ICB module + I/O modules	ICB module + I/O modules
InteliDrive Mobile	ICB module + I/O modules	ICB module + I/O modules
InteliDrive Lite	No	No
InteliLite NT	No	No
InteliComapct NT	No	No
InteliNano NT	No	No
InteliDrive Nano	No	No

Available commands

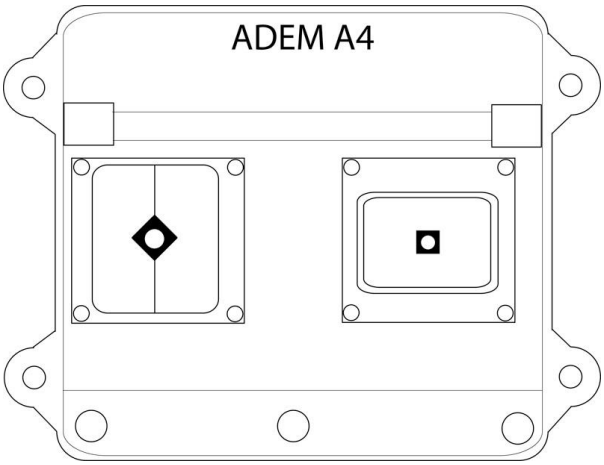
For more information about available values and signals, please refer to I-CB manual.

Recommended wiring of PL1000E or PL1000T



Check that CAN bus terminating resistors or appropriate jumpers are connected.

ADEM A4 with EMCP3.x or ADEM A4 with EMCP4.x



The configuration and connection is the same on the gen-set equipped with ADEM A4 (ECU) and EMCP 3.x or EMCP 4.x (generator set controller). The ADEM 4.x is the successor of the ADEM 3.x.

Controllers that support the ADEM A4 with EMCP3.x or ADEM A4 with EMCP4.x

	Selection in PC software
	Caterpillar ADEM&EMCP
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Amber Warning Lamp EMCP	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped. This signal comes from EMCP panel.
Malfunction Lamp EMCP	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active. This signal comes from EMCP panel.
Protect Lamp EMCP	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related. This signal comes from EMCP panel.
Red Stop Lamp EMCP	This lamp is used to relay trouble code information that is of a severe enough condition

	that it warrants stopping the engine. This signal comes from EMCP panel.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Startup Mode	There are several phases in a starting action and different reasons why a start cannot take place. See the table below.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Oil Temperature	Temperature of the engine lubricant.
IntercoolTemp	Temperature of liquid found in the intercooler located after the turbocharger.
Barometric Pressure	Absolute air pressure of the atmosphere.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Air Inlet Pressure	Absolute air pressure at input port to intake manifold or air box.
Air Filter Differential Pressure	Change in engine air system pressure, measured across the filter, due to the filter and any accumulation of solid foreign matter on or in the filter. This is the measurement of the first filter in a multiple air filter system.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Accelerator Pedal Position 1	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
Left Turbo Inlet Pressure	Gage pressure of the air entering the compressor side of the turbocharger.
Right Turbo Inlet Pressure	Gage pressure of the air entering the compressor side of the turbocharger.
Left Exhaust Temp	Temperature of the combustion by-products entering the turbine side of the turbocharger.
Right Exhaust Temp	Temperature of the combustion by-products entering the turbine side of the turbocharger.
Right Air Filter Restriction	Change in engine air system pressure, measured across the filter, due to the filter and any accumulation of solid foreign matter on or in the filter. This is for monitoring the air filter on the intake to the turbocharger.
Desired OpSpd	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Crankcase Pressure	Gage pressure inside engine crankcase.
Oil Filter Diff.Press	Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.
Fuel Filter Diff.Press	Change in fuel delivery pressure, measured across the filter, due to accumulation of solid or semisolid matter on the filter element.
Throttle Position	The position of the value used to regulate the supply of a fluid, usually air or fuel/air

	mixure, to an engine. 0% represents no supply.
Exhaust Gas Port 1 Temp - Exhaust Gas Port 16 Temp	Temperature at the cylinder exhaust port of the engine. The values is available for cylinders 1 – 16.
Gas Supply Pressure	Gage pressure of gas supply to fuel metering device.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Engine speed EMCP	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders. This signal comes from EMCP panel.
Coolant Temp EMCP	Temperature of liquid found in engine cooling system. This signal comes from EMCP panel.
Fuel Temp EMCP	Temperature of fuel entering injectors. This signal comes from EMCP panel.
Fuel Temp EMCP	Temperature of fuel entering injectors. This signal comes from EMCP panel. This signal comes from EMCP panel.
Electrical Potential (Voltage) EMCP	Electrical potential measured at the input of the electronic control unit supplied through a switching device.. This signal comes from EMCP panel.
Battery Potential (Voltage) EMCP	Measured electrical potential of the battery.
Fuel Delivery Pressure EMCP	Gage pressure of fuel in system as delivered from supply pump to the injection pump. This signal comes from EMCP panel.
Engine Oil Pressure EMCP	Gage pressure of oil in engine lubrication system as provided by oil pump. This signal comes from EMCP panel.
Total Engine Hours EMCP	Accumulated time of operation of engine. This signal comes from EMCP panel.
ECU analog inputs (controller's outputs)	

Speed control can be done by using PWM from the controller (SG interface) to the ADEM. PWM rate for InteliGen-NT or InteliSys-NT controller has to be set to 500Hz. See the SpdGovPWM rate setpoint in the Sync/Load ctrl group of setpoints. This feature has to be enabled in the ECU. Please contact your local distributor to check it.
Start/Stop command can by configured as Remote Start/Stop EMCP input. Use ECU PwrRelay controller output for this purpose.

Starter Mode values meening

Value	Starter Mode
0	start not requested
1	starter active, gear not engaged
2	starter active, gear engaged
3	start finished; starter not active after having been actively engaged (after 50ms mode goes to 0)
4	starter inhibited due to engine already running
5	starter inhibited due to engine not ready for start (preheating)
6	starter inhibited due to driveline engaged or other transmission inhibit
7	starter inhibited due to active immobilizer
8	starter inhibited due to starter over-temp
9	Reserved
10	Reserved
11	Reserved
12	starter inhibited - reason unknown
13	error (legacy implementations only; use 14)
14	error
15	not available

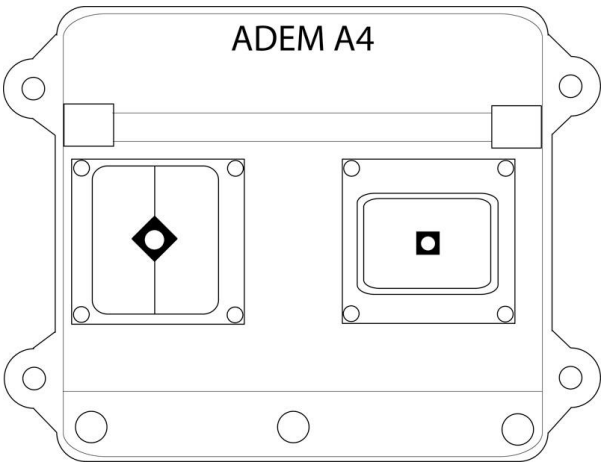
Recommended wiring

Function	ECU 70pin AMP connector	9pin diagnostic connector	Controller
CAN H	50	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	42	C	CAN1 (extension modules/J1939) – CAN COM
CAN L	34	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	48,52,53,55	N/A	N/A
Battery - (negative)	61,63,65,69	N/A	N/A
Key Switch	70	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	66 (38-S-SPD*)	N/A	SG OUT
Analog Speed Control	68 (39-D-SPD*)	N/A	SG COM

* Caterpillar PWM speed contol terminal

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

ADEM



Controllers that support the ADEM

	Selection in PC software
	Caterpillar J1939
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Oil Temperature	
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.

Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Alternator Potential (Voltage)	Electrical potential measured at the alternator output.
Electrical Potential (Voltage)	Measured electrical potential of the battery.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Oil Filter Diff. Press	Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.
Fuel Filter Diff. Press	Change in fuel delivery pressure, measured across the filter, due to accumulation of solid or semisolid matter on the filter element.
Left Exhaust Temp	Temperature of the combustion by-products entering the turbine side of the turbocharger.
Right Exhaust Temp	Temperature of the combustion by-products entering the turbine side of the turbocharger.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
AuxTemp	Pressure measured by auxiliary pressure sensor #1
AuxPress	Temperature measured by auxiliary temperature sensor #1
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested Speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 70pin AMP connector	9pin diagnostic connector	Controller
CAN H	50	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	42	C	CAN1 (extension modules/J1939) – CAN COM
CAN L	34	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	48,52,53,55	N/A	N/A
Battery - (negative)	61,63,65,69	N/A	N/A
Key Switch	70	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	66 (38-S-SPD*)	N/A	SG OUT
Analog Speed Control	68 (39-D-SPD*)	N/A	SG COM

* Caterpillar PWM speed control terminal

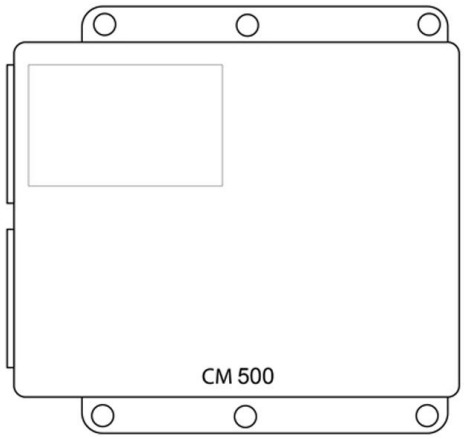
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Cummins Engines Support

ECU Types

ECU Type	Engine type
CM500	Industrial engines QSK19, QSK23, QSK45, QSK60, QSK78,
CM558	Gas engines, QST30 (slave ECU)
CM570 (CM876)	QSM11 (Tier3), QSX15 (Tier2/3), ISM 400, ISM 435
CM800	ISB, ISBe
CM850	QSL9 (Tier3), QSB5/7 (Tier3), QSK38 , QSK19 (Tier2/3), QST30 (Tier2), QSK50/60 (Tier2) – drive engines
PGI 1.1 (CM850,CM2150,CM2250)	QSB7 and QSL9 Tier 4i QSK50/60, QSK19, QSK38 MCRS Tier II QSB5, QSB7, QSL9, QSM11 Tier III
CM2250	Industrial engines (ISX, ISB series)
GCS	QSK23 (Tier2), QSK45/60/78, QST30 (Tier2)

CM500



Controllers that support the CM500

	Selection in PC software
	Cummins CM500
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
AP low idle switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch.
Water In Fuel	Signal which indicates the presence of water in the fuel.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
AP Position	The ratio of actual position of the analog engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the torque controller.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Oil Temp	Temperature of the engine lubricant.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Barometric Pressure	Absolute air pressure of the atmosphere.
Air Inlet Temperature	Temperature of air entering vehicle air induction system.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Electrical Potential	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Reguested Speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

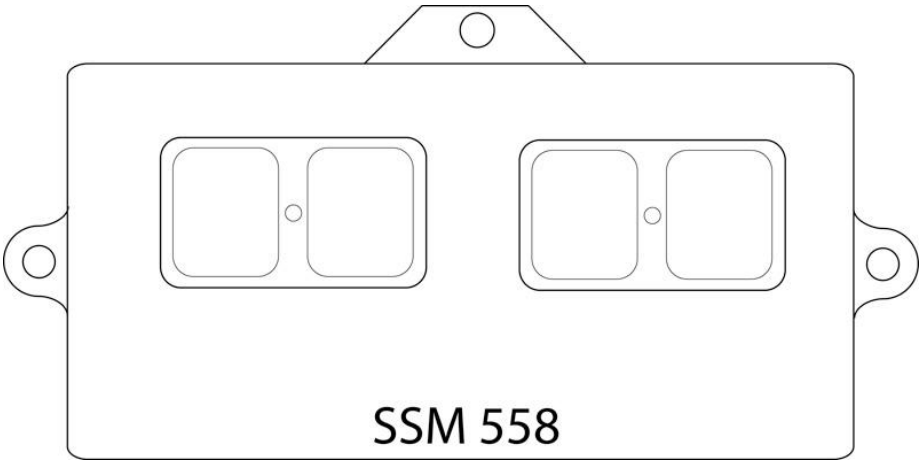
Recommended wiring

Function	ECU A2 connector	9pin diagnostic connector	Controller
CAN H	32	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	33	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	3,4,5	B	N/A
Battery - (negative)	7,8	A	N/A
Key Switch	10	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

CM558

Support of this ECU is so far done for engines where CM558 is a standalone module not as a part of the gas genset system with master unit CM700 and other components.



Controllers that support the CM558

	Selection in PC software
	Cummins CM558
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Engine Fuel Shutoff 1 Control	For more information about, please contact the local representative.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Aftertreat1 ExhGas Temp 1	The reading from the exhaust gas temperature sensor located farthest upstream in the aftertreatment system in exhaust bank 1.
Aftertreat1 ExhGas	The reading from the exhaust gas temperature sensor located midstream of the other two

Temp 2	temperature sensors in the in the aftertreatment system in exhaust bank 1.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
EngineOil Temp	Temperature of the engine lubricant.
EngTemp	Temperature of liquid found in engine cooling system.
T-ECU	Temperature of the engine electronic control unit.
Fuel Valve 1 Position	The position of a gaseous fuel valve that is metering the fuel flow to the engine. 0% indicates no fuel flow through value and 100% means maximum fuel flow through value.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Intake Manif. Absolute Press	The absolute pressure measured of the air intake manifold. If there are multiple air pressure sensors in the intake stream, this is the last one in flow direction before entering the combustion chamber.
Engine Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Fuel Actuator 1 Command	The control command to fuel actuator 1, normalized to percent, where 0% represents fully cloase and 100% represents fully open. Typically, this fuel actuator is used to regulate low pressure natural gas flow rate, mixing into the air flow, which together then come into the engine.
Throttle Actuator 1 Command	The control command to throttle actuator 1, normalized to percent, where 0% represents fully cloase and 100% represents fully open. Typically, this throttle actuator is used to regulate air or air / fuel mix to the engine.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	

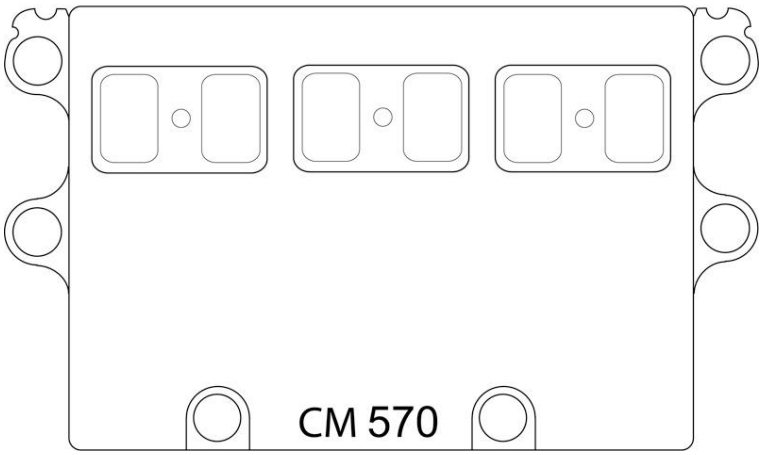
Controller's analog output for speed control configuration

There is no speed control over CAN bus available for this particular ECU.

Recommended wiring

No documentation available so far!
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

CM570



Controllers that support the CM570

	Selection in PC software
	Cummins CM570
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
PTO VarSpdSw	Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at a variable speed.
Water in fuel	Signal which indicates the presence of water in the fuel.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Run/Stop *1*2*3*4	The command used for engine running. On the occasion of loss of datalink, the engine will not shut down as it is looking for the initial 'run' command and will only shutdown if it was sent 'stop' or if it experienced a shutdown fault. The recommended source value for this command is Fuel solenoid.
Idle/Rated *1*2*3	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
Emergency Stop	The command which should be used for normal shutdown and Emergency Stop is

Indication *1*2*3	implemented by providing a normally-closed signal. The ECU will react in a manner as to disable fuel flow to the engine any time the command is active. The ECU will power down and stop the communication and broadcast of J1939 messages when the engine reaches 0 RPM. The recommended source value for this command Logical 0.
Utility/Isochronous Gain Select	Please contact Cummins representative for further information about this command. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
DesiredOpSpd	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Speed Bias Reference *1*2*3*4	Speed bias provides the means to adjust the engine speed set point while the engine is running. It is used for synchronization with the power grid. Once synchronized and paralleled with other power sources the speed bias is used to make the gen-set and engine pick up or shed load. In the case of using speed bias to pick up and shed load the commanded engine speed does change, but the actual engine speed does not change.
Frequency Selection *1*2*3*4	This feature gives the operator ability to switch the rated speed between 50Hz and 60Hz. This feature will only be enabled and functional on engines that have been rated for dual speed operations. The engine has two speed set points that define the base operating speed of the engine. The system will only react to a state transition while the Engine speed is 0. If datalink is lost during operation the alternate frequency will not be effected until engine reaches 0 RPM. The recommended source values is an contstant following the requested function.
Shutdown Override *1*2*3	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The recommended source values is an contstant following the requested function.
Requested Speed (TSC1) *2	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active. This value is available only on ECU with non G-Drive calibraiton.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Speed Bias Reference settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpdRegOut	
Convert	Yes	
Limits	-10.000 V	-10 %
	10.000 V	10 %
Speed Bias Reference settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	-10 %
	100.0 %	10 %

Frequency Selection	Source Value
50 Hz	0
60 Hz	1
Reserved	2 - 5
Error	6
Do not care	7

Shutdown override values meening

Shutdown Override	Source Value
No shutdown override	0
Start block override	1
General shutdown override	2
All shutdown override	3
Error	4 -6
Don't care	7

If you have bought the engine as a part of gen-set package (with PCC panel) the ECU might be delivered with different communication interface (not PGI) which means that speed control doesn't work with ComAp controller. It is necessary to use/order ECU software with calibration for G-drive engines (with PGI).

Recommended wiring

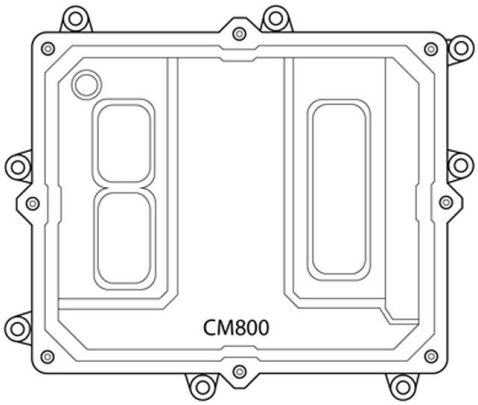
Function	ECU C-01 50pin connector	9pin diagnostic connector	Controller
CAN H	46	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	37	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	36	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	7,8,17,18,28	B	N/A
Battery - (negative)	29,30,39,40,50	A	N/A
Key Switch	38	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Table of supported ECU calibration

Engine type	ECU calibration
QSX15-G4	N 11959.01
QSX15-G6	N 11960.01
QSX15-G7	N 11961.01
QSX15-G8	N 11962.01 N 11962.05 N12013.00
QSX15-G9	N 11963.01
ISM	L 21103.10

CM800



Controllers that support the CM800

	Selection in PC software
	Cummins CM800
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Water In Fuel	Signal which indicates the presence of water in the fuel.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
PTO VarSPdSw	Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at a variable speed.
ECU binary inputs (controller's outputs - commands)	
Run/Stop	The command used for engine running. On the occasion of loss of datalink, the engine will not shut down as it is looking for the initial 'run' command and will only shutdown if it was sent 'stop' or if it experienced a shutdown fault. The recommended source value for this command is Fuel solenoid.
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.

Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
DesiredOpSpd	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Barometric Pressure	Absolute air pressure of the atmosphere.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested Speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Shutdown Override	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The recommended source values is an contstant following the requested function.

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Shutdown override values meaning

Shutdown Override	Source Value
No shutdown override	0
Start block override	1
General shutdown override	2
All shutdown override	3
Error	4 -6
Don't care	7

Recommended wiring

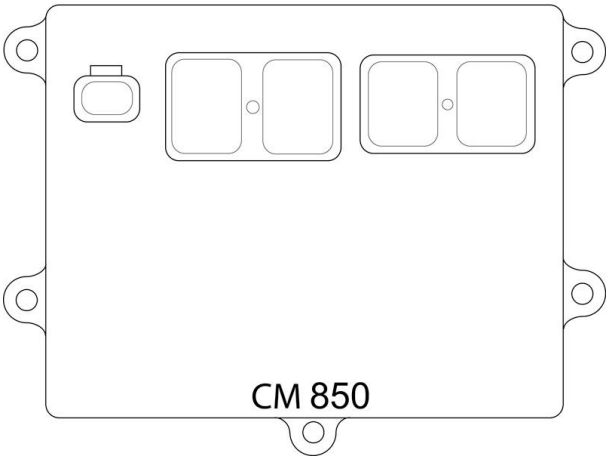
Function	ECU 40pin top connector	3pin diagnostic connector	Controller
CAN H	53	2	CAN1 (extension modules/J1939) – CAN H
CAN COM	51	3	CAN1 (extension modules/J1939) – CAN COM
CAN L	52	1	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,7,12,13	N/A	N/A
Battery - (negative)	3,9,14,15	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Table of supported ECU calibration

Engine type	G-Drive ECU calibration
6ISBe	90132.05

CM850



Controllers that support the CM850

	Selection in PC software
	Cummins CM850
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
PTO VarSpdSw	Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at a variable speed.
Water in fuel	Signal which indicates the presence of water in the fuel.
ECU binary inputs (controller's outputs - commands)	
Run/Stop *1*2*3*4	The command used for engine running. On the occasion of loss of datalink, the engine will not shut down as it is looking for the initial 'run' command and will only shutdown if it was sent 'stop' or if it experienced a shutdown fault. The recommended source value for this command is Fuel solenoid.
Idle/Rated *1*2*3	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
Shutdown Override *1*2*3	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The recommended source value for this command is Logical 0.

ECU analog outputs (controller's inputs)	
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Exhaust Gas Port 1 Temp – Exhaust Gas Port 16 Temp	Temperature at the cylinder exhaust port of the engine. The values is available for cylinders 1 – 16.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Engine Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Engine Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Inj. Timing Rail 1 Pressure	Gage pressure of fuel in the timing rail delivered from the supply pump to the injector timing intake.
Intercooler Thermostat Opening	The current position of the thermostat used to regulated the temperature of the engine intercooler. A value of 0% represents the thermostat being completely closed.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Intercooler Temp	Temperature of liquid found in the intercooler located after the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Fuel Temp	Temperature of fuel (gas) passing through the first fuel control system.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
DesiredOpSpd	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Barometric Pressure	Absolute air pressure of the atmosphere.
Turbo Oil Temp	Temperature of the turbocharger lubricant.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Speed Bias Reference *1*2*3*4	Speed bias provides the means to adjust the engine speed set point while the engine is running. It is used for synchronization with the power grid. Once synchronized and paralleled with other power sources the speed bias is used to make the gen-set and engine pick up or shed load. In the case of using speed bias to pick up and shed load the commanded engine speed does change, but the actual engine speed does not change.
Frequency Selection *1*2*3*4	This feature gives the operator ability to switch the rated speed between 50Hz and 60Hz. This feature will only be enabled and functional on engines that have been rated for dual speed operations. The engine has two speed set points that define the base operating speed of the engine. The system will only react to a state transition while the Engine speed is 0. If datalink is lost during operation the alternate frequency will not be effected until engine reaches 0 RPM. The recommended source values is an contstant following the requested function.
Governor Gain Adjustment	For service purpose only! Default value is 5 (20480_D or 5000_H)

Supported by the non-configurable controllers:
*1 - InteliLite^{NT} *2 - InteliDrive Lite *3 - InteliCompact^{NT} *4 - InteliNano^{NT} *5 - InteliDrive Nano
More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Speed Bias Reference settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpdRegOut	
Convert	Yes	
Limits	-10.000 V	-10 %
	10.000 V	10 %
Speed Bias Reference settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	-10 %
	100.0 %	10 %

Frequency Selection	Source Value
50 Hz	0
60 Hz	1
Reserved	2 - 5
Error	6
Do not care	7

Recommended wiring

Function	ECU J2 50pin connector	9pin diagnostic connector	Controller
CAN H	46	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	37	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	47	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	B	N/A
Battery - (negative)	?	A	N/A
Key Switch	39	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

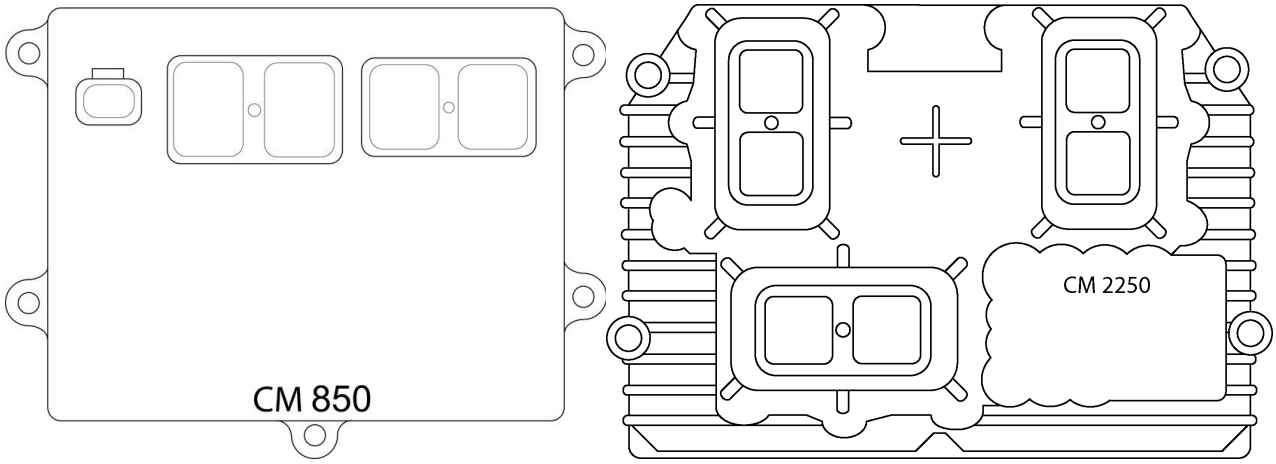
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Table of supported ECU calibration

Engine type	G-Drive ECU calibration
Engine QSB7-G	AZ 90084.02
Engine QSL9	AZ 90105.04 AZ 90056.02 AZ 90041.05 (analog speed control)

Engine type	Industrial ECU calibration
Engine QSK38	AQ 60186.98 AQ 60176.01

PGI 1.1 interface (CM850 or CM2150 or CM2250)



Controllers that support the PGI 1.1 interface (CM850 or CM2150 or CM2250)

	Selection in PC software
	Cummins CM850/CM2150/CM2250
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
DPF Act. Reg. Inhibit Status	Indicates the state of diesel particulate filter active regeneration inhibition.
DPF ActRegInhibitDueTo InhSw	Indicates the state of diesel particulate filter active regeneration inhibition due to the diesel particulate filter regeneration inhibit switch.
DPF ActRegInhibNot WarmUp	Indicates the state of diesel particulate filter active regeneration inhibition due to engine not warmed up.
Water in fuel	Signal which indicates the presence of water in the fuel.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Idle/Rated *1*2*3	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
Shutdown Override *1*2*3	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The

	recommended source value for this command is Logical 0.
DPF Reg.Inhibit Switch	Indicates the state of a switch available to the operator that inhibits diesel particulate filter regeneration. The recommended source should follow the requested function.
DPF Reg.Force Switch	Indicates the state of a switch available to the operator that forces diesel particulate filter regeneration. The recommended source should follow the requested function.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Tank Low Level Indicator	Value used for Tier4 icon control.
DPF Lamp Command	Value used for Tier4 icon control.
DPF Status	Value used for Tier4 icon control.
HEST Lamp Command	Command to control the exhaust system high temperature lamp. This lamp indicates that the exhaust system temperature is high.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Interface Version1	For more information about, please contact the local representative.
Interface Version2	For more information about, please contact the local representative.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Generator Governing Bias *1*2*3*4	Speed bias provides the means to adjust the engine speed set point while the engine is running. It is used for synchronization with the power grid. Once synchronized and paralleled with other power sources the speed bias is used to make the gen-set and engine pick up or shed load. In the case of using speed bias to pick up and shed load the commanded engine speed does change, but the actual engine speed does not change.
Frequency Selection *1*2*3*4	This feature gives the operator ability to switch the rated speed between 50Hz and 60Hz. This feature will only be enabled and functional on engines that have been rated for dual speed operations. The engine has two speed set points that define the base operating speed of the engine. The system will only react to a state transition while the Engine speed is 0. If datalink is lost during operation the alternate frequency will not be effected until engine reaches 0 RPM. The recommended source values is an contstant following the requested function.
Speed Bias Reference	Speed bias provides the means to adjust the engine speed set point while the engine is running. It is used for synchronization with the power grid. Once synchronized and paralleled with other power sources the speed bias is used to make the gen-set and engine pick up or shed load. In the case of using speed bias to pick up and shed load the commanded engine speed does change, but the actual engine speed does not change.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Generator Governing Bias settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpdRegOut	
Convert	Yes	
Limits	-10.000 V	-10 %
	10.000 V	10 %
Generator Governing Bias settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	-10 %
	100.0 %	10 %

Frequency Selection	Source Value
50 Hz	0
60 Hz	1
Reserved	2 - 5
Error	6
Do not care	7

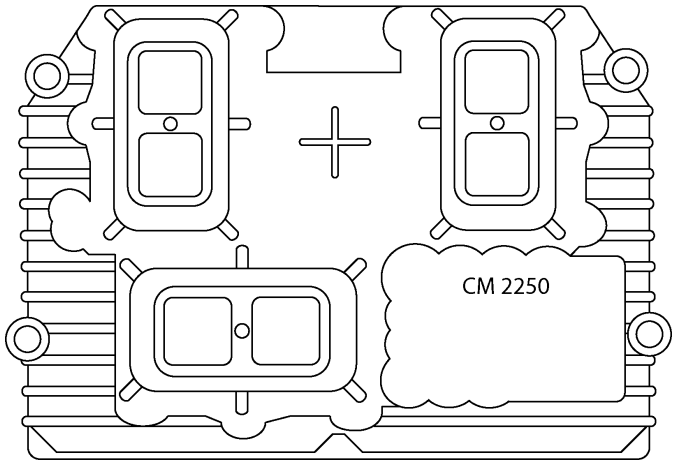
If you have bought the engine as a part of gen-set package (with PCC panel) the ECU might be delivered with different communication interface (not PGI) which means that speed control doesn't work with ComAp controller. It is necessary to use/order ECU software with calibration for G-drive engines (with PGI).

Recommended wiring

Function	ECU J2 50pin connector	9pin diagnostic connector	Controller
CAN H	46	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	37	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	47	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	B	N/A
Battery - (negative)	?	A	N/A
Key Switch	39	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

CM2250 industrial



Controllers that support the CM2250 industrial

	Selection in PC software
	Cummins CM2250
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
DPF ActRegInhib NotWarmUp	Indicates the state of diesel particulate filter active regeneration inhibition due to engine not warmed up.
DPF ActRegInhibit DueToInhSw	Indicates the state of diesel particulate filter active regeneration inhibition due to the diesel particulate filter regeneration inhibit switch.
DPF Act. Reg. Inhibit Status	Indicates the state of diesel particulate filter active regeneration inhibition.
Water in fuel	Signal which indicates the presence of water in the fuel.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
DPFR Inhibit Switch	Indicates the state of a switch available to the operator that inhibits diesel particulate filter

	regeneration. The recommended source should follow the requested function.
DPFR Force Switch	Indicates the state of a switch available to the operator that forces diesel particulate filter regeneration. The recommended source should follow the requested function.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Tank Low Level Indicator	Value used for Tier4 icon control.
DPF Lamp Command	Value used for Tier4 icon control.
DPF Status	Value used for Tier4 icon control.
HEST Lamp Command	Command to control the exhaust system high temperature lamp. This lamp indicates that the exhaust system temperature is high.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Intake Manifold Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested Speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.

Controller's analog output for speed control configuration

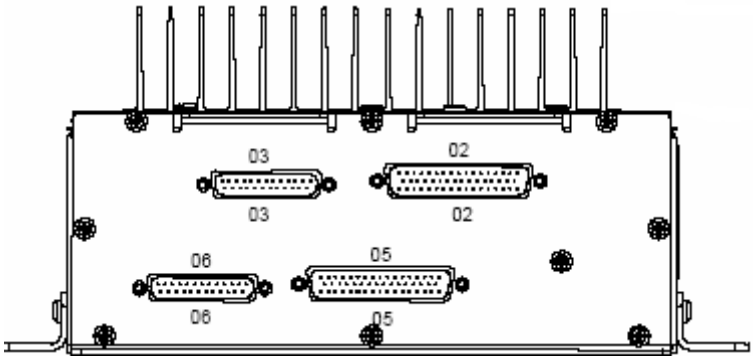
Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

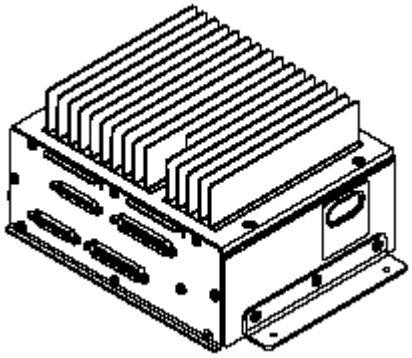
Recommended wiring

Function	ECU connector	9pin diagnostic connector	Controller
CAN H	?	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	?	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	B	N/A
Battery - (negative)	?	A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

GCS





Controllers that support the GCS

	Selection in PC software
	Cummins Modbus
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES*
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	No
InteliDrive Nano	No

* available for ID-DCU Industrial firmware ver. 3.0 or newer only

Available signals

ECU binary outputs (controller's inputs)	
Run/Stop Switch State	The command used for engine running. On the occasion of loss of datalink, the engine will not shut down as it is looking for the initial 'run' command and will only shutdown if it was sent 'stop' or if it experienced a shutdown fault. The recommended source value for this command is Fuel solenoid.
Red Shutdown Lamp	It warrants stopping the engine.
Yellow Warning Lamp	Is reporting a problem with the engine system but the engine need not be immediately stopped.
Fuel Shut-Off Valve Driver State	Is reporting a fuel Shut-Off Valve output.
ECU binary inputs (controller's outputs - commands)	
Shutdown Override	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The recommended source value for this command is Logical 0.
Fault Acknowledge	Switch signal which indicates the position of the fault acknowledge switch. This switch function allows the operator to acknowledge faults of the engine. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.

