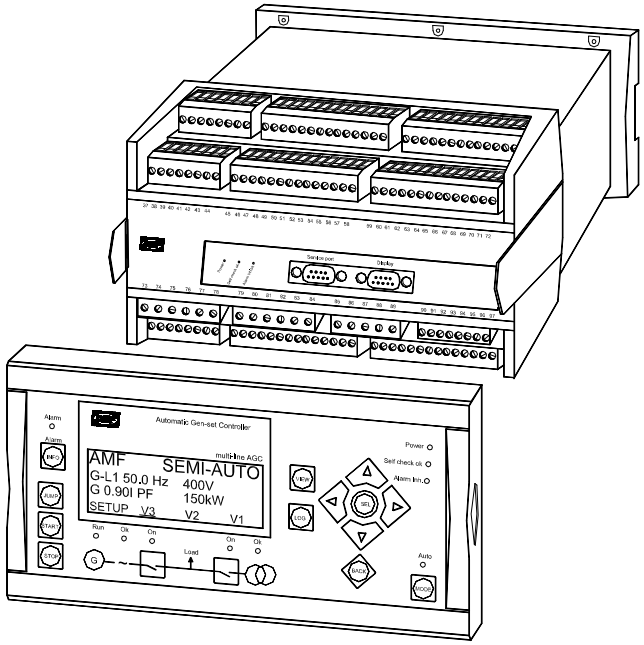
DEIF A/S

Description of options

Option H5,
CAN bus based engine interface comm.
Automatic Gen-set Controller

4189340375C
SW version 2.1X.X



- *Description of option*
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1. Warnings and legal information

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The units are not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Definitions

Throughout this document a number of notes and warnings will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Notes

The notes provide general information which will be helpful for the reader to bear in mind.

Warning

The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

2. Description of option

H5 option

Option H5 is a hardware option, and therefore a separate PCB is installed in slot #8 in addition to the standard installed hardware.

Function	ANSI no.
Serial engine communication	-

Terminal description

CAN bus communication

The PCB for the engine interface communication module is placed in slot #8.

Term.	Function	Description
133	Can-H	CAN bus card option H5, Engine Interface Communication
132	Ground	
131	Can-L	
130	Can-H	
129	Ground	
128	Can-L	
127	Not used	
126	Not used	

Terminals 133 and 130 are internally connected.
Terminals 131 and 128 are internally connected.

The Can-H and Can-L lines must be connected to the proper Can-H and Can-L terminals on the engine communication module.

Please refer to the Installation Instructions of the specific type.

Modbus communication

The PCB for the modbus card is placed in slot #2, if the controller unit is equipped with option H2 (modbus).

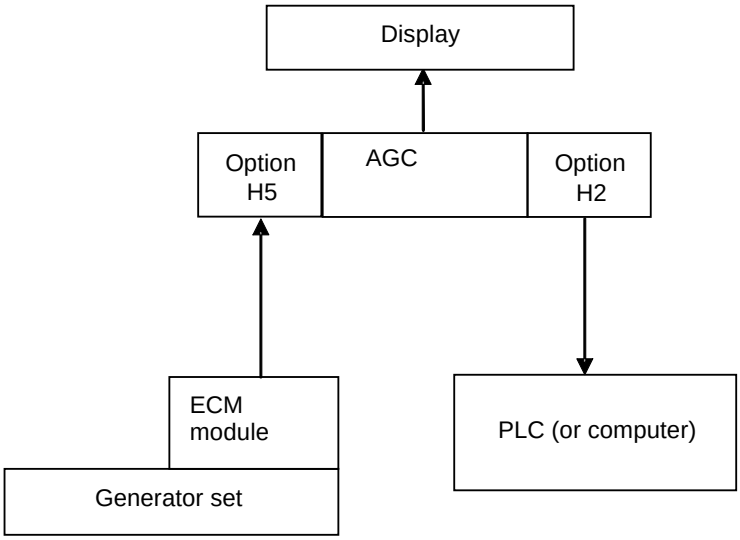
Term.	Function	Description
29	DATA + (A)	Modbus RTU/ASCII, RS485
30	GND	
31	DATA - (B)	
32	Not used	
33	DATA + (A)	
34	Not used	
35	DATA - (B)	
36	Not used	

Terminals 29 and 33 are internally connected.
Terminals 31 and 35 are internally connected.

