



MEC 310

GENSET CONTROLLER

Option J – CANbus J1939

r. 0474G



PM077 Rev 1 09/08/20

This description of options covers the following products:

MEC 310

FW version 1.2X.X

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1. Warnings and legal information

Legal information and responsibility

Thomson Technology takes no responsibility for installation or operation of the engine set. If there is any doubt about how to install or operate the engine 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 unauthorized 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.

Factory settings

The unit is delivered with certain factory settings. Given the fact that these settings are based on average values, they are not necessarily the correct settings for matching the individual engine. Thus precautions must be taken to check the settings before running the engine.

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

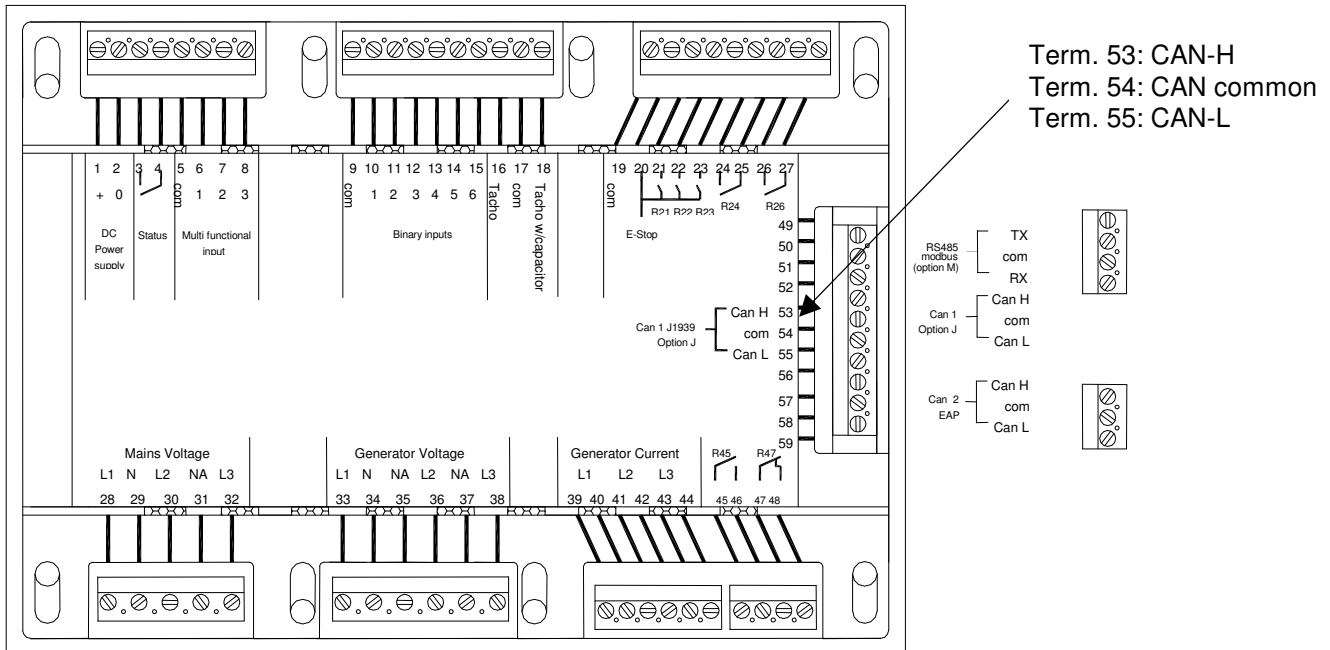
Option J

This manual describes option J for the MEC 310 controller. The option gives the possibility to communicate between the MEC 310 and several engine types over the CANbus network.

Terminal description for MEC 310

| Term. | Function | Description |
|-------|----------|-------------|
| 53 | CAN-H | CAN 1 |
| 54 | CAN-GND | |
| 55 | CAN-L | |

An overview of the terminals can be seen below. The slots are positioned in the unit as follows (rear of the unit):



Modbus communication

If option M is present in the MEC 310 unit it's possible to read engine data over the Modbus.



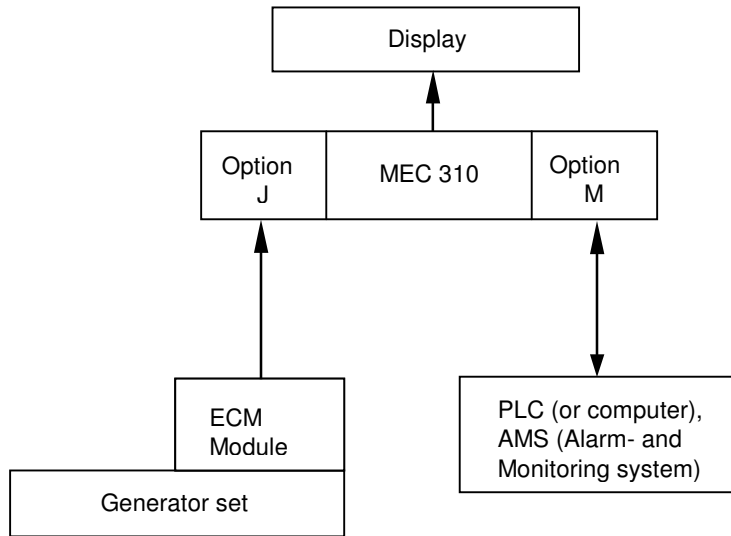
Please refer to the document 'Option M – Modbus Communications' for the relevant MEC 310 unit.