Coolant Temp	Temperature of liquid found in engine cooling system.
Oil Pressure QSK23/45/60/78	Gage pressure of oil in engine lubrication system as provided by oil pump.
Oil Pressure QST30, QSX15	Gage pressure of oil in engine lubrication system as provided by oil pump.
Frequency Adjust Pot	An signal output is provided to read the generator set frequency. The frequency is adjustable within ±3Hz of the rated operating frequency.
Running Time	Accumulated time of operation of engine.
Final Speed Reference	Please contact Cummins representative for further information about this value.
+/- 2,5V Speed Bias	This speed bias signal is provided as feedback from compatible speed governing and load share controller.
Fuel Rate (UK)	Amount of fuel consumed by engine per unit of time.
Fuel Rate (US)	Amount of fuel consumed by engine per unit of time.
Intake Manif. Press (QSX15)	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Intake Manif. Temp (QSX15)	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Oil Temperature (QSX15)	Temperature of the engine lubricant.
Intake Manif. Press (QSKxx)	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Intake Manif. Temp (QSKxx)	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Pump Pressure (QSKxx)	Please contact Cummins representative for further information about this value.
Fuel Rail Pressure (QSKxx)	Please contact Cummins representative for further information about this value.
Fuel Inlet Temperature (QSKxx)	Temperature of fuel entering injectors.
Timing Rail Pressure (QSKxx)	Please contact Cummins representative for further information about this value.
Intake Manif. Press L (QST30)	Gage pressure of air measured downstream on the left compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Intake Manif. Press R (QST30)	Gage pressure of air measured downstream on the right compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Intake Manif. Temp L (QST30)	Temperature of pre-combustion air found in intake manifold of engine left air supply system.
Intake Manif. Temp R (QST30)	Temperature of pre-combustion air found in intake manifold of engine right air supply system.
Oil Temperature (QST30)	Temperature of the engine lubricant.
ECU analog inputs (controller's outputs)	

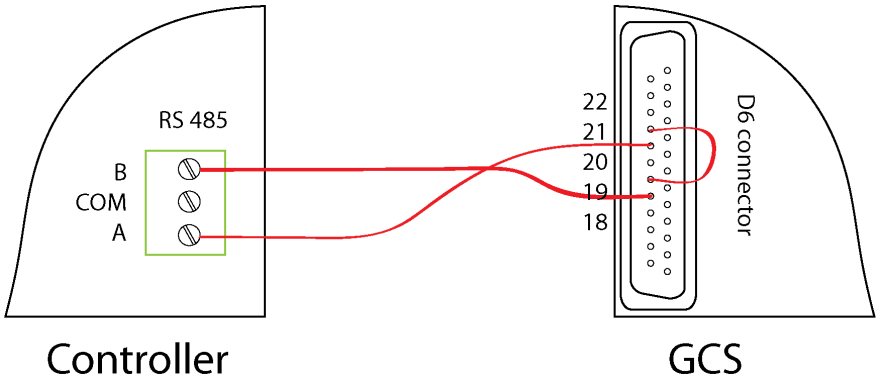
Controller's analog output for speed control configuration

There is no speed control over CAN bus available for this particular ECU.

Recommended wiring

Function	ECU 25pin D6 connector	9pin diagnostic connector	Controller
RS485 A	21	N/A	RS485 – RS485 A
RS485 COM	?	N/A	RS485 – RS485 COM
RS485 B	18	N/A	RS485 – RS485 B
Battery + (positive)	?	N/A	N/A
Battery - (negative)	?	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Service Mode Enable	19 and 22	N/A	Loop
Function	**ECU 25pin D3 connector**	**9pin diagnostic connector**	**Controller**
Analog Speed Control*	11	N/A	SG OUT
Analog Speed Control	12	N/A	SG COM
Analog Speed Control Shield	20		N/A
			*Analog Speed Control range 2.5VDC – 7.5VDC

Recommended wiring



In case that the GCS doesn't communicate try to activate input Diagnostic mode (pin 07 on connector D6).

Controller recommended setting (Setpoints/Comms settings group)

Controller	Setpoint	Value	Interface (Connector)
InteliGen NT	RS232(1) mode RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(1), RS 485(2) RS 232(1) *3, RS 232(2) *3
InteliSys NT	RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(2) RS 232(1) *3, RS 232(2) *3
InteliLite NT	COM2 Mode	ECU LINK	RS 485 *2
InteliComapct NT	COM2 Mode	ECU LINK	RS 485 *2
InteliDrive DCU *4	RS485 Mode	ECU LINK	RS 485 *3
InteliDrive Mobile *4	RS485 Mode	ECU LINK	RS 485 pin 85(A), pin 87(B), pin 86(COM)
InteliDrive Lite	COM2 Mode	ECU LINK	RS 485 *2

*2 IL-NT RS232-485 communication module is required
*3 external RS232-485 converter is required
*4 Setpoints/Basic setpoints group

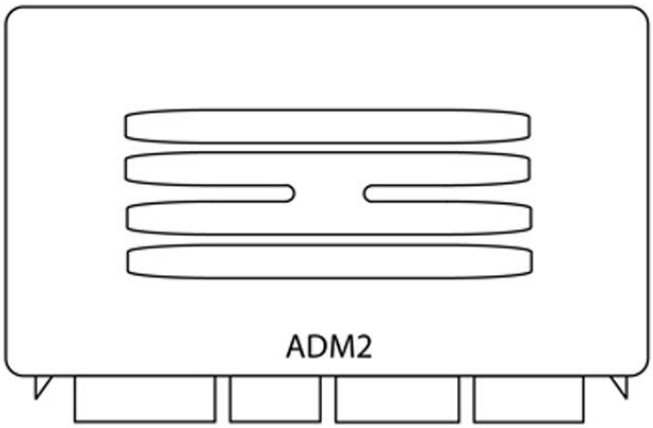
Available list of texts of fault codes is here.

DaimlerChrysler Engines Support

ECU Types

ECU Type	Engine type
ADM2	500, 900, 450
ADM3	500, 900, 450

ADM2



Controllers that support the ADM2

	Selection in PC software
	DaimlerChrysler ADM2
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that

	it warrants stopping the engine.
ECU binary inputs (controller's outputs - commands)	
Inhibit fuel injection *1*2*3*4	The command used for engine fuel injection inhibits. The recommended source value for this command is Logical 0.
Engine start *1*2*3*4	The command used for engine start. The recommended source value for this command is Fuel solenoid.
Inhibit engine start	The command used for engine start inhibits. The recommended source value for this command is Logical 0.
TorqueConvLockup Engaged	For more information about these commands, please contact the local representative.
Engine overspeed enable	
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Output shaft speed	If the speed signal Engine speed is not available, the Transmission output shaft speed can also be used to generate a vehicle speed information.
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 21pin connector	9pin diagnostic connector	Controller
CAN H	19	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	20	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	21	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1	N/A	N/A
Battery - (negative)	3	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

ADM3

Controllers that support the ADM3

	Selection in PC software
	DaimlerChrysler ADM3
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
ECU binary inputs (controller's outputs - commands)	
Inhibit fuel injection	The command used for engine fuel injection inhibit. The recommended source value for this command is Logical 0.
Engine start	The command used for engine start. The recommended source value for this command is Fuel solenoid.
Inhibit engine start	The command used for engine start inhibit. The recommended source value for this command is Logical 0.
TorqueConvLockup Engaged	For more information about these commands, please contact the local representative.
Engine overspeed enable	
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available

	at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Software Version	For service purpose only!
ECU analog inputs (controller's outputs)	
Output shaft speed	If the speed signal Engine speed is not available, the Transmission output shaft speed can also be used to generate a vehicle speed information.
Requested speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 21pin connector	9pin diagnostic connector	Controller
CAN H	19	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	20	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	21	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1	N/A	N/A
Battery - (negative)	3	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

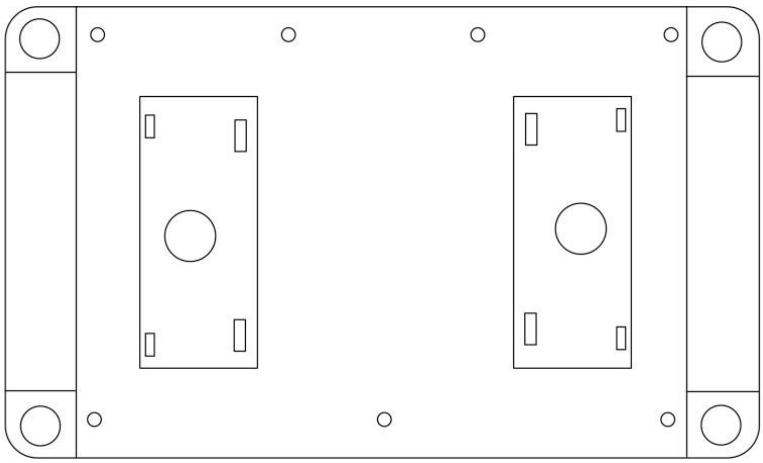
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Detroit Diesel Engines Support

ECU Types

ECU Type	Engine type
DDEC IV	Series 50, 60
DDEC V	Series 60

DDEC IV



Controllers that support the DDEC IV

	Selection in PC software
	DDC DDEC IV/V
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).

ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

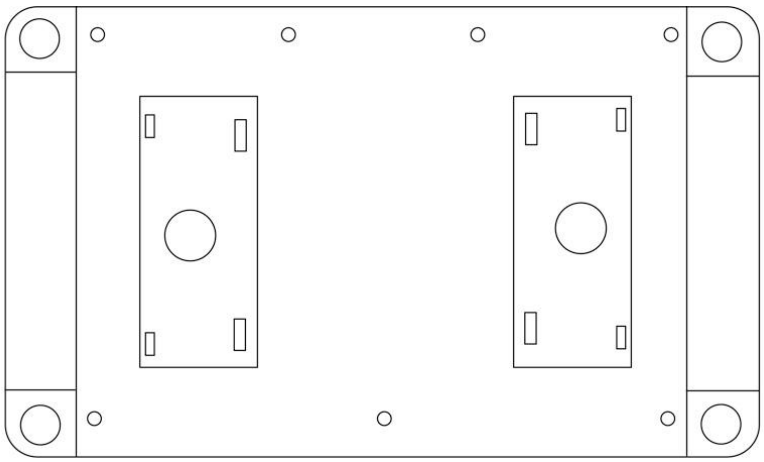
Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	6pin communication connector	9pin diagnostic connector	Controller
CAN H	F	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	D	E	CAN1 (extension modules/J1939) – CAN COM
CAN L	E	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	A	N/A
Battery - (negative)	?	B	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

DDEC V



Controllers that support the DDEC V

	Selection in PC software
	DDC DDEC IV/V
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the

	operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 68pin connector	9pin diagnostic connector	Controller
CAN H	43	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	44	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	58	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	61, 62, 65, 66	N/A	N/A
Battery - (negative)	63, 64, 67, 68	N/A	N/A
Key Switch	15	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Deutz Engines Support

ECU Types

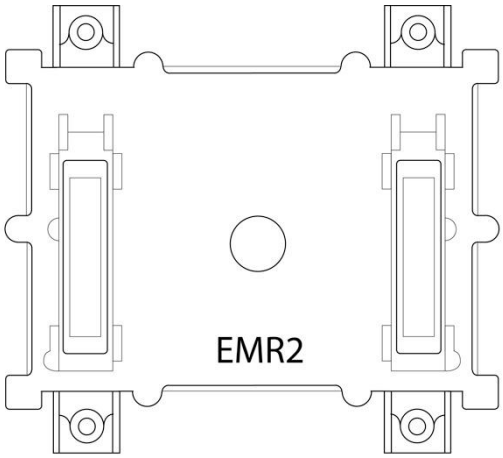
ECU Type	Engine Type
EMR2	10xx series
EMR3-E (EDC16, EDC7)	TCD 2012 4V TCD 2013 4V TCD 2015
EMR3-S (EDC16, EDC7)	TCD 2012 2V TCD 2013 2V TCD 2013 4V
EMR4 (EDC17CV52)	TCD 3.6 L4 TCD 4.1 L4 TCD 6.1 L6 TCD 7.8 L6 TCD 12 V6 TCD 16 V8
TEM Evolution	TBG 616/620/632 TCG 2016/2020/2032

Previous engine designation	New engine designation
TCD 20xx L04	TCD 2.9 L4
TCD 2010 L04	TCD 3.6 L4
TCD 2012 L04	TCD 4.1 L4
TCD 2012 L06	TCD 6.1 L6
TCD 2013 L06	TCD 7.8 L6
TCD 2015 V06	TCD 12 V6
TCD 2015 V08	TCD 16 V8

Engine type explanation

Engine Type	Meaning
Txxxxxx	Turbocharged
xCxxxxx	Charge air cooled
xxDxxxx	Diesel enfine
xxx12xx	Displacement in liters
xxxxxLx	L – in line engine, V – V-engine
Xxxxxx6	Number of cylinders

EMR2



Controllers that support the EMR2

	Selection in PC software
	Deutz EMR2
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Lock status	The command activates the engine start. If set engine stops and engine start prohibition will be active. The recommended source value for this command is Logical 0.
Stop Request *1*2*3*4	The command stops the running engine. The recommended source value for this command is stop pulse.
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees

	divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Software ID	For service purpose only!
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Deutz does not recommend to switch off the engine by removing the power supply (battery).
It causes fault code SPN=536.

Recommended setting of EMR2 using Serdia PC tool:

Page 30: 4400 = 1 … CAN activation
Page 31: 4412 = 1 … Activate TSC1a receive telegram
Page 31: 4470 = 1 … Activate CAN set point by TSC1a
Page 12: 4829 = 8… Enable stop request telegram
Page 10: 4900 = 8 … Selection of input channel type for nominal speed value sensor
828 = FunctEngineStop – Switch assignment for "Engine stop" function
4424 = TelStopRequestOn – SAEJ1939: Active Engine Stop Request receives telegram

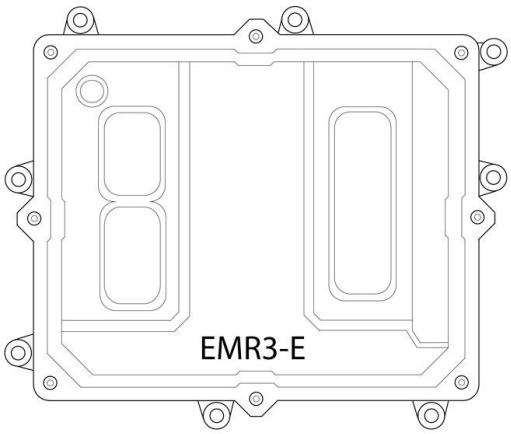
Recommended wiring

Function	ECU 25pin F connector	9pin diagnostic connector	Controller
CAN H	12	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	13	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	14	N/A	N/A
Battery - (negative)	1	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

It is recommended to stop the engine by stop signal, not by removing the power from ECU (it can result in problems with subsequent starting).

EMR3-E



Controllers that support the EMR3-E

	Selection in PC software
	Deutz EMR3
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Lock status	The command activates the engine start. If set engine stops and engine start prohibition will be active. The recommended source value for this command is Logical 0.
Stop Request *1*2*3*4	The command stops the running engine. The recommended source value for this command is stop pulse.
Start Lock	As long as the start is forbidden, the value 1 has to be send. Sending the 0 will release the start lock. This value is used for normal operation with no start prohibition. It can not release a start prohibition which is caused by other sources, i.e. internal engine protection functions or other CAN bus messages. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a

	percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Software ID	For service purpose only!
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active. **It is not allowed by Deutz to control speed over CAN bus on genset engines!** **Use pedal position input on ECU instead (see more details in Recommended wiring).**
Torque Map	Switch between internal torque map1 and torque map0. The recommended source values is an contstant following the requested function.
Engine speed droop	Switch between internal droop1 and droop2. The recommended source values is an contstant following the requested function.
High Idle Droop	Switch between internal high idle droop1 and high idle droop2. The recommended source values is an contstant following the requested function.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Torque Map values meaning

Value	Torque Map	Engine Speed Droop	High Idle Droop
0	no modification of torque map	no modification of droop	no modification of high idle droop
1	switch to torque map 1	selects droop 1	Selects high idle droop 1
2	switch to torque map 2	selects droop 2	selects high idle droop 2

Recommended wiring

Function	ECU D2 connector	diagnostic connector	Controller
CAN H	35	M	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	34	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	2,3,8,9 (klemme 30)	A	N/A
Battery - (negative)	5,6,10,11 (klemme 31)	B	N/A
Key Switch	40	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	79	N/A	SG OUT *
Analog Speed Control	78	N/A	SG COM

*Analog Speed Control range 0VDC to 5VDC, 100kOhm pull-down resitance

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

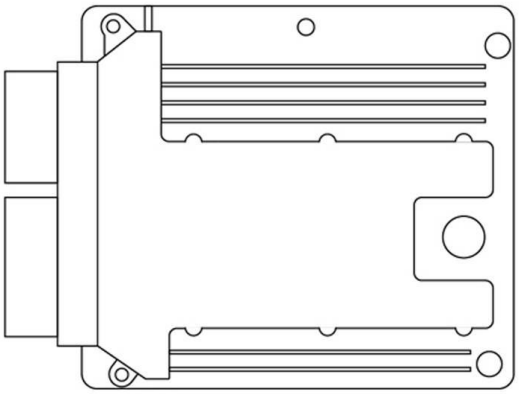
It is not allowed by Deutz to control speed over CAN bus on gen-set engines! Use pedal position input on ECU instead.

The SG OUT signal MUST NOT exceed the limits otherwise EMR3 blocks speed control via this input. Therefore it is recommended to keep the controller powered on always while the EMR3 is powered on (by Klemme 30). Or it is necessary to switch off this protection in EMR3.

Main relay

EMR3-E has internal relay providing power supply to EMR3. As soon as the ignition key is turned off (Klemme 15) the main relay switches off the EMR3 within cca. 10 seconds. The main relay separates the EMR3 from the battery + (Klemme 30).

EMR3-S



Controllers that support the EMR3-S

	Selection in PC software
	Deutz EMR3
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Lock status	The command activates the engine start. If set engine stops and engine start prohibition will be active. The recommended source value for this command is Logical 0.
Stop Request *1*2*3*4	The command stops the running engine. The recommended source value for this command is stop pulse.
Start Lock	As long as the start is forbidden, the value 1 has to be send. Sending the 0 will release the start lock. This value is used for normal operation with no start prohibition. It can not release a start prohibition which is caused by other sources, i.e. internal engine protection functions or other CAN bus messages. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a

	percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Software ID	For service purpose only!
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active. **It is not allowed by Deutz to control speed over CAN bus on genset engines!** **Use pedal position input on ECU instead (see more details in Recommended wiring).**
Torque Map	Switch between internal torque map1 and torque map0. The recommended source values is an contstant following the requested function.
Engine speed droop	Switch between internal droop1 and droop2. The recommended source values is an contstant following the requested function.
High Idle Droop	Switch between internal high idle droop1 and high idle droop2. The recommended source values is an contstant following the requested function.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Torque Map values meaning

Value	Torque Map	Engine Speed Droop	High Idle Droop
0	no modification of torque map	no modification of droop	no modification of high idle droop
1	switch to torque map 1	selects droop 1	Selects high idle droop 1
2	switch to torque map 2	selects droop 2	selects high idle droop 2

Recommended wiring

Function	ECU D2 connector	diagnostic connector	Controller
CAN H	62	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	61	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,3,5	N/A	N/A
Battery - (negative)	2,4,6	N/A	N/A
Key Switch	28	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	9	N/A	SG OUT
Analog Speed Control	30	N/A	SG COM

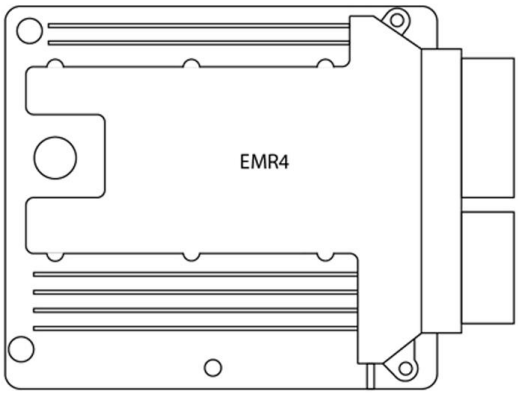
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

It is not allowed by Deutz to control speed over CAN bus on gen-set engines! Use pedal position input on ECU instead.

The SG OUT signal MUST NOT exceed the limits otherwise EMR3 blocks speed control via this input. Therefore it is recommended to keep the controller powered on always while the EMR3 is powered on. Or it is necessary to switch off this protection in EMR3.

Main relay
EMR3-E has internal relay providing power supply to EMR3. As soon as the ignition key is turned off the main relay switches off the EMR3 within cca. 10 seconds. The main relay separates the EMR3 from the battery +.

EMR4



Controllers that support the EMR4

	Selection in PC software
	Deutz EMR4
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	YES
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
DPF Active Regeneration	Indicates the state of diesel particulate filter active regeneration inhibition.
DPF ActRegInhibitDue ToInhSw	Indicates the state of diesel particulate filter active regeneration inhibition due to the diesel particulate filter regeneration inhibit switch.
DPF Inhibited Status	Indicates the state of diesel particulate filter active regeneration inhibition.
DPF Passive Regeneration	Indicates the state of diesel particulate filter passive regeneration.
DPF Inhibit Command	As long as this bit is set the regeneration will not start If the inhibit command will be set when a regeneration procedure is still running, the regeneration will be stopped and inhibited till the bit will be set to zero.
DPF Regeneration Request	This command is treated like the HW regeneration button. Once set the regeneration request, the regeneration procedure will run automatically when the conditions for regenerations are fulfilled.
APP Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.

Bank 1 Exhaust Dew Point	Indicates that the temperature on the exhaust side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 1.
Bank 1 Intake Dew Point	Indicates that the temperature on the intake side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 1.
Bank 2 Exhaust Dew Point	Indicates that the temperature on the exhaust side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 2.
Bank 2 Intake Dew Point	Indicates that the temperature on the intake side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 2.
Start Lock	The signal indicates the engine start prohibition. If set engine stops and engine start prohibition will be active.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request[*1*2*3*4]	The command stops the running engine. The recommended source value for this command is stop pulse.
Start Lock	As long as the start is forbidden, the value 1 has to be send. Sending the 0 will release the start lock. This value is used for normal operation with no start prohibition. It can not release a start prohibition which is caused by other sources, i.e. internal engine protection functions or other CAN bus messages. The recommended source value for this command is Logical 0.
DPF Regeneration Inhibit[*1]	Indicates the state of a switch available to the operator that inhibits diesel particulate filter regeneration. The recommended source should follow the requested function.
DPF Regeneration Force[*1]	Indicates the state of a switch available to the operator that forces diesel particulate filter regeneration. The recommended source should follow the requested function.
ECU analog outputs (controller's inputs)	
Air Intake Temperature	Temperature of air entering vehicle air induction system.
Barometric pressure (absolute)	Absolute air pressure of the atmosphere.
Urea Tank Level	Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.
Urea Temperature	Temperature of the diesel exhaust fluid in the storage tank.
Catalyst Intake Temperature	Temperature of the engine combustion byproducts entering the diesel oxidation catalyst in exhaust bank 1. This diesel parameter should be used with engines fueled by diesel fuel (not natural gas or propane).
Catalyst Outlet Temperature	Temperature of the engine combustion byproducts leaving the diesel oxidation catalyst in exhaust bank 1. This diesel parameter should be used with engines fueled by diesel fuel (not natural gas or propane).
DPF Differential Pressure	Exhaust differential pressure measured between the intake and exhaust of a diesel particulate filter in exhaust bank 1.
DPF Ash Load Percent	Indicates the ash load percent of diesel particulate filter 1. 100% is the level at which active diesel particulate filter ash service should be performed.
DPF Soot Load Percent	Indicates the soot load percent of diesel particulate filter 1. 100% is the level at which active diesel particulate filter regeneration should be triggered.
DPF Lamp	Command to control the diesel particulate filter lamp.
DPF Status	Indicates the state of the diesel particulate filter regeneration need and urgency.
HEST Lamp Command	Command to control the exhaust system high temperature lamp. This lamp indicates that the exhaust system temperature is high.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees

	divided by the number of cylinders.
Starter mode	There are several phases in a starting action and different reasons why a start cannot take place. See the table below.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Hand Gas Position	The ratio of actual position of the remote analog engine speed/torque request input device to the maximum position of the input device. For example, in on-highway vehicles this could be an accelerator control device that is external to the drivers cab or an accelerator that is controlled by a hand lever from the operators seat.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Exhaust Gas Mass Flow	Measured/calculated exhaust gas mass upstream of the aftertreatment system in exhaust bank 1 and 2.
Nominal Friction Torque	The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel delivery pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Fuel temperature	Temperature of fuel entering injectors.
Air filter differential pressure	Change in engine air system pressure, measured across the filter, due to the filter and any accumulation of solid foreign matter on or in the filter. This is the measurement of the first filter in a multiple air filter system.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
DPF Inlet Pressure	Exhaust back pressure as a result of particle accumulation on filter media placed in the exhaust stream.
Exhaust Gas Temperature	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Software ID	For service purpose only!
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Power Reduction	Reduces the max. engine torque. The base for the percentage value is the max. torque curve 1. If there is more than one source for power reduction active, i.e. internal power protection by temperature and this message, the lowest value (= the highest reduction) will be used. If there is a timeout of a message the last valid data will be used furthermore for the calculation. 0% causes the EMR4 to switch off the engine. 100% means no power reduction.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

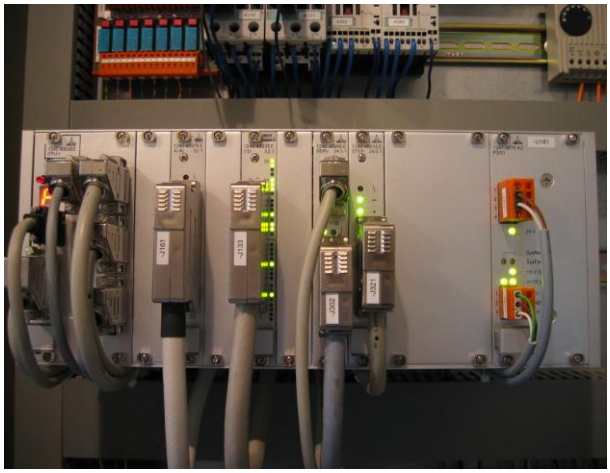
Started Mode values meaning

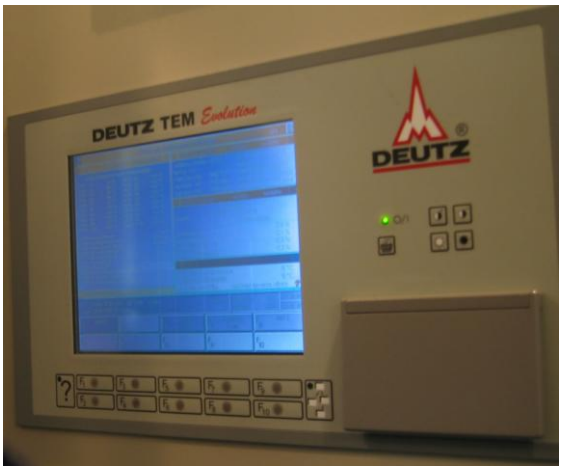
Value	Starter Mode
0	start not requested
1	starter active, gear not engaged
2	starter active, gear engaged
3	start finished; starter not active after having been actively engaged (after 50ms mode goes to 0)
4	starter inhibited due to engine already running
5	starter inhibited due to engine not ready for start (preheating)
6	starter inhibited due to driveline engaged or other transmission inhibit
7	starter inhibited due to active immobilizer
8	starter inhibited due to starter over-temp
9	Reserved
10	Reserved
11	Reserved
12	starter inhibited - reason unknown
13	error (legacy implementations only; use 14)
14	error
15	not available

Recommended wiring

No documentation available so far!
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

TEM Evolution





Configuration

For connection to Deutz TEM module it is necessary to use an I-CB module. Configuration of the controller and I-CB has to be done separately using GenConfig or DriveConfig and ICBEdit software. For further information see I-CB manual.

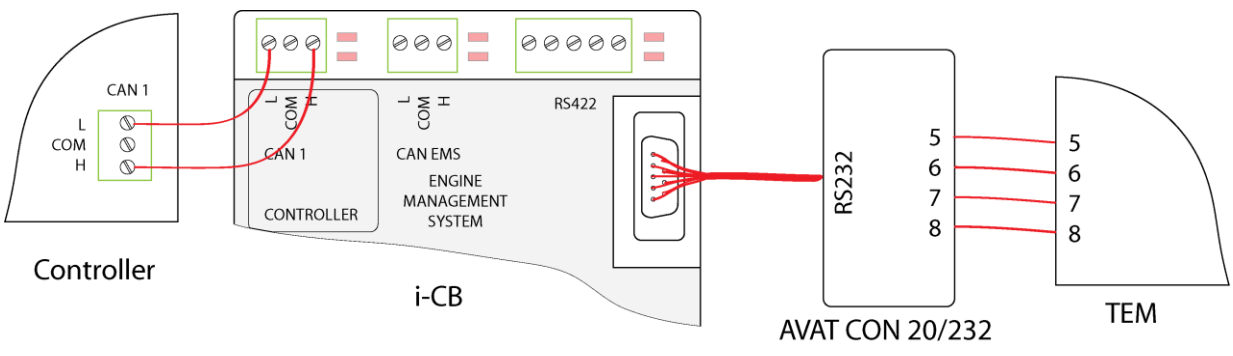
Controllers that support the TEM Evolution

	Selection in PC software
	Deutz TEM
InteliSys NT	Legacy I-CB/DeutzTEME
InteliGen NT	Legacy I-CB/DeutzTEME
InteliDrive DCU	ICB module + I/O modules
InteliDrive Mobile	ICB module + I/O modules
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available commands

For more information about available values and signals, please refer to I-CB manual or ICBEdit PC software.

Recommended wiring

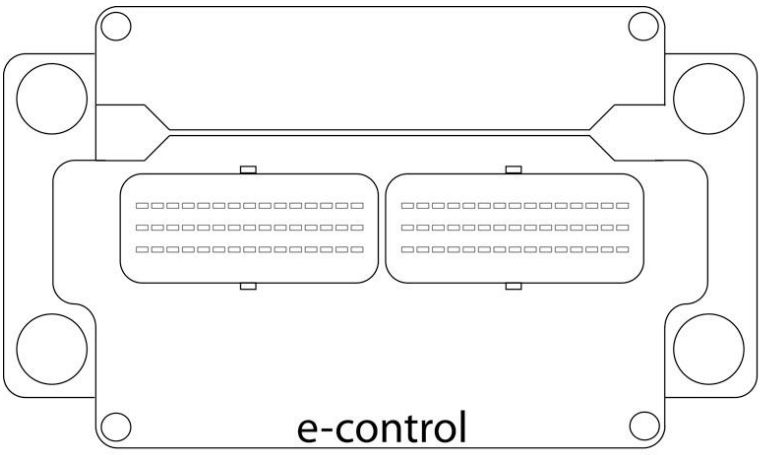


Ford Engines Support

ECU Types

ECU Type	Engine type
E-control	DSG-423, WSG-1068

E-control



Controllers that support the E-control

	Selection in PC software
	Ford e-control
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.

Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Air Inlet Temperature	Temperature of air entering vehicle air induction system.
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Accelerator Pedal Position2	The ratio of actual position of the second analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the secondary accelerator control in an application.
AccPedal 1 Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.
Load At Current Speed	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Engine Oil Temp	Temperature of the engine lubricant.
Coolant Temp	Temperature of liquid found in engine cooling system.
Intercooler Temp	Temperature of liquid found in the intercooler located after the turbocharger.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Requested speed[*1*2*3*4]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
[*1] - InteliLite[NT] [*2] - InteliDrive Lite [*3] - InteliCompact[NT] [*4] - InteliNano[NT] [*5] - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A

Recommended wiring

Function	ECU B connector	Customer 42-pin connector	Controller
CAN H	14	28	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	15	29	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	60,79	N/A	N/A
Battery - (negative)	4,69,81	N/A	N/A
Key Switch	N/A	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

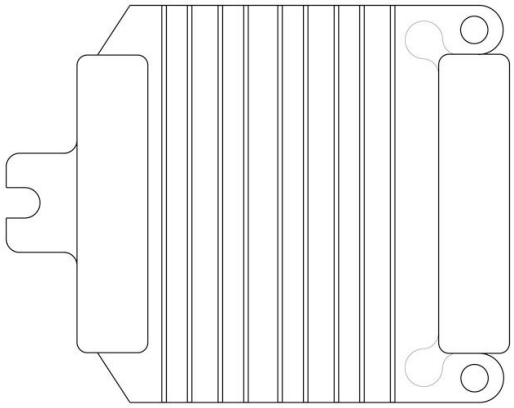
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

GM Engines Support

ECU Types

ECU Type	Engine Type
MEFI4B MEFI5B MEFI6	Diesel engines
SECM	Gas engines
E-control E-control LCI	Natural gas or propane engines: GM 3.0 liter GM 4.3 liter GM 5.0 liter GM 5.7 liter GM 8.1 naturally aspirated GM 8.1 turbo

MEFI4B, MEFI5B



Controllers that support the MEFI4B, MEFI5B

	Selection in PC software
	GM MEFI4/MEFI5B
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Fuel Level (MEFI5B only)	Ratio of volume of fuel to the total volume of fuel storage container.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Air Intake Pressure (MEFI5B only)	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure (MEFI5B only)	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp (MEFI5B only)	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp (MEFI5B only)	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate (MEFI5B only)	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU J1 or J2 connectors	diagnostic connector	Controller
CAN H	24 (J2)	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	9 (J2)	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1 (J2)	N/A	N/A
Battery - (negative)	13,28,29 (J1)	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

MEFI6

Controllers that support the MEFI6

	Selection in PC software
	GM MEFI6
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
MEFI6 Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped. This is a proprietary GM lamp.
MEFI6 Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active. This is a proprietary GM lamp.
MEFI6 Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related. This is a proprietary GM lamp.
MEFI6 Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine. This is a proprietary GM lamp.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
AT1 Intake O2	
AT1 Outlet O2	Indicates that the temperature on the exhaust side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 1.
AT1 Intake O2	Indicates that the temperature on the intake side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 1.
AT2 Outlet O2	Indicates that the temperature on the exhaust side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 2.

AT2 IntakeO2	Indicates that the temperature on the intake side of the aftertreatment system has exceeded the dew point, as estimated by the ECM in exhaust bank 2.
Fuel Level	Ratio of volume of fuel to the total volume of fuel storage container.
ECM Hardware	For service purpose only!
ECM Information1	For service purpose only!
Engine Displacement	For service purpose only!
OEM Engine ID	For service purpose only!
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Starter Mode	There are several phases in a starting action and different reasons why a start cannot take place. See the table below.
AP Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Desired speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Oil Temperature	Temperature of the engine lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed[*1*2*3*4]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active. This is a proprietary GM speed request.
TSC1 Requested speed	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active. This is a standard J1939 speed request.