Only modbus can be used to transmit the data to the PLC. Profibus cannot be used.

Wirings

Principle diagram



For actual wiring diagrams, please refer to the installation instructions.

3. Functional description

This communication extracts information from the Electronic Control Module (ECM) of an engine equipped with an ECM module with CAN bus interface. The values can be used as display values, alarms/shutdown alarms and values to be transmitted through modbus.

Engine types

Data can be read from the following engine types:

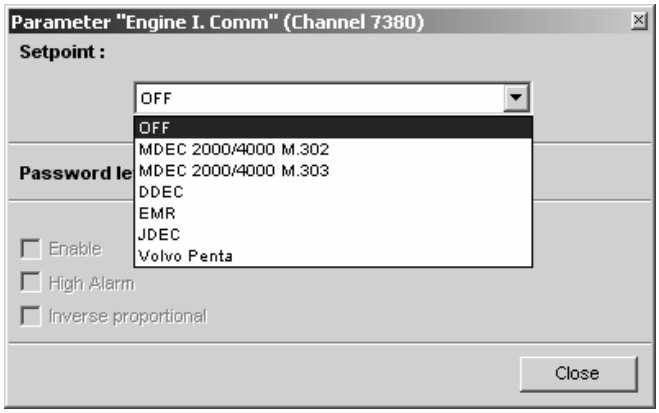
Engine manufacturer	Protocol	Comment
MTU	MDEC communication, module 302 or 303	
MTU	MDEC communication, module M.201 or M.304	Select M.303
Detroit Diesel	DDEC communication	
Deutz	EMR CAN bus communication	
John Deere	JDEC communication	
Volvo	Volvo Penta D12 AUX communication	

The communication type can be set up via the display or the PC utility software.

Engine type selection

The proper communication is selected via the PC utility software in the dialog box shown below. It can also be selected in the display (menu 7380).

If OFF is selected it means that no communication is selected.



Please choose MDEC 2000/4000 M.303, when M.201 or M.304 is required.

Communication system

All these protocols are based on a CAN bus communication system. Except for the MDEC communication, all of them are based on the J1939. The MDEC protocol is an MTU designed protocol.

The Baud rate is fixed by the engine manufacturer at:

MDEC: Series 2000/4000- module 302	MDEC: Series 2000/4000- module 303	DDEC	EMR	JDEC	Volvo Penta
125 kBit/s	125 kBit/s	250 kBit/s	250 kBit/s	250 kBit/s	250 kBit/s

EIC unit

The selection of the EIC unit determines whether bar/Celsius or psi/Fahrenheit is used in the display. The selection is made in menu 7390. The selection affects display value and also the data readable by the modbus communication (option H2).

Alarm functions

A number of alarms can be configured. Please refer to the Designer's Reference Handbook for information about this configuration.

The following items can be configured to an alarm:

Menu number	Alarm	Comment
7400	Communication error	
7420	EIC shutdown	Binary value See shutdown table below
7430	Overspeed	Actual RPM
7440/7450	Coolant temperature (2 levels)	Actual temperature
7460/7470	Oil pressure (2 levels)	Actual pressure

If the alarm must activate a relay output, please notice that the number of configurable relay outputs is option dependent.

Warning

Below is a list of warnings that can be shown on the display. The warnings will be shown as an alarm in the alarm window. The alarms can be acknowledged from the display, but they will be visible until the alarm disappears in the ECM module.