Wiring

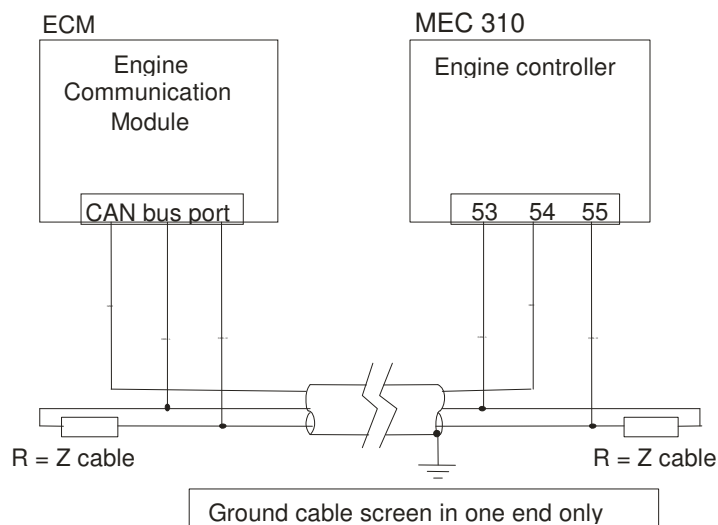


MEC 310: For wiring details, please refer to the document 'Installation Instructions and Reference Handbook'.

Principle diagram



Connection diagram:



3. Functional description

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

Engine types

Data can be transmitted between the MEC 310 units and the following engine controllers/types:

| Engine Manufacturer | Engine Controller/Type | Comment |
|---------------------|---|--------------------|
| Caterpillar | ADEM III and A4/C4.4, C6.6, C9, C15, C18, C32 | Rx/Tx |
| Cummins | CM570, CM850/QSL, QSB5 & 7, QSM11, QSK19, 50 & 60 | Rx/Tx |
| Detroit Diesel | DDEC III and IV/Series 50, 60 & 2000 | Rx/Tx |
| Deutz | EMR 2 (EMR)/912, 913, 914 and L2011 | Rx/Tx |
| - | General J1939 | Rx/Tx |
| Iveco | EDC7 (Bosch MS6.2)/Series NEF, CURSOR and VECTOR 8 | Rx/Tx |
| John Deere | JDEC/PowerTech M, E and Plus | Rx/Tx |
| MTU | MDEC, module M.302 or M.303/Series 2000 and 4000 | Rx |
| MTU | MDEC, module M.201 or M.304/Series 2000 and 4000 | Rx Select M.303 |
| MTU | ADEC/Series 2000 and 4000 | Rx/Tx |
| Perkins | Series 1100, 1300, 2300 and 2800 | Rx/Tx |
| Scania | EMS | Rx |
| Scania | EMS S6 (KWP2000)/Dx9x, Dx12x, Dx16x | Rx/Tx |
| Volvo Penta | EDC4 | Rx Select EMR 2 |
| Volvo Penta | EMS | Rx |
| Volvo Penta | EMS 2 and EDCIII/D6, D7, D9, D12 and D16 (GE and AUX variants only) | Rx/Tx |



Rx/Tx: Please go to the section ‘Specific engine type descriptions’ for details of data read and write.



The engine type is selected in menu 7561.



For support of controller/engine types not listed, please contact Thomson Technology.

Communication system

All these protocols are based on a CANbus communication system. Except for the MDEC and ADEC communication, all of them are based on the J1939. The MDEC and ADEC protocols are MTU designed protocols based on CANopen.

The baud rate is fixed by the engine manufacturer at:

| | |
|-------------------|--|
| MDEC, ADEC | Caterpillar, Cummins, Detroit Diesel, Deutz, Iveco, John Deere, Perkins, Scania and Volvo Penta |
| 125 kb/s | 250 kb/s |

EIC unit

The selection of the EIC unit (menu 10970) determines whether bar/PSI and Celsius/Fahrenheit is used. The selection affects display readings, values used for alarm evaluation (menu 76xx) and data readable by Modbus communication (option M).

Common for all alarm functions

A number of alarms can be configured.

The following items can be configured to an alarm:

| Menu number | Alarm | Comment |
|--------------------|---------------------------|---|
| 7570 | EI comm. error | Communication error |
| 7580 | EIC warning | Any alarm listed as warning for the selected engine type in the section 'Specific engine type descriptions'. |
| 7590 | EIC shutdown | Any alarm listed as shutdown for the selected engine type in the section 'Specific engine type descriptions'. |
| 7600 | EIC overspeed | Actual RPM |
| 7610/7620 | EIC coolant t. (2 levels) | Actual temperature |
| 7630/7640 | EIC oil press. (2 levels) | Actual pressure |
| 7650/7660 | EIC oil temp. (2 levels) | Actual temperature |

J1939 measurement table

This is the common J1939 measurement overview showing which measurements are available. Note that not all measurements are supported by the individual engines; please refer to the specific engine description.