Supported by the non-configurable controllers:
[*1] - InteliLite[NT] [*2] - InteliDrive Lite [*3] - InteliCompact[NT] [*4] - InteliNano[NT] [*5] - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

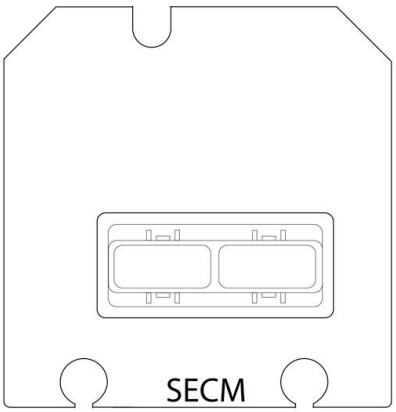
Started Mode value meaning

Value	Starter Mode
0	start not requested
1	starter active, gear not engaged
2	starter active, gear engaged
3	start finished; starter not active after having been actively engaged (after 50ms mode goes to 0)
4	starter inhibited due to engine already running
5	starter inhibited due to engine not ready for start (preheating)
6	starter inhibited due to driveline engaged or other transmission inhibit
7	starter inhibited due to active immobilizer
8	starter inhibited due to starter over-temp
9	Reserved
10	Reserved
11	Reserved
12	starter inhibited - reason unknown
13	error (legacy implementations only; use 14)
14	error
15	not available

Recommended wiring

No documentation available so far!
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

SECM



Controllers that support the SECM

	Selection in PC software
	GM SECM
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Approaching Shutdown	Status signal which indicates that engine shutdown is imminent. This engine protection signal can be a result of different systems failing, i.e., engine overheating.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
System Configuration	Parameter which indicates the configuration of the engine shutdown system.
System Timer State	Status signal which indicates the current mode of the engine protection system timer system.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	

Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Inlet Air Mass Flow Rate	Mass flow rate of fresh air entering the engine air intake, before any EGR mixer, if used. Flow rate of fresh air conducted to the engine cylinders to support combustion.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Engine Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

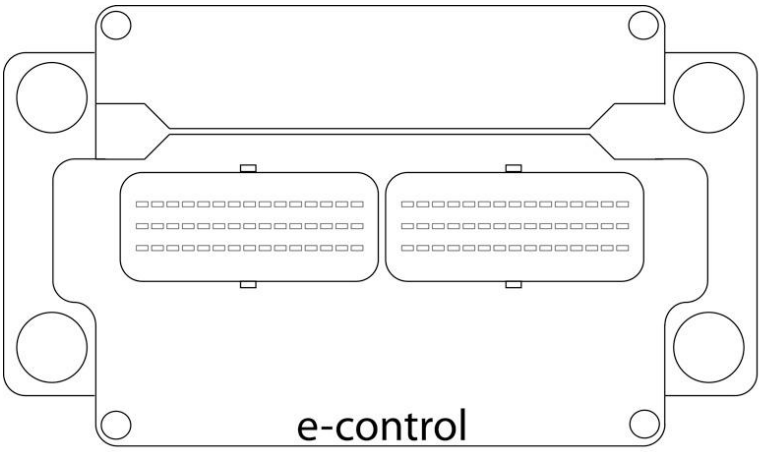
Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU B connector	diagnostic connector	Controller
CAN H	20	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	21	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	22	N/A	N/A
Battery - (negative)	17	N/A	N/A
Key Switch	N/A	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

E-control



Controllers that support the E-control

	Selection in PC software
	GM e-control
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Air Inlet Temperature	Temperature of air entering vehicle air induction system.
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.

Engine torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Accelerator Pedal Position2	The ratio of actual position of the second analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the secondary accelerator control in an application.
AccPedal 1 Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.
Load At Current Speed	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Intercooler Temp	Temperature of liquid found in the intercooler located after the turbocharger.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU B connector	diagnostic connector	Controller
CAN H	A (N)	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	? (S)	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	B (P)	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	N/A	N/A
Battery - (negative)	?	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

E-control LCI

Controllers that support the E-control LCI

	Selection in PC software
	GM e-control LCI
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Air Inlet Temperature	Temperature of air entering vehicle air induction system.
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Intercooler Temp	Temperature of liquid found in the intercooler located after the turbocharger.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.

Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU B connector	diagnostic connector	Controller
CAN H	A	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	B	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	N/A	N/A
Battery - (negative)	?	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

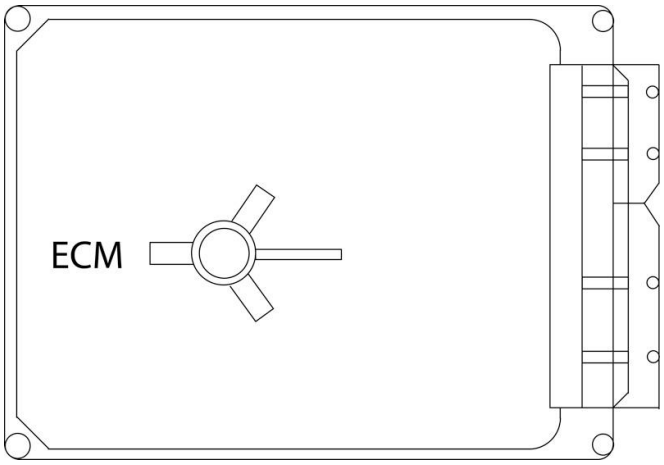
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Isuzu Engines Support

ECU Types

ECU Type	Engine Type	
ECM	4HK series	5.2L (140kW-190kW)
	4J series	3.0L (46kW-140kW)
	6HK series	7.8L (up to 300kW)
	6U series	9.8L (up to 400kW)
	6W series	15.7L (up to 400kW)

ECM



Controllers that support the ECM

	Selection in PC software
	Isuzu ECM
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.

Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request	The command for normal stopping of the engine. The recommended source value for this command is Stop solenoid.
ECU analog outputs (controller's inputs)	
EngOil Filter Diff.Press	Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 121pin connector	diagnostic connector	Controller
CAN H	18	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	37	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	2,5	N/A	N/A
Battery - (negative)	1,3,4	N/A	N/A
Key Switch	24	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

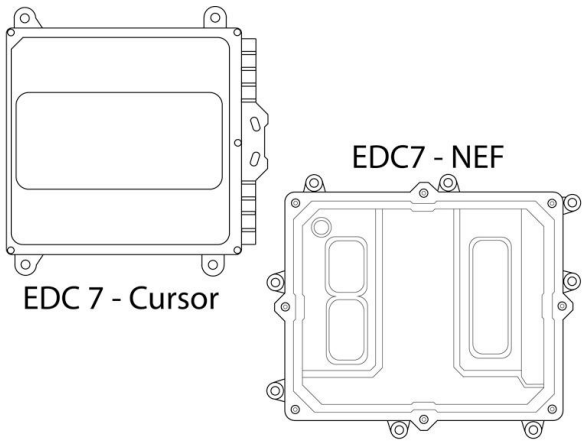
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Iveco Engines Support

ECU Types

ECU Type	Engine Type
EDC (EDC62 or EDC7C1 or EDC7UC31)	NEF (N40, N60), Cursor (9, 10, 13)
ADEMIII	Vector

EDC



Controllers that support the EDC

	Selection in PC software
	Iveco NEF&Cursor
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Brake Switch	Switch signal which indicates that the driver operated brake foot pedal is being pressed. This brake foot pedal is controlling the vehicles' service brake (total vehicle braking application, not park brakes). It is necessary for safe drivetrain behavior that the switch activates before the physical braking components are activated.
Catalyst Tank Level	Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.
Clutch Switch	Switch signal which indicates that the clutch pedal is being pressed. It is necessary for a safe drivetrain behavior that the clutch switch is set before the clutch is opened.
Cruise Control Active	Cruise control is switched on. It is not ensured that the engine is controlled by Druide

	control, as in the case of a large driver's demand the engine is controlled by the driver while cruise control is active. The cruise control is set to 0 if a switch off condition occurs.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Diagnostic Lamp Status	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Engine Oil Pressure Low	Low pressure of oil in engine lubrication system as provided by oil pump.
Engine Oil Temperature High	High temperature of oil in engine lubrication system as provided by oil pump.
Engine Overspeed	This signal is active when the actual engine speed is above the operating range.
Engine Over Temp Status	Indicates the state of pre-warming of the engine. 0 – No warning 1 – Prewarning 2 – Warning 3 to 7 – Not defined
Fuel Filter Heater Status	This signal is active when the fuel filter heater is active.
Immobilizer Fuel Block	Please contact local representative for further information about this signal.
Water In Fuel	Signal which indicates the presence of water in the fuel.
APP Kick Down Switch	Switch signal which indicates whether the accelerator pedal kickdown switch is opened or closed.
APP Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.
Retarder Brake Assist Switch	Switch signal which indicates whether the operator wishes the retarder to be enabled for vehicle braking assist. The retarder does not check this switch, nor does the enabling of this switch engage the retarder.
Retarder Shift Assist Switch	Switch signal which indicates whether the operator wishes the retarder to be enabled for vehicle braking assist. The retarder does not check this switch, nor does the enabling of this switch engage the retarder.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
Wait To Start Lamp	Lamp signal which indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Cold Start Heater Status	Please contact local representative for further information about this signal.
ECM Operational Status	For service purpose only!
Engine Degradation Level	Please contact local representative for further information about this signal.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine Torque Mode	State signal which indicates which engine torque mode is currently generating, limiting, or controlling the torque. Note that the modes are not in prioritized order. Not all modes may be relevant for a given device. Some device may not implement all functions. The data type of this parameter is measured. Mode 0 means 'No request': engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking). Modes 1b

	to 14 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Nominal Friction Torque	The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps.
Operating Speed Asymmetry	For service purpose only!
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Actual Retarder Torque	Actual braking torque of the retarder as a percent of retarder configuration reference torque.
Retarder Torque Mode	State signal which indicates which retarder torque mode is currently generating, limiting, or controlling the torque. Note that the modes are not in prioritized order. Not all modes may be relevant for a given device. Mode 0 means 'No request': engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking). Modes 1 to 14 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Trap Inlet Pressure	Exhaust back pressure as a result of particle accumulation on filter media placed in the exhaust stream.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Mode without SCI *1*2*3*4	This mode is recommeded to used when there is no SCI connected to the CAN bus. Source has to be set " ***Not used*** ", i.e. there can't be set any value !
Mode with SCI	This mode must be used when a SCI module is connected to the CAN bus. Source has to be set " ***Not used*** ", i.e. there can't be set any value !

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring for NEF

Function	ECU A2 89pin connector	diagnostic connector	Controller
CAN H	52	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	53	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1, 7, 12, 13	N/A	N/A
Battery - (negative)	3, 9, 14, 15	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

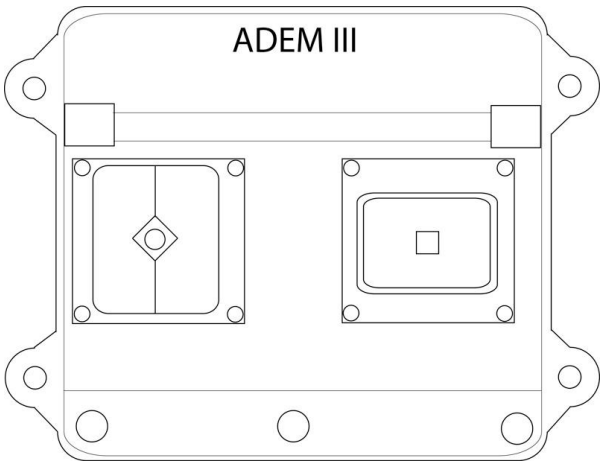
Diagnostic connector layout is on page 13 or here.

Recommended wiring for Cursor

Function	ECU A2 89pin connector	diagnostic connector	Controller
CAN H	11	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	12	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	N/A	N/A
Battery - (negative)	?	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

ADEMIII



Controllers that support the ADEMIII

	Selection in PC software
	Iveco Vector
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
Start Request *1*2*3*4	The command used for engine running. The recommended source value for this command is Fuel solenoid.
Cold Start Request *1*2*3*4	The command for start the engine in cold enviroment conditions. If Cold Start Request signal is not used, configure it to Logical 0. Otherwise the engine will not start.
ECU analog outputs (controller's inputs)	

Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Cooling water temp	Temperature of liquid found in engine cooling system.
Oil pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Oil temperature	Temperature of the engine lubricant.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

In case if alternative format (°F, psi, gph) is selected in LiteEdit PC software, the value **Total Fuel Used** is showed in dimension **US gaollon** instead of Imperial gallon !

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	Interface card	diagnostic connector	Controller
CAN H	J2 1	C	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	J2 2	D	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	116	N/A	N/A
Battery - (negative)	117	N/A	N/A
Key Switch	J7 18,19 *	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

* Emergency stop must open this contact. After power on it has to wait for 10 seconds before start the engine - if ECU PwrRelay output is used to close this contact Prestart time has to be set to at least 10 seconds.

JCB Engines Support

ECU Types

ECU Type	Engine Type
JCB Delphi DCM	Dieselmax or ecoMAX

Delphi DCM

Controllers that support the Delphi DCM

	Selection in PC software
	JCB Delphi DCM
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
APP Kick Down Switch	Switch signal which indicates whether the accelerator pedal kickdown switch is opened or closed.
Idle Shutdown has Shutdown Engine	Status signal which identifies whether or not the engine has been shutdown by the idle shutdown timer system.
Idle Shutdown Timer Function	Parameter which indicates the configuration of the idle shutdown timer system.
Idle Shutdown Timer Override	Status signal which indicates the status of the override feature of the idle shutdown timer system.
Idle Shutdown Timer State	Status signal which indicates the current mode of operation of the idle shutdown timer system.
Wait to Start Lamp	Lamp signal which indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
Water In Fuel Indicator	Signal which indicates the presence of water in the fuel.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a

	percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine Demand Torque	The requested torque output of the engine by all dynamic internal inputs, including smoke control, noise control and low and high speed governing.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine Torque Mode	State signal which indicates which engine torque mode is currently generating, limiting, or controlling the torque. Note that the modes are not in prioritized order. Not all modes may be relevant for a given device. Some device may not implement all functions. The data type of this parameter is measured. Mode 0 means 'No request': engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking). Modes 1b to 14 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Remote Accelerator	The ratio of actual position of the remote analog engine speed/torque request input device to the maximum position of the input device. For example, in on-highway vehicles this could be an accelerator control device that is external to the drivers cab or an accelerator that is controlled by a hand.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
T-ECU	Temperature of the engine electronic control unit.
Estimated Percent Fan Speed	Estimated fan speed as a ratio of the fan drive (current speed) to the fully engaged fan drive. A two state fan (off/on) will use 0% and 100% respectively. A variable speed fan will use 0% to 100%. Multiple fan systems will use 0 to 100% to indicate the percent cooling capacity being provided.
Fan Drive State	This parameter is used to indicate the current state or mode of operation by the fan drive. See the table below.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed[*1*2*3*4]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Fuel Level	Ratio of volume of fuel to the total volume of fuel storage container.

Supported by the non-configurable controllers:
[*1] - InteliLite[NT] [*2] - InteliDrive Lite [*3] - InteliCompact[NT] [*4] - InteliNano[NT] [*5] - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Fan drive state values meaning

Value	Fan Drive State
0	Fan off
1	Engine system'General
2	Excessive engine air temperature
3	Excessive engine oil temperature
4	Excessive engine coolant temperature
5	Excessive transmission oil temperature
6	Excessive hydraulic oil temperature
7	Default Operation
8	1000 Not defined
9	1001 Manual control
10	1010 Transmission retarder
11	1011 A/C system
12	1100 Timer
13	1101 Engine brake
14	1110 Other
15	Not availeble

Recommended wiring

Function	ECU X2 62pin connector	diagnostic connector	Controller
CAN H	27	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	19	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	23	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	57, 60, 53, 49	N/A	N/A
Battery - (negative)	58, 59, 61, 62	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Jenbacher Engines Support

ECU Types

ECU Type	Engine Type
DIA.NE	Gas engines

DIA.NE

To enable communication with Jenbacher Diane over Modbus, order the engine with Modbus interface !

Controllers that support the DIA.NE

	Selection in PC software
	Jenbacher Diane
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

ECU binary outputs (controller's inputs)	
GCB Closed	This signal indicates closed position of generator circuit breaker.
GCB Open	This signal indicates open position of generator circuit breaker.
MCB Closed	This signal indicates closed position of utility circuit breaker.
MCB Open	This signal indicates open position of utility circuit breaker.
Operation OFF	For more information about this signal contact local representative
Operation ON	For more information about this signal contact local representative
Ready for Aut. Demand OFF	For more information about this signal contact local representative
Ready for Aut. Demand	For more information about this signal contact local representative

ON	
Service Selector Switch AUT	The feedback from Service Selector Switch. The switch is in Auto position.
Service Selector Switch MAN	The feedback from Service Selector Switch. The switch is in Manual position.
Service Selector Switch OFF	The feedback from Service Selector Switch. The switch is in OFF position.
Demand for Auxiliaries	For more information about this signal contact local representative
GCB Closed 2	For more information about this signal contact local representative
General Trip	For more information about this signal contact local representative
General Warning	For more information about this signal contact local representative
MCB Closed 2	For more information about this signal contact local representative
Module is Demanded	For more information about this signal contact local representative
Operation - Engine is Running	For more information about this signal contact local representative
Pulse for OperHours Counter	For more information about this signal contact local representative
Pulse for Start Counter	For more information about this signal contact local representative
Ready for Aut. Demand	For more information about this signal contact local representative
Re-synchronizing Activated	For more information about this signal contact local representative
Service Select. Switch AUT 2	For more information about this signal contact local representative
Service Select. Switch MAN 2	For more information about this signal contact local representative
Synchronizing Gen. Activated	For more information about this signal contact local representative
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Jacket Water Temperature	For more information about this signal contact local representative
Jacket Water Pressure	Gage pressure of liquid found in engine cooling system.
Engine Oil Temperature	Temperature of the engine lubricant.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
ExhstGasTemp-Turbocharger	For more information about this signal contact local representative
ExhstGasTemp-HeatExchanger	For more information about this signal contact local representative
PlateTempExhstGasHeat Exch.	For more information about this signal contact local representative
Cylinder Exhaust Gas Temp	For more information about this signal contact local representative
Heating Water Return Temp	For more information about this signal contact local representative
Generator Power Factor	For more information about this signal contact local representative
Generator Frequency	For more information about this signal contact local representative
Gener. Current Average	For more information about this signal contact local representative
Gener. Voltage Aver. Ph-Ph	For more information about this signal contact local representative
Total Active Output	For more information about this signal contact local representative
Total Reactive Output	For more information about this signal contact local representative
Setpoint Power Control	For more information about this signal contact local representative

Operation Hours Counter	Accumulated time of operation of engine.
Start Counter	For more information about this signal contact local representative
Fuel Mixture Temperature	For more information about this signal contact local representative
Excitation Voltage	For more information about this signal contact local representative
Generator Voltage L1-L2	For more information about this signal contact local representative
Generator Power	For more information about this signal contact local representative
Generator Reactive Power	For more information about this signal contact local representative
Generator Apparent Power	For more information about this signal contact local representative
Generator Neutral Current	For more information about this signal contact local representative
Boost Pressure Actual Value	For more information about this signal contact local representative
Gasmixer Position	For more information about this signal contact local representative
Throttle Valve Position	For more information about this signal contact local representative
Turbocharg Bypass Position	For more information about this signal contact local representative
ECU analog inputs (controller's outputs)	

Controller's analog output for speed control configuration

There is no speed control over CAN bus available for this particular ECU.

Recommended wiring

Function	Siemens converter	9pin diagnostic connector	Controller
RS485 A	A	N/A	RS485 – RS485 A
RS485 COM	COM	N/A	RS485 – RS485 COM
RS485 B	B	N/A	RS485 – RS485 B
Battery + (positive)	?	N/A	N/A
Battery - (negative)	?	N/A	N/A
Key Switch	N/A	N/A	Any binary output configured as ECU PwrRelay

Diagnostic connector layout is on page 13 or here.

Controller recommended setting (Setpoints/Comms settings group)

Controller	Setpoint	Value	Interface (Connector)
InteliGen^{NT}	RS232(1) mode RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(1), RS 485(2) RS 232(1) *^{3}, RS 232(2) *^{3}
InteliSys^{NT}	RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(2) RS 232(1) *^{3}, RS 232(2) *^{3}

*^{3} external RS232-485 converter is required

John Deere Engines Support

ECU Types

ECU Type	Engine Type
JDEC	Diesel engines

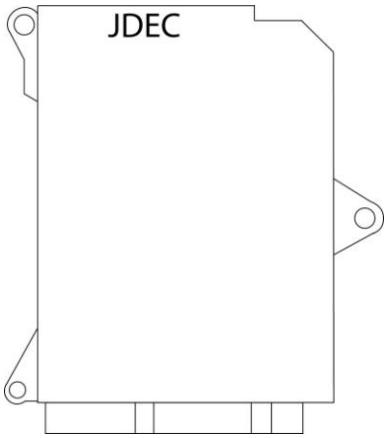
Engine type explanation

Engine type		Meaning
4045HF275	4xxxxxxxx	Number of cylinders
	x045xxxxx	Displacement in litres YY.Z
	xxxxHxxxx	T - turbocharger w/o aftercooler H - turbocharger w aftercooler
	xxxxxFxxx	F - OEM engine
	xxxxxx4xx	Valves/cylinder
	xxxxxxx8x	Emissions: 7 - Tier II 8 - Tier III
	xxxxxxxx5	0 - no ECU 5 - J1939 ECU 9 - J1939 ECU, Tier II electronic

PowerTech engine type explanation

Engine type		Meaning
PSS 6.8L	Pxxxxx	Technology : P - Powertech plus E - Powertech E
	xSxxxx	Turbocharger : V – Variable geometry turchocharger (VGT) S – Series turbochargers W – wastegate turbocharger
	xxSxxx	Aftertreatment : S – Exhaust filter and SCR X – Exhaust filter
	xxx6.8L	Displacement

JDEC



Controllers that support the JDEC

	Selection in PC software
	John Deere
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
APP Kick Down Switch	Switch signal which indicates whether the accelerator pedal kickdown switch is opened or closed.
Idle Shutdown has Shutdown Engine	Status signal which identifies whether or not the engine has been shutdown by the idle shutdown timer system.
Idle Shutdown Timer Function	Parameter which indicates the configuration of the idle shutdown timer system.
Idle Shutdown Timer Override	Status signal which indicates the status of the override feature of the idle shutdown timer system.
Idle Shutdown Timer State	Status signal which indicates the current mode of operation of the idle shutdown timer system.
Wait to Start Lamp	Lamp signal which indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
Water In Fuel Indicator	Signal which indicates the presence of water in the fuel.
ECU binary inputs (controller's outputs - commands)	

DPF Regen.Inhibit Switch[*1]	Indicates the state of a switch available to the operator that inhibits diesel particulate filter regeneration. The recommended source should follow the requested function.
DPF Regen.Force Switch[*1]	Indicates the state of a switch available to the operator that forces diesel particulate filter regeneration. The recommended source should follow the requested function.
Cleaning Allow[*1*2*3]	Please contact local representation for more information about this command. The recommended source should follow the requested function.
ECU analog outputs (controller's inputs)	
Ash Load Percent	Indicates the ash load percent of diesel particulate filter 1. 100% is the level at which active diesel particulate filter ash service should be performed.
Soot Load Percent	Indicates the soot load percent of diesel particulate filter 1. 100% is the level at which active diesel particulate filter regeneration should be triggered.
DPF Act.Reg. ForcedStatus	Value used for Tier4 icon control.
DPF Lamp Command	Value used for Tier4 icon control.
DPF Staus	Indicates the state of the diesel particulate filter regeneration need and urgency.
HEST Lamp Command	Command to control the exhaust system high temperature lamp. This lamp indicates that the exhaust system temperature is high.
Fuel Rail Pressure	Please contact JohnDeere representative for further information about this value.
Manifold Air Pressure	Please contact JohnDeere representative for further information about this value.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine Demand Torque	The requested torque output of the engine by all dynamic internal inputs, including smoke control, noise control and low and high speed governing.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Engine Torque Mode	State signal which indicates which engine torque mode is currently generating, limiting, or controlling the torque. Note that the modes are not in prioritized order. Not all modes may be relevant for a given device. Some device may not implement all functions. The data type of this parameter is measured. Mode 0 means 'No request': engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking). Modes 1b to 14 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Remote Accelerator	The ratio of actual position of the remote analog engine speed/torque request input device to the maximum position of the input device. For example, in on-highway vehicles this could be an accelerator control device that is external to the drivers cab or an accelerator that is controlled by a hand.
Desired Operation Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Nominal Friction Torque	The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume.

	Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system. Dones from Master unit..
Crankcase Pressure	Gage pressure inside engine crankcase.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Intercooler Temp	Temperature of liquid found in the intercooler located after the turbocharger.
Oil Temp	Temperature of the engine lubricant.
Turbo Oil Temp	Temperature of the turbocharger lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Fan drives state values meaning

Value	Fan Drive State
0	Fan off
1	Engine system'General
2	Excessive engine air temperature
3	Excessive engine oil temperature
4	Excessive engine coolant temperature
5	Excessive transmission oil temperature
6	Excessive hydraulic oil temperature
7	Default Operation
8	1000 Not defined
9	1001 Manual control
10	1010 Transmission retarder

11	1011 A/C system
12	1100 Timer
13	1101 Engine brake
14	1110 Other
15	Not availeble

Recommended wiring

Function	ECU 21pin connector	diagnostic connector	Controller
CAN H	V	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	F	F	CAN1 (extension modules/J1939) – CAN COM
CAN L	U	B	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	B	E	N/A
Battery - (negative)	E	D	N/A
Key Switch	G	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Important JDEC settings for speed control via CAN are:
Torque speed control - Enable TSC1 Source 1; Source Address 1 set to 3
Governor droop – Set RPM of droop to e.g. 36 (it will enable controller to vary engine speed its nominal speed)
Throttle – Disable all throttles

MAN Engines Support

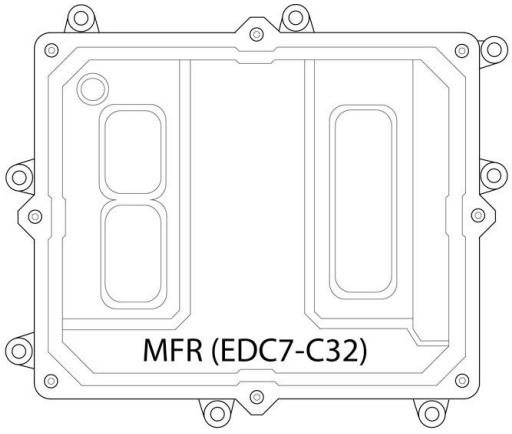
ECU Types

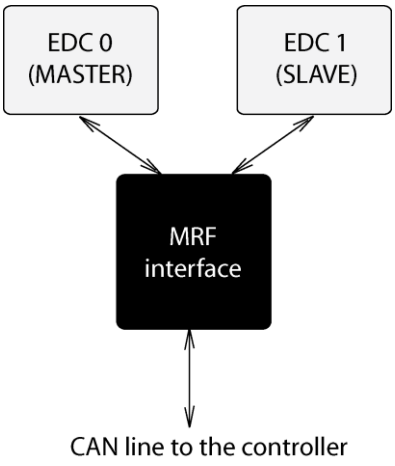
ECU Type	Engine Type
EDC Master and MFR interface unit	6 R
EDC Master, EDC Slave and MFR interface unit	8 V, 12 V

Engine type explanation

Engine type	Meaning
D 0836 LE 201/203	D - Water-cooled four stroke Diesel engine with direct fuel injection E - Water-cooled 4 stroke Otto-gas-engines with spark ignition
	E - naturally aspirated engine TE - turbocharged engine LE - turbocharged and intercooled engine
Number of cylinders, arrangement	**Meaning**
6 R	R - vertically arranged in-line V - cylinders in 90° V arrangement

EDC Master, EDC Slave and MFR interface system





Controllers that support the EDC Master, EDC Slave and MFR interface system

	Selection in PC software
	MAN MFR
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	No
InteliDrive Nano	YES

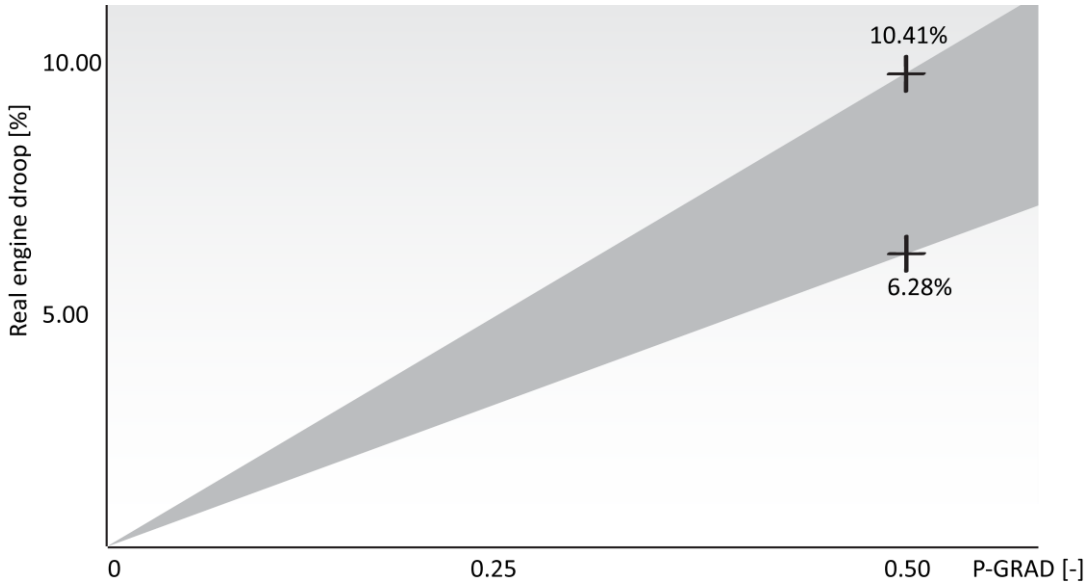
Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Amber Warning Lamp (MFR)	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp (MFR)	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active. This signal comes from Master ECU.
Protect Lamp (MFR)	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related. This signal comes from Master ECU.
Red Stop Lamp (MFR)	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine. . This signal comes from Master ECU.
Amber Warning Lamp (sl)	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped. . This signal comes from Slave ECU.
Malfunction Lamp (sl)	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active. This signal comes from Slave ECU.
Protect Lamp (sl)	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related. This signal comes from Slave ECU.
Red Stop Lamp (sl)	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine. This signal comes from Slave ECU.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Start Request[*1*2*3*4]	The command used for engine running. The recommended source value for this command is Fuel solenoid.
Stop Request[*1*2*3*4]	The command for normal stopping of the engine. The recommended source value for this command is Stop solenoid.
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Fakt UW	For more information about this signal contact the local representative.
Load	For more information about this signal contact the local representative.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Pressure Master	Gage pressure of liquid found in engine cooling system. Dones from Master unit..
Engine Oil Pressure Master	Gage pressure of oil in engine lubrication system as provided by oil pump. Comes from Master unit.
Fuel Del. Pressure Master	Gage pressure of fuel in system as delivered from supply pump to the injection pump. Comes from Mater unit.

Coolant Pressure Slave	Gage pressure of liquid found in engine cooling system.
Engine Oil Pressure Slave	Gage pressure of oil in engine lubrication system as provided by oil pump. Comes from Slave unit.
Fuel Del. Pressure Slave	Gage pressure of fuel in system as delivered from supply pump to the injection pump. Comes from Slave unit.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Coolant level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Water in fuel	Signal which indicates the presence of water in the fuel.
Electrical Potential (Voltage)	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Requested speed[*1*2*3*4]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
P-Grad[*1*2*3]	P-GRAD Drehzahlregler is parameter for setting engine droop. From this value is calculated real engine droop. See the graph, there is a conversion P-GRAD parameter to real engine droop. The engine droop can not be set exactly – it depends on engine. The value lies between MAX and MIN engine droop. The recommended source values is an contstant following the requested function. See the chart below.
ZDR Parametersatz[*1*2*3]	ZDR parameters are a internal setting of MAN company. These parameter set the regulation loop in the engine ECU. For more information, please contact your MAN local distributor. Adjust to 0 for singlespeed applications. The recommended source values is an contstant following the requested function.

Supported by the non-configurable controllers:
[*1] - InteliLite[NT] [*2] - InteliDrive Lite [*3] - InteliCompact[NT] [*4] - InteliNano[NT] [*5] - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.



Controller ECU PwrRelay output can be used to activate Ignition (Kl.15).

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen^{NT} or InteliSys^{NT}		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

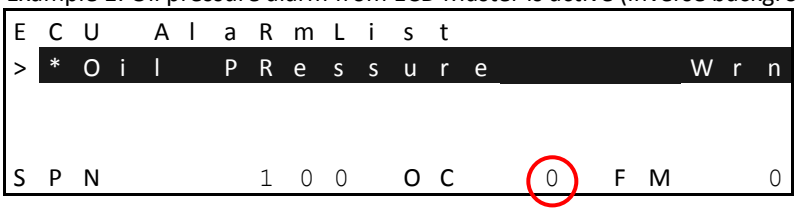
Diagnostics

The controller shows in the alarm list for each fault:

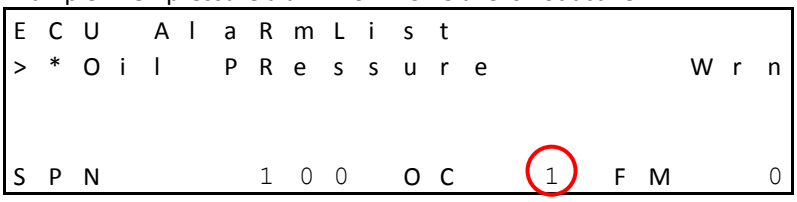
- Text message or fault code number
- SPN number on the bottom row
- OC number on the bottom row which says from where comes this fault:
  - 0 ... EDC Master
  - 1 ... EDC Slave
  - 39 ... MFR
- FMI number in the right bottom corner

Fault details are displayed in the bottom row when fault is selected with > mark in the list of faults by Up/Down arrows.