The available warnings depend on the actual communication type:

	Warning list	MDEC: Module 302	MDEC: Module 303	DDEC	EMR	JDEC	Volvo Penta
1	MDEC yellow alarm	X	X	-	-	-	-
2	Low oil pressure warning	X	X	-	-		-
3	High coolant temp. warning	X	X	-	-	-	-
4	High intercooler temp.	X	X	-	-	-	-
5	Defect coolant level switch	X	X	-	-	-	-
6	EMR warning	-	-	-	X	-	-
7	JDEC warning	-	-	-	-	X	-
8	Oil pressure	-	-	-	-	X	-
9	Intake manifold	-	-	-	-	X	-
10	Coolant temperature	-	-	-	-	X	-
11	Fuel injection pump	-	-	-	-	X	-

Shutdown

All shutdown alarms are grouped in the table below. It is possible to configure ‘EIC shutdown’ (menu 7420) in the system setup to put the unit in a shutdown state and/or to activate relay outputs if necessary. The shutdown state is present, until it disappears in the ECM module.

Below the list of the alarms included in this group depending on engine communication type:

	Alarm type	MDEC: Module 302	MDEC: Module 303	DDEC	EMR	JDEC	Volvo Penta
1	Overspeed shutdown	X	X	-	X	-	-
2	MDEC red alarm	X	X	-	-	-	-
3	Low oil pressure shutdown	X	X	-	X	X	-
4	Low coolant level shutdown	X	X	-	-	-	-
5	MDEC ECU failure	X	X	-	-	-	-
6	High coolant temp. shutdown	X	X	-	-	-	-
7	High oil temp. shutdown	X	X	-	-	-	-
8	High charge air temp. shutdown	X	X	-	-	-	-
9	High coolant temp. shutdown	-	-	-	X	X	-
10	EMR shutdown	-	-	-	X	-	-
11	JDEC shutdown	-	-	-	-	X	-
12	Fuel temperature	-	-	-	-	X	-
13	Fuel control valve	-	-	-	-	X	-
14	ECU failure	-	-	-	-	X	-

Displayed values

The table shows which values that can be displayed in the view menu. That is in V1, V2 and V3.

For information about the menu structure of the AGC, please see the Designer's Reference Handbook.

The display values corresponding to the engine communication have a description beginning with 'EIC'.

Error messages

The following error messages can occur:

Message	Description
Engine I. value N.A.	The value is not available for the present engine type
Value selected error	The value cannot be read due to sensor error, sub-system or module error
'N.A.'	The available value changes to N.A. due to communication error

Object selection

The view lines can be configured with the available values:

Object	MDEC M.302	MDEC M.303	DDEC	EMR	JDEC	Volvo Penta
EIC speed	Avail.	Avail.	Avail.	Avail.	Avail.	Avail.
EIC coolant temp.	Avail.	Avail.	Avail.	Avail.	Avail.	Avail.
EIC oil pressure	Avail.	Avail.	Avail.	Avail.	Avail.	Avail.
EIC faults	Avail.	Avail.	N. A.	Avail.	N. A.	N. A.
EIC oil temp.	Avail.	Avail.	Avail.	N. A.	N. A.	Avail.
EIC fuel temp.	Avail.	Avail.	Avail.	N. A.	Avail.	N. A.
EIC boost pressure	N. A.	N. A.	Avail.	N. A.	N. A.	Avail.
EIC air inlet temp.	N. A.	N. A.	Avail.	N. A.	N. A.	Avail.
EIC coolant level	N. A.	N. A.	Avail.	N. A.	N. A.	N. A.
EIC fuel rate	N. A.	N. A.	Avail.	N. A.	Avail.	Avail.
EIC charge air pressure	Avail.	Avail.	N. A.	N. A.	N. A.	N. A.
EIC charge air temp.	Avail.	Avail.	N. A.	N. A.	Avail.	Avail.
EIC d.d. % torque	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC actual % torque	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC acc. pedal pos.	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC % load, c. speed	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC air inlet pressure	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC exhaust gas temp.	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC engine hours	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC oil f. diff. press.	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC battery voltage	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC fuel del. press.	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC oil level	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC crankcase press.	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC coolant pressure	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.
EIC water in. fuel	N. A.	N. A.	N. A.	N. A.	N. A.	Avail.

Modbus communication

If option H2 (modbus) is installed, then the data can be transmitted to a PLC or a computer.

Please refer to the option H2 technical documentation for more information about our standard external modbus communication from the controller unit AGC to an external PLC (or computer).