The table shows which values can be displayed in the view screens.



For information about the menu structure, please see the Installation and Operation Manual.

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 view is not selectable 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 value is not supported by the engine, or due to communication error. |

Object selection, J1939

The view lines can be configured with these available values.



For Modbus scaling, please see the table on page 39.



The engine is expected to use source address 0.

| Object | PGN no. | Priority | Start position of 1 st data byte | Length (bytes) | SPN no. | Unit | J1939-71 scaling |
|--|---------|----------|---|----------------|---------|------|---|
| EIC speed | 61444 | 3/6 | 4 | 2 | 190 | RPM | 0.125 rpm/bit, offset 0 |
| EIC coolant temp. (*1) | 65262 | 3/6 | 1 | 1 | 110 | °C | 1 deg C/bit, offset -40 C |
| EIC oil pressure (*2) | 65263 | 6 | 4 | 1 | 100 | kPA | 4 kPA/bit, offset 0 |
| EIC faults | 65230 | 6 | 1 | 1 | 1218 | | 1/bit, offset 0 |
| EIC oil temp. (*3) | 65262 | 3/6 | 3 | 2 | 175 | °C | 0.03125 °C/bit, offset -273 °C |
| EIC fuel temp. | 65262 | 3/6 | 2 | 1 | 174 | °C | 1 °C/bit, offset -40 °C |
| EIC intake manifold #1 P. (also called EIC boost P.) | 65270 | 6 | 2 | 1 | 102 | kPA | 2 kPA/bit, offset 0 |
| EIC air inlet temp. | 65269 | 6 | 6 | 1 | 172 | °C | 1 °C/bit, offset -40 °C |
| EIC coolant level | 65263 | 6 | 8 | 1 | 111 | % | 0.4 %/bit, offset 0 |
| EIC fuel rate | 65266 | 6 | 1 | 2 | 183 | l/h | 0.05 l/h per bit, offset 0 |
| EIC intake manifold 1 temp. (also called EIC charge air temp.) | 65270 | 6 | 3 | 1 | 105 | °C | 1 °C/bit, offset -40 °C |
| EIC d.d. % torque | 61444 | 3/6 | 2 | 1 | 512 | % | 1 %/bit, offset -125% |
| EIC actual % torque | 61444 | 3/6 | 3 | 1 | 513 | % | 1 %/bit, offset -125% |
| EIC acc. pedal pos. | 61443 | 3/6 | 2 | 1 | 91 | % | 0.4 %/bit, offset 0 |
| EIC % load, c. speed | 61443 | 3/6 | 3 | 1 | 92 | % | 1 %/bit, offset 0 |
| EIC air inlet pressure | 65270 | 6 | 4 | 1 | 106 | kPA | 2 kPA/bit, offset 0 |
| EIC exhaust gas temp. | 65270 | 6 | 6 | 2 | 173 | °C | 0.03125 °C/bit, offset -273 °C |
| EIC engine hours | 65253 | 6 | 1 | 4 | 247 | h | 0.05 hr/bit, offset 0, max: 32767hrs |
| EIC oil filter diff. press. | 65276 | 6 | 4 | 1 | 99 | kPA | 0.5 kPA/bit, offset 0 |
| EIC key switch battery potential | 65271 | 6 | 7 | 2 | 158 | V DC | 0.05 V DC/bit, offset 0 |
| EIC fuel del. press. | 65263 | 6 | 1 | 1 | 94 | kPA | 4 kPA/bit, offset 0 |
| EIC oil level | 65263 | 6 | 3 | 1 | 98 | % | 0.4 %/bit, offset 0 |
| EIC crankcase press. | 65263 | 6 | 5 | 2 | 101 | kPA | 1/128 kPA/bit, offset -250 kPA |
| EIC coolant pressure | 65263 | 6 | 7 | 1 | 109 | kPA | 2 kPA/bit, offset 0 |
| EIC water in. fuel | 65279 | 6 | 1 | 2 bit | 97 | | 00: No, 01: Yes, 10: Error, 11: Not available |
| EIC turbo oil temp. | 65262 | 3/6 | 5 | 2 | 176 | °C | 0.03125 °C/bit, offset -273 °C |
| EIC particulate trap inlet | 65270 | 6 | 1 | 1 | 81 | kPA | 0.5 kPA/bit, offset 0 |

| Object | PGN no. | Priority | Start position of 1st data byte | Length (bytes) | SPN no. | Unit | J1939-71 scaling |
|-----------------------------|----------------|-----------------|---|-----------------------|----------------|-------------|--------------------------------|
| EIC air filter diff. | 65270 | 6 | 5 | 1 | 107 | kPA | 0.05 kPA/bit, offset 0 |
| EIC coolant filter diff. | 65270 | 6 | 8 | 1 | 112 | kPA | 0.5 kPA/bit, offset 0 |
| EIC atmospheric press. | 65269 | 6 | 1 | 1 | 108 | kPA | 0.5 kPA/bit, offset 0 |
| EIC ambient air temp. | 65269 | 6 | 4 | 2 | 171 | °C | 0.03125 °C/bit, offset -273 °C |
| EIC trip fuel gaseous | 65199 | 7 | 1 | 4 | 1039 | kg | 0.5 kg/bit, offset 0 |
| EIC total fuel used gaseous | 65199 | 7 | 5 | 4 | 1040 | kg | 0.5 kg/bit, offset 0 |
| EIC engine trip fuel | 65257 | 6 | 1 | 4 | 182 | L | 0.5 L/bit, offset 0 |
| EIC engine total fuel used | 65257 | 6 | 5 | 4 | 250 | L | 0.5 L/bit, offset 0 |