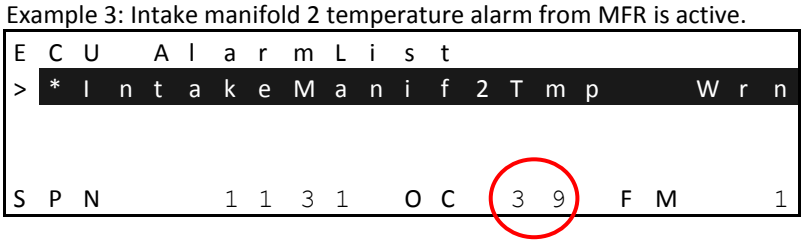
Example 1: Oil pressure alarm from ECD Master is active (inverse background color).



Example 2: Oil pressure alarm from ECD Slave is not active.



Example 3: Intake manifold 2 temperature alarm from MFR is active.



Recommended wiring

Function	ECU 89pin connector	diagnostic connector	Controller
CAN H	53	X2-28	CAN1 (extension modules/J1939) – CAN H
CAN COM	51	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	52	X2-29	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,7,12,13	X2-33	N/A
Battery - (negative)	3,9,14,15	X2-32	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

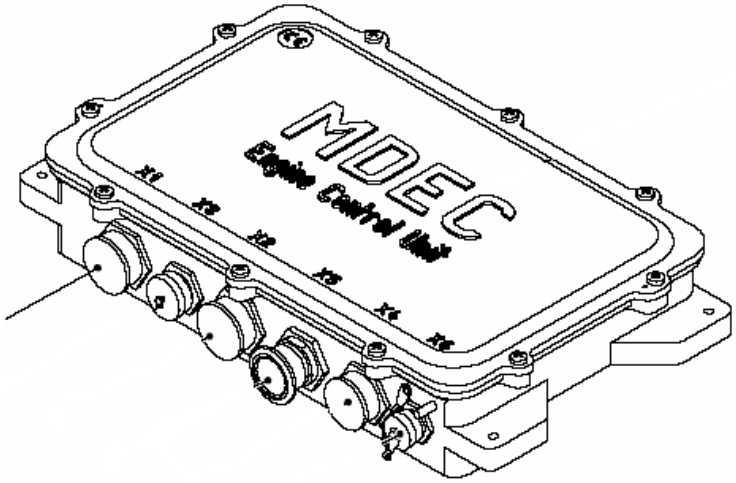
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

MTU Engines Support

ECU Types

ECU Type	Engine Type
MDEC ADEC & SAM	Series 2000, 4000
ADEC & SAM ECU8 (ADEC) & SMART Connect	Series 1600

MDEC



Configuration

For connection to MTU MDEC module it is necessary to use an I-CB module. Configuration of the controller and I-CB has to be done separately using GenConfig or DriveConfig and ICBEdit software. For further information see I-CB manual.

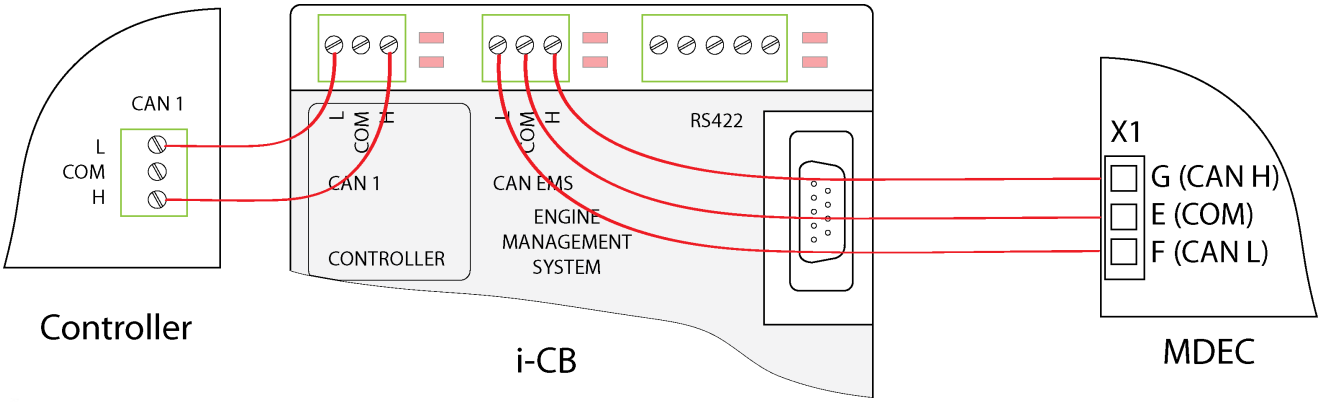
Controllers that support the MDEC

	Selection in PC software
	MTU MDEC
InteliSys NT	Legacy I-CB/MTU-Diesel
InteliGen NT	Legacy I-CB/MTU-Diesel
InteliDrive DCU	ICB module + I/O modules
InteliDrive Mobile	ICB module + I/O modules
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available commands

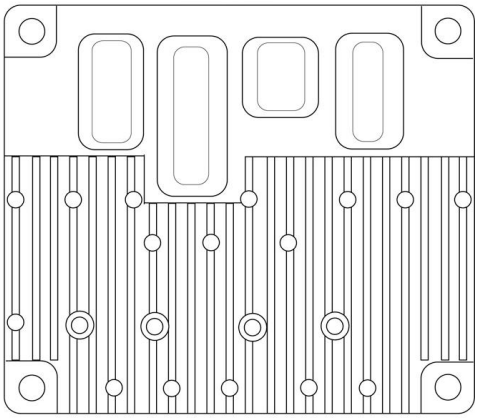
For more information about available values and signals, please refer to I-CB manual or ICBEdit PC software.

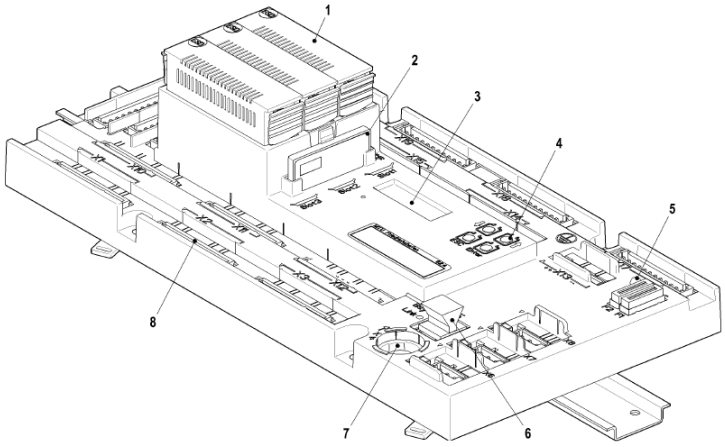
Recommended wiring



Check that CAN bus terminating resistors or appropriate jumpers are connected.

ADEC (ECU7) & SAM





For communication with the ComAp controller the CCB2 card has to be present and J1939 has to be configured using the minidialog.

No fault codes in DM1 frame are provided by MTU ADEC system. Fault codes are only available as analog input "Failure Codes". ECU binary inputs may be used as fault code representative. Therefore you can use only 16 fault codes – binary inputs (standard ECU size) or 32 (large ECU size) !

Controllers that support the ADEC (ECU7) & SAM

	Selection in PC software	
	MTU ADEC J1939	MTU ADEC J1939 P-engines
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	YES	YES
InteliLite NT	YES	No
InteliComapct NT	YES	No
InteliNano NT	YES	No
InteliDrive Nano	YES	YES

Available signals

ECU binary outputs (controller's inputs)	
AL ECU Defect	For more information about this signal contact MTU local representative. PV index = 116
AL Speed Demand Defect	For more information about this signal contact MTU local representative. PV index = 118
HI Power Supply	Power supply voltage over the limit. Protection Level1. PV index = 123
HI T-Coolant	Coolant temperature over the limit. Protection Level1. PV index = 129
HI T-ECU	Temperature of the ECU over the limit. Protection Level1. PV index = 170
HI T-Exhaust A	Temperature of the exhaust A-side over the limit. Protection Level1. PV index = 500
HI T-Exhaust B	Temperature of the exhaust B-side over the limit. Protection Level1. PV index = 510
HI T-Charge Air	Temperature of the turbocharger over the limit. Protection Level1. PV index = 133
HI T-Lube Oil	Temperature of the engine lube oil over the limit. Protection Level1. PV index = 143
HIHI ECU Power Supp	Power supply voltage over the limit. Protection Level2. PV index = 271

Volt	
HIHI T-Coolant	Coolant temperature over the limit. Protection Level2. PV index = 129
HIHI T-Charge Air	Temperature of the turbocharger over the limit. Protection Level2. PV index = 168
HIHI T-Lube Oil	Temperature of the engine lube oil over the limit. Protection Level2. PV index = 144
LO Coolant Level	Level of the coolant under the limit. Protection Level1. PV index = 55
LO P-Lube Oil	Pressure of the engine lube oil under the limit. Protection Level1. PV index = 29
LO Power Supply	Power supply voltage under the limit. Protection Level1. PV index = 122
LOLO ECU Power Supp Volt	Power supply voltage under the limit. Protection Level2. PV index = 270
LOLO P-Lube Oil	Pressure of the engine lube oil under the limit. Protection Level1. PV index = 30
SS Engine Speed Low	For more information about this signal contact MTU local representative. PV index = 177
HI T-Fuel	Fuel temperature over the limit. Protection Level1. PV index = 299
Override Feedback for ECU	For more information about this signal contact MTU local representative. PV index = 66
SS Overspeed	For more information about this signal contact MTU local representative. PV index = 3
Cylinder Cutout	For more information about this signal contact MTU local representative. PV index = 74
Engine Running	For more information about this signal contact MTU local representative. PV index = 68
Ext Stop Activated	For more information about this signal contact MTU local representative. PV index = 1
Feedback CAN Mode Switch	For more information about this signal contact MTU local representative.
Feedback Decrease Speed	For more information about this signal contact MTU local representative. PV index = 19
Feedback Increase Speed	For more information about this signal contact MTU local representative. PV index = 18
Load Generator ON	For more information about this signal contact MTU local representative. PV index = 78
Preaheat Temp. Not Reached	For more information about this signal contact MTU local representative. PV index = 89
Priming Pump On	For more information about this signal contact MTU local representative. PV index = 301
Speed Demand Fail Mode	For more information about this signal contact MTU local representative. PV index = 13
AL Idle Speed Not Reached	For more information about this signal contact MTU local representative. PV index = 241
AL Prelubrication Fault	For more information about this signal contact MTU local representative.
AL Runup Speed Not Reached	For more information about this signal contact MTU local representative.
AL Start Speed Not Reached	For more information about this signal contact MTU local representative. PV index = 239
HI Level Day-Tank	For more information about this signal contact MTU local representative. PV index = 353
HI Level Holding-Tank	For more information about this signal contact MTU local representative. PV index = 363
HI Pressure 1	For more information about this signal contact MTU local representative. PV index = 520
HI Pressure 2	For more information about this signal contact MTU local representative. PV index = 530
HI T-Ambient	Ambient temperature over the limit. Protection Level1. PV index = 580
HI T-Coolant Intercooler	Intercooler temperature over the limit. Protection Level1. PV index = 139
HI T-Winding 1	Winding1 temperature over the limit. Protection Level1. PV index = 540
HI T-Winding 2	Winding2 temperature over the limit. Protection Level1. PV index = 550
HI T-Winding 3	Winding3 temperature over the limit. Protection Level1. PV index = 560
LO Intercooler Coolant Level	Level of the intercoolant under the limit. Protection Level1. PV index = 99
LO Level Day-Tank	For more information about this signal contact MTU local representative. PV index = 354
LO Level Holding-Tank	For more information about this signal contact MTU local representative. PV index = 364
T-Generator Warning	For more information about this signal contact MTU local representative. PV index = 241
AL Water In Fuel	For more information about this signal contact MTU local representative. PV index = 590

Prefilter 1	
AL Water In Fuel Prefilter 2	For more information about this signal contact MTU local representative. PV index = 600
Automatic Shutdown	For more information about this signal contact MTU local representative. PV index = 213
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Disable CylinderCutOut 2	For more information about this signal contact MTU local representative.
Request Test Overspeed	For more information about this signal contact MTU local representative.
Alarm Reset *1*2*3	The command for Reset ECU Alarms. The recommended source value for this command is FltResButnEcho.
Speed Setting Limit Active	For more information about this signal contact MTU local representative.
Mode Switch	For more information about this signal contact MTU local representative.
Governor ParameterSet Select.	For more information about this signal contact MTU local representative.
Intermittent Oil Priming	For more information about this signal contact MTU local representative.
Engine Start *1*2*3*4	The command used for engine running. The recommended source value for this command is Starter.
50/60Hz *1*2*3*4	This feature gives the operator ability to switch the rated speed between 50Hz and 60Hz. The system will only react to a state transition while the Engine speed is 0. The recommended source value for this command is Logical 0 for 50Hz and Logical 1 for 60Hz.
Override *1*2*3	Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to override an impending engine shutdown. The recommended source value for this command is Logical 0.
Engine Stop *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
ECU analog outputs (controller's inputs)	
Nominal Speed	The maximum governed rotational velocity of the engine crankshaft under full load.
Pressure 1	Pressure measured by auxiliary pressure sensor #1.
Pressure 2	Pressure measured by auxiliary pressure sensor #2.
Failure Codes	Number of fault codes. If there are more than 1 fault code, the "Failure Codes" shows are fault codes step by step.
Actual Droop	For more information about this signal contact MTU local representative.
Level Day-Tank	For more information about this signal contact MTU local representative.
Level Holding-Tank	For more information about this signal contact MTU local representative.
T-Ambient	Temperature of air surrounding vehicle.
Rated Power	For more information about this signal contact MTU local representative.
Trip Avg Fuel Rate	Average fuel rate, equal to trip fuel divided by trip time while the engine speed is above zero, since the last trip reset. This includes idle, PTO (both moving and non-moving) and drive operation but excludes ignition-on time while the engine speed is at zero rpm.
T-Winding 1	Temperature of the windings inside the alternator.
T-Winding 2	Temperature of the windings inside the alternator.
T-Winding 3	Temperature of the windings inside the alternator.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
P-Fuel	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
P-Lube Oil	Gage pressure of oil in engine lubrication system as provided by oil pump.
T-Exhaust A (20V4000 only)	Temperature of combustion byproducts leaving the engine. Measured on side – A.
T-Exhaust B (20V4000 only)	Temperature of combustion byproducts leaving the engine. Measured on side – B.
T-Coolant	Temperature of liquid found in engine cooling system.

T-Coolant Intercooler	Temperature of liquid found in the intercooler located after the turbocharger.
T-Fuel	Temperature of fuel entering injectors.
T-Lube Oil	Temperature of the engine lubricant.
T-ECU	Temperature of the engine electronic control unit.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
P-Charge Air	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Speed Demand Source	For more information about this signal contact MTU local representative.
Requested Torque	For more information about this signal contact MTU local representative.
Engine Optimized	For more information about this signal contact MTU local representative.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Start Process 1	For service purpose only!
Start Process 2	For service purpose only!
Effective Speed Demand	For more information about this signal contact MTU local representative.
Selected Speed Demand	For more information about this signal contact MTU local representative.
Fdb Spd Demand ana.CAN	For more information about this signal contact MTU local representative.
Fdb Spd Demand analog	For more information about this signal contact MTU local representative.
T-Charge Air	Temperature of the air exiting the turbocharger 1 compressor outlet.
ETC Speed Turbo Charger 1	Rotational velocity of rotor in the turbocharger.
ECU Power Supply Voltage	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Speed Demand Analog *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Speed Demand Switches *1*2*3*4	For more information about this signal contact MTU local representative.
Engine alternate droop accelerator 1 select *1*2*3	For more information about this signal contact MTU local representative.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Abbreviation explanation

Abbreviation	Meaning
AL	Alarm - Warning or alarm due to a binary signal
LO	Low - Warning or alarm threshold due to a shortfall
HI	High - Warning or alarm limits are exceeded
TD	Transmitter Deviation - Warning or alarm due to a large deviation between the analog values of two redundant sensors
SD	Sensor Defective - Warning or alarm because of a defective sensor
SF	Switch Fault - Warning or alarm condition due to an improper combination two complementary switch
SS	Security Shutdown - Alarm, which led to engine emergency stop
MG	Message - Message from external system
SE	System Error - Warning, a system error
DL	Default Lost - Warning due to a node failure in the default field bus
RL	Redundancy Lost - Warning due to a node failure in the redundant fieldbus
PB	Push Buton - Indicator due to the activation of certain control keys

Protection Level	Protection type
Protection Level1	Warning
Protection Level2	Shutdown

If you have some problems with frame EBC1 (PGN=61441d, F001h) e.g. binary output *engine stop*, please contact your MTU serviceman to upgrade firmware in your ECU / SAM module.

Automatically it is configured to isochronous (Droop2 = 0% corresponds to Engine alternate droop accelerator 1 select = 1). If you want to use droop (Droop1 = 4%) then set Source to 0.

Recommended wiring between ADEC and SAM module

Function	ADEC X1 connector	SAM X6 connector
CAN H	19	3
CAN COM	20	1
CAN L	35	2

Recommended wiring for power supply

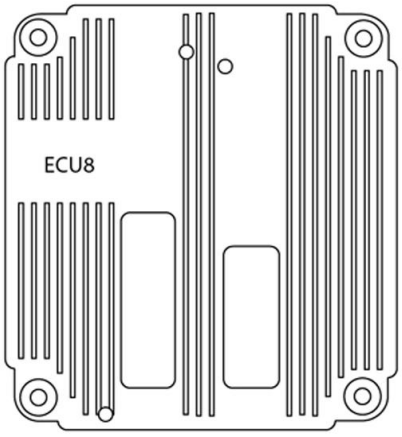
Function	ADEC X3 connector	SAM X13 connector
+24VDC	3,6,9,12,13	1,2
GND	1,4,7,10	3,4

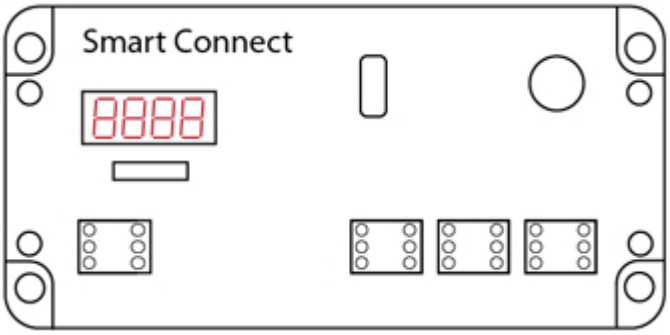
Recommended wiring

Function	SAM module	diagnostic connector	Controller
CAN H	X23 – 2	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	X23 – 3	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	X23 – 1	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	X13 – 1,2	N/A	N/A
Battery - (negative)	X13 – 3,4	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

ECU8 and SMARTConnect





Controllers that support the ECU8 and SMARTConnect

	Selection in PC software
	MTU SMART Connect
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Coolant Pre-heated State	For more information about this signal contact MTU local representative.
Engine Cylinder Cutoff	Status of "global" cylinder cutoff. This means there is at least one cylinder cut off.
External Stop State	For more information about this signal contact MTU local representative.
Load Generator Status	For more information about this signal contact MTU local representative.
MTU Engine Running State	For more information about this signal contact MTU local representative.
Safety&ProtectionOverStat	For more information about this signal contact MTU local representative.
Oper Speed Down Switch Fdb	For more information about this signal contact MTU local representative.
Oper. Speed Up Switch Fdb	For more information about this signal contact MTU local representative.
Speed Demand Fail Mode	For more information about this signal contact MTU local representative.

EPS Engine Shutdown	For more information about this signal contact MTU local representative.
ECU binary inputs (controller's outputs - commands)	
Trip Group 1	For more information about this signal contact MTU local representative.
Engine Start Command *1*2*3*4	The command used for engine running. The recommended source value for this command is Starter.
Engine Stop Command *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
EngSafety&ProtOverride Cmd *1*2*3	Overrides Engine Safety System and Engine Protection System ("Limp home switch"). The recommended source value for this command is Logical 0.
Engine Overspeed Test Cmd	For more information about this signal contact MTU local representative.
DisableEngCyl CutoffCmd2	For more information about this signal contact MTU local representative.
IntermittentOil PrimingCmd	For more information about this signal contact MTU local representative.
EngSpdGovernor ParamSwitch	For more information about this signal contact MTU local representative.
Operating Speed Up Switch	For more information about this signal contact MTU local representative.
Oper. Speed Down Switch	For more information about this signal contact MTU local representative.
MTU Req Speed Limit Switch	For more information about this signal contact MTU local representative.
ECU analog outputs (controller's inputs)	
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Rated Power	For more information about this signal contact MTU local representative.
Rated Speed	For more information about this signal contact MTU local representative.
Engine Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
ECU Temperature	Temperature of the engine electronic control unit.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Intake Manifold Abs Press	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Trip Fuel	Fuel consumed during all or part of a journey.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
MTU Requested Abs. Torque	For more information about this signal contact MTU local representative.
Current Speed Demand src	For more information about this signal contact MTU local representative.
Demanded Operating Speed	For more information about this signal contact MTU local representative.
Speed Demand Analog In fdb	For more information about this signal contact MTU local representative.
Speed Demand CAN fdb	For more information about this signal contact MTU local representative.
Actual Droop	For more information about this signal contact MTU local representative.

MTU Error Codes	For more information about this signal contact MTU local representative.
Keyswitch Battery Voltage	For more information about this signal contact MTU local representative.
ECU analog inputs (controller's outputs)	
Frequency Selection *1*2*3*4	This feature gives the operator ability to switch the rated speed. The system will only react to a state transition while the Engine speed is 0. The recommended source values is an contstant following the requested function.
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
Speed Demand Switches	CAN Demand Switches contains at: Bit 0 - 3 the source for Local normal switch position Bit 4 - 7 the source for Local Emergency switch position Bit 8 - 11 the source for Remote normal switch position Bit 12 - 15 the source for Remote Emergency switch position With the following assignment per bit group: 0: Analog CAN 1: Up/Down ECU 2: Up/Down CAN 3: Analog ECU 4: Analog ECU relative 5: Frequency 6: Notch Position (not used)

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

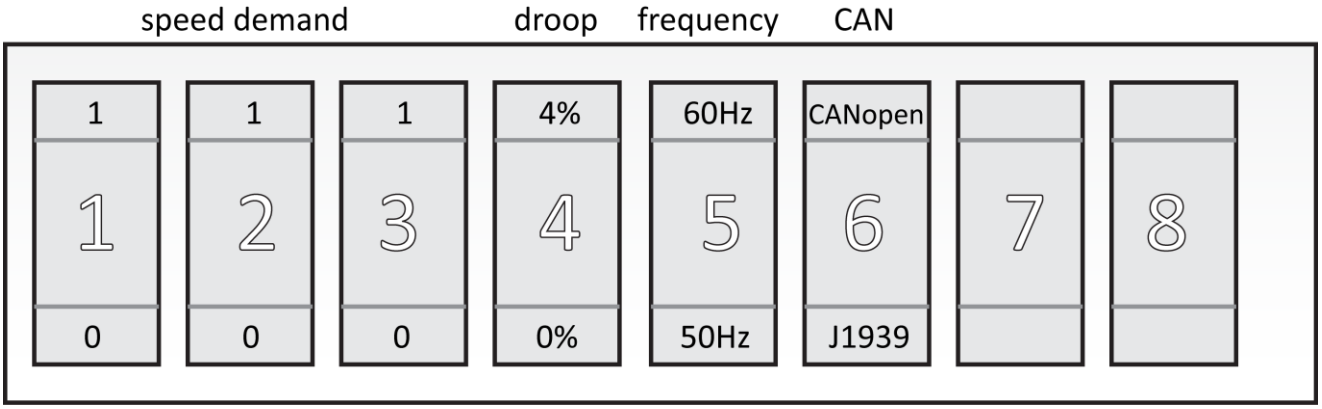
Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Frequency Selection	Source Value
50 Hz	0
60 Hz	1
Reserved	2 - 5
Error	6
Do not care	7

Smart module DIP switches adjustment

1	2	3	4	5	6	7	8
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF



Please, notice that the DIP switch configuration is checking up after SMART connect powering up. Any change of DIP switches requires power off and on again of SMART connect.

Speed demand DIP swichs codes			
Code DEC	**Code BIN**	**Designation**	
0	000	ECU default	ECU default settings of the 4 internal speed demand switches – default speed up/down
1	001	ECU direct up / down	The speed demand (up / down) controlled over binary inputs directly at the ECU. Settings can by done via DiaSys at the ECU.
2	010	ECU analogue relative	The analogoue speed demand controlled over analogue input directly at the ECU. Settings can by done via DiaSys at the ECU. 0VDC = -100RPM 5VDC = +100RPM
3	011	ECU analogue relative	The analogoue speed demand controlled over analogue input directly at the ECU. Settings can by done via DiaSys at the ECU. 0VDC = -100RPM 10VDC = +100RPM
4	100	ECU analogue relative	The analogoue speed demand controlled over analogue input directly at the ECU. Settings can by done via DiaSys at the ECU. 4mADC = -100RPM 20mADC = +100RPM
5	101	CAN analogue	The speed demand value (unit,RPM) will be transferred via CAN bus from SAM/SMART to the ECU. The speed demand information must be received from an external CAN bus (CANopen,SEA J1939)
6	110	CAN up / down	The speed demand (up / down) will be transferred via CAN bus from SAM/SMART to the ECU. The speed demand information must be received from an external CAN bus (CANopen,SEA J1939)
7	111	External speed demand source	The speed demand is flexible. The speed demand source can be transmitted from an external controller.

Recommended wiring

Please, notice that this wiring is valid for the engines where SMART CAN1 is configured for MCS5 protocol (MTU proprietary) and CAN2 is configured for J1939 protocol. This configuration is going to be available on 1600 series engines since May 2011.

Recommended wiring between ADEC and SMART module

Function	ADEC X1 connector	SMART X3 connector	SMART X4 connector
CAN1 H	1	1	
CAN1 COM	5	3	
CAN1 L	2	2	
CAN2 H	3		1
CAN2 COM	8		3
CAN2 L	4		2

Recommended wiring

Function	SMART connector	diagnostic connector	Controller
CAN H	X4 – 1	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	X4 – 3	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	X4 – 2	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	X1 – 2	N/A	N/A
Battery - (negative)	X1 – 3	N/A	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Ignition (switched by K1)

Function	Connector
Ignition +24VDC	X1 – 32
Ignition IN	X1 – 31

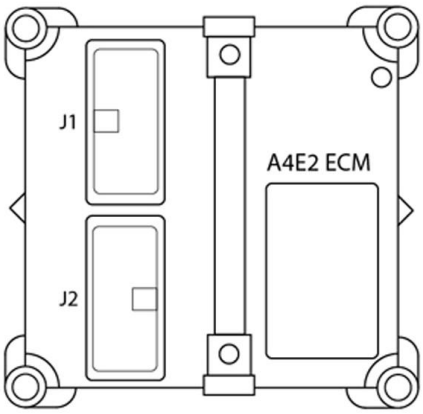
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Perkins Engines Support

ECU Types

ECU Type	Engine Type
A4E1 of A4E2	1100 series
1300	1300 series
ECM or CAT ADEM3, ADEM4	2300 series 2500 series 2800 series

1100 series



Controllers that support the 1100 series

	Selection in PC software
	Perkins ECM
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.

Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring for A4E1

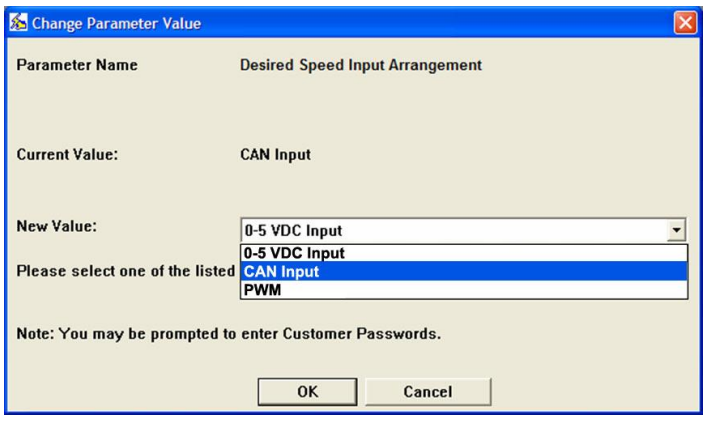
Function	ECU connector	diagnostic connector	Controller
CAN H	52	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	61	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	56,57	A	N/A
Battery - (negative)	68,69	B	N/A
Key Switch	70	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	25	N/A	SG OUT
Analog Speed Control	44	N/A	SG COM

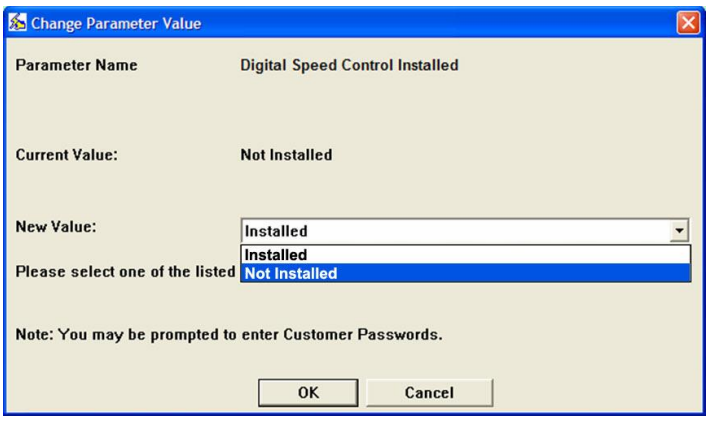
Recommended wiring for A4E2

Function	ECU connector	diagnostic connector	Controller
CAN H	20	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	22	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	21	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	7,8,15,16	A	N/A
Battery - (negative)	1,2,3,9,10	B	N/A
Key Switch	40	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	3	N/A	SG OUT
Analog Speed Control	17	N/A	SG COM

Diagnostic connector layout is on page 13 or here.

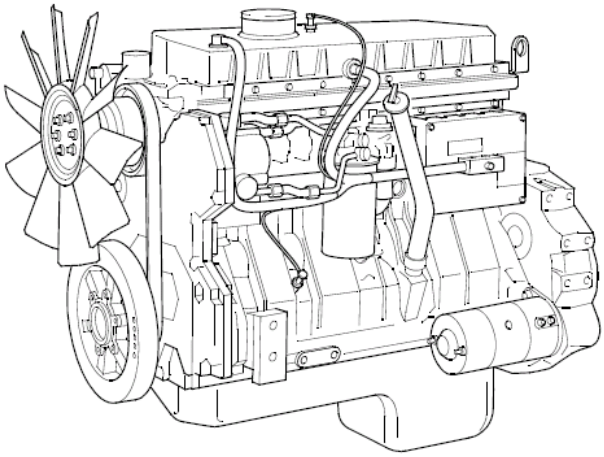
To enable speed control over CAN bus set Desired Speed Input Arrangement to "CAN Input" and Digital Speed Control Installed to "Not Installed" in Perkins EST program.





Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

1300 series



To enable speed control over the CAN bus, order the engine with load sharing option. Speed control over the datalink is supported by the engine manufactured since 2003.

Controllers that support the 1300 series

	Selection in PC software	
	Perkins ECM	Perkins 1300 (option)
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	No
InteliDrive Mobile	YES	No
InteliDrive Lite	YES	No
InteliLite NT	YES	YES
InteliComapct NT	YES	No
InteliNano NT	YES	YES
InteliDrive Nano	YES	No

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.

Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring for 1300 unit

Function	ECU connector	diagnostic connector	Controller
CAN H	16	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	GND	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	17	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	25,21,22,41,	A	N/A
Battery - (negative)	23,42,1,2	B	N/A
Key Switch	24	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Recommended wiring for CAT unit

Function	ECU J1 21-pin connector	diagnostic connector	Controller
CAN H	20	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	22	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	21	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	7,8,15,16	A	N/A
Battery - (negative)	1,2,3,9,10	B	N/A
Key Switch	40	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	3	N/A	SG OUT
Analog Speed Control	17	N/A	SG COM

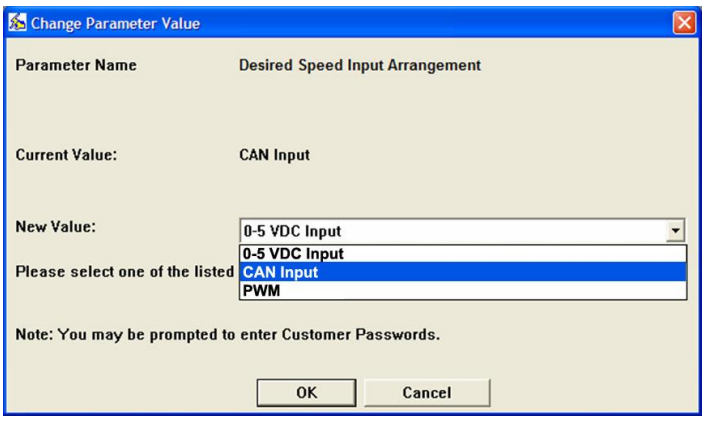
Diagnostic connector layout is on page 13 or here.

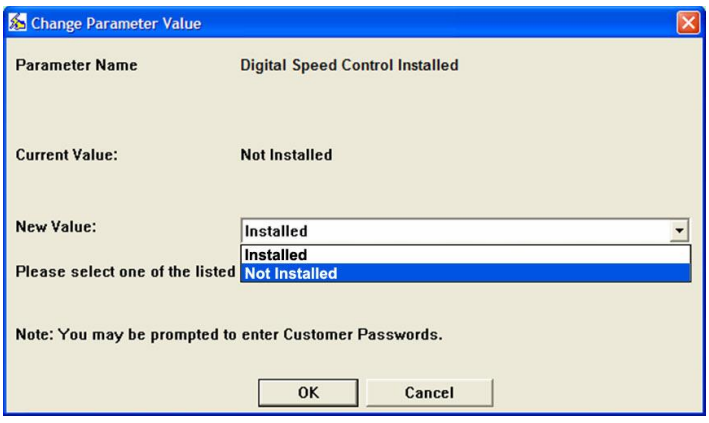
To enable speed control over CAN bus if possible - set Desired Speed Input Arrangement to "CAN Input" and Digital Speed Control Installed to "Not Installed" in Perkins EST program.

No value for speed control being sent to the ECU when Perkins 1300 is configured!

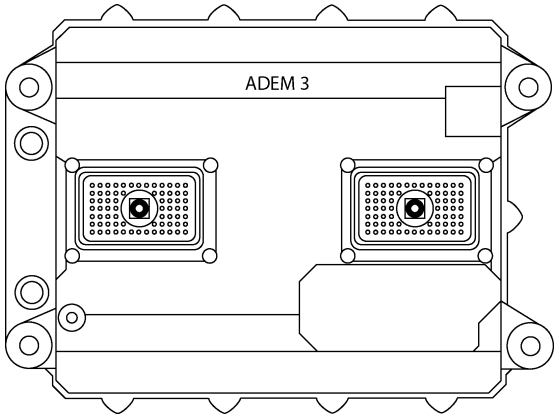
To enable speed control over CAN bus set Desired Speed Input Arrangement to "CAN Input" and Digital Speed Control Installed to "Not Installed" in Perkins EST program.