4. Parameter list

For information about the structure of the parameter descriptions, see the Designer's Reference Handbook.

7380 Engine communications

No.	Setting	First setting	Second setting	Third setting	Fourth setting	Fifth setting	Sixth setting	Seventh setting
7381	Engine comm.	OFF	MDEC M.302	MDEC M.303	DDEC	EMR	JDEC	Volvo Penta

7390 CAN unit

No.	Setting		First setting	Second setting	Factory setting
7391	CAN unit	Set point	Bar/Celsius	Psi/Fahrenheit	Bar/Celsius

7400 EI communication error

No.	Setting		Min. setting	Max. setting	Factory setting
7401	EI comm. error	Delay	0.0 s	100.0 s	0.0 s
7402	EI comm. error	Relay output A	R0 (none)	Option dependent	R0 (none)
7403	EI comm. error	Relay output B	R0 (none)		R0 (none)
7404	EI comm. error	Enable	OFF	ON	OFF
7505	EI comm. error	Fail class	Warning (2)	Trip MB (6)	Warning (2)

7420 EIC shutdown

No.	Setting		Min. setting	Max. setting	Factory setting
7421	EIC shutdown	Delay	0.0 s	100.0 s	0.0 s
7422	EIC shutdown	Relay output A	R0 (none)	Option dependent	R0 (none)
7423	EIC shutdown	Relay output B	R0 (none)		R0 (none)
7424	EIC shutdown	Enable	OFF	ON	OFF
7425	EIC shutdown	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

7430 EIC overspeed

No.	Setting		Min. setting	Max. setting	Factory setting
7431	EIC overspeed	Set point	0 RPM	2000 RPM	1600 RPM
7432	EIC overspeed	Delay	0.0 s	100.0 s	2.0 s
7433	EIC overspeed	Relay output A	R0 (none)	Option dependent	R0 (none)
7434	EIC overspeed	Relay output B	R0 (none)		R0 (none)
7435	EIC overspeed	Enable	OFF	ON	OFF
7436	EIC overspeed	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

7440 EIC cooling water temperature 1

No.	Setting		Min. setting	Max. setting	Factory setting
7441	EIC cool w. t. 1	Set point	-40 deg.	210 deg.	100 deg.
7442	EIC cool w. t. 1	Delay	0.0 s	100.0 s	5.0 s
7443	EIC cool w. t. 1	Relay output A	R0 (none)	Option dependent	R0 (none)
7444	EIC cool w. t. 1	Relay output B	R0 (none)		R0 (none)
7445	EIC cool w. t. 1	Enable	OFF	ON	OFF
7446	EIC cool w. t. 1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

7450 EIC cooling water temperature 2

No.	Setting		Min. setting	Max. setting	Factory setting
7451	EIC cool w. t. 2	Set point	-40 deg.	210 deg.	110 deg.
7452	EIC cool w. t. 2	Delay	0.0 s	100.0 s	5.0 s
7453	EIC cool w. t. 2	Relay output A	R0 (none)	Option dependent	R0 (none)
7454	EIC cool w. t. 2	Relay output B	R0 (none)		R0 (none)
7455	EIC cool w. t. 2	Enable	OFF	ON	OFF
7456	EIC cool w. t. 2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

7460 EIC oil pressure 1

No.	Setting		Min. setting	Max. setting	Factory setting
7461	EIC oil press. 1	Set point	0.0 bar	10.0 bar	2.0 bar
7462	EIC oil press. 1	Delay	0.0 s	100.0 s	5.0 s
7463	EIC oil press. 1	Relay output A	R0 (none)	Option dependent	R0 (none)
7464	EIC oil press. 1	Relay output B	R0 (none)		R0 (none)
7465	EIC oil press. 1	Enable	OFF	ON	OFF
7466	EIC oil press. 1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

7470 EIC oil pressure 2

No.	Setting		Min. setting	Max. setting	Factory setting
7471	EIC oil press. 2	Set point	0.0 bar	10.0 bar	1.0 bar
7472	EIC oil press. 2	Delay	0.0 s	100.0 s	5.0 s
7473	EIC oil press. 2	Relay output A	R0 (none)	Option dependent	R0 (none)
7474	EIC oil press. 2	Relay output B	R0 (none)		R0 (none)
7475	EIC oil press. 2	Enable	OFF	ON	OFF
7476	EIC oil press. 2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

5. Modbus communication

This chapter is to be considered as additional information for option H2. Please refer to the ECM (Engine Communication Module) user manuals for more information about the ECM protocol technical description and the details of each communication value.