For the Iveco Vector 8 type only:

(*1): EIC coolant temp.: PGN=65282, priority=6, start at byte 5, length=1byte, SPN=110, same scale

(*3): EIC oil temp.: PGN=65282, priority=6, start at byte 6, length=1byte, SPN=175, same scale

(*2): EIC oil pressure. PGN=65282, priority=6, start at byte 7, length=1byte, 8kPa/bit gain, 0kPA offset, data range: 0 to +2000 kPA



The objects are not supported by all engines. Please refer to the specific engine type manual for information about the specific engine.



The Modbus addresses are read only (function code 04h), and are only available if option M (Modbus RTU) is implemented.

Verification of J1939 objects

To verify the communication, various CAN PC tools can be used. Common for these are that they must be connected to the CANbus between the MEC 310 unit and the engine controller. When the tool is connected, it is possible to monitor the communication between the two units. For use of the CAN tool, please refer to the manual for the product used.

As an example, you may see the following telegram:

0xcfc00400 ff 7d 7d e0 15 ff f0 ff
 DATA BYTE: 1 2 3 4 5 6 7 8

- 0xc is the priority
- f004 is the PGN number (61444 in decimal value)
- The 8 bytes following the CAN ID (**0xcfc00400**) are data, starting with byte 1

The priority needs to be converted to decimal. Note that the 3 priority bits in this case are displayed in the CAN id (You see 0xcfc00400 instead of 0x0cf00400). In other cases you may read e.g. 0x18fef200 (PGN 65266).

The formula to find the priority number (P) is to divide by 4:

0xc = 12 (Dec) => Priority 3

| Priority | DecID | HexID |
|----------|-------|-------|
| 1 | 4d | 0x4 |
| 2 | 8d | 0x8 |
| 3 | 12d | 0xc |
| 4 | 16d | 0x10 |
| 5 | 20d | 0x14 |
| 6 | 24d | 0x18 |

Normally in SAE J1939, only priority 3 and 6 are used.

Hereafter the data can be read (PGN 61444):

0xcf00400 xD ff 7d 7d e0 15 ff f0 ff

| | | | |
|----------------------|---------------|----|---------------|
| Engine torque | (Data byte 1) | ff | Not available |
| Driver demand torque | (Data byte 2) | 7d | |
| Actual engine torque | (Data byte 3) | 7d | |
| Engine speed | (Data byte 4) | e0 | |
| Engine speed | (Data byte 5) | 15 | |
| Source address | (Data byte 6) | ff | Not available |
| Engine starter mode | (Data byte 7) | f0 | |
| Engine Demand | (Data byte 8) | ff | Not available |

Calculation example:

RPM resolution is 0.125 RPM/bit, offset 0.

The result is then 15e0 (Hex) or 5600 (dec)*0.125 = 700 RPM.

Displaying of J1939 DM1/DM2 and Scania KWP2000 alarms

Besides some engine specific alarms which are shown in the standard alarm list, the J1939 Diagnostic messages DM1 (active alarms) and DM2 (historic alarm log list) as well as the Scania KWP 2000 alarms can all be shown on the display.

MEC 310

J1939

Use the up or down buttons until the DM1 or DM2 is shown in the display and press enter. The alarm log will be shown in the display.

Example:

| | |
|-------------------|------|
| DM1 LOG | DDEC |
| Oil pressure | |
| Low level warning | |
| SPN | 100 |
| FMI | 17 |

The alarm log in DM1 shows the active alarms, the DM2 shows the historical alarms.

Use the up and down buttons to scroll through the list.

Scania KWP 2000

Use the up or down buttons until the engine log is shown in the display and press enter. The alarm log will be shown in the display.

Example:

| |
|---------------------|
| Scania KW2000 LOG |
| 1105 Speed sensor 1 |
| Active alarms: 6 |





The Scania KWP 2000 log shows active and passive alarms in a mix.

Use the up and down buttons to scroll through the list.