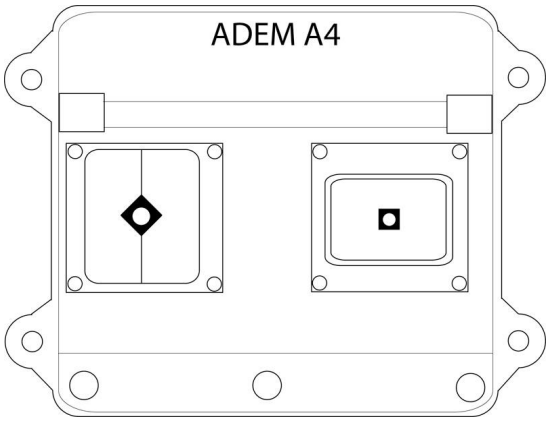
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.





2300, 2500, 2800 series





Controllers that support the 2300, 2500, 2800 series

	Selection in PC software
	Perkins ECM
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate

	powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Throttle position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential (Voltage)	Measured electrical potential of the battery.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring for ADEM4 (2200, 2500 series)

Function	ECU J1 connector	diagnostic connector	Controller
CAN H	50	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	42	C	CAN1 (extension modules/J1939) – CAN COM
CAN L	34	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	48,52,53,70	A	N/A
Battery - (negative)	61,63,65	B	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

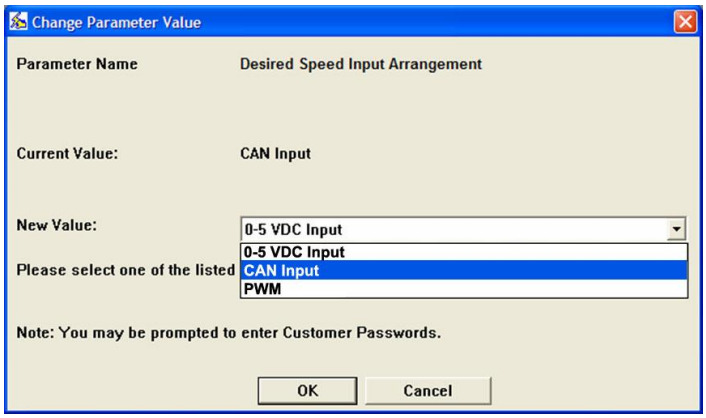
Diagnostic connector layout is on page 13 or here.

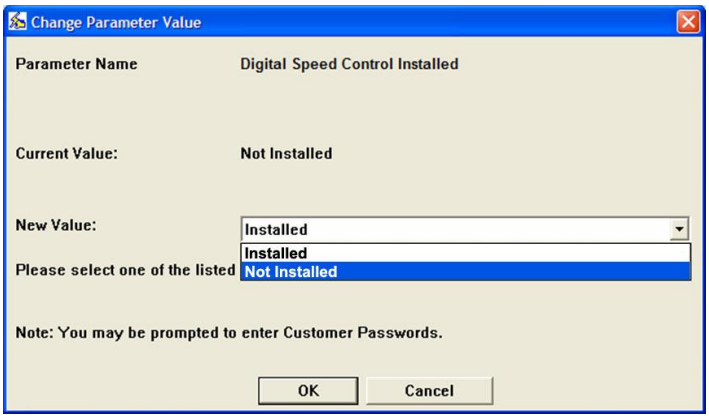
Recommended wiring for ADEM 3 (2300, 2800 series)

Function	ECU J1 connector	diagnostic connector	Controller
CAN H	50	G	CAN1 (extension modules/J1939) – CAN H
CAN COM	42	C	CAN1 (extension modules/J1939) – CAN COM
CAN L	34	F	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	48,52,53,70	A	N/A
Battery - (negative)	61,63,65	B	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	17	N/A	SG OUT
Analog Speed Control	3	N/A	SG COM

Diagnostic connector layout is on page 13 or here.

To enable speed control over CAN bus set Desired Speed Input Arrangement to "CAN Input" and Digital Speed Control Installed to "Not Installed" in Perkins EST program. Or make a loop on J1 connector pins 49 and 18.





Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Scania Engines Support

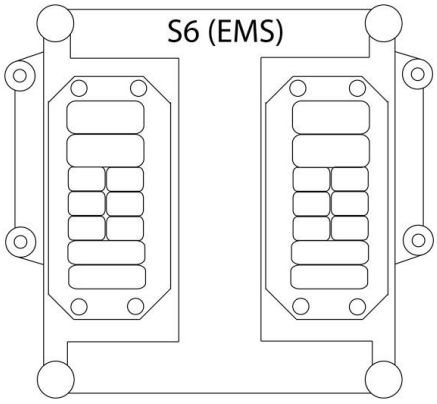
ECU Types

ECU Type	Engine Type
S6 (EMS)	DC9, DI12, DC12, DC16, D9M, DI12M, DI16M
S8	DC9, DC13,DC16

Engine type explanation

Engine Type	Meaning
Dxxx	Diesel fuel
xCxx	Intercooler: C - Air/Air, I - Water/Air
xx12	Displacement
xxxxM	Marine

S6



Controllers that support the S6

	Selection in PC software	
	Scania S6 Singlespeed Scania S6 Singlespeed from ver.1794335	Scania S6 Allspeed Scania S6 Allspeed from ver.1794335
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	YES	YES
InteliLite NT	YES	No
InteliComapct NT	YES	No
InteliNano NT	YES	No
InteliDrive Nano	No	YES

Available signals

ECU binary outputs (controller's inputs)	
Diagnostic Status	For more information about this signal contact Scania local representative.
Engine stop limit exceed	For more information about this signal contact Scania local representative.
Generator Charge	For more information about this signal contact Scania local representative.
High Engine Coolant Temp	Temperature of liquid in engine cooling system over the limit.
Low Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
New DTC	For more information about this signal contact Scania local representative.
PowerLost Due to HighTemp	For more information about this signal contact Scania local representative.
Test Engine Lamp	For more information about this signal contact Scania local representative.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
APP Kickdown Switch	For more information about this signal contact Scania local representative.
APP Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Droop enable *1*2*3	Enable or disable droop function. The droop value is changeble with calibration parameter or with TSC-proprietary. The recommended source value for this command is Logical 0.
Torque enable	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction. The recommended source value for this command is Logical 0.
Engine Start *1*2*3*4	The command used for engine running. The recommended source value for this command is Starter.
Emergency Engine Stop	Normaly used for engine emergency stop. When used it will set an error- / information code. The recommended source value for this command is Logical 0.
Engine Stop *1*2*3*4	Normaly used for engine emergency stop. When used it will NOT set an error- / information code in contrast to " Emergency Engine Stop". The recommended source value for this command is stop solenoid.
Nominal Speed 1 *1*2*3 Nominal Speed 2 *1*2*3	Choose nominal engine speed with these switches. NSSW1 NSSW2 Nominal speed 0 0 Use changeable calibration parameter 1 0 1500 RPM 0 1 1800 RPM 1 1 Low idle command
Torque Limit 1 Torque Limit 2	Choosing between 4 different torque limit curves (if available) TLSW1 TLSW2 Torque limit 0 0 Highest torque limit curve. (Curve 0) 1 0 Low torque limit curve. (Curve 1) 0 1 User defined curve. (Curve 2) 1 1 User defined curve. (Curve 3)
Exhaust brake floor	For more information about this signal contact Scania local representative.

switch	
Exhaust brake – Brake Assist Switch	For more information about this signal contact Scania local representative.
Idle Command	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
White smoke limit request	For more information about this signal contact Scania local representative.
TSC1 Droop Enable	Enable or disable droop function. The droop value is changeble with calibration parameter or with TSC-proprietary. The recommended source value for this command is Logical 0.
Droop Inc	For more information about this signal contact Scania local representative.
Droop Dec	For more information about this signal contact Scania local representative.
Parking Brake Switch	For more information about this signal contact Scania local representative.
Cruise Control Enable Switch	For more information about this signal contact Scania local representative.
Brake Switch	For more information about this signal contact Scania local representative.
Clutch Switch	For more information about this signal contact Scania local representative.
Cruise Control Coast Switch	For more information about this signal contact Scania local representative.
Cruise Control Resume Switch	For more information about this signal contact Scania local representative.
Cruise Control Accelerate Switch	For more information about this signal contact Scania local representative.
Engine Test mode switch	For more information about this signal contact Scania local representative.
Engine Shutdown Override Switch *1*2*3	If engine shut down due to low oil pressure, low coolant level or high water temperature is available this switch can override the function. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
CAN Version of DLN2	For service purpose only!
Single Speed Droop Value	The actual droop value for single speed engines are transmitted.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Nominal Friction Torque	The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.

Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
Nominal speed offset *1*2*3*4	Nominal speed offset (if Torque enable is "Engine speed control"). Increase or decrease the referens speed (with or without droop) in relation to nominal speed. The offset range is changeble with calibration parameters. (normaly ± 120 rpm, 0% = -120 rpm and 100% = +120 rpm)
Requested Droop	For more information about this signal contact Scania local representative.
Requested Speed	For more information about this signal contact Scania local representative.

Supported by the non-configurable controllers:
*1 - InteliLite^{NT} *2 - InteliDrive Lite *3 - InteliCompact^{NT} *4 - InteliNano^{NT} *5 - InteliDrive Nano

Controller's analog output for speed control configuration

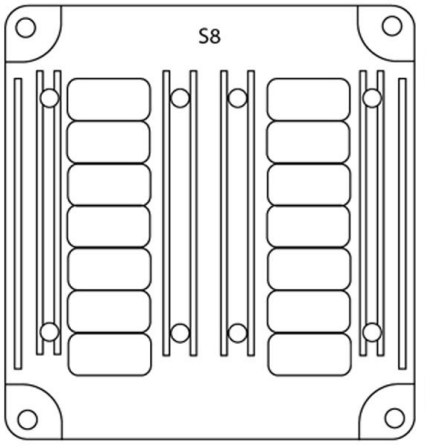
Nominal speed offset **settings for InteliGen^{NT} or InteliSys^{NT}**	
Source	Speed request
Convert	No
Speed Bias Reference settings for InteliDrive DCU, InteliDrive Mobile	
Source	Speed Request
Convert	No

Recommended wiring for

Function	ECU B1 connector	diagnostic connector	Controller
CAN H	9	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	10	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,6	N/A	N/A
Battery - (negative)	2,7	N/A	N/A
Key Switch	3	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

S8



Controllers that support the S8

	Selection in PC software	
	Scania S8 Singlespeed	Scania S8 Allspeed
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	No	No
InteliLite NT	YES	No
InteliComapct NT	No	No
InteliNano NT	YES	No
InteliDrive Nano	YES	YES

Available signals

ECU binary outputs (controller's inputs)	
Diagnostic Status	For more information about this signal contact Scania local representative.
Engine stop limit exceed	For more information about this signal contact Scania local representative.
Generator Charge	For more information about this signal contact Scania local representative.
High Engine Coolant Temp	Temperature of liquid in engine cooling system over the limit.
High Engine Oil Level	Oil level over the limit.
Low Engine Oil Level	Oil level under the limit.
Low Engine Oil Pressure	Oil pressure under the limit.
Low Urea Level	Urea level under the limit.
New DTC	For more information about this signal contact Scania local representative.
PowerLost Due to HighTemp	For more information about this signal contact Scania local representative.
Test Engine Lamp	For more information about this signal contact Scania local representative.
Afterrun Status	For more information about this signal contact Scania local representative.
Engine Air Filter Clogged	For more information about this signal contact Scania local representative.
GasLeakage	For more information about this signal contact Scania local representative.
Incorrect Driver Init Engine Sd	For more information about this signal contact Scania local representative.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the

	engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Acceleration Rate Limit	For more information about this signal contact Scania local representative.
APP Kickdown Switch	For more information about this signal contact Scania local representative.
APP Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch. The low idle switch is defined in SAE J1843.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Droop enable	Enable or disable droop function. The droop value is changeble with calibration parameter or with TSC-proprietary. The recommended source value for this command is Logical 0.
Engine Start[*4]	The command used for engine running. The recommended source value for this command is Starter.
Emergency Engine Stop	Normaly used for engine emergency stop. When used it will set an error- / information code. The recommended source value for this command is Logical 0.
Engine Stop[*4]	Normaly used for engine emergency stop. When used it will NOT set an error- / information code in contrast to " Emergency Engine Stop".
Nominal Speed 1 Nominal Speed 2	Choose nominal engine speed with these switches. NSSW1 NSSW2 Nominal speed 0 0 Use changeable calibration parameter 1 0 1500 RPM 0 1 1800 RPM 1 1 Low idle command
Torque Limit 1 Torque Limit 2	Choosing between 4 different torque limit curves (if available) TLSW1 TLSW2 Torque limit 0 0 Highest torque limit curve. (Curve 0) 1 0 Low torque limit curve. (Curve 1) 0 1 User defined curve. (Curve 2) 1 1 User defined curve. (Curve 3)
Exhaust brake floor switch	For more information about this signal contact Scania local representative.
Exhaust brake Ä Brake Assist Switch	For more information about this signal contact Scania local representative.
Idle Command	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
White smoke limit request	For more information about this signal contact Scania local representative.
Retarder Selection	For more information about this signal contact Scania local representative.
Shutdown Override Switch	If engine shut down due to low oil pressure, low coolant level or high water temperature is available this switch can override the function. The recommended source value for this command is Logical 0.
DPF Manual Inhibit	For more information about this signal contact Scania local representative.
ECU analog outputs (controller's inputs)	
Single Speed Droop Value	The actual droop value for single speed engines are transmitted.
Malfunction Indicator	For more information about this signal contact Scania local representative.
Oil Level Measuring Status	Oil Level Measuring

Urea Level	For more information about this signal contact Scania local representative.
Starter Motor Normal Temp	For more information about this signal contact Scania local representative.
Urea level inducement state	0 – urea level OK 1 – low urea level 2 – fill up urea 3 – urea tank empty 4 – error 5 – not available
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Nominal Friction Torque	The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Engine Oil Temp	Temperature of the engine lubricant.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
ECU analog inputs (controller's outputs)	
APP - Nominal Speed Offset	Nominal speed offset (if Torque enable is "Engine speed control"). Increase or decrease the referens speed (with or without droop) in relation to nominal speed. The offset range is changeble with calibration parameters. (normaly ± 120 rpm, 0% = -120 rpm and 100% = +120 rpm)
DPF Manual Activation	For more information about this signal contact Scania local representative.
Requested speed[*4]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
[*1] - InteliLite[NT] [*2] - InteliDrive Lite [*3] - InteliCompact[NT] [*4] - InteliNano[NT] [*5] - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Nominal speed offset **settings for InteliGen^{NT} or InteliSys^{NT}**	
Source	Speed request
Convert	No
Speed Bias Reference settings for InteliDrive DCU, InteliDrive Mobile	
Source	Speed Request
Convert	No

Recommended wiring

Function	ECU connector	8pin diagnostic connector	Controller
CAN H	?	6	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	?	7	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	1,3,4	N/A
Battery - (negative)	?	2,5	N/A
Key Switch	?	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

SISU Engines Support

ECU Types

ECU Type	Engine Type
EEM2	xxDxx
EEM3	xxCxx

Engine type explanation

Engine Type	Meaning
74xxx	Cylinder volume in 0.1 litres
xxCxx	C - Common rail D - Bosch VP 44/30 solenoid controlled injection pumps
xxxTx	Turbocharged
xxxxA	Air-to-air intercooler

EEM2

Controllers that support the EEM2

	Selection in PC software	
	SISU EEM3 Gen-set	SISU EEM3 Propulsion
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	YES	YES
InteliLite NT	YES	No
InteliComapct NT	YES	No
InteliNano NT	YES	No
InteliDrive Nano	No	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Start Request *1*2*3*4	The command used for engine running. The recommended source value for this command is Fuel solenoid.
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.

ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Droop percentage request	Nominal speed offset (if Torque enable is "Engine speed control"). Increase or decrease the referens speed (with or without droop) in relation to nominal speed.
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

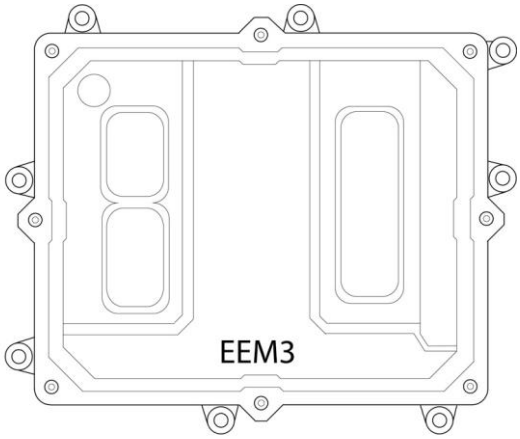
Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU 31pin connector	8pin diagnostic connector	Controller
CAN H	30	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	31	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,3,8,13	N/A	N/A
Battery - (negative)	2,4,7,9	N/A	N/A
Key Switch	5	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

EEM3



Controllers that support the EEM3

	Selection in PC software	
	SISU EEM3 Gen-set	**SISU EEM3 Propulsion**
InteliSys NT	YES	No
InteliGen NT	YES	No
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	YES	YES
InteliLite NT	YES	No
InteliComapct NT	YES	No
InteliNano NT	YES	No
InteliDrive Nano	No	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Start Request *1*2*3*4	The command used for engine running. The recommended source value for this command is Fuel solenoid.
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
ECU analog outputs (controller's inputs)	
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees

	divided by the number of cylinders.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Droop percentage request	Nominal speed offset (if Torque enable is "Engine speed control"). Increase or decrease the referens speed (with or without droop) in relation to nominal speed.
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU A2 89pin connector	8pin diagnostic connector	Controller
CAN H	53	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	51	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	52	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,7,12,13	N/A	N/A
Battery - (negative)	3,9,14,15	N/A	N/A
Key Switch	N/A	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Steyr Engines Support

ECU Types

ECU Type	Engine Type
M1	Marine engines

M1

Controllers that support the M1

	Selection in PC software
	Steyr M1
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Engine Warning Light	For more information about this signal contact Steyr local representative.
Preheating Control Light	For more information about this signal contact Steyr local representative.
Engine Oil Pressure Light	For more information about this signal contact Steyr local representative.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Position	For more information about this signal contact Steyr local representative.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.

Fuel Rate	Amount of fuel consumed by engine per unit of time.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
ECU analog inputs (controller's outputs)	

Controller's analog output for speed control configuration

There is no speed control over CAN bus available for this particular ECU.

Recommended wiring

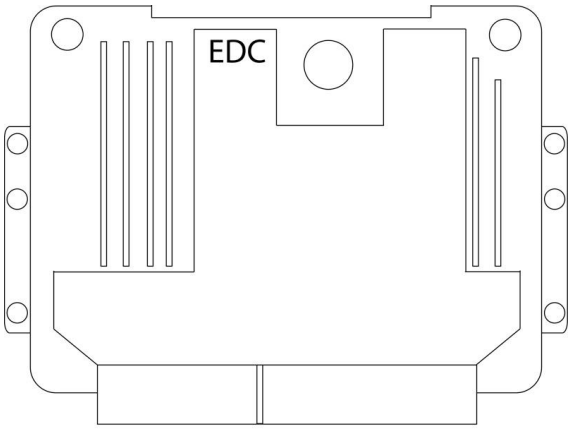
No documentation available so far!
Diagnostic connector layout is on page 13 or here.

VM Engines Support

ECU Types

ECU Type	Engine Type
EDC	Industrial and marine

EDC



Controllers that support the EDC

	Selection in PC software	
	VM Industrial	VM Marine
InteliSys NT	YES	YES
InteliGen NT	YES	YES
InteliDrive DCU	YES	YES
InteliDrive Mobile	YES	YES
InteliDrive Lite	YES	YES
InteliLite NT	YES	YES
InteliComapct NT	YES	YES
InteliNano NT	YES	YES
InteliDrive Nano	YES	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
PTO Accelerate Switch	Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at a variable speed.
PTO Cost/Decelerate Switch	For more information about this signal contact VM local representative.

PTO Enable Switch	For more information about this signal contact VM local representative.
PTO Resume Switch	For more information about this signal contact VM local representative.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
Water in Fuel	Signal which indicates the presence of water in the fuel.
Wait to Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Stop Request*1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
Parking Brake Switch	Switch signal which indicates when the parking brake is set. The recommended source value for this command is Logical 0.
Cruise Control Enable Switch	Switch signal which indicates that it is possible to manage the cruise control function. The recommended source value for this command is Logical 0.
Brake Switch	Switch signal which indicates when the brake is set. The recommended source value for this command is Logical 0.
Clutch Switch	For more information about this signal contact VM local representative.
Cruise Control Coast Switch	Switch signal of the cruise control activator which indicates that the activator is in the position 'coast (decelerate).' The recommended source value for this command is Logical 0.
Cruise Control Resume Switch	Switch signal of the cruise control activator which indicates that the activator is in the position 'resume.' The recommended source value for this command is Logical 0.
Cruise Control Accelerate Switch	Switch signal of the cruise control activator which indicates that the activator is in the position 'accelerate.' The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Barometric Pressure	Absolute air pressure of the atmosphere.
PartTrapAshLoad	For more information about this signal contact VM local representative.
PartTrapSootLoad	For more information about this signal contact VM local representative.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
EngineOil Temp	Temperature of the engine lubricant.
Fuel Temp	Temperature of fuel entering injectors.
Estimated Percent Fan Speed	Estimated fan speed as a ratio of the fan drive (current speed) to the fully engaged fan drive. A two state fan (off/on) will use 0% and 100% respectively. A variable speed fan will use 0% to 100%. Multiple fan systems will use 0 to 100% to indicate the percent cooling capacity being provided.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temperature	Temperature of combustion byproducts leaving the engine.

Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
ECU analog inputs (controller's outputs)	
Requested speed *1*2*3*4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.
PTO State	For more information about this signal contact VM local representative.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

More about an constant for ECU controller is on page 14 or here.

Controller's analog output for speed control configuration

Requested Speed settings for InteliGen NT or InteliSys NT		
Source	SpeedReq RPM	
Convert	NO	
Limits	N/A	N/A
	N/A	N/A
Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Recommended wiring

Function	ECU connector	diagnostic connector	Controller
CAN H	62	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	N/A	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	83	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	1,5	N/A	N/A
Battery - (negative)	2,4,6	N/A	N/A
Key Switch	28	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Volvo Engines Support

ECU Types

ECU Type	Engine Type
EDC3 (EMS1)	xxD12xxxx
EMS2	xxD9xxxx, xxD16xxxx, xxD734xx
EDC4 (EMR2)	xxD5xxxx, xxD7xxxx

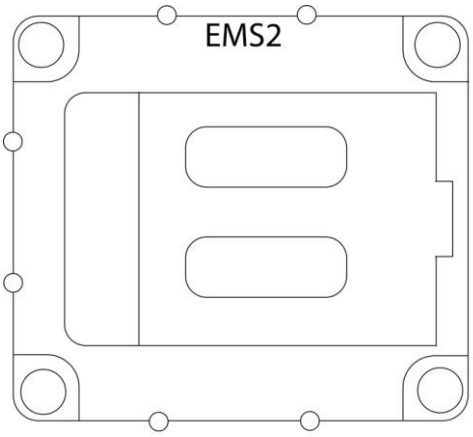
Engine type explanation

Engine Type	Meaning
Txxxxxxxx	Turbocharged
xAxxxxxxx	Air to air intercooled
xxDxxxxxx	Diesel fuel
xxx16xxxx	Displacement indication
xxxxx3xxx	Generation
xxxxxx0xx	Version
xxxxxxxGx	Generator drive
xxxxxxxxE	Emission controlled

Standalone connection (hardwired speed potentiometer)

On D12 industrial genset engines it's possible to connect stand alone connection. If there is a ComAp panel connected via CAN bus during power up the engine will detect this and will be controlled via Can bus. But if the ComAp panel is dead during power up the engine and if there is connected a potentiometer on standalone connector the engine will detect this and will run in stand alone mode.

EDC3 (EMS1) or EMS2 (singlespeed engines only)



Controllers that support the EDC3 (EMS1) or EMS2 (singlespeed engines only)

	Selection in PC software
	Volvo EMSI Singlespeed / EMSII
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	YES
InteliComapct NT	YES
InteliNano NT	YES
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Approaching Shutdown	Status signal which indicates that engine shutdown is imminent. This engine protection signal can be a result of different systems failing, i.e., engine overheating.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
15 Fuse Status	The of the 15 supply fuse.
30 Fuse Status	The of the 30 supply fuse.
Buzzer	Controls the buzzer.
Buzzer/Lamptest	Controls the buzzertest / lamptest.
Coolant Level Alarm	The status of the coolant level alarm switch.
Coolant Temperature	The status of the (virtual) coolant temperature alarm switch.
EMS DiagnoseRedLamp	The status of the red diagnose lamp of the EMS (Mirror of PID 44, J1587)
EMS DiagnoseYellow	The status of the yellow diagnose lamp of the EMS (Mirror of PID 44, J1587).

Lamp	
EMS Fuse Status	The of the EMS supply fuse.
EngineOil Filter Diff.Press	The status of the engine oil filter differential pressure alarm.
Extra Fuse Status	The of the extra supply supply fuse.
Fuel Pressure Alarm	The status of the Fuel pressure alarm.
General Lamptest	Controls the general lamptest.
Charge Alarm	The status of the (virtual) charge alarm switch.
Oil Pressure Alarm	The status of the (virtual) oil pressure alarm switch.
Oil Temperature Alarm	The status of the (virtual) oil temprature alarm switch.
Override Indication	The status of the engine protection override.
Overspeed Alarm	Status of the (virtual) overspeed alarm switch.
Preheat Indication	The status of the preheat relay.
Primary Bat.Status	Status of the primary battery circuit.
Running Indication	The running status of the engine.
Secondary Bat.Status	Status of the secondary battery circuit.
Water in Fuel	Signal which indicates the presence of water in the fuel.
ECU binary inputs (controller's outputs - commands)	
Start Request *1*2*3*4	The command used for engine running. The recommended source value for this command is Starter.
Stop Request *1*2*3*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
Governor Mode	Indicates if the engine shall operate in Engine speed mode or Torque mode. 0 – Isochronous mode 1 – Droop mode
Idle Speed Select *1*2*3	The idle/rated switch allows to command the engine between idle speed and rated speed. The recommeneded source value for this command is Idle/Nominal.
Frequency Select *1*2*3*4	Indicates if the engine shall operate at Primary engine speed or Secondary engine speed.
Diagnostic Request	For more information about this commands, please contact the local representative.
Preheat Request *1*2*3	Status of the Preheat request. The recommended source value for this command is Logical 0.
Protection Override	Status of the Engine protection override request. The recommended source value for this command is Logical 0.
Fuel disable request	For more information about this commands, please contact the local representative. The recommended source value for this command is Logical 0.
ECU analog outputs (controller's inputs)	
Catalyst Tank Level	Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.
Operator Inducement Severity	The severity of operator inducement for anomalies with the SCR system, such as tampering, low DEF quality, and DEF tank level. Higher numerical levels indicate more severe levels of inducement. Level 1 is tge least severe.
Tank Low Level Indicator	The desired illumination of the driver's warning indicator for diesel exhaust fluid (DEF) tank low level.
EngOil Filter Diff.Press	Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary

	accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Oil Temp	Temperature of the engine lubricant.
Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential	Electrical potential measured at the input of the electronic control unit supplied through a switching device.
Idle engine speed	The calibrated idle speed of the engine.
Maximum engine speed	The maximum engine speed.
ECU analog inputs (controller's outputs)	
Accelerator Pedal Position *1*2*3*4	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Requested speed *4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Accelerator Pedal Position settings for InteliGen NT or InteliSys NT	
Source	Speed request
Convert	No
Accelerator Pedal Position settings for InteliDrive DCU, InteliDrive Mobile	
Source	Speed Request
Convert	Yes

Frequency change procedure

Customers, who are using ComAp control unit, must transmit certain messages to the D9 / D16 in the same way as Volvo Penta's CIU in order to change from 1500 to 1800 RPM (or opposite).

Procedure if not energized:
1. Power up the ECU.
2. Change the Frequency select setpoint of transmitted value.
3. Send a stop request – press the Stop button.
The whole procedure (step 1 to 3) must not exceed 10 seconds.

Procedure with power on:
1. Send a stop request – press the Stop button.
2. Change the Frequency select setpoint of transmitted value.
3. Send a stop request – press the Stop button.
The whole procedure (step 1 to 3) must not exceed 10 seconds.

Recommended wiring

Function	ECU connector	8pin diagnostic connector	Controller
CAN H	?	1	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	?	2	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	4	N/A
Battery - (negative)	?	3	N/A
Key Switch	?	5	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM
Stop Request	?	6	Any binary output configured as **inverted** ECU Comm error

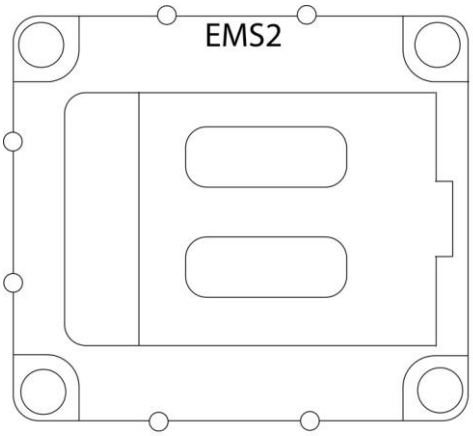
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

If the engine doesn't crank, check the state of engine mounted auxiliary stop device.

It is important that there is no continuous active stop signal on pin 6.
If there is a "constant" active stop signal a number of problems will occur:

- It is impossible to change parameters.
- It is impossible to reprogram the control unit.
- The ECU could be damaged when power is removed.

EDC3 (EMS1) or EMS2 (allspeed engines only)



Controllers that support the EDC3 (EMS1) or EMS2 (allspeed engines only)

	Selection in PC software
	Volvo EMSI Allspeed
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	YES
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Approaching Shutdown	Status signal which indicates that engine shutdown is imminent. This engine protection signal can be a result of different systems failing, i.e., engine overheating.
Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Boost Temperature	Status of the (virtual) boost temperature alarm switch.
Coolant Level Alarm	The status of the coolant level alarm switch.
Coolant Temperature	Temperature of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
EngOil Filter Diff.Press	Change in engine oil pressure, measured across the filter, due to the filter and any

	accumulation of solid or semisolid material on or in the filter.
Exhaust Temperature	Temperature of combustion byproducts leaving the engine.
Fresh Water Pressure	Status of the (virtual) fresh water pressure alarm switch.
Fuel Pressure Alarm	The status of the Fuel pressure alarm.
Charge Alarm	The status of the (virtual) charge alarm switch.
Oil Level Alarm	The status of the oil level alarm switch.
Oil Pressure Alarm	Gage pressure of oil in engine lubrication system as provided by oil pump.
Oil Temperature Alarm	The status of the (virtual) oil temprature alarm switch.
Overspeed Alarm	Status of the (virtual) overspeed alarm switch.
Piston Cooling Pressure	Status of the pistion cooling pressure alarm switch.
Running Indication	The running status of the engine.
Sea Water Pressure	Status of the (virtual) sea water pressure alarm switch.
Water in Fuel Alarm	The status of the water in fuel alarm switch.
Water in Fuel	Signal which indicates the presence of water in the fuel.
ECU binary inputs (controller's outputs - commands)	
Crank Request*4	The command used for engine running. The recommended source value for this command is Starter.
Stop Request*4	The command for normal stopping of the engine. The recommended source value for this command is Stop pulse.
Current Gear	For more information about this commands, please contact the local representative.
ECU analog outputs (controller's inputs)	
Catalyst Tank Level	Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.
Operator Inducement Severity	The severity of operator inducement for anomalies with the SCR system, such as tampering, low DEF quality, and DEF tank level. Higher numerical levels indicate more severe levels of inducement. Level 1 is tge least severe.
Tank Low Level Indicator	The desired illumination of the driver's warning indicator for diesel exhaust fluid (DEF) tank low level.
EngOil Filter Diff.Press	Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.
Actual Torque	The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque. The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.
Demand Torque	The requested torque output of the engine by the driver.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. For on-highway vehicles, this will typically be the operator's accelerator pedal. In marine applications, this will typically be the operator's throttle lever.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.
Coolant Pressure	Gage pressure of liquid found in engine cooling system.
Crankcase Pressure	Gage pressure inside engine crankcase.
Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Fuel Temp	Temperature of fuel entering injectors.
Oil Temp	Temperature of the engine lubricant.

Air Intake Pressure	Absolute air pressure at inlet to intake manifold or air box.
Boost Pressure	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger.
Exhaust Gas Temp	Temperature of combustion byproducts leaving the engine.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Total Fuel Used	Accumulated amount of fuel used during vehicle operation.
Fuel Rate	Amount of fuel consumed by engine per unit of time.
Battery Potential	Electrical potential measured at the input of the electronic control unit supplied through a switching device.
Sea Water Pressure	The sea water pressure.
Idle engine speed	The calibrated idle speed of the engine.
Maximum engine speed	The maximum engine speed.
ECU analog inputs (controller's outputs)	
Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Requested speed *4	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*1 - InteliLite NT *2 - InteliDrive Lite *3 - InteliCompact NT *4 - InteliNano NT *5 - InteliDrive Nano

Controller's analog output for speed control configuration

Accelerator Pedal Position settings for InteliGen NT or InteliSys NT	
Source	Speed request
Convert	No
Accelerator Pedal Position settings for InteliDrive DCU, InteliDrive Mobile	
Source	Speed Request
Convert	No

Frequency change procedure

Customers, who are using ComAp control unit, must transmit certain messages to the D9 / D16 in the same way as Volvo Penta's CIU in order to change from 1500 to 1800 RPM (or opposite).

Procedure if not energized:
1. Power up the ECU.
2. Change the Frequency select setpoint of transmitted value.
3. Send a stop request – press the Stop button.
The whole procedure (step 1 to 3) must not exceed 10 seconds.

Procedure with power on:
1. Send a stop request – press the Stop button.
2. Change the Frequency select setpoint of transmitted value.
3. Send a stop request – press the Stop button.
The whole procedure (step 1 to 3) must not exceed 10 seconds.