A certain amount of engine data can be transmitted from the engine communication module to the controller unit. They can be transmitted through modbus option H2.

The available values depend on the selected type of engine communication.

The data readable by the modbus communication are converted into the chosen unit in menu 7390.

MDEC series – 2000/4000 – module 302 & 303 – MTU engines

Measurement table (words (2 bytes), read only registers - function code = 03h).

Addr.	Content	Type
109	EIC alarms	Bit 0 EIC communication error Bit 2 EIC shutdown Bit 3 EIC overspeed Bit 4 EIC coolant water temperature 1 Bit 5 EIC coolant water temperature 2 Bit 6 EIC oil pressure 1 Bit 7 EIC oil pressure 2
110	EIC alarms	Bit 0 Overspeed, shutdown Bit 1 Low oil pressure, warning Bit 2 Low oil pressure, shutdown Bit 3 Low coolant level, shutdown Bit 4 MDEC ECU failure, shutdown Bit 5 High coolant temperature, warning Bit 6 High coolant temperature, shutdown Bit 7 High intercooler coolant temperature, warning Bit 8 High oil temperature, shutdown Bit 9 High charge air temperature, shutdown Bit 10 Defect coolant level switch, warning Bit 11 MDEC yellow alarm, warning Bit 12 MDEC red alarm, shutdown
111	EIC speed	Engine comm. speed [rpm]
112	EIC coolant temp.	Engine comm. coolant temperature [deg][F]
113	EIC oil pressure	Engine comm. engine oil pressure [bar/100][psi/100]
114	EIC faults	Engine comm. number of actual faults
115	EIC oil temp.	Engine comm. engine oil temperature [deg][F]
116	EIC fuel temp.	Engine comm. fuel temperature [deg/10][F/10]
121	EIC charge air pressure	Engine comm. charge air pressure [bar/100][psi/100]
122	EIC charge air temp.	Engine comm. charge air temperature [deg][F]

DDEC – Detroit engines

Measurement table (words (2 bytes), read only registers - function code = 03h).

Addr.	Content	Type
109	EIC alarms	Bit 0 EIC communication error Bit 2 EIC shutdown Bit 3 EIC overspeed Bit 4 EIC coolant water temperature 1 Bit 5 EIC coolant water temperature 2 Bit 6 EIC oil pressure 1 Bit 7 EIC oil pressure 2
111	EIC speed	Engine comm. speed [rpm]
112	EIC coolant temp.	Engine comm. coolant temperature [deg][F]
113	EIC oil pressure	Engine comm. engine oil pressure [bar/100][psi/100]
115	EIC oil temp.	Engine comm. engine oil temperature [deg][F]
116	EIC fuel temp.	Engine comm. fuel temperature [deg][F]
117	EIC boost pressure	Engine comm. boost pressure [bar/100][psi/100]
118	EIC air inlet temp.	Engine comm. air inlet temperature [deg][F]
119	EIC coolant level	Engine comm. coolant level [%/10]
120	EIC fuel rate	Engine comm. fuel rate [L/h/10]

EMR – Deutz engines

Measurement table (words (2 bytes), read only registers - function code = 03h).

Addr.	Content	Type
109	EIC alarms	Bit 0 EIC communication error Bit 2 EIC shutdown Bit 3 EIC overspeed Bit 4 EIC coolant water temperature 1 Bit 5 EIC coolant water temperature 2 Bit 6 EIC oil pressure 1 Bit 7 EIC oil pressure 2
110	EIC alarms	Bit 0 High coolant temperature shutdown Bit 1 Low oil pressure shutdown Bit 2 Overspeed shutdown Bit 3 EMR shutdown (LS: lamp status) Bit 4 EMR warning (LS: lamp status)
111	EIC speed	Engine comm. speed [rpm]
112	EIC coolant temp.	Engine comm. coolant temperature [deg][F]
113	EIC oil pressure	Engine comm. engine oil pressure [bar/100][psi/100]
114	EIC faults	Engine comm. number of actual faults

JDEC – John Deere engines

Measurement table (words (2 bytes), read only registers - function code = 03h).