Control commands sent to the engine

Engine types with the possibility to send commands to the ECM via the CANbus communication line:

| Engine type \ Command | Detroit Diesel DDEC | John Deere JDEC | Caterpillar | Perkins | Cummins | Generic J1939 | Deutz EMR | Iveco | MTU MDEC | MTU ADEC | Scania EMS | Scania EMS S6 | Volvo Penta | Volvo Penta EMS 2 |
|-----------------------|---------------------|-----------------|-------------|---------|---------|---------------|-----------|-------|----------|----------|------------|---------------|-------------|-------------------|
| Preheat | - | - | - | - | - | - | - | X | - | - | - | - | - | X |
| Start / Stop | - | - | - | - | - | - | - | X | - | X | - | X | - | X |
| Engine speed | X | X | X | X | X | X | X | X | - | X | - | X | - | X |
| Nominal frequency | - | - | - | - | X | - | - | - | - | X | - | X | - | X |
| Governor gain | - | - | - | - | X | - | - | - | - | - | - | - | - | - |
| Idle speed | - | - | - | - | - | - | - | - | - | - | - | X | - | X |
| Droop | - | - | - | - | X | - | - | - | - | - | - | X | - | X |
| Shutdown override | - | - | - | - | X | - | - | - | - | - | - | X | - | - |

-  For engine types not mentioned, CANbus control is not supported. In these cases start/stop etc. must be send to the controller using hardwired connections.
-  The menu number 7563 has to be used for enabling or disabling the transmission of all the MEC 310 unit EIC control frames listed in the above table.
-  When the droop command is available for an engine communication type, the droop function must be enabled by using M-logic only. See the M-logic documentation.
-  When the droop command is not available for an engine communication type, the droop emulated function can be selected by using M-logic. In this case, it will be the MEC 310 unit that will operate the droop function. See the M-logic documentation.

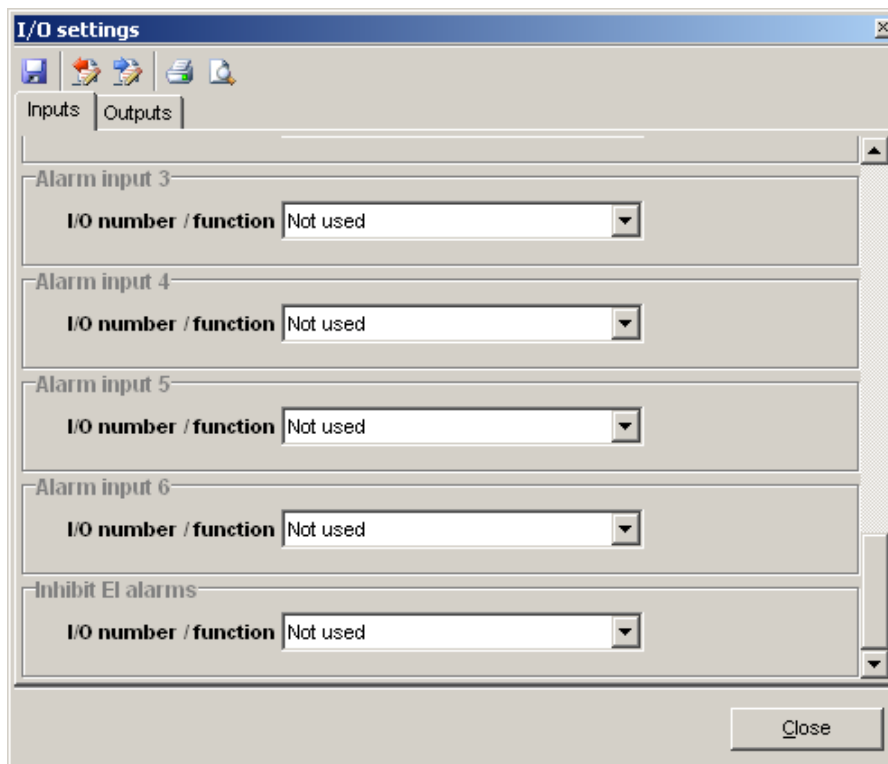
4. Specific engine type descriptions

Alarm enabling/disabling

Refer to the MEC 310 Installation and Operation Manual, chapter TPS 300 software configuration.

If an alarm is enabled, it can be inhibited. The configuration of this inhibit function is selectable by means of the TPS 300 software in the menu line Settings/Inhibits.

The illustration below shows the inhibit EI alarms located in the I/O settings.



Views available on the display

| Object | DDEC | EMR | JDEC | Volvo Penta | Scania EMS |
|--------------------------|-----------|-----------|-----------|-------------|------------|
| Speed | Available | Available | Available | Available | Available |
| Coolant temp. | Available | Available | Available | Available | Available |
| Oil pressure | Available | Available | Available | Available | Available |
| EIC: Faults | N. A. | Available | N. A. | N. A. | N. A. |
| EIC: Oil temp. | Available | N. A. | N. A. | Available | Available |
| EIC: Fuel temp. | Available | N. A. | Available | N. A. | N. A. |
| EIC: Boost pressure | Available | N. A. | N. A. | Available | Available |
| EIC: Air inlet temp. | Available | N. A. | N. A. | N. A. | N. A. |
| EIC: Coolant level | Available | N. A. | N. A. | Available | Available |
| EIC: Fuel rate | Available | N. A. | Available | Available | Available |
| EIC: Charge air pressure | N. A. | N. A. | N. A. | N. A. | N. A. |
| EIC: Charge air temp. | N. A. | N. A. | Available | Available | Available |
| EIC: Air inlet pressure | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Exhaust gas temp. | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Engine hours | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Oil f. diff. press. | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Battery voltage | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Fuel del. press. | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Oil level | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Crankcase press. | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Coolant pressure | N. A. | N. A. | N. A. | Available | N. A. |
| EIC: Water in. fuel | N. A. | N. A. | N. A. | Available | N. A. |