Recommended wiring

Function	ECU connector	8pin diagnostic connector	Controller
CAN H	?	1	CAN1 (extension modules/J1939) – CAN H
CAN COM	?	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	?	2	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	?	4	N/A
Battery - (negative)	?	3	N/A
Key Switch	?	5	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM
Stop Request	?	6	Any binary output configured as **inverted** ECU Comm error

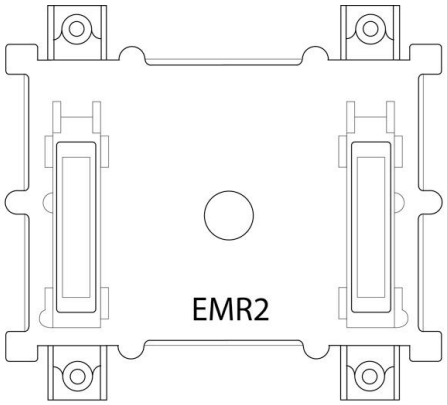
Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

If the engine doesn't crank, check the state of engine mounted auxiliary stop device.

It is important that there is no continuous active stop signal on pin 6.
If there is a “constant” active stop signal a number of problems will occur:

- It is impossible to change parameters.
- It is impossible to reprogram the control unit.
- The ECU could be damaged when power is removed.

EDC4 (EMR2)



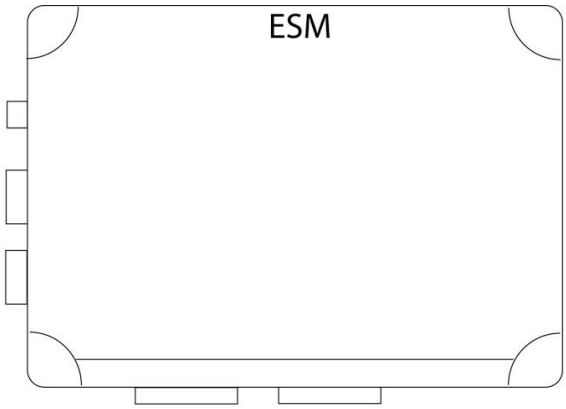
For more informarion follow Deutz EMR2 chapter (page 66).

Waukesha Engines Support

ECU Types

ECU Type	Engine Type
ESM	VHP & APG engine family

ESM



Controllers that support the ESM

	Selection in PC software
	Waukesha ESM
InteliSys NT	YES
InteliGen NT	YES
InteliDrive DCU	No
InteliDrive Mobile	No
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	No

Available signals

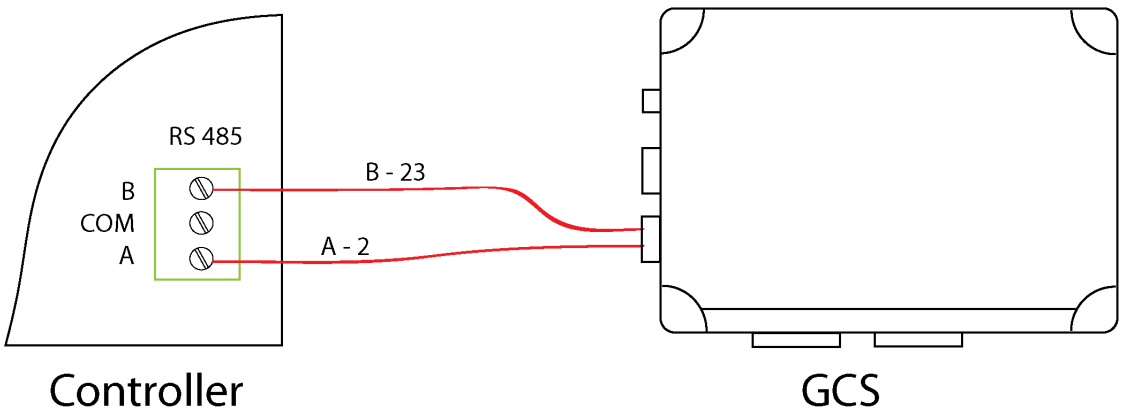
ECU binary outputs (controller's inputs)	
Main Fuel Valve	Status of the main fuel valve.
Pre-chamber Fuel Valve	Status of the pre-chamber fuel valve (if applicable).
Engine Running	Whether the engine is running or not running.
Starter Motor	Whether the starter motor is engaged or not.
Pre/Post Lube	Whether the pre/post lube pump is running.
Yellow Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Red Shutdown Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Engine Knocking	Whether the engine is in uncontrollable knock.
Start Engine Signal	Whether the start engine signal is active.

Normal Shutdown	Whether the normal shutdown signal is active.
Emergency Shutdown	Whether the emergency shutdown signal is active.
Remote rpm Select	Whether the remote rpm analog input is active or inactive.
Run High Idle	Whether the run high idle digital input is active.
Load Coming	Whether the load coming digital input is active.
Alter Dynamics/Synchr Mode	Whether the alternate governor dynamics is active.
Lockout Button/Ignit Module	Whether either the lockout button has been depressed or the IPM-D has failed, or is not powered.
ECU binary inputs (controller's outputs - commands)	
ECU analog outputs (controller's inputs)	
Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Intake Manifold Press	Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.
Throttle Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Coolant Temp	Temperature of liquid found in engine cooling system.
Battery Voltage	Electrical potential measured at the input of the electronic control unit supplied through a switching device.
Intake Manifold Temp	Temperature of pre-combustion air found in intake manifold of engine air supply system.
Engine Oil Temp	Temperature of the engine lubricant.
First exhaust temperature	For more information about this commands, please contact the local representative.
Second exhaust temperature	For more information about this commands, please contact the local representative.
ECU analog inputs (controller's outputs)	

Controller's analog output for speed control configuration

There is no speed control over CAN bus available for this particular ECU.

Recommended wiring



Check that CAN bus terminating resistors or appropriate jumpers are connected.

Recommended wiring

Function	ECU 47pin connector	9pin diagnostic connector	Controller
RS485 A	2	N/A	RS485 – RS485 A
RS485 COM	N/A	N/A	RS485 – RS485 COM
RS485 B	23	N/A	RS485 – RS485 B
Battery + (positive)	N/A	N/A	N/A
Battery - (negative)	N/A	N/A	N/A
Key Switch	N/A	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	N/A	N/A	SG OUT
Analog Speed Control	N/A	N/A	SG COM
Analog Speed Control Shield	N/A		N/A
Service Mode Enable	N/A	N/A	Loop

Controller recommended setting (Setpoints/Comms settings group)

Controller	Setpoint	Value	Interface (Connector)
InteliGen^{NT}	RS232(1) mode RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(1), RS 485(2) RS 232(1) *[3], RS 232(2) *[3]
InteliSys^{NT}	RS232(2) mode	ECU LINK	
	RS485(X)conv.	ENABLED DISABLED	RS 485(2) RS 232(1) *[3], RS 232(2) *[3]

*[3] external RS232-485 converter is required

Available list of texts of fault codes is here.

Waukesha wiring recommendations

Two modbus wires are available at the end of the Customer Interface Harness (loose wires). The two wires are grey and labeled **RS 485A-** and **RS 485B+**.

RS-485 networking needs termination resistors if long wire runs are used. Termination resistors of 120Ω are placed across the RS-485 A- and B+ wires at each device and at the MODBUS master (INTELIGEN-NT, INTELISYS-NTcontrollers has jumper connecting this resistor closed as default). For short distances of 10 m or less and with slower baud rates (ComAp uses 9600 bps), termination resistors are not needed.

Typically, short distances of 32 ft. (10 m) would not require termination resistors; however, if you experience communication errors, first check the programmed baud rate. ComAp uses 9600 bps which is Waukesha default setting. If communication errors persist, termination resistors may be necessary even for short distances.

Diagnostic lamps

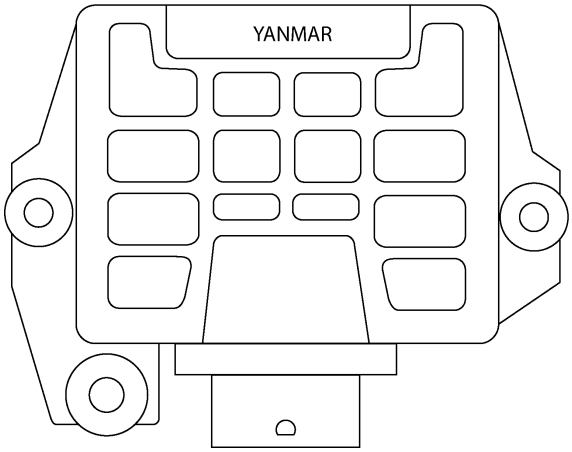
It is possible to configure Yellow Warning Lamp and Red Shutdown Lamp as binary inputs. Displaying of fault codes in the alarm list is conditioned by configuration of these inputs. Once they are not configured the alarms are blocked and not displayed.

Yanmar Engines Support

ECU Types

ECU Type	Engine Type
TNV	All TNV Common Rail Series

TNV



Controllers that support the TNV

	Selection in PC software
	Yanmar TNV
InteliSys NT	No
InteliGen NT	No
InteliDrive DCU	YES
InteliDrive Mobile	YES
InteliDrive Lite	No
InteliLite NT	No
InteliComapct NT	No
InteliNano NT	No
InteliDrive Nano	YES

Available signals

ECU binary outputs (controller's inputs)	
Amber Warning Lamp	This lamp is used to relay trouble code information that is reporting a problem with the engine system but the engine need not be immediately stopped.
Malfunction Lamp	This lamp is used to relay only emissions-related trouble code information. This lamp is only illuminated when there is an emission-related trouble code active.
Protect Lamp	This lamp is used to relay trouble code information that is reporting a problem with a engine system that is most probably not electronic subsystem related.
Red Stop Lamp	This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the engine.
Preheat	The status of the preheat relay.
AP low idle switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch.
Wait To Start Lamp	This lamp indicates that the engine is too cold to start and the operator should wait until the

	signal becomes inactive (turns off).
ECU binary inputs (controller's outputs - commands)	
Shutdown Requests	
ECU analog outputs (controller's inputs)	
Air Inlet Temperature	Temperature of air entering vehicle air induction system.
Barometric Pressure	Absolute air pressure of the atmosphere.
Engine speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
Starter mode	There are several phases in a starting action and different reasons why a start cannot take place. See the table below.
AP Position	The ratio of actual position of the analog engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Percent Load	The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.
Desired Operating Speed	An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.
Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
Coolant Temp	Temperature of liquid found in engine cooling system.
Oil Temp	Temperature of the engine lubricant.
ECU Temperature	Temperature of the engine electronic control unit.
Battery Potential (Voltage)	Electrical potential measured at the input of the electronic control unit supplied through a switching device..
Electrical Potential	Measured electrical potential of the battery.
ECU analog inputs (controller's outputs)	
Accelerator Pedal Position	The ratio of actual position of the analog engine speed/torque request input device to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application.
Requested speed*[5]	This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Supported by the non-configurable controllers:
*[1] - InteliLite[NT] *[2] - InteliDrive Lite *[3] - InteliCompact[NT] *[4] - InteliNano[NT] *[5] - InteliDrive Nano

Controller's analog output for speed control configuration

Requested Speed settings for InteliDrive DCU, InteliDrive Mobile		
Source	Speed Request	
Convert	Yes	
Limits	0.0 %	Min eng. speed (800RPM)
	100.0 %	Max eng. speed (2100RPM)

Diagnostic connector layout is on page 13 or here. Available list of texts of fault codes is here.

Starter Mode values meening

Value	Starter Mode
0	start not requested
1	starter active, gear not engaged
2	starter active, gear engaged
3	start finished; starter not active after having been actively engaged (after 50ms mode goes to 0)
4	starter inhibited due to engine already running
5	starter inhibited due to engine not ready for start (preheating)
6	starter inhibited due to driveline engaged or other transmission inhibit
7	starter inhibited due to active immobilizer
8	starter inhibited due to starter over-temp
9	Reserved
10	Reserved
11	Reserved
12	starter inhibited - reason unknown
13	error (legacy implementations only; use 14)
14	error
15	not available

Recommended wiring

Function	ECU connector	diagnostic connector	Controller
CAN H	40	N/A	CAN1 (extension modules/J1939) – CAN H
CAN COM	30	N/A	CAN1 (extension modules/J1939) – CAN COM
CAN L	39	N/A	CAN1 (extension modules/J1939) – CAN L
Battery + (positive)	34	N/A	N/A
Battery - (negative)	33,45	N/A	N/A
Key Switch	7	N/A	Any binary output configured as ECU PwrRelay
Analog Speed Control	?	N/A	SG OUT
Analog Speed Control	?	N/A	SG COM

Diagnostic connector layout is on page 13 or here.

List of Texts of ECU Fault Codes

Caterpillar ADEM A4 with EMCP3.x or ADEM A4 with EMCP4.x

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
38	ExtTankFuelLvl	174	Fuel Temp	706	Custom Event 6
51	ThrottlePos	175	EngOil Temp	898	RequestedSpeed
82	StartAirPress	189	RatedEngSpeed	924	Digital Out 1
91	AccelPedalPos	190	EngineSpeed	925	Digital Out 2
94	FuelDelPress	231	J1939 Datalink	970	AuxEngSdSwitch
95	FuelFiltDifPre	237	VIN	971	EngDerateSwtch
96	Fuel Level	515	EngDesOpSpeed	1109	EngSdApproach
97	WaterInFuelInd	620	5V SupplyFail	1110	Engine Sd
98	EngineOilLevel	625	SCADA DataLink	1122	GenRBearingTmp
99	OilFilterDifPr	626	PrehActuator	1231	Accessory DL
100	EngOil Press	628	EMSProgFailure	1239	Fuel Leakage
101	CrankcasePress	629	EEPROMChecksum	1485	ECU MainRelay
102	Boost Press	630	CalibrMemFail	1664	Start Fail
105	Intake Temp	636	Crank Sensor	2433	RExthaustTemp
106	AirInletPress	637	TimingSensor	2434	LExthaustTemp
107	AirFiltDifPres	639	J1939 CAN Bus	2436	Gen Frequency
108	BarometricPres	651	InjectorCyl#1	2440	Gen Voltage
109	Coolant Press	652	InjectorCyl#2	2448	Gen Current
110	EngCool Temp	653	InjectorCyl#3	2452	Gen Rev. Power
111	Coolant Level	654	InjectorCyl#4	2648	ServiceTime
137	FireExtinPress	655	InjectorCyl#5	4000	AirDampClosed
153	CrankcasePress	656	InjectorCyl#6	4001	ATS in NormPos
158	BattPotential	677	EngStartRelay	4002	ATS in EmerPos
167	BattChrgSystV	701	Custom Event 1	4003	BattChargFail
168	BatteryVoltage	702	Custom Event 2	4004	GCB Closed
171	AmbientAirTemp	703	Custom Event 3	4005	MCB Closed
172	AirInlet Temp	704	Custom Event 4	4006*	EngCooldown
173	Exhaust Temp	705	Custom Event 5	4007*	EMCP NotInAuto

*hidden fault code

Caterpillar ADEM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	637	TimingSensor
91	AccelPedalPos	168	BatteryVoltage	639	J1939 CAN Bus
94	FuelDelPress	172	AirInlet Temp	651	InjectorCyl#1
97	WaterInFuelInd	174	Fuel Temp	652	InjectorCyl#2
98	EngineOilLevel	175	EngOil Temp	653	InjectorCyl#3
100	EngOil Press	189	RatedEngSpeed	654	InjectorCyl#4
101	CrankcasePress	190	EngineSpeed	655	InjectorCyl#5
102	Boost Press	231	J1939 Datalink	656	InjectorCyl#6
105	Intake Temp	237	VIN	677	EngStartRelay
106	AirInletPress	515	EngDesOpSpeed	898	RequestedSpeed
107	AirFiltDifPres	620	5V SupplyFail	970	AuxEngSdSwitch
108	BarometricPres	626	PrehActuator	971	EngDerateSwtch
109	Coolant Press	628	EMSProgFailure	1109	EngSdApproach
110	EngCool Temp	629	EEPROMChecksum	1110	Engine Sd
111	Coolant Level	630	CalibrMemFail	1485	ECU MainRelay
153	CrankcasePress	636	Crank Sensor		

Cummins CM500

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
29	Hand Throttle	174	Fuel Temp	1076	FuelPump
91*	AccelPedalPos	175	EngOil Temp	1077	FuelPump
94	FuelDelPress	190	EngineSpeed	1078	FuelPump
97	WaterInFuelInd	191	OutShaftSpeed	1083	AuxTempSensor
98	EngineOilLevel	558	AP Idle	1084	AuxPressSensor
100	EngOil Press	620	5V SupplyFail	1129	IntakePressure
102	Boost Press	626	PrehActuator	1131	IntakeMan2Temp
105	Intake Temp	627	PowerLost	1132	IntakeMan3Temp
108	BarometricPres	629	EEPROMChecksum	1172	Turbo Temp
109	Coolant Press	630	CalibrMemFail	1173	Turbo 2 Temp
110	EngCool Temp	632	FuelShutoff	1244	FuelingAct
111	Coolant Level	633	FuelActuator	1349	InjectorRail#2
135	FuelPump	635	EngineTiming	1347	FuelPressure
156	FuelTiming	639	J1939 CAN Bus	1380	LowOilLevel
157	FuelRail Press	974	RemAPSensor	1384	Shutdown J1939
168	BatteryVoltage	1043	IntManifold		

*hidden fault code

Cummins CM558

Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	639	J1939 CAN Bus
100	EngOil Press	724	Heated Oxygen
105	Intake Temp	1136	ECU Temp
109	Coolant Press	1204	ElectricalLoad
110	EngCool Temp	1442	Fuel Valve 1
168	BatteryVoltage	2634	Main Relay
190	EngineSpeed	3464	ThrottleCmd
444	Battery 2 Volt	3509	SensorSupply1
623	RedStopLamp	3510	SensorSupply2
624	DiagnosticLamp	3563	IntakePress 1
629	EEPROMChecksum	3938	GenSpdGovBias
630	CalibrMemFail	520352	IgnitSdRelay
632	FuelShutoff	520353	CarburInletGas
633	FuelActuator		

Cummins CM570

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	636	Crank Sensor
91	AccelPedalPos	168	BatteryVoltage	637	TimingSensor
94	FuelDelPress	172	AirInlet Temp	639	J1939 CAN Bus
97	WaterInFuelInd	174	Fuel Temp	651	InjectorCyl#1
98	EngineOilLevel	175	EngOil Temp	652	InjectorCyl#2
100	EngOil Press	189	RatedEngSpeed	653	InjectorCyl#3
101	CrankcasePress	190	EngineSpeed	654	InjectorCyl#4
102	Boost Press	231	J1939 Datalink	655	InjectorCyl#5
105	Intake Temp	237	VIN	656	InjectorCyl#6
106	AirInletPress	515	EngDesOpSpeed	677	EngStartRelay
107	AirFiltDifPres	620	5V SupplyFail	898	RequestedSpeed
108	BarometricPres	626	PrehActuator	970	AuxEngSdSwitch
109	Coolant Press	627	PowerLost	971	EngDerateSwtch
110	EngCool Temp	628	EMSProgFailure	1109	EngSdApproach
111	Coolant Level	629	EEPROMChecksum	1110	Engine Sd
153	CrankcasePress	630	CalibrMemFail	1485	ECU MainRelay

Cummins CM800

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	636	Crank Sensor
91	AccelPedalPos	168	BatteryVoltage	637	TimingSensor
94	FuelDelPress	172	AirInlet Temp	639	J1939 CAN Bus
97	WaterInFuelInd	174	Fuel Temp	651	InjectorCyl#1
98	EngineOilLevel	175	EngOil Temp	652	InjectorCyl#2
100	EngOil Press	189	RatedEngSpeed	653	InjectorCyl#3
101	CrankcasePress	190	EngineSpeed	654	InjectorCyl#4
102	Boost Press	231	J1939 Datalink	655	InjectorCyl#5
105	Intake Temp	237	VIN	656	InjectorCyl#6
106	AirInletPress	515	EngDesOpSpeed	677	EngStartRelay
107	AirFiltDifPres	620	5V SupplyFail	898	RequestedSpeed
108	BarometricPres	626	PrehActuator	970	AuxEngSdSwitch
109	Coolant Press	627	PowerLost	971	EngDerateSwtch
110	EngCool Temp	628	EMSProgFailure	1109	EngSdApproach
111	Coolant Level	629	EEPROMChecksum	1110	Engine Sd
153	CrankcasePress	630	CalibrMemFail	1485	ECU MainRelay

Cummins CM850

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	636	Crank Sensor
91	AccelPedalPos	168	BatteryVoltage	637	TimingSensor
94	FuelDelPress	172	AirInlet Temp	639*	J1939 CAN Bus
97	WaterInFuelInd	173	Exhaust Temp	651	InjectorCyl#1
98	EngineOilLevel	174	Fuel Temp	652	InjectorCyl#2
100	EngOil Press	175	EngOil Temp	653	InjectorCyl#3
101	CrankcasePress	189	RatedEngSpeed	654	InjectorCyl#4
102	Boost Press	190	EngineSpeed	655	InjectorCyl#5
105	Intake Temp	231	J1939 Datalink	656	InjectorCyl#6
106	AirInletPress	237	VIN	677	EngStartRelay
107	AirFiltDifPres	515	EngDesOpSpeed	898	RequestedSpeed
108	BarometricPres	620	5V SupplyFail	970	AuxEngSdSwitch
109	Coolant Press	626	PrehActuator	971	EngDerateSwtch
110	EngCool Temp	627	PowerLost	1109	EngSdApproach
111	Coolant Level	628	EMSProgFailure	1110	Engine Sd
153	CrankcasePress	629	EEPROMChecksum	1485	ECU MainRelay
157	FuelRail Press	630	CalibrMemFail		

Cummins PGI 1.1 interface (CM850 or CM2150 or CM2250)

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
27	EGRValvePos	663	InjectorCyl#13	1338	MisfireCyl16
81	DPF Pressure	664	InjectorCyl#14	1347	Fuel-pump
84	SpeedSensor	665	InjectorCyl#15	1377	MultUnitSynch
91	AccelPedalPos	666	InjectorCyl#16	1378	OilChangeTime
93	SwitchData	697	PWM1-Gauge1	1380	LowOilLevel
94	FuelDelPress	701	AuxInput1Act	1387	AuxPressure
95	FuelFilDifPres	702	AuxInOut#2	1388	AuxPressSens#1
97	WaterInFuel	703	AuxInOut#3	1484	Severe Fault
99	OilFilterDifPr	723	SecSpeedSens	1563	ECMIdentificat
100	EngOil Press	729	AirHeaterRelay	1632	LowOilLevel
101	CrankcasePress	974	RemAPSensor	1634	CVN Error
102	Boost Press	1073	EngComprBrake	1800	BatteryTemp
103	TBC1Speed	1075	ElectrLiftPump	2433	RExthaustTemp
105	Intake Temp	1112	EngineBrake#3	2434	LExthaustTemp
108	BarometricPres	1128	IntakeMan2Pres	2623	AccelPedalPos
109	Coolant Press	1131	IntakeMan2Temp	2630	ChargeAirTemp
110	EngCool Temp	1132	IntakeMan3Temp	2789	SysDiagCode#1
111	Coolant Level	1133	IntakeMan4Temp	2791	EGR Actuator
157	FuelRail Press	1136	ECU Temp	2797	InjectorBank
166	CylPowerImbal	1137	ExhaustTemp 1	3050	AftertreatDOC
168	BatteryVoltage	1138	ExhaustTemp 2	3058	EngineEGR
171	AmbientAirTemp	1139	ExhaustTemp 3	3241	AftExhGasTmp#1
173	Exhaust Temp	1140	ExhaustTemp 4	3242	DPFIntakGasTmp
174	Fuel Temp	1141	ExhaustTemp 5	3245	AftExhGasTmp#3
175	EngOil Temp	1142	ExhaustTemp 6	3246	DPFOutltGasTmp
183	Fuel Rate	1143	ExhaustTemp 7	3249	AftExhGasTmp#2
190	EngineSpeed	1144	ExhaustTemp 8	3251	APFDiffPresSns
191	OutShaftSpeed	1145	ExhaustTemp 9	3481	AftFuelRate
251	RTCPowerInterr	1146	ExhaustTemp 10	3509	SensorSupply1
411	ExhaustGasPres	1147	ExhaustTemp 11	3510	SensorSupply2
412	EGR Temp	1148	ExhaustTemp 12	3511	SensorSupply3
441	AuxTempSensIn1	1149	ExhaustTemp 13	3512	SensorSupply4
558	AP Idle	1150	ExhaustTemp 14	3513	SensorSupply5
597	BrakeSwitch	1151	ExhaustTemp 15	3514	SensorSupply6

611	APCDieselFlow	1152	ExhaustTemp 16	3549	Post-OilFilter
612	CrankshaftSpd	1172	Turbo Temp	3555	AmbientAirDens
623	RedStopLamp	1208	Pre-OilFilterP	3556	AftFuelInj#1
627	PowerLost	1209	ExhaustGasPres	3597	ECUSupplyVolt
629	EEPROMChecksum	1231	CAN Bus OFF	3610	DPFOutletPress
630	CalibrMemFail	1235	CAN Bus OFF	3703	DPF RegenInhib
633	FuelActuator	1242	BrakePower	3936	DPF System
639*	J1939 CAN Bus	1265	OilBurnValve	3938	GenSpdGovBias
640	AuxCmdDualSd	1322	MisfireCyls	4182	GenFrequencPot
641	VGT Actuator	1323	MisfireCyl1	4183	DroopCircuit
644	ExtSpeedInput	1324	MisfireCyl2	4184	GainCircuit
647	CoolingFan	1325	MisfireCyl3	4185	OverspeedSDRel
651	InjectorCyl#1	1326	MisfireCyl4	4186	LOP SD Relay
652	InjectorCyl#2	1327	MisfireCyl5	4187	HET SD Relay
653	InjectorCyl#3	1328	MisfireCyl6	4188	Pre-LowOilPres
654	InjectorCyl#4	1329	MisfireCyl7	4223	Pre-HighEngTmp
655	InjectorCyl#5	1330	MisfireCyl8	4795	Aftertreatment
656	InjectorCyl#6	1331	MisfireCyl9	4796	Aftertreatment
657	InjectorCyl#7	1332	MisfireCyl10	5298	Aftertreatment
658	InjectorCyl#8	1333	MisfireCyl11	520199	CruiseControl
659	InjectorCyl#9	1334	MisfireCyl12	520320	CrankcasDepres
660	InjectorCyl#10	1335	MisfireCyl13	520441	EGROutPresSens
661	InjectorCyl#11	1336	MisfireCyl14	520442	EGRMixTempSens
662	InjectorCyl#12	1337	MisfireCyl15	520448	CrankcaseVent

*hidden fault code

Cummins CM2250 industrial

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
27	EGRValvePos	639*	J1939 CAN Bus	729	AirHeaterRelay
81	DPF Pressure	641	VGT Actuator	1075	ElectrLiftPump
97	WaterInFuelInd	647	CoolingFan	1136	ECU Temp
100	EngOil Press	651	InjectorCyl#1	1209	ExhaustGasPres
101	CrankcasePress	652	InjectorCyl#2	1231	CAN Bus OFF
102	Boost Press	653	InjectorCyl#3	1347	FuelPressure
103	TBC1Speed	654	InjectorCyl#4	1378	OilChangeTime
105	Intake Temp	655	InjectorCyl#5	2789	SysDiagCode#1
110	EngCool Temp	656	InjectorCyl#6	2791	EGR Actuator
111	Coolant Level	657	InjectorCyl#7	2797	InjectorBank
157	FuelRail Press	658	InjectorCyl#8	3509	SensorSupply1
168	BatteryVoltage	659	InjectorCyl#9	3510	SensorSupply2
171	AmbientAirTemp	660	InjectorCyl#10	3511	SensorSupply3
190	EngineSpeed	661	InjectorCyl#11	3512	SensorSupply4
411	ExhaustGasPres	662	InjectorCyl#12	3513	SensorSupply5
412	EGR Temp	663	InjectorCyl#13	3514	SensorSupply6
611	FuelInletMeter	664	InjectorCyl#14	3555	AmbientAirDens
627	PowerLost	665	InjectorCyl#15	3597	ECUSupplyVolt
629	EEPROMChecksum	666	InjectorCyl#16	4795	Aftertreatment
633	FuelActuator	723	SecSpeedSens	4796	Aftertreatment

*hidden fault code

Cummins GCS

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
111	ECM-IntFailure	235	CoolLvlCritLow	113	EngTimActCirc
115	MagPickupSenSd	253	OilLvlCritLow	116	FuelPresSensSH
121	MgPickupSenWrn	254	FuelShutoffVal	117	FuelPresSensSL
122	IntkManPressLH	261	FuelTempHigh	118	FuelPumpSensSH
123	IntkManPressLL	263	FuelTmpSenShrH	119	FuelPumpSensSL
128	IntkManPressRH	265	FuelTmpSenShrL	224	CentinelActShr
129	IntkManPressRL	266	FuelTmpCritHig	236	EngPositionSen
135	OilPrsSenShrtH	343	ECM-IntHWFail	252	EngOilLevelSen
141	OilPrsSenShrtL	415	OilPresCritLow	259	FuelShutoffVlv
143	EngOilPressLow	421	OilTempHigh	316	FuelSuppPumpSH
144	CoolTSenShortH	422	CoolLvlSensor	318	FuelSuppPumpSt
145	CoolTSenShortL	471	OilLevelLow	326	EngOilLevelLow
146	EngCoolTmpHigh	488	IntakeManTmpH	359	FailedToStart
151	EngCoolTCritH	581	FuelSuppPumpPH	423	FuelActtrStuck
152	EngCoolTempLow	582	FuelSuppPumpPL	441	Batt1VoltLow
153	IntakeManTmpLB	1211	FuelShutoffVlv	442	Batt1VoltHigh
154	IntakManTmpSen	1212	FuelShutoffVlv	451	InjectrPSensSH
155	CritIntakeManT	1411	GenOutFreqPot	452	InjectrPSensSL
159	IntkManTmpSenH	1412	DroopAdjPotent	455	FuelCtrlValvSH
161	IntkManTmpSenL	1413	ContrConfigErr	467	TimRailActCirc
166	RackPositSensH	1416	FailToShutdown	468	FuelRailActCrc
167	RackPositSensL	1417	ECMPowrdwnFail	498	EngOilLvlSenSH
168	RackActPositLB	1418	GainAdjPotent	499	EngOilLvlSenSL
169	RackActPositLB	1424	DiagLampError	514	FuelCtrlValve
171	FuelRackActPos	1425	CommSdLampErr	554	FuelPresSenErr
174	RackActuatrPos	1426	CommWrnLampErr	555	EnginBlowbyWrn
179	RackPositSensH	1427	OSLampError	556	EngineBlowbySD
181	RackPositSensL	1428	LOPLampError	611	EngHotShutdown
182	RackActPositRB	1429	HETLampError	649	ChangeLubrOil
183	RackActPositRB	1431	PreLOPLampErr	688	EngOilLvl1High
197	CoolantLvlLow	1432	PreHETLampErr	689	EngSpeedSenErr
212	OilTempSensorH	1433	LocEmergStop	719	BlowbyPrSensSH
213	OilTempSensorL	1434	RemEmergStop	729	BlowbyPrSensSL
214	OilTmpCritHigh	1435	EngineCold	1419	FuelRailError

219	EngOilLevelLow	1438	FailToCrank	1421	TimingRailDrv1
221	BarPressSensH	1443	BattVoltLow	1422	TimingRailDrv2
222	BarPressSensL	1473	ECMWatchdogFls	1423	FuelPumpDiagEr
223	OilBurnValvSol	1479	FailToStrtLamp	1436	HPI-PTFuelSyst
228	CoolPresCritLo	2297	FuelSuppPumpLa	2111	EngCoolTmp2SSH
231	CoolPressSensH	2974	RackPosSensor1	2112	EngCoolTmp2SSL
232	CoolPressSensL	2975	RackPosSensor2	2113	EngCoolTmp2Wrn
234	EngSpeedHigh	112	EngTimingActtr	2114	EngCoolTemp2SD

Daimler Chrysler ADM2

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	637	TimingSensor
91	AccelPedalPos	168	BatteryVoltage	639	J1939 CAN Bus
94	FuelDelPress	172	AirInlet Temp	651	InjectorCyl#1
97	WaterInFuelInd	174	Fuel Temp	652	InjectorCyl#2
98	EngineOilLevel	175	EngOil Temp	653	InjectorCyl#3
100	EngOil Press	189	RatedEngSpeed	654	InjectorCyl#4
101	CrankcasePress	190	EngineSpeed	655	InjectorCyl#5
102	Boost Press	231	J1939 Datalink	656	InjectorCyl#6
105	Intake Temp	237	VIN	677	EngStartRelay
106	AirInletPress	515	EngDesOpSpeed	898	RequestedSpeed
107	AirFiltDifPres	620	5V SupplyFail	970	AuxEngSdSwitch
108	BarometricPres	626	PrehActuator	971	EngDerateSwtch
109	Coolant Press	628	EMSProgFailure	1109	EngSdApproach
110	EngCool Temp	629	EEPROMChecksum	1110	Engine Sd
111	Coolant Level	630	CalibrMemFail	1485	ECU MainRelay
153	CrankcasePress	636	Crank Sensor		

Daimler Chrysler ADM3

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	637	TimingSensor
91	AccelPedalPos	168	BatteryVoltage	639	J1939 CAN Bus
94	FuelDelPress	172	AirInlet Temp	651	InjectorCyl#1
97	WaterInFuelInd	174	Fuel Temp	652	InjectorCyl#2
98	EngineOilLevel	175	EngOil Temp	653	InjectorCyl#3
100	EngOil Press	189	RatedEngSpeed	654	InjectorCyl#4
101	CrankcasePress	190	EngineSpeed	655	InjectorCyl#5
102	Boost Press	231	J1939 Datalink	656	InjectorCyl#6
105	Intake Temp	237	VIN	677	EngStartRelay
106	AirInletPress	515	EngDesOpSpeed	898	RequestedSpeed
107	AirFiltDifPres	620	5V SupplyFail	970	AuxEngSdSwitch
108	BarometricPres	626	PrehActuator	971	EngDerateSwtch
109	Coolant Press	628	EMSProgFailure	1109	EngSdApproach
110	EngCool Temp	629	EEPROMChecksum	1110	Engine Sd
111	Coolant Level	630	CalibrMemFail	1485	ECU MainRelay
153	CrankcasePress	636	Crank Sensor		

Detroit Diesel Engines DDEC IV/DDEC V

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	636	Crank Sensor
91	AccelPedalPos	168	BatteryVoltage	637	TimingSensor
94	FuelDelPress	172	AirInlet Temp	639	J1939 CAN Bus
97	WaterInFuelInd	173	Exhaust Temp	651	InjectorCyl#1
98	EngineOilLevel	174	Fuel Temp	652	InjectorCyl#2
100	EngOil Press	175	EngOil Temp	653	InjectorCyl#3
101	CrankcasePress	189	RatedEngSpeed	654	InjectorCyl#4
102	Boost Press	190	EngineSpeed	655	InjectorCyl#5
105	Intake Temp	231	J1939 Datalink	656	InjectorCyl#6
106	AirInletPress	237	VIN	677	EngStartRelay
107	AirFiltDifPres	515	EngDesOpSpeed	898	RequestedSpeed
108	BarometricPres	620	5V SupplyFail	970	AuxEngSdSwitch
109	Coolant Press	626	PrehActuator	971	EngDerateSwtch
110	EngCool Temp	628	EMSProgFailure	1109	EngSdApproach
111	Coolant Level	629	EEPROMChecksum	1110	Engine Sd
153	CrankcasePress	630	CalibrMemFail	1485	ECU MainRelay