Addr.	Content	Type
109	EIC alarms	Bit 0 EIC communication error Bit 2 EIC shutdown Bit 3 EIC overspeed Bit 4 EIC coolant water temperature 1 Bit 5 EIC coolant water temperature 2 Bit 6 EIC oil pressure 1 Bit 7 EIC oil pressure 2
110	EIC alarms	Bit 0 High coolant temperature shutdown Bit 1 Low oil pressure shutdown Bit 2 Fuel temperature shutdown Bit 3 Fuel control valve shutdown Bit 4 ECU failure shutdown Bit 5 Oil pressure warning Bit 6 Intake manifold warning Bit 7 Coolant temperature warning Bit 8 Fuel injection pump warning Bit 9 JDEC shutdown (LS: lamp status) Bit 10 JDEC warning (LS: lamp status)
111	EIC speed	Engine comm. speed [rpm]
112	EIC coolant temp.	Engine comm. coolant temperature [deg][F]
113	EIC oil pressure	Engine comm. engine oil pressure [bar/100][psi/100]
116	EIC fuel temp.	Engine comm. fuel temperature [deg][F]
120	EIC fuel rate	Engine comm. fuel rate [L/h/10]
122	EIC charge air temp.	Engine comm. charge air temperature [deg][F]

Volvo Penta engines

Measurement table (words (2 bytes), read only registers - function code = 03h).

Addr.	Content	Type
109	EIC alarms	Bit 0 EIC communication error Bit 2 EIC shutdown Bit 3 EIC overspeed Bit 4 EIC coolant water temperature 1 Bit 5 EIC coolant water temperature 2 Bit 6 EIC oil pressure 1 Bit 7 EIC oil pressure 2
111	EIC speed	Engine comm. speed [rpm]
112	EIC coolant temp.	Engine comm. coolant temperature [deg][F]
113	EIC oil pressure	Engine comm. engine oil pressure [bar/100][psi/100]
115	EIC oil temp.	Engine comm. engine oil temperature [deg][F]
117	EIC boost pressure	Engine comm. boost pressure [bar/100][psi/100]
118	EIC air inlet temp.	Engine comm. air inlet temperature [deg][F]
120	EIC fuel rate	Engine comm. fuel rate [L/h/10]
122	EIC charge air temp.	Engine comm. charge air temperature [deg][F]
123	EIC d.d. % torque	Engine comm. driver's demand engine - percent torque [%]
124	EIC actual % torque	Engine comm. actual engine - percent torque [%]
125	EIC acc. pedal pos.	Engine comm. accelerator pedal position [%]
126	EIC % load, c. speed	Engine comm. percent load at current speed [%]
127	EIC air inlet pressure	Engine comm. air inlet pressure [bar/100][psi/100]
128	EIC exhaust gas temp.	Engine comm. exhaust gas temperature [deg/10][F/10]
129	EIC engine hours	Engine comm. ENGINE HOURS [H]
130	EIC oil f. diff. press.	Engine comm. engine oil filter diff. press. [bar/100][psi/100]
131	EIC battery voltage	Engine comm. battery potential [V/10], switched
132	EIC fuel del. press.	Engine comm. fuel delivery pressure [bar/100][psi/100]
133	EIC oil level	Engine comm. engine oil level [%]
134	EIC crankcase press.	Engine comm. crankcase pressure [bar/100][psi/100]
135	EIC coolant pressure	Engine comm. coolant pressure [bar/100][psi/100]
136	EIC water in. fuel	Engine comm. WATER IN FUEL INDICATOR [ON/OFF]

Resolution hours (98) - approx. 3.75 years supported.