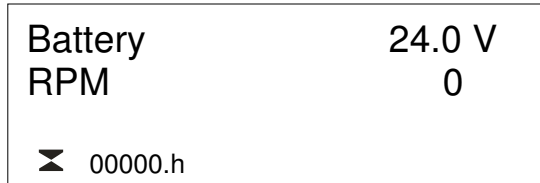
- All the display values corresponding to this option J have a description beginning with 'EIC'.
- If a view line is not available, it will not be shown.
- If the value for an available view line is not available due to some type of error in the sensor, sub-system or module, '--' is shown.
- If the value for an available view line is not available (e.g. due to a communication error), the value field is exchanged with '—'.
- The menu 6001 (Engine I. Comm.) is affecting the shown value on the display.

Display functions

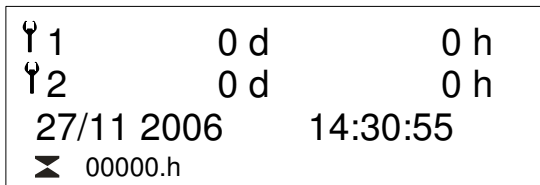
The display indicates both readings and alarms. Illustrated below are examples with icons and English language.



Type and software version.

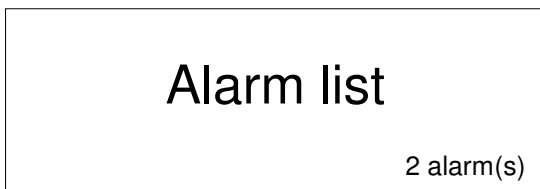


Battery voltage, RPM and running hours counter.

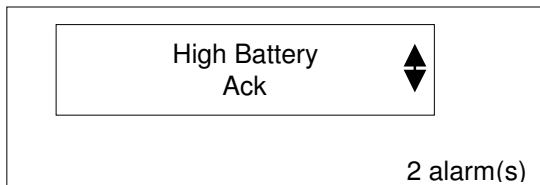


Service timer 1 and 2.

Date and time.



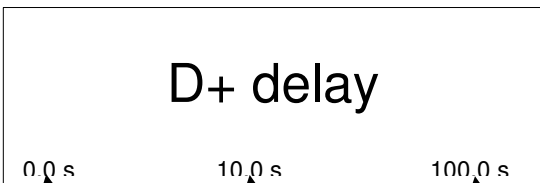
Press \leftarrow to enter the list of active alarms.



Active alarm list. The alarm list pops up automatically, when an alarm appears. When the arrow is present, more alarms are active. Press \blacktriangledown to scroll through the list. Exit the list by pressing ESC.



Press \leftarrow to enter the parameter setting.



Parameter example: D+ delay setting. Use \blacktriangle or \blacktriangledown to scroll through the settings list. If change of settings is necessary, press \leftarrow and enter the password. Then use \blacktriangle or \blacktriangledown to change values. Use ESC to leave settings.

Min. value Actual value Max. value



The available parameters depend on the set options. Some parameters can only be changed using the TPS 300 programming software. The parameter list will automatically be abandoned, if no button is pressed during a 30 sec. period.

Running detection

During a start sequence the start relay is deactivated, if:

- the speed exceeds the RPM running setting
- the running feedback input is ON, or
- the measured frequency of the generator is above 30Hz, or
- the speed information given by the EIC communication is above the limit EICoverspeed_6010

During a stop sequence the generator is considered to be stopped, if:

- the speed is below the running setting
- the running feedback input is OFF, or
- the measured frequency of the generator is below 30Hz, or
- the speed information given by the EIC communication is below the limit EICoverspeed_6010



The J1939 warnings/shutdowns with corresponding SPN and FMI numbers in this chapter refer to those that will automatically appear in the alarm list. The alarms can be acknowledged from the display.

The available alarms vary from engine type to engine type. Besides these, the entire log list can be read in the engine controller by holding the 'LOG' button for 3 seconds.

Caterpillar/Perkins (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 17 | 1 |
| Intake manifold #1 P | 102 | 15 | - |
| Coolant temperature | 110 | 15 | 1 |
| High inlet air temp. | 172 | 15 | - |
| Fuel temperature | 174 | 15 | - |
| Overspeed | 190 | 15 | 0 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ' - ' means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x0c000000. J1939 TSC1.



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

Cummins CM850 (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-------------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 18 | 1 |
| Coolant temperature | 110 | 16 | 0 |
| Oil temperature | 175 | 16 | 0 |
| Intake manifold temp | 105 | 16 | 0 |
| Fuel temperature | 174 | 16 | 0 |
| Coolant level low | 111 | 18 | 1 |
| Overspeed | 190 | - | 16 |
| Crankcase pressure high | 101 | - | 0 |
| Coolant pressure low | 109 | - | 1 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘ - ’ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x00FF69DC. For Cummins proprietary ‘Engine governing’ EG telegram, the source address of the ML-2 controller is 0xDC/220 dec).