Deutz EMR2

Fault Code (SPN)	Text	Fault Code (SPN)	Text
84	SpeedSensor	204	PWM1
91	AccelPedalPos	205	PWM2
98	EngineOilLevel	206	IntMemoryFault
100	EngOil Press	207	BattVoltToLow
102	Boost Press	208	OutputEngStop
105	Intake Temp	209	ActorRackPos
108	BarometricPres	210	CalibrMemFault
109	Coolant Press	231	J1939 Datalink
110	EngCool Temp	535	Actuator Diff
111	Coolant Level	536*	Ignore 1
171	AmbientAirTemp	563	Main Relay 3
174	Fuel Temp	572	DigitalOutput6
190	EngineSpeed	743	CAN Bus Comm
200	RackPosition	752	Program Test
201	Hand Throttle	765	Param Store
202	AutoCalibrFail	766	RAMTest/PwrCur
203	CAN-MsgTimeout	898	RequestedSpeed

*hidden fault code

Deutz EMR3-E and EMR3-S

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
29	Hand Throttle	704	CoolTempLamp	523351	InjVlvBnk1B
84	SpeedSensor	705	OilPressLamp	523352	InjVlvBnk2A
91	AccelPedalPos	729	AirHeaterRelay	523353	InjVlvBnk2B
94	FuelDelPress	730	AirHeaterValve	523354	InjVlvChipA
97	WaterInFuelInd	898	RequestedSpeed	523355	InjVlvChipB
100	EngOil Press	923	EngPowerOutput	523370	CompresionTest
102	Boost Press	975	Fan Actuator	523420	Watchdog
105	Intake Temp	1072	InterEngBrake	523450	MultiStateSw
107	AirFiltDifPres	1074	EngBrkFlapAct	523451	MultiStateSw
108	BarometricPres	1079	Sensorvoltage	523452	MultiStateSw
109	Coolant Press	1080	ECUIntError	523470	RailPressValve
110	EngCool Temp	1081	PreheatLamp	523490	ShutoffCond
111	Coolant Level	1109	EngSdApproach	523500	FrmMngTxTO
157	FuelRail Press	1231	CAN Bus OFF	523550	TPU Defect
158	IgnitNotDetect	1235	CAN Bus OFF	523561	BIP Cyl1
168	BatteryVoltage	1237	OverrideSwitch	523562	BIP Cyl2
174	Fuel Temp	1322	MisfireCyls	523563	BIP Cyl3
175	EngOil Temp	1323	MisfireCyl1	523564	BIP Cyl4
190	EngineSpeed	1324	MisfireCyl2	523565	BIP Cyl5
520	FrmMngTOTSC1TR	1325	MisfireCyl3	523566	BIP Cyl6
563	Main Relay 3	1326	MisfireCyl4	523567	BIP Cyl7
624	DiagnosticLamp	1327	MisfireCyl5	523568	BIP Cyl8
630	EEPROM Access	1328	MisfireCyl6	523600	SerialComm
639	J1939 CAN Bus	1346	Misfire	523601	ReferenceVolt
651	InjectorCyl#1	1450	MisfireCyl7	523602	Fan Speed
652	InjectorCyl#2	1451	MisfireCyl8	523604	FrmMngTOEngTmp
653	InjectorCyl#3	1638	CustomerSensor	523605	FrmMngTOTSC1AE
654	InjectorCyl#4	2634	Main Relay	523606	FrmMngTOTSC1AR
655	InjectorCyl#5	2791	EGR Actuator	523607	FrmMngTOTSC1DE
656	InjectorCyl#6	523212	FrmMngTOEngPrt	523608	FrmMngTOTSC1DR
657	InjectorCyl#7	523216	FrmMngTOPrHt	523609	FrmMngTOTSC1PE
658	InjectorCyl#8	523218	FrmMngTORxCCVS	523610	FrmMngTOTSC1VE
676	AirHeaterRelay	523222	FrmMngTOTCO1	523611	FrmMngTOTSC1VR
677	EngStartRelay	523238	FrmMngTOSwtOut	523612	ECUIntMonitor

701	AuxInput1Act	523239	FrmMngDecV1	523613	RailPressure
702	AuxInOut#2	523240	FrmMngFunModCt	523615	MeterUnitValve
703	ECU IntError	523350	InjVlvBnk1A	523617	HWEMonCom

Deutz EMR4

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
29	Hand Throttle	704	CoolTempLamp	523351	InjVlvBnk1B
84	SpeedSensor	705	OilPressLamp	523352	InjVlvBnk2A
91	AccelPedalPos	729	AirHeaterRelay	523353	InjVlvBnk2B
94	FuelDelPress	730	AirHeaterValve	523354	InjVlvChipA
97	WaterInFuelInd	898	RequestedSpeed	523355	InjVlvChipB
100	EngOil Press	923	EngPowerOutput	523370	CompresionTest
102	Boost Press	975	Fan Actuator	523420	Watchdog
105	Intake Temp	1072	InterEngBrake	523450	MultiStateSw
107	AirFiltDifPres	1074	EngBrkFlapAct	523451	MultiStateSw
108	BarometricPres	1079	Sensorvoltage	523452	MultiStateSw
109	Coolant Press	1080	ECUIntError	523470	RailPressValve
110	EngCool Temp	1081	PreheatLamp	523490	ShutoffCond
111	Coolant Level	1109	EngSdApproach	523500	FrmMngTxTO
157	FuelRail Press	1231	CAN Bus OFF	523550	TPU Defect
158	IgnitNotDetect	1235	CAN Bus OFF	523561	BIP Cyl1
168	BatteryVoltage	1237	OverrideSwitch	523562	BIP Cyl2
174	Fuel Temp	1322	MisfireCyls	523563	BIP Cyl3
175	EngOil Temp	1323	MisfireCyl1	523564	BIP Cyl4
190	EngineSpeed	1324	MisfireCyl2	523565	BIP Cyl5
520	FrmMngTOTSC1TR	1325	MisfireCyl3	523566	BIP Cyl6
563	Main Relay 3	1326	MisfireCyl4	523567	BIP Cyl7
624	DiagnosticLamp	1327	MisfireCyl5	523568	BIP Cyl8
630	EEPROM Access	1328	MisfireCyl6	523600	SerialComm
639	J1939 CAN Bus	1346	Misfire	523601	ReferenceVolt
651	InjectorCyl#1	1450	MisfireCyl7	523602	Fan Speed
652	InjectorCyl#2	1451	MisfireCyl8	523604	FrmMngTOEngTmp
653	InjectorCyl#3	1638	CustomerSensor	523605	FrmMngTOTSC1AE
654	InjectorCyl#4	2634	Main Relay	523606	FrmMngTOTSC1AR
655	InjectorCyl#5	2791	EGR Actuator	523607	FrmMngTOTSC1DE
656	InjectorCyl#6	523212	FrmMngTOEngPrt	523608	FrmMngTOTSC1DR
657	InjectorCyl#7	523216	FrmMngTOPrHt	523609	FrmMngTOTSC1PE
658	InjectorCyl#8	523218	FrmMngTORxCCVS	523610	FrmMngTOTSC1VE
676	AirHeaterRelay	523222	FrmMngTOTCO1	523611	FrmMngTOTSC1VR
677	EngStartRelay	523238	FrmMngTOSwtOut	523612	ECUIntMonitor

701	AuxInput1Act	523239	FrmMngDecV1	523613	RailPressure
702	AuxInOut#2	523240	FrmMngFunModCt	523615	MeterUnitValve
703	ECU IntError	523350	InjVlvBnk1A	523617	HWEMonCom

Ford e-control

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
0	RS485	925	PWM6	520203	AdaptLearn NG
29	FPP2	926	PWM7	520204	C-L GasolBank1
51	TPS1	1079	SupplyVoltage	520205	C-L GasolBank2
84	Roadspeed	1080	Sensorsupply2	520206	ClosedLoop LPG
91	FPP1	1127	TIP Voltage	520207	Closed-loop NG
94	FuelPress	1192	WGPvoltage	520208	EGO2 Open/Lazy
100	EngOil Press	1213	MILcontrol	520209	EGO3 Open/Lazy
102	Boost Press	1239	FuelRunOutLong	520210	EGO4 Open/Lazy
105	IAT	1268	Sparkcoil1	520211	CatalInactGas1
106	AMP	1269	Sparkcoil2	520212	CatalInactGas2
108	BPpressure	1270	Sparkcoil3	520213	CatalInactLPG
109	Coolant Press	1271	Sparkcoil4	520214	CatalInactOnNG
110	ECT	1272	Sparkcoil5	520215	AUXAnaPullDn1V
168	BatteryVoltage	1273	Sparkcoil6	520216	AUXAnaPullUp1V
173	EGTtemperature	1274	Sparkcoil7	520217	AUXAnaPullUp2V
174	FTvoltage	1275	Sparkcoil8	520218	AUXAnaPullUp3V
190	CrankSignalFl	1276	Sparkcoil9	520219	AUXAnaPullUp1
441	EMWT1	1277	Sparkcoil10	520220	AUXAnaPullUp2
442	EMWT2	1321	Start Relay	520221	AUXAnaPullUp3
443	ERWT1voltage	1323	Cylinder1	520222	AUX digital 1
444	ERWT2voltage	1324	Cylinder2	520223	AUX digital 2
515	EngineSpeed	1325	Cylinder3	520224	AUX digital 3
558	IVSstuck	1326	Cylinder4	520230	PWM5
628	FLASH	1327	Cylinder5	520240	GasFuelTempVFl
629	EEPROMChecksum	1328	Cylinder6	520241	Knock2
630	RAM	1329	Cylinder7	520250	FPP1
636	CRANKsignal	1330	Cylinder8	520251	TPS2 voltage
639	CAN-J1939fault	1347	Fuel-pump	520252	IACwiring
645	Tachoutput	1348	Fuelpump	520260	MegaJector
651	Injector1	1384	Shutdown J1939	520270	Gov1/2/3Fail
652	Injector2	1386	ERWT2 Voltage	520401	FuelImpurityH
653	Injector3	1485	Powerrelay	520800	InCam/DistFl
654	Injector4	1692	Boostcontrol	520801	ExhtCamPosErr
655	Injector5	2000	CAN-J1939Fault	520803	MegaJectorFl

656	Injector6	2646	PWM8 Short	522525	CatalystInact
657	Injector7	2647	PWM9 Short	522540	PWM3-Gauge3
658	Injector8	3050	Catalystinact	522593	MegaJectorComm
659	Injector9	3051	CatalInactGas2	522594	MegaJectorVolt
660	Injector10	3056	UEGO return V	522595	MegaJectorAct
695	OverrdCtrlMode	3217	UEGOSenseCell	522596	MegaJectorCirc
697	PWM1-Gauge1	3218	UEGOPumpVShort	522597	MegaJectorComm
698	PWM2-Gauge2	3221	UEGOprocessor	522598	PWM4 Short
699	PWM3-Gauge3	3222	UEGO	522599	Injector1Short
700	PWM4-Gauge4	3225	UEGOPump	522600	Injector4Short
701	AuxInput1Act	3227	EGO1open/lazy	522601	Injector2Short
702	AuxInOut#2	3256	EGO1open/lazy	522602	Injector3Short
703	AuxInOut#3	3266	EGO4 Open/Lazy	522603	GasFuelTempVFl
704	AUX1	3468	Gaseousfuel	522604	Power relay
705	AUX2	3673	TPS2voltage	522606	EGO2 Open/Lazy
706	AUX3	4236	Closes-loopGB1	522655	CLGasBank1/LPG
710	AUXpull-down	4237	Adap-learnGB1	522660	AdpLrnGas1/LPG
711	AUXpull-down2	4238	Closes-loopGB2	522697	MicroprocFail
712	AUXpull-down3	4239	Adap-learnGB1	522710	TPS1 voltage
713	AUXpull-down4	520197	Knock2sensor	522711	TPS2 voltage
723	SecSpeedSens	520199	FPP1/2Invalid	522712	FPP1 voltage
724	EGO1 Open/Lazy	520200	AdpLrnGasBank1	522737	EGO1 Open/Lazy
731	Knock1sensor	520201	AdpLrnGasBank2	522752	CAMInputSignal
920	BuzzerControl	520202	AdaptLearn LPG	524260	SensorSupplyV2

GM MEFI4B, MEFI5B

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	65537	OxygenSensor	65551	RomAndCheckSum
84	Speed Sensor	65538	EgrNotTracking	65552	OxygenSensor1
94	FuelDelPress	65539	Est	65553	OxygenSensor2
98	EngineOilLevel	65540	EstOrBypass	65600	TacModuleFault
100	EngOil Press	65541	Coil A Fault	65554	FuelPumpRelay
105	Intake Temp	65542	Coil B Fault	65555	Inj A Short
106	AirInletPress	65543	Coil C Fault	65556	Inj B Short
109	Coolant Press	65544	Coil D Fault	65557	Recirc Fault
110	EngCool Temp	65545	Coil E Fault	65558	Depspwr Ref
113	GovIntHigh	65546	Coil F Fault	65559	CANBus HWFault
174	Fuel Temp	65547	Coil G Fault	65701	Gener Warning1
620	5V SupplyFail	65548	Coil H Fault	65702	Gener Warning2
636	Crank Fault	65549	Knock1Inactive	65703	Stop Engine
723	SecSpeedSens	65550	Knock2Inactive		

GM MEFI6

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
27	EGRValvePos	1352	Cyl1Knock	65561	OxyVoltage
38	ExtTankFuelLvl	1353	Cyl2Knock	65562	PostO2Voltage
51	ThrottlePos	1354	Cyl3Knock	65565	OxyFuelTrim
84	Speed Sensor	1355	Cyl4Knock	65567	OxyResponse
87	CruiseSpdHigh	1356	Cyl5Knock	65580	CPU
91	AccelPedalPos	1357	Cyl6Knock	65581	MHC
94	FuelDelPress	1358	Cyl7Knock	65582	NvRam
96	Fuel Level	1359	Cyl8Knock	65585	FuelSelInput
98	EngineOilLevel	1360	Cyl9Knock	65601	EtcTps2
100	EngOil Press	1361	Cyl10Knock	65602	EtcTps1
103	TBC1Speed	1362	Cyl11Knock	65604	EtcPps2
105	Intake Temp	1363	Cyl12Knock	65605	EtcPps1
106	AirInletPress	1393	IgnCoilASecCir	65613	EtcPps12
108	BarometricPres	1394	IgnCoilBSecCir	65615	EtcActuation
109	Coolant Press	1395	IgnCoilCSecCir	65616	EtcProcess
110	EngCool Temp	1396	IgnCoilDSecCir	65618	EtcReturn
113	GovIntHigh	1397	IgnCoilESecCir	65675	CatEfficiencyA
132	MassAirFlow	1398	IgnCoilFSecCir	65676	CatEfficiencyB
135	FuelPump	1399	IgnCoilGSecCir	65701	CoolantLevel
158	BattPotential	1400	IgnCoilHSecCir	65702	Gener Warning2
159	FuelRailPres	1442	FuelPresReg2	65703	Stop Engine
167	SysVolt	1634	CVN Error	65723	CamSensorW
168	BatteryVoltage	1635	CMM_CODECAL	65724	CamSensorX
174	Fuel Temp	1695	SysTooRich	65725	CamSensorY
175	EngOil Temp	1695	SysTooLean	65728	CamSensorZ
188	SpeedAtIdleLow	1765	FuelValve	66002	StarterRelay
190	EngineSpeed	1765	FuelValve	66003	MilDriver
237	VIN	2000	ECU failure	66011	GasLockOFF
245	OdometerNotPrg	2430	ECSensor	66013	PowertrainDrr
527	SpdControlLamp	2430	ECSenLow	66014	PowertrainSw
596	CruiseContInpA	2430	ECSenHigh	66015	FuelControlVlv
597	BrakeSwitch	2430	CoolantLevelL	66019	OxyHeater
599	CruiseCtrSet	2433	ExGasTempB1	66021	PostOxy Heater
600	CruiseCtrCoast	2434	ExGasTempB2	75701	Gener Warning1

601	CruiseCtResume	2628	FuelShutoffVlv	522545	MIL_Lamp
602	CruiseCtrAccel	2645	Main Relay	522608	O2 Heater
620	5V SupplyFail	2659	EGRFlow	522609	Rear O2
623	RedStopLamp	2807	FuelShutoffVlv	522610	Throttle
627	PowerLost	2923	PwrSteerPress	522611	Throttle Area1
628	EMSProgFailure	3050	CatEffBellowB1	522612	Throttle Area3
630	CalibrMemFail	3051	CatEffBellowB2	522613	Throttle Area3
632	FuelShutoff	3053	FuelCapLamp	522614	ThrottleFailed
636	CrankSensor	3061	ColdStart	522615	ThrottleClosed
637	Pickup Crank	3217	O2B1S1	522616	ThrottlePos
639	J1939 CAN Bus	3223	O2B1S1HtrLow	522617	ThrottleNotDwn
650	ActuatorSupply	3227	PostCatFuel	522630	O2LeanBank1
651	InjectorCyl#1	3232	O2B1S2	522631	O2RichBank1
652	InjectorCyl#2	3256	O2B1S2	522632	O2LeanBank2
653	InjectorCyl#3	3261	O2B2S1	522633	O2RichBank2
654	InjectorCyl#4	3266	PostCatFuel	522635	LFBK1LeanFuel
655	InjectorCyl#5	3271	O2B2S2	522636	LFBK1RichFuel
656	InjectorCyl#6	3464	ThrottleCmd	522637	LFBK2LeanFuel
657	InjectorCyl#7	3472	SecAirValv A	522638	LFBK2RichFuel
658	InjectorCyl#8	3472	SecAirFlow	522690	SPI Bus Error
680	InjPressRegul	3476	SecAirValv Bt	522691	ChecksumError
723	SecSpeedSens	3509	SensorSupply1	522692	RedundantFlt
731	Knock1sensor	3510	SensorSupply2	522694	ChecksumError
836	EngRPMOutput	3511	SensorSupply3	522695	RMC_PAPMPP
837	ContModuleVSS	3563	IntakePress 1	522696	RMC_PEDMPP
876	ClutchRelay	3673	Throttle	522698	RMC_CLOCKPP
911	Maintenance	4002	StarterReqCirc	522699	RMC_INHWP
931	FuelPumpSec	4256	CrankRPMTooLow	522700	RMC_TIMEOUTPP
987	CheckEngLamp	65537	OxygenSensor	522712	APS_1_CC1
1071	Fan1	65538	EgrNotTracking	522713	APS_2_CC1
1127	BoostPress	65539	Est	522729	ADPT_OBD_GAIN
1188	WastegateOut	65540	EstOrBypass	522730	ADPT_OBD_OFF
1195	ImmKeyNoProg	65541	Coil A Fault	522731	ADPT_OBD_PRES
1196	ImmKeyIncorr	65542	Coil B Fault	522735	O2 Bank1
1213	MILcontrol	65543	Coil C Fault	522736	O2 Bank1
1239	Fuel Leakage	65544	Coil D Fault	522739	O2 HeaterBank1
1268	IgnitionCoil#1	65545	Coil E Fault	522740	O2 HeaterBank1

1269	IgnitionCoil#2	65546	Coil F Fault	522743	OBDII Lean1
1270	IgnitionCoil#3	65547	Coil G Fault	522744	OBDII Lean1
1271	IgnitionCoil#4	65548	Coil H Fault	522745	OXY_SENS_MSR
1272	IgnitionCoil#5	65549	Knock1Inactive	522746	OXY_S2_MSR
1273	IgnitionCoil#6	65550	Knock2Inactive	522747	OXY_SENS_PER
1274	IgnitionCoil#7	65551	RomAndCheckSum	522748	OXY_S2_PERIODE
1275	IgnitionCoil#8	65552	OxygenSensor1	522749	OXY_SENS_RL_R
1321	Start Relay	65553	OxygenSensor2	522750	OXY_S2_RL_RESP
1322	MisfireCyls	65555	ChangeOil	522752	FailToStart
1323	MisfireCyl1	65600	TacModuleFault	522755	FuelPump
1324	MisfireCyl2	65554	FuelPumpRelay	523821	OilLamp
1325	MisfireCyl3	65555	Inj A Short	524260	5VPowerSupply
1326	MisfireCyl4	65556	Inj B Short	524261	5VPowerSupply
1327	MisfireCyl5	65557	Recirc Fault	524266	ThrottleMotor
1328	MisfireCyl6	65558	Depspwr Ref	524286	ThrottleMotor
1329	MisfireCyl7	65559	CANBus HWFault	524287	TorqReduction
1330	MisfireCyl8	65560	CanBusGovCmd		

GM SECM

Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	1118	GasO2
100	EngOil Press	1119	ActExhaustOxyg
102	Boost Press	1213	MILcontrol
105	Intake Temp	1268	IgnitionCoil#1
109	Coolant Press	1269	IgnitionCoil#2
110	EngCool Temp	1270	IgnitionCoil#3
158	BattPotential	1271	IgnitionCoil#4
190	EngineSpeed	1272	IgnitionCoil#5
632	FuelShutoff	1273	IgnitionCoil#6
651	InjectorCyl#1	1274	IgnitionCoil#7
724	Heated Oxygen	1275	IgnitionCoil#8
911	ServiceFault1	1379	ServiceFault4
912	ServiceFault2	1442	LSD FltDither1
913	ServiceFault3	1443	LSD FltDither2
1079	Sensorvoltage	3057	GasPostO2
1116	GasFuelAdapt	3464	ThrottleCmd

GM E-control

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
0	RS485	925	PWM6	520203	AdaptLearn NG
29	FPP2	926	PWM7	520204	C-L GasolBank1
51	TPS1	1079	SupplyVoltage	520205	C-L GasolBank2
84	Roadspeed	1080	Sensorsupply2	520206	ClosedLoop LPG
91	FPP1	1127	TIP Voltage	520207	Closed-loop NG
94	FuelPress	1192	WGPvoltage	520208	EGO2 Open/Lazy
100	EngOil Press	1213	MILcontrol	520209	EGO3 Open/Lazy
102	Boost Press	1239	FuelRunOutLong	520210	EGO4 Open/Lazy
105	IAT	1268	Sparkcoil1	520211	CatalInactGas1
106	AMP	1269	Sparkcoil2	520212	CatalInactGas2
108	BPpressure	1270	Sparkcoil3	520213	CatalInactLPG
109	Coolant Press	1271	Sparkcoil4	520214	CatalInactOnNG
110	ECT	1272	Sparkcoil5	520215	AUXAnaPullDn1V
168	BatteryVoltage	1273	Sparkcoil6	520216	AUXAnaPullUp1V
173	EGTtemperature	1274	Sparkcoil7	520217	AUXAnaPullUp2V
174	FTvoltage	1275	Sparkcoil8	520218	AUXAnaPullUp3V
190	CrankSignalFl	1276	Sparkcoil9	520219	AUXAnaPullUp1
441	EMWT1	1277	Sparkcoil10	520220	AUXAnaPullUp2
442	EMWT2	1321	Start Relay	520221	AUXAnaPullUp3
443	ERWT1voltage	1323	Cylinder1	520222	AUX digital 1
444	ERWT2voltage	1324	Cylinder2	520223	AUX digital 2
515	EngineSpeed	1325	Cylinder3	520224	AUX digital 3
558	IVSstuck	1326	Cylinder4	520230	PWM5
628	FLASH	1327	Cylinder5	520240	GasFuelTempVFl
629	EEPROMChecksum	1328	Cylinder6	520241	Knock2
630	RAM	1329	Cylinder7	520250	FPP1
636	CRANKsignal	1330	Cylinder8	520251	TPS2 voltage
639	CAN-J1939fault	1347	Fuel-pump	520252	IACwiring
645	Tachoutput	1348	Fuelpump	520260	MegaJector
651	Injector1	1384	Shutdown J1939	520270	Gov1/2/3Fail
652	Injector2	1386	ERWT2 Voltage	520401	FuelImpurityH
653	Injector3	1485	Powerrelay	520800	InCam/DistFl
654	Injector4	1692	Boostcontrol	520801	ExhtCamPosErr
655	Injector5	2000	CAN-J1939Fault	520803	MegaJectorFl

656	Injector6	2646	PWM8 Short	522525	CatalystInact
657	Injector7	2647	PWM9 Short	522540	PWM3-Gauge3
658	Injector8	3050	Catalystinact	522593	MegaJectorComm
659	Injector9	3051	CatalInactGas2	522594	MegaJectorVolt
660	Injector10	3056	UEGO return V	522595	MegaJectorAct
695	OverrdCtrlMode	3217	UEGOSenseCell	522596	MegaJectorCirc
697	PWM1-Gauge1	3218	UEGOPumpVShort	522597	MegaJectorComm
698	PWM2-Gauge2	3221	UEGOprocessor	522598	PWM4 Short
699	PWM3-Gauge3	3222	UEGO	522599	Injector1Short
700	PWM4-Gauge4	3225	UEGOPump	522600	Injector4Short
701	AuxInput1Act	3227	EGO1open/lazy	522601	Injector2Short
702	AuxInOut#2	3256	EGO1open/lazy	522602	Injector3Short
703	AuxInOut#3	3266	EGO4 Open/Lazy	522603	GasFuelTempVFl
704	AUX1	3468	Gaseousfuel	522604	Power relay
705	AUX2	3673	TPS2voltage	522606	EGO2 Open/Lazy
706	AUX3	4236	Closes-loopGB1	522655	CLGasBank1/LPG
710	AUXpull-down	4237	Adap-learnGB1	522660	AdpLrnGas1/LPG
711	AUXpull-down2	4238	Closes-loopGB2	522697	MicroprocFail
712	AUXpull-down3	4239	Adap-learnGB1	522710	TPS1 voltage
713	AUXpull-down4	520197	Knock2sensor	522711	TPS2 voltage
723	SecSpeedSens	520199	FPP1/2Invalid	522712	FPP1 voltage
724	EGO1 Open/Lazy	520200	AdpLrnGasBank1	522737	EGO1 Open/Lazy
731	Knock1sensor	520201	AdpLrnGasBank2	522752	CAMInputSignal
920	BuzzerControl	520202	AdaptLearn LPG	524260	SensorSupplyV2

GM E-control LCI

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
0	Gov1/2/3fail	657	Injector7	1270	Sparkcoil3
29	FPP2voltage	658	Injector8	1271	Sparkcoil4
51	TPS1voltage	659	Injector9	1272	Sparkcoil5
84	Roadspeed	660	Injector10	1273	Sparkcoil6
91	FPP1voltage	697	PWM1-Gauge1	1274	Sparkcoil7
94	FPvoltage	698	PWM2-Gauge2	1275	Sparkcoil8
100	EngOil Press	699	PWM3-Gauge3	1276	Sparkcoil9
102	Boost Press	700	PWM4-Gauge4	1277	Sparkcoil10
105	IATvoltage	701	AuxInput1Act	1323	Cylinder1
106	MAPpressure	702	AuxInOut#2	1324	Cylinder2
108	BPpressure	703	AuxInOut#3	1325	Cylinder3
109	Coolant Press	704	AUX1	1326	Cylinder4
110	ECTvoltage	705	AUX2	1327	Cylinder5
168	BatteryVoltage	706	AUX3	1328	Cylinder6
173	EGTtemperature	707	AUXdigital1	1329	Cylinder7
174	FTvoltage	708	AUXdigital2	1330	Cylinder8
441	EMWT1voltage	709	AUXdigital3	1347	Fuel-pump
442	EMWT2voltage	710	AUXpull-down	1348	Fuelpump
515	EngineSpeed	711	AUXpull-down2	1385	ERWT1voltage
558	IVSstuck	712	AUXpull-down3	1485	Powerrelay
616	Startrelay	713	AUXpull-down4	3050	Catalystinact
628	FLASH	723	SecSpeedSens	3217	EGO1open/lazy
629	EEPROMChecksum	731	Knock1sensor	3227	EGO1open/lazy
630	RAM	920	BuzzerControl	3256	EGO1open/lazy
632	FuelShutoff	924	PWM5	3468	Gaseousfuel
636	CRANKsignal	925	PWM6	3673	TPS2voltage
639	CAN-J1939fault	926	PWM7	4236	Closes-loopGB1
645	Tachoutput	1079	Sensorvoltage	4237	Adap-learnGB1
651	Injector1	1080	Sensorsupply2	4238	Closes-loopGB2
652	Injector2	1110	J1939request	4239	Adap-learnGB1
653	Injector3	1192	WGPvoltage	520197	Knock2sensor
654	Injector4	1213	MILcontrol	520252	IACwiring
655	Injector5	1268	Sparkcoil1	520260	MegaJector
656	Injector6	1269	Sparkcoil2		

Isuzu ECM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
91*	AccelPedalPos	651	InjectorCyl#1	1347	SCV OC +B S GS
100	EngOil Press	652	InjectorCyl#2	1485	ECU MainRelay
102	Boost Press	653	InjectorCyl#3	10001	EGR Position
105	Intake Temp	654	InjectorCyl#4	10002	EGR Valve Ctrl
108	BarometricPres	655	InjectorCyl#5	10003	InjectNozzCom1
109	Coolant Press	656	InjectorCyl#6	10004	InjectNozzCom2
110	EngCool Temp	676*	Ignore 1	10005	ChargeCircuit1
157	FuelRail Press	677*	EngStartRelay	10006	ChargeCircuit2
172	AirInlet Temp	723	SecSpeedSens	10007	CPU fault
174	Fuel Temp	987	CheckEngLamp	10008	A/D Conversion
190	EngineSpeed	1077	CPU Monitor IC	10009	5V SupplyFail3
628	EMSProgFailure	1079	Sensorvoltage	10010	5V SupplyFail4
633	FuelActuator	1080	Sensorsupply2	10011	5V SupplyFail5
636	Crank Sensor	1239	Fuel Leakage	10013	EEPROM fault
639*	J1939 CAN Bus	1240	NoPumpPresFeed		

*hidden fault code

Iveco EDC

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	65589	FuelTempSens	0x1008F	RgnNrm time
91	AccelPedalPos	65592	OilPressSens	0x10091	BoostPressure
94	FuelDelPress	65594	OilTempSens	0x10092	BPA
97	WaterInFuelInd	0x10051	Cyl 1 error	0x20092	BPA
98	EngineOilLevel	0x10052	Cyl 2 error	0x30092	BPA
100	EngOil Press	0x10053	Cyl 3 error	0x10093	TurbineSpeed
101	CrankcasePress	0x10054	Cyl 4 error	0x10094	EPCtl
102	Boost Press	0x10055	Cyl 5 error	0x10095	PCR deviation
105	Intake Temp	0x10056	Cyl 6 error	0x20095	PCR Check
106	AirInletPress	0x10059	PWM Powerstage	0x10096	Cyl 1 Timing
107	AirFiltDifPres	0x1005A	AD-Channel	0x20096	Cyl 2 Timing
108	BarometricPres	0x1005B	High pressure	0x30096	Cyl 3 Timing
109	Coolant Press	0x10061	Cyl 1 ShortCir	0x40096	Cyl 4 Timing
110	EngCool Temp	0x10062	Cyl 2 ShortCir	0x10097	Cyl 1 Calibr
111	Coolant Level	0x10063	Cyl 3 ShortCir	0x20097	Cyl 2 Calibr
153	CrankcasePress	0x10064	Cyl 4 ShortCir	0x30097	Cyl 3 Calibr
158	BattPotential	0x10065	Cyl 5 ShortCir	0x40097	Cyl 4 Calibr
168	BatteryVoltage	0x10066	Cyl 6 ShortCir	0x10098	Cylinder 5
172	AirInlet Temp	0x10067	Cyl 1 OpenLoad	0x20098	Cylinder 6
173	Exhaust Temp	0x10068	Cyl 2 OpenLoad	0x30098	Cylinder 5
174	Fuel Temp	0x10069	Cyl 3 OpenLoad	0x40098	Cylinder 6
175	EngOil Temp	0x1006A	Cyl 4 OpenLoad	0x10099	P2 pressure
189	RatedEngSpeed	0x1006B	Cyl 5 OpenLoad	0x1009A	TurbineSpeed
190	EngineSpeed	0x1006C	Cyl 6 OpenLoad	0x1009B	Hi TurbineSpd
231	J1939 Datalink	0x1006D	Rail monitor	0x1009C	P3 pressure
237	VIN	0x10071	Bank 1 error	0x1009D	InnerCtrlTemp
515	EngDesOpSpeed	0x10072	Bank 1 error	0x1009E	OuterCtrlTemp
620	5V SupplyFail	0x10073	Bank 2 error	0x1009F	EGSys-NOxEstIv
626	PrehActuator	0x10074	Bank 2 error	0x100A1	Lambda Nox
628	EMSProgFailure	0x1007B	Misfire	0x200A1	Lambda Nox
629	EEPROMChecksum	0x1007C	Chip error	0x100A2	Nox Sensor
630	CalibrMemFail	0x1007E	InjectionLimit	0x100A3	Nox Sensor
636	Crank Sensor	0x10084	SRA2EDC	0x100A4	Nox Sensor
637	TimingSensor	0x10085	Load-IdleRange	0x100A5	DM1DCU timeout

639	J1939 CAN Bus	0x30085	Drift Limit	0x100A6	SCR1 timeout
651	InjectorCyl#1	0x10086	Supply Voltage	0x200A6	SCR2 timeout
652	InjectorCyl#2	0x20086	AirMassSignal	0x100A8	LowUreaLevel
653	InjectorCyl#3	0x30086	AirMassSignal	0x200A8	LowUreaLevel
654	InjectorCyl#4	0x40086	Reference	0x300A8	Urea Sensor
655	InjectorCyl#5	0x10087	PosGovernor	0x400A8	Wrong urea
656	InjectorCyl#6	0x10088	NegGovernor	0x100A9	GasTemp
677	EngStartRelay	0x20088	GovernorCheck	0x200AB	GasPipePress
898	RequestedSpeed	0x10089	EGR PowerStage	0x100AB	VDC1
970	AuxEngSdSwitch	0x20089	EGR PowerStage	0x100AC	EGR
971	EngDerateSwtch	0x30089	EGR PowerStage	0x200AC	EngGsFlowRt
1109	EngSdApproach	0x1008A	EGR Bypass	0x100AD	ExhaustGasTemp
1110	Engine Sd	0x1008B	ThrottActuator	0x100AE	AirHumidity
1485	ECU MainRelay	0x2008B	ValveActuator	0x100AF	SPN1 message
65579*	PSAirHeater1	0x3008B	TVA	0x200AF	SPN2 message
65585	CoolantTmpSens	0x1008D	PosGovernor	0x300AF	SPN3 message
65588	BoostPressSens	0x1008E	NegGovernor	0x400AF	SPN4 message