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

- Frequency selection
Nominal frequency is written automatically based on the frequency nominal setting. 50Hz is written if $f_{NOM} < 55\text{Hz}$, 60Hz is written if f_{NOM} is $>55\text{Hz}$.
- Gain setting
Gain is set in menu 2773.

Detroit Diesel DDEC (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘-’ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x0c000000. J1939 TSC1.



The speed regulation is enabled in settings 2781 (Reg. output) and 7563 (EIC Controls).

Deutz EMR 2 (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | - | 1 |
| Coolant temperature | 110 | - | 0 |
| Overspeed | 190 | - | 0 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘ - ‘ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0xc000003. For J1939 TSC1, the source address of the ML-2 controller is 3.



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

General J1939 (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘ - ‘ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x0c000000. J1939 TSC1.



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

Iveco (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 17 | 1 |
| Intake manifold #1 P | 102 | 15 | - |
| Coolant temperature | 110 | 15 | 0 |
| High inlet air temp. | 172 | 15 | - |
| Fuel temperature | 174 | 15 | - |
| Overspeed | 190 | 15 | 0 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘ - ’ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0xc000003.
For J1939 TSC1, the source address of the ML-2 controller is 3.
For the Iveco Vector 8 type only: CANbus ID for speed control: 0xcFF0027.



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

John Deere JDEC (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 18 | 1 |
| Intake manifold | 105 | 16 | - |
| Coolant temperature | 110 | 16 | 0 |
| Fuel injection pump | 1076 | 10 | 6 |
| Fuel temperature | 174 | - | 16 |
| ECU failure | 2000 | - | 6 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication ‘ - ‘ means that the alarm in question is not supported.

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x0c000000. J1939 TSC1.



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

MTU ADEC (CANopen)



The MTU ADEC is not a part of the J1939, therefore the reading of values, alarms and shutdowns are different.

Display readings

| Object |
|--|
| EIC speed |
| EIC coolant temp. |
| EIC oil pressure |
| EIC faults |
| EIC oil temp. |
| EIC fuel temp. |
| EIC Coolant level |
| EIC charge air pressure |
| EIC charge air temp. (or EIC intake manifold 1 temp.) |
| EIC air inlet press. |
| EIC running hours |
| EIC ECU power supp. |
| EIC oil level |
| EIC after cooler water inlet temp. |
| EIC atmospheric press. |
| EIC ambient air temp. |
| EIC exch. temp. A |
| EIC exch. temp. B |
| EIC temp. winding 1 |
| EIC temp. winding 2 |
| EIC temp. winding 3 |
| EIC turbo 1 outlet temp. |
| EIC engine intercooler temp. |



The Modbus addresses are read only (function code 04h), and are only available if option M Modbus RTU is implemented.

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.

| Warning list |
|--------------------------------|
| Coolant temp. high |
| Charge air temp. high |
| Intercooler coolant temp. high |
| Lube oil temp. high |
| ECU temp. high |
| Engine speed too low |
| Prelube fail. |
| Start speed not reached |
| Common alarm (yellow) |
| Lube oil pressure low |
| Coolant level low |
| Intercooler coolant level low |
| ECU defect |
| Speed demand failure |
| Power supply low voltage |
| Power supply high voltage |
| Overspeed |
| Lube oil press. low |
| Coolant temp. high |
| Lube oil temp. high |
| Charge air temp. high |

| Warning list |
|--------------------------------|
| ECU power supply high |
| ECU power supply low |
| Generator temp. high |
| Holding tank high level |
| Holding tank low level |
| Generator winding 1 high temp. |
| Generator winding 2 high temp. |
| Generator winding 3 high temp. |
| Ambient temp. high |
| Water in fuel 1 |
| Water in fuel 2 |
| Fuel temp. high |
| Exhaust bank A high temp. |
| Exhaust bank B high temp. |
| Fuel high pressure 1 |
| Fuel high pressure 2 |
| Day tank high level |
| Day tank low level |
| Run-up speed not reached |
| Idle speed not reached |
| |

Shutdown

Below is a shutdown value that can be shown on the display. It is possible to configure 'EIC shutdown' 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.

| Shutdown list |
|-------------------|
| AL Com. Alarm Red |

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x300+ADEC ID – speed demand telegram (ADEC ID is selected in menu 7562, default ID is 6 → 0x306).



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).

- Start/Stop command
- Frequency selection
Nominal frequency is written automatically based on the frequency nominal setting. 50Hz is written if $f_{NOM} < 55\text{Hz}$, 60Hz is written if f_{NOM} is $>55\text{Hz}$.



The CANopen node ID no is selected in setting 7562. The default value (6) usually matches the ADEC setting.

MTU MDEC module 302/303 (MTU)



The MTU MDEC is not a part of the J1939, therefore the reading of values, alarms and shutdowns are different.