*hidden fault code

Iveco Vector

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
29	Hand Throttle	652	InjectorCyl#2	1108	SdOverridden
100	EngOil Press	653	InjectorCyl#3	1127	BoostPress
105	Intake Temp	654	InjectorCyl#4	1239	Fuel Leakage
108	BarometricPres	655	InjectorCyl#5	1661	CrankTermRelay
109	Coolant Press	656	InjectorCyl#6	1980	OverspeedLamp
110	EngCool Temp	657	InjectorCyl#7	1981	OilPressLamp
132	TurboHeatLimit	658	InjectorCyl#8	1984	ShutdownLamp
157	FuelRailPress	659	InjectorCyl#9	1985	J1 5V SupplyEr
168	BatteryVoltage	660	InjectorCyl#10	1986	RemoteOperLamp
174	Fuel Temp	661	InjectorCyl#11	1987	CoolTempLamp
175	EngOil Temp	662	InjectorCyl#12	1993	WarningLamp
190	EngineSpeed	677	EngStartRelay	1994	DiagnosticLamp
639	J1939 CAN Bus	723	SecSpeedSens	1995	PersModuleErr
651	InjectorCyl#1	729	AirHeaterRelay	1997	FuelValveErr

JCB Delphi DCM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	168	BatteryVoltage	654	InjectorCyl#4
84	Speed Sensor	172	AirInlet Temp	655	InjectorCyl#5
86	CruiseControl	174	Fuel Temp	656	InjectorCyl#6
91	AccelPedalPos	175	EngOil Temp	677	EngStartRelay
94	FuelDelPress	189	RatedEngSpeed	731	Knock1sensor
97	WaterInFuelInd	190	EngineSpeed	898	RequestedSpeed
98	EngineOilLevel	231	J1939 Datalink	970	AuxEngSdSwitch
100	EngOil Press	237	VIN	971	EngDerateSwtch
101	CrankcasePress	515	EngDesOpSpeed	974	RemAPSensor
102	Boost Press	620	5V SupplyFail	1075	ElectrLiftPump
105	Intake Temp	626	PrehActuator	1076	FuelPump
106	AirInletPress	627	PowerLost	1079	Sensorvoltage
107	AirFiltDifPres	628	EMSProgFailure	1080	Sensorsupply2
108	BarometricPres	629	EEPROMChecksum	1083	ECU Temperat
109	Coolant Press	630	CalibrMemFail	1109	EngSdApproach
110	EngCool Temp	636	Crank Sensor	1110	Engine Sd
111	Coolant Level	637	TimingSensor	1213	MILcontrol
153	CrankcasePress	639	J1939 CAN Bus	1485	ECU MainRelay
156	FuelTiming	651	InjectorCyl#1	1804	IntakeAirHeatr
157	FuelRail Press	652	InjectorCyl#2	2648	ServiceTime
158	BattPotential	653	InjectorCyl#3		

John Deere JDEC

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	189	RatedEngSpeed	677	EngStartRelay
91	AccelPedalPos	190	EngineSpeed	898	RequestedSpeed
94	FuelDelPress	237	VIN	970	AuxEngSdSwitch
97	WaterInFuelInd	412	EGR Temp	971	EngDerateSwtch
100	EngOil Press	515	EngDesOpSpeed	1076	FuInPuFCtrlVlv
102	Boost Press	611	InjectorWiring	1077	FuelInPumpCtrl
105	Intake Temp	620	5V SupplyFail	1078	FuelInPumpSens
106	AirInletPress	627	PowerLost	1079	Sensorvoltage
107	AirFiltDifPres	629	EEPROMChecksum	1080	Sensorsupply2
108	BarometricPres	632	FuelShutoff	1109	EngSdApproach
109	Coolant Press	636	Crank Sensor	1110	Engine Sd
110	EngCool Temp	637	TimingSensor	1172	Turbo Temp
111	Coolant Level	651	InjectorCyl#1	1347	FuelPressure
157	FuelRail Press	652	InjectorCyl#2	1348	FuelPumpAsse#2
158	BattPotential	653	InjectorCyl#3	1485	ECU MainRelay
168	BatteryVoltage	654	InjectorCyl#4	1569	EngProtDerate
174	Fuel Temp	655	InjectorCyl#5	2000	ECU failure
175	EngOil Temp	656	InjectorCyl#6	2630	ChargeAirTemp

MAN EDC Master, EDC Slave and MFR interface system

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
81	DPF Pressure	652	InjectorCyl#2	3771	M/S CAN Fail
94	FuelDelPress	653	InjectorCyl#3	3772	M/S Ignition
98	EngineOilLevel	654	InjectorCyl#4	3775	Rail Pressure
100	EngOil Press	655	InjectorCyl#5	3804	MFR/EDC CAN TO
102	Boost Press	656	InjectorCyl#6	3806	EDC M/S CAN TO
105	Intake Temp	1131	IntakeMan2Temp	3813	Starter Fail
109	Coolant Press	3009	Overspped	3815	ExhaustBackP
110	EngCool Temp	3014	No Ignition	3823	Missfiring
168	BatteryVoltage	3069	RedundSpdProt	3923	Coolant Temp 2
173	Exhaust Temp	3076	Wrong MFR	5000	SupplyVoltFail
174	Fuel Temp	3687	UnderpresValve	5016	Overspeed
175	EngOil Temp	3732	Initial Fail	5017	OverrideActive
190	Engine Speed	3751	Starter Relay	5019	EngineCANFail
609	Controller#2	3752	Camshaft Sens	5034	CustCAN TO KSM
651	InjectorCyl#1	3753	Mainshaft Sens	5035	FuelFilterWtrL

MTU ADEC (ECU7) & SAM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
003	HI T-Fuel	212	SD P-Coolant	353	AL OpenLdClB3
004	SS T-Fuel	215	SD P-HD	354	AL OpenLdClB4
005	HI T-ChargeAir	216	SD T-Lube Oil	355	AL OpenLdClB5
006	SS T-ChargeAir	219	SD T-IntakeAir	356	AL OpenLdClB6
009	HI T-CoolInter	220	SD LvlCoolWatr	357	AL OpenLdClB7
010	SS T-CoolInter	221	SD P-Diff Oil	358	AL OpenLdClB8
015	LO P-Lube Oil	222	SD LeakFuelLvl	359	AL OpenLdClB9
016	SS P-Lube Oil	223	SD LvlCoolIntr	360	AL OpenLdClB10
019	HI T-ExhaustA	227	SD OilPressure	361	AL PwrStageLow
020	SS T-ExhaustA	228	SD P-Fuel	362	AL PwrStagHigh
021	HI T-ExhaustB	229	AL StopCamshaf	363	AL StopPwrStag
022	SS T-ExhaustB	230	SD CranksftSpd	365	AL StopMVWirin
023	LO CoolLevel	231	SD CamshaftSpd	371	AL Wiring TO1
024	SS CoolLevel	232	SD ChrgrSpeed1	381	AL WiringTOP1
025	HI P-Diff Oil	239	SD P-Diff Fuel	382	AL WiringTOP2
026	SS P-Diff Oil	240	SD P-Fuel	383	AL WiringTOP3
030	SS Overspeed	245	SD ECUPwrSupp	384	AL WiringTOP4
031	HI ETC1Overspd	266	SD SpeedDemand	390	AL MCRExceeded
032	SS ETC1Overspd	269	SD LoadAnalog	400	AL DigitInp 1
033	HI P-DiffFuel	270	SD FreqInput	401	AL DigitInp 2
034	SS P-DiffFuel	301	AL TimingClA1	402	AL DigitInp 3
036	HI ETC2Overspd	302	AL TimingClA2	403	AL DigitInp 4
037	SS ETC2Overspd	303	AL TimingClA3	404	AL DigitInp 5
044	LO CoolLvlInt	304	AL TimingClA4	405	AL DigitInp 6
051	HI T-Lube Oil	305	AL TimingClA5	406	AL DigitInp 7
052	SS T-Lube Oil	306	AL TimingClA6	407	AL DigitInp 8
057	LO P-coolant	307	AL TimingClA7	408	AL Emerg Stop
058	SS P-Coolant	308	AL TimingClA8	410	LO U-PDU
059	SS T-CoolantL3	309	AL TimingClA9	411	LOLO U-PDU
060	SS T-CoolantL4	310	AL TimingClA10	412	HI U-PDU
065	LO P-Fuel	311	AL TimingClB1	413	HIHI U-PDU
066	SS P-Fuel	312	AL TimingClB2	414	HI WtrFuelPref
067	HI T-Coolant	313	AL TimingClB3	417	SD WtrFuelpref
068	SS T-Coolant	314	AL TimingClB4	438	LO P-Fuel 2

081	AL RailLeakage	315	AL TimingClB5	439	HI P-Fuel 2
082	HI P-Fuel	316	AL TimingClB6	441	AL Syst2Leaks
083	LO P-Fuel	317	AL TimingClB7	444	SD U-PDU
089	SS Speed Low	318	AL TimingClB8	445	SD P-Amb Air
090	SS IdleNtReach	319	AL TimingClB9	446	SD P-HD2
091	SS ReleaseSpd	320	AL TimingClB10	448	HI P-ChargeAir
092	SS StarterSpd	321	AL WiringClA1	449	SS P-ChargeAir
093	SS T-Preheat	322	AL WiringClA2	450	SD TorqueInp
094	LO T-Preheat	323	AL WiringClA3	454	SS PowerReduct
095	AL Prelubric	324	AL WiringClA4	463	SD AUX 2
102	AL FuelConsCnt	325	AL WiringClA5	464	SD P-AUX 1
104	AL EngHoursCnt	326	AL WiringClA6	468	SD T-AUX 1
118	LO ECUPwrSupp	327	AL WiringClA7	469	SD AUX 1
119	LOLO ECUPower	328	AL WiringClA8	470	SD T-ECU
120	HI ECUPwrSupp	329	AL WiringClA9	471	SD CoilCurr
121	HIHI ECUPower	330	AL WiringClA10	472	AL Stop SD
122	HI T-ECU	331	AL WiringClB1	474	AL Wiring FO
141	AL PwrTooHigh	332	AL WiringClB2	475	AL CR Trigger
142	AL MCR1HourExc	333	AL WiringClB3	476	AL CrashRecErr
176	AL LifeDataNA	334	AL WiringClB4	478*	AL YellowAlarm
177	AL LifeDataInc	335	AL WiringClB5	479*	AL Red Alarm
180	AL CAN1NodeLst	336	AL WiringClB6	480	AL ExtEngProt
181	AL CAN2NodeLst	337	AL WiringClB7	510	AL Override
182	AL CANWrongPar	338	AL WiringClB8	515	AL Starter
183	AL CANNoPUData	339	AL WiringClB9	543	AL >1 FDHSlave
184	AL CANPUDataEr	340	AL WiringClB10	544	AL ConfigChang
186	AL CAN1BusOff	341	AL OpenLdClA1	549	AL PwrInterupt
187	AL CAN1ErrPass	342	AL OpenLdClA2	555	AL Call MTU
188	AL CAN2BusOff	343	AL OpenLdClA3	576	AL ESCMOverrid
189	AL CAN2ErrPass	344	AL OpenLdClA4	594	AL L1 UDVFault
201	SD T-Coolant	345	AL OpenLdClA5	595	AL L2 UDVFault
202	SD T-Fuel	346	AL OpenLdClA6	598	AL L1 UDVFault
203	SD T-ChargeAir	347	AL OpenLdClA7	599	AL L2 UDVFault
205	SD T-CoolInter	348	AL OpenLdClA8	610	AL HPFuel1Wir
206	SD T-ExhaustA	349	AL OpenLdClA9	611	AL HPFuel2Wir
207	SD T-ExhaustB	350	AL OpenLdClA10	612	AL PresValve1
208	SD P-ChargeAir	351	AL OpenLdClB1	613	AL PresValve2

211	SD P-Lube Oil	352	AL OpenLdClB2	

*hidden fault code

MTU ECU8 and SMARTConnect

Fault Code (SPN)	Text
52	IntercoolerTmp
94	FuelDelPress
100	EngOil Press
109	Coolant Press
110	EngCool Temp
111	Coolant Level
158	BattPotential
174	Fuel Temp
175	EngOil Temp
188	SpeedAtIdleLow
190	EngineSpeedLow
898	RequestedSpeed
1136	ECU Temp
2629	Turbo1 OutTemp
520837	Starter Speed
520838	EngRunUpSpeed

Perkins ECM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
1	InjectorCyl#1	174	Fuel Temp	626	PrehActuator
2	InjectorCyl#2	175	EngOil Temp	628	EMSProgFailure
3	InjectorCyl#3	183	Fuel Rate	629	EEPROMChecksum
4	InjectorCyl#4	189	RatedEngSpeed	630	CalibrMemFail
5	InjectorCyl#5	190	EngineSpeed	636	Crank Sensor
6	InjectorCyl#6	228	TimingCalibr	637	TimingSensor
41	8VSensPwrSupp	231	J1939 Datalink	639	J1939 CAN Bus
51	ThrottlePos	234	Incorrect FW	651	InjectorCyl#1
91	AccelPedalPos	237	VIN	652	InjectorCyl#2
92	PercentLoad	247	TotalEngHours	653	InjectorCyl#3
94	FuelDelPress	248	DataLinkComm	654	InjectorCyl#4
97	WaterInFuelInd	253	CheckSysParams	655	InjectorCyl#5
98	EngineOilLevel	254	ECM Fault	656	InjectorCyl#6
100	EngOil Press	261	TimingCalibr	677	EngStartRelay
101	CrankcasePress	262	5VSensPwrSupp	678	ECM 8DC supply
102	Boost Press	268	CheckPrgParams	695	OverrdCtrlMode
105	Intake Temp	273	TurboOutltPres	723	SecSpeedSens
106	AirInletPress	274	AtmospherPress	799	Service Tool
107	AirFiltDifPres	281	ActionAlrtLamp	898	RequestedSpeed
108	BarometricPres	282	EngOverspdLamp	970	AuxEngSdSwitch
109	Coolant Press	285	EnCoolTempLamp	971	EngDerateSwtch
110	EngCool Temp	286	LubOilPresLamp	1108	CritOverrideEn
111	Coolant Level	323	EnShutdownLamp	1109	EngSdApproach
153	CrankcasePress	324	EngWarningLamp	1110	Engine Sd
157	FuelRailPress	342	EngSpeedSens2	1111	CheckCfgParams
158	BattPotential	443	CrankTermRelay	1266	DiagnosticLamp
168	BatteryVoltage	515	EngDesOpSpeed	1485	ECU MainRelay
172	AirInlet Temp	620	5V SupplyFail	1690	AnlgThrottlSig

Scania S6 (All versions)

Fault Code (SPN)	Text	Fault Code (SPN)	Text
0x1000	Overspeed	0x6605	Starter Motor
0x1100	EngSpdSensor1	0x6702	AlternatorChrg
0x1200	EngSpdSensor2	0x6A00	ExhaustBrkAct
0x2000	WtrTempSensor	0xB000	OilPressProt
0x2100	ChrgAirTmpSens	0xB100	CoolantLevProt
0x2200	ChrgAirPrsSens	0xB200	OverheatCoolWt
0x2300	OilTempSensor	0xB300	EmergencyStop
0x2400	OilPressSensor	0xB501	CoolantLevel
0x2600	SensorSupply1	0xC000	PDEInjctorCyl1
0x2700	SensorSupply2	0xC100	PDEInjctorCyl2
0x2800	ExtrAnalogInp	0xC200	PDEInjctorCyl3
0x3200	BatteryVoltage	0xC300	PDEInjctorCyl4
0x3300	CAN msg not ok	0xC400	PDEInjctorCyl5
0x3403	CAN version	0xC500	PDEInjctorCyl6
0x4300	HWWatchdog	0xC600	PDEInjctorCyl7
0x6200	FanActuator	0xC700	PDEInjctorCyl8
0x6400	WasteGateAct	0xE200	OverheatProt
0x6600	StarterActuatr	0xE600	CoordEmergStop

Scania S8 (All versions)

Fault Code (SPN)	Text	Fault Code (SPN)	Text
0x1000	Overspeed	0x6605	Starter Motor
0x1100	EngSpdSensor1	0x6702	AlternatorChrg
0x1200	EngSpdSensor2	0x6A00	ExhaustBrkAct
0x2000	WtrTempSensor	0xB000	OilPressProt
0x2100	ChrgAirTmpSens	0xB100	CoolantLevProt
0x2200	ChrgAirPrsSens	0xB200	OverheatCoolWt
0x2300	OilTempSensor	0xB300	EmergencyStop
0x2400	OilPressSensor	0xB501	CoolantLevel
0x2600	SensorSupply1	0xC000	PDEInjctorCyl1
0x2700	SensorSupply2	0xC100	PDEInjctorCyl2
0x2800	ExtrAnalogInp	0xC200	PDEInjctorCyl3
0x3200	BatteryVoltage	0xC300	PDEInjctorCyl4
0x3300	CAN msg not ok	0xC400	PDEInjctorCyl5
0x3403	CAN version	0xC500	PDEInjctorCyl6
0x4300	HWWatchdog	0xC600	PDEInjctorCyl7
0x6200	FanActuator	0xC700	PDEInjctorCyl8
0x6400	WasteGateAct	0xE200	OverheatProt
0x6600	StarterActuatr	0xE600	CoordEmergStop

Sisu EEM2/EEM3

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	652	InjectorCyl#2	9082	CamSpeedSensor
91	AccelPedalPos	653	InjectorCyl#3	9083	CamSpeedSensor
94	FuelDelPress	654	InjectorCyl#4	9090	EngineSpeedErr
97	WaterInFuelInd	655	InjectorCyl#5	9107	InvalidECUAddr
98	EngineOilLevel	656	InjectorCyl#6	9131	SolenoidValve1
100	EngOil Press	677	EngStartRelay	9132	SolenoidValve2
101	CrankcasePress	898	RequestedSpeed	9133	SolenoidValve3
102	Boost Press	970	AuxEngSdSwitch	9134	SolenoidValve4
105	Intake Temp	971	EngDerateSwtch	9135	SolenoidValve5
106	AirInletPress	1109	EngSdApproach	9136	SolenoidValve6
107	AirFiltDifPres	1110	Engine Sd	9140	Throttle2Sens
108	BarometricPres	1136	ECU Temp	9141	Throttle3Sens
109	Coolant Press	1485	ECU MainRelay	9150	Rail Pressure
110	EngCool Temp	9006	VehicleCANoff	9151	PressReliefVlv
111	Coolant Level	9008	IDmoduleCANoff	9152	FuelFiltrPress
153	CrankcasePress	9010	AmbientPress	9153	FuelFiltrPress
157	FuelRail Press	9021	5Vdc Supply 1	9174	MPROP
168	BatteryVoltage	9022	5Vdc Supply 2	9230	EngSpecMismtch
172	AirInlet Temp	9023	5Vdc Supply 3	9231	EngSNMismatch
174	Fuel Temp	9024	WaterInFuelSup	9233	IDM-NotPresent
175	EngOil Temp	9025	SelfTestWtchdg	9234	IDM-NotComptbl
189	RatedEngSpeed	9026	SelfTestVoltHi	9235	ID Module
190	EngineSpeed	9027	SelfTestVoltLo	9236	IDM-MemDefect
231	J1939 Datalink	9030	MainRelay1Shrt	9237	IDM-Watchdog
237	VIN	9031	MainRelay2Shrt	9238	IDM-Brownout
515	EngDesOpSpeed	9032	MainRelay3Shrt	9239	EngSpecMissing
620	5V SupplyFail	9033	MainRelay	9240	EngSNMissing
626	PrehActuator	9034	MainRelayDfct	9241	IDM-NotPresent
628	EMSProgFailure	9035	NormalRecovery	9242	GeneratedByPTE
629	EEPROMChecksum	9036	Full restart	9243	MaxECUByPTE
630	CalibrMemFail	9070	CrankSpeedSens	9305	BadDIConfig
636	Crank Sensor	9071	CrankSpeedSens	9306	PTO InputError
637	TimingSensor	9072	CrankSpeedSens	9310	ExternalFlt1
639	J1939 CAN Bus	9080	CamSpeedSensor	9311	ExternalFlt2

651	InjectorCyl#1	9081	CamSpeedSensor	9312	TorqCtrlInput

VM EDC

Industrial

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
27	EGRValvePos	190	EngineSpeed	657	InjectorCyl#7
51	ThrottlePos	228	MOfsCaSCrS	658	InjectorCyl#8
84	VSSCD1	231	J1939 Datalink	675	GlwCDLmp
91	AccelPedalPos	237	VIN	676	GlwCD
94	FuelDelPress	515	EngDesOpSpeed	677	EngStartRelay
97	WaterInFuelInd	597	BrakeSwitch	723	EngMCaS1
98	EngineOilLevel	598	ConvCD	767	GearbxRgear
100	EngOil Press	604	GearCDPNLmpOut	835	OPSCDLmp
101	CrankcasePress	620	5V SupplyFail	859	FlFCDHtg
102	Boost Press	624	DiagnosticLamp	898	RequestedSpeed
105	Intake Temp	625	FMTCNonMonoMap	970	AuxEngSdSwitch
106	AirInletPress	626	PrehActuator	971	EngDerateSwtch
107	AirFiltDifPres	627	HWEMonUMinSupp	976	FrmMngTOPTO
108	BarometricPres	628	EMSProgFailure	977	FanCD
109	Coolant Press	629	EEPROMChecksum	979	MSSCD
110	EngCool Temp	630	CalibrMemFail	1079	SSpMon
111	Coolant Level	633	PCVCD	1109	EngSdApproach
132	AFSCD	634	TVACD	1110	Engine Sd
153	CrankcasePress	636	Crank Sensor	1137	ExhaustTemp 1
157	RailMeUn	637	TimingSensor	1138	ExhaustTemp 2
158	BattPotential	639	J1939 CAN Bus	1213	MILcontrol
164	RailPressure	651	InjectorCyl#1	1347	MeUnCD
168	BatteryVoltage	652	InjectorCyl#2	1351	ACCDCmpr
172	AirInlet Temp	653	InjectorCyl#3	1484	Severe Fault
174	Fuel Temp	654	InjectorCyl#4	1485	ECU MainRelay
175	EngOil Temp	655	InjectorCyl#5	1680	AOHtCDHt1
189	RatedEngSpeed	656	InjectorCyl#6		

Marine

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	172	AirInlet Temp	651	InjectorCyl#1
91	AccelPedalPos	174	Fuel Temp	652	InjectorCyl#2

94	FuelDelPress	175	EngOil Temp	653	InjectorCyl#3
97	WaterInFuelInd	189	RatedEngSpeed	654	InjectorCyl#4
98	EngineOilLevel	190	EngineSpeed	655	InjectorCyl#5
100	EngOil Press	228	MOfsCaSCrS	656	InjectorCyl#6
101	CrankcasePress	231	J1939 Datalink	657	InjectorCyl#7
102	Boost Press	237	VIN	658	InjectorCyl#8
105	Intake Temp	515	EngDesOpSpeed	677	EngStartRelay
106	AirInletPress	620	5V SupplyFail	679	RailPCV5
107	AirFiltDifPres	624	DiagnosticLamp	723	EngMCaS1
108	BarometricPres	626	PrehActuator	835	OPSCDLmp
109	Coolant Press	627	HWEMonUMin	898	RequestedSpeed
110	EngCool Temp	628	EMSProgFailure	970	AuxEngSdSwitch
111	Coolant Level	629	EEPROMChecksum	971	EngDerateSwtch
132	AFSCD	630	CalibrMemFail	976	FrmMngTOPTO
153	CrankcasePress	633	PCVCD	1079	SSpMon
157	RailMeUn	636	Crank Sensor	1109	EngSdApproach
158	BattPotential	637	TimingSensor	1110	Engine Sd
164	RailPressure	639	J1939 CAN Bus	1347	MeUnCD
168	BatteryVoltage	641	PCRGvnrDvt	1485	ECU MainRelay

Volvo EDC3 (EMS1) or EMS2 (singlespeed engines only)

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
20	EngCool Press	652	InjectorCyl#2	0x0009E	BattPotential
91	AccelPedalPos	653	InjectorCyl#3	0x000AD	Exhaust Temp
94	FuelDelPress	654	InjectorCyl#4	0x000AE	Fuel Temp
97	WaterInFuelInd	655	InjectorCyl#5	0x000AF	EngineOil Temp
98	EngineOilLevel	656	InjectorCyl#6	0x200E7	SAE J1939 fail
100	EngOil Press	677	EngStartRelay	0x200E8	5V DC Fail
101	CrankcasePress	679	InjPressRegul	0x200F0	Prg MemoryFail
102	Boost Press	729	PreheatSensor	0x200F5	EMS HW Failure
105	Intake Temp	975	Fan Speed	0x200FA	SAE J1587 fail
106	AirInletPress	1080	5V Sensor 2	0x200FD	CalibrMem fail
107	AirFiltDifPres	1184	Exhaust Temp	0x200FE	Controller#1
108	BarometricPres	1188	WastegateOut	0x30001	Injector 1
109	Coolant Press	1239	RailPresSystem	0x30002	Injector 2
110	EngCool Temp	1485	ECU MainRelay	0x30003	Injector 3
111	Coolant Level	1675	EngStartRelay	0x30004	Injector 4
153	CrankcasePress	2791	EGR Status	0x30005	Injector 5
158	BattPotential	520192	PistonCoolSw	0x30006	Injector 6
164	RailPressure	520193	SeaWaterPress	0x30015	Pickup Cam
172	AirInlet Temp	520194	Starter input	0x30016	Pickup Crank
173	Exhaust Temp	520195	Stop input	0x30020	WastegateOut
175	EngOil Temp	0x00014	EngCool Press	0x30021	CoolingFan
190	EngineSpeed	0x0001A	Fan Speed	0x40003	Starter Output
231	J1939 Datalink	0x0005E	Fuel Press	0x40006	ExtSTOP Active
608	J1587 Datalink	0x00061	Water in fuel	0x40008	Piston CoolPr
620	5V SupplyFail	0x00062	Oil Level	0x40062	J1587 Sync
626	PrehActuator	0x00063	Oil Diff Press	0x40084	J1587 Throttl
628	EMSProgFailure	0x00064	EngOil Press	0x4010B	SeaWater Press
629	EEPROMChecksum	0x00066	Boost Press	0x600C9	J1939 Datalink
630	CalibrMemFail	0x00069	Intake Temp	0x600D8	J1939 Bus
636	Pickup Cam	0x0006A	AirInletPress	0x73C01	Primary Batt
637	Pickup Crank	0x0006C	Barom Press	0x73C02	Secondary Batt
639	J1939 CAN Bus	0x0006E	EngCool Temp	0x73C03	15 supply
647	CoolingFan	0x0006F	Coolant Level	0x73C04	30 supply
651	InjectorCyl#1	0x00099	CrankcasePress	0x73C05	EMS supply

Volvo EDC3 (EMS1) or EMS2 (allspeed engines only)

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
20	EngCool Press	652	InjectorCyl#2	0x0009E	BattPotential
51	ThrottlePos	653	InjectorCyl#3	0x000AD	Exhaust Temp
94	FuelDelPress	654	InjectorCyl#4	0x000AE	Fuel Temp
97	WaterInFuelInd	655	InjectorCyl#5	0x000AF	EngineOil Temp
98	EngineOilLevel	656	InjectorCyl#6	0x200E7	SAE J1939 fail
100	EngOil Press	677	EngStartRelay	0x200E8	5V DC Fail
101	CrankcasePress	679	InjPressRegul	0x200F0	Prg MemoryFail
102	Boost Press	729	PreheatSensor	0x200F5	EMS HW Failure
105	Intake Temp	975	Fan Speed	0x200FA	SAE J1587 fail
106	AirInletPress	1080	5V Sensor 2	0x200FD	CalibrMem fail
107	AirFiltDifPres	1184	Exhaust Temp	0x200FE	Controller#1
108	BarometricPres	1188	WastegateOut	0x30001	Injector 1
109	Coolant Press	1239	RailPresSystem	0x30002	Injector 2
110	EngCool Temp	1485	ECU MainRelay	0x30003	Injector 3
111	Coolant Level	1675	EngStartRelay	0x30004	Injector 4
153	CrankcasePress	2791	EGR Status	0x30005	Injector 5
158	BattPotential	520192	PistonCoolSw	0x30006	Injector 6
164	RailPressure	520193	SeaWaterPress	0x30015	Pickup Cam
172	AirInlet Temp	520194	Starter input	0x30016	Pickup Crank
173	Exhaust Temp	520195	Stop input	0x30020	WastegateOut
175	EngOil Temp	0x00014	EngCool Press	0x30021	CoolingFan
190	EngineSpeed	0x0001A	Fan Speed	0x40003	Starter Output
231	J1939 Datalink	0x0005E	Fuel Press	0x40006	ExtSTOP Active
608	J1587 Datalink	0x00061	Water in fuel	0x40008	Piston CoolPr
620	5V SupplyFail	0x00062	Oil Level	0x40062	J1587 Sync
626	PrehActuator	0x00063	Oil Diff Press	0x40084	J1587 Throttl
628	EMSProgFailure	0x00064	EngOil Press	0x4010B	SeaWater Press
629	EEPROMChecksum	0x00066	Boost Press	0x600C9	J1939 Datalink
630	CalibrMemFail	0x00069	Intake Temp	0x600D8	J1939 Bus
636	Pickup Cam	0x0006A	AirInletPress	0x73C01	Primary Batt
637	Pickup Crank	0x0006C	Barom Press	0x73C02	Secondary Batt
639	J1939 CAN Bus	0x0006E	EngCool Temp	0x73C03	15 supply
647	CoolingFan	0x0006F	Coolant Level	0x73C04	30 supply
651	InjectorCyl#1	0x00099	CrankcasePress	0x73C05	EMS supply

Waukesha ESM

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
211	OilPressSenFlt	311	Cyl16-IgnitFlt	451	RemoteRPMOver
212	IMAP-LB SenFlt	312	EngOverload	454	BattVoltOut
213	OilTempSenFlt	313	IgnitionFault	455	ECUTempHigh
214	IMAP-RB SenFlt	314	RemoteRPMFlt	523	AlternatorFlt
221	IMAT SenFlt	315	HighIMAT	541	UserDI Changed
222	MainFuelValve	322	CalibrateAct	542	StartWithRPM>0
223	OilPressLow	323	StuckThrotLink	552	EngBeingDriven
224	Knock	332	IgnitCommFlt	555	InternalFault
225	KnockSenFlt	333	CoolTempHigh	65748	CrankMagPickup
231	Cyl1-IgnitFlt	335	OilTempHigh	65750	CamMagPickup
232	Cyl2-IgnitFlt	353	IgnitPwrHigh	65757	EngOverspeed
233	Cyl3-IgnitFlt	341	StepperLeftFlt	65758	CustomerSd
234	Cyl4-IgnitFlt	342	SteperRightFlt	65759	OilPressLow
235	Cyl5-IgnitFlt	343	LBOxygSensFlt	65760	Knock
241	Cyl6-IgnitFlt	344	ExhTempHighLB	65767	OverCrank
242	Cyl7-IgnitFlt	345	RBOxygSensFlt	65768	EngineStall
243	Cyl8-IgnitFlt	351	ExhTempHighRB	65787	CustOverspeed
244	Cyl9-IgnitFlt	413	LeanLimitLeft	65848	EngOverload
245	Cyl10-IgnitFlt	415	RichLimitLeft	65849	Lockout/Ignit
251	Cyl11-IgnitFlt	422	CoolTempSenFlt	65851	HighIMAT
252	Cyl12-IgnitFlt	423	LeanLimitRight	65869	CoolTempHigh
253	Cyl13-IgnitFlt	425	RichLimitRight	65871	KnockAbsThres
254	Cyl14-IgnitFlt	432	StepperCommFlt	66087	Update Err/Flt
255	Cyl15-IgnitFlt	441	ThrottleActFlt	66089	SecurityViolat

Yanmar TNV

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	637	TimingSensor
91	AccelPedalPos	168	BatteryVoltage	639	J1939 CAN Bus
94	FuelDelPress	172	AirInlet Temp	651	InjectorCyl#1
97	WaterInFuelInd	174	Fuel Temp	652	InjectorCyl#2
98	EngineOilLevel	175	EngOil Temp	653	InjectorCyl#3
100	EngOil Press	189	RatedEngSpeed	654	InjectorCyl#4
101	CrankcasePress	190	EngineSpeed	655	InjectorCyl#5
102	Boost Press	231	J1939 Datalink	656	InjectorCyl#6
105	Intake Temp	237	VIN	677	EngStartRelay
106	AirInletPress	515	EngDesOpSpeed	898	RequestedSpeed
107	AirFiltDifPres	620	5V SupplyFail	970	AuxEngSdSwitch
108	BarometricPres	626	PrehActuator	971	EngDerateSwtch
109	Coolant Press	628	EMSProgFailure	1109	EngSdApproach
110	EngCool Temp	629	EEPROMChecksum	1110	Engine Sd
111	Coolant Level	630	CalibrMemFail	1485	ECU MainRelay
153	CrankcasePress	636	Crank Sensor		

Standard J1939 engine

Fault Code (SPN)	Text	Fault Code (SPN)	Text	Fault Code (SPN)	Text
51	ThrottlePos	158	BattPotential	637	TimingSensor
91	AccelPedalPos	168	BatteryVoltage	639	J1939 CAN Bus
94	FuelDelPress	172	AirInlet Temp	651	InjectorCyl#1
97	WaterInFuelInd	174	Fuel Temp	652	InjectorCyl#2
98	EngineOilLevel	175	EngOil Temp	653	InjectorCyl#3
100	EngOil Press	189	RatedEngSpeed	654	InjectorCyl#4
101	CrankcasePress	190	EngineSpeed	655	InjectorCyl#5
102	Boost Press	231	J1939 Datalink	656	InjectorCyl#6
105	Intake Temp	237	VIN	677	EngStartRelay
106	AirInletPress	515	EngDesOpSpeed	898	RequestedSpeed
107	AirFiltDifPres	620	5V SupplyFail	970	AuxEngSdSwitch
108	BarometricPres	626	PrehActuator	971	EngDerateSwtch
109	Coolant Press	628	EMSProgFailure	1109	EngSdApproach
110	EngCool Temp	629	EEPROMChecksum	1110	Engine Sd
111	Coolant Level	630	CalibrMemFail	1485	ECU MainRelay
153	CrankcasePress	636	Crank Sensor		

Notes