Displayed values

| Object |
|--|
| EIC speed |
| EIC coolant temp. |
| EIC oil pressure |
| EIC faults |
| EIC oil temp. |
| EIC fuel temp. |
| EIC charge air pressure |
| EIC charge air temp. (or EIC intake manifold 1 temp.) |



The Modbus addresses are read only (function code 04h), and are only available if the option M Modbus RTU is implemented.

Alarms

Below is a list of alarms that can be shown on the display. The alarms will be shown 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.

| Alarm list | Warning | Shutdown |
|------------------------------|---------|----------|
| MDEC yellow alarm | X | - |
| MDEC red alarm | - | X |
| Overspeed | - | X |
| Low oil pressure | X | X |
| High coolant temp. | X | X |
| High oil temp | - | X |
| High intercooler temp. | X | - |
| Defective cool. level switch | X | - |
| Low coolant level | - | X |
| MDEC ECU failure | - | X |



MDEC indication “ – “ means that the alarm in question is not supported.

Write commands to engine controller

None.

Scania EMS (J1939)

Warning/shutdowns

None.

Write commands to engine controller

None.

Scania EMS 2 S6 (J1939)



Scania EMS 2 S6 does not use the J1939 SPN/FMI (Suspect Parameter Number/Failure Mode Indicator) system for alarm handling. Instead the DNL2 system is used. For this reason, the alarm handling is also different.

Warnings and shutdowns (DNL2 alarms)

Below is a list of warnings and shutdowns that can be shown on the display. They 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.

| Warning/shutdown list | DNL2 warning | DNL2 shutdown |
|-----------------------|--------------|---------------|
| EMS warning | X | - |
| Low oil pressure | X | - |
| High coolant temp | X | - |
| Stop limit exceeded | - | X |
| Charge 61 | X | - |
| EIC yellow lamp | X | - |
| EIC red lamp | - | X |



DNL2 indication “ – “ means that the alarm in question is not supported.



Handling of alarms is only active when the engine is running.

Error log

It is possible to retrieve and acknowledge alarms in the error log of the Scania EMS S6 (KWP 2000).

The alarms available are the same alarms, which can be read by the flash combination of the diagnostics lamp on the EMS S6 (please refer to the engine documentation).



For option J, the EMS S6 software version and engine number is automatically retrieved when CANbus communication is established.

| Flash code | MEC310 displayed text | Description |
|-------------------|------------------------------|--|
| 11 | Overrevving | One or both engine speed sensors have indicated above 3000 RPM |
| 12 | Speed sensor 1 | Engine sensor 1 |
| 13 | Speed sensor 2 | Engine sensor 2 |
| 14 | Water T sen. | Engine coolant temperature sensor |
| 15 | Char. air T sen | Charge air temperature sensor |
| 16 | Char. air P sen | Charge air pressure sensor |
| 17 | Oil temp. sen. | Oil temperature sensor |
| 18 | Oil pres. sen. | Oil pressure sensor |
| 23 | Fault in cor. | Fault in coordinator |
| 25 | Throttle pedal | CAN message for fine tune nominal speed out of range |
| 27 | Emerg. stop o.r | Engine stop overridden |
| 31 | Oil pres. prot | Oil pressure protection activated |
| 32 | Wrong parameter | Wrong parameter setting for defect CAN communication |
| 33 | Battery voltage | Battery voltage out of range |
| 37 | Emerg. stop cor | Emergency stop switch activated |
| 43 | CAN cir. defect | CAN circuit defect |
| 48 | CAN mess. DLN1 | CAN message from the coordinator missing or not correct |
| 49 | Wrong CAN ver. | Non-matching CAN version in EMS and coordinator |
| 51 | Un. inj. cyl. 1 | Unit injector cylinder 1 |
| 52 | Un. inj. cyl. 2 | Unit injector cylinder 2 |
| 53 | Un. inj. cyl. 3 | Unit injector cylinder 3 |
| 54 | Un. inj. cyl. 4 | Unit injector cylinder 4 |
| 55 | Un. inj. cyl. 5 | Unit injector cylinder 5 |
| 56 | Un. inj. cyl. 6 | Unit injector cylinder 6 |
| 57 | Un. inj. cyl. 7 | Unit injector cylinder 7 |
| 58 | Un. inj. cyl. 8 | Unit injector cylinder 8 |
| 59 | Extra ana. inp. | Voltage out of range on extra analogue input pin |
| 61 | System shutdown | System shut down incorrectly |
| 66 | Coola. l. prot. | Low engine coolant level |
| 86 | HW watchdog | Hardware watchdog |
| 87 | Fault in RAM | The EMS has detected that the fault code memory is not functioning correctly |
| 89 | Seal | The program in the EMS has been altered in a prohibited manner |
| 94 | Coola. shut off | Engine coolant temperature/oil pressure shutdown |
| 96 | Overheat prot. | Overheat protection activated |
| 99 | Fault in TPU | Error in TPU Timer Processor Unit |

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls)
- Droop
- Engine speed
CANbus ID: Offset: 0xcfff727
Speed: 0x0cff8027

- Frequency selection
Nominal speed/frequency is selected in 2772. If 'User' is selected, nominal speed/frequency is written automatically, based on the frequency nominal setting.
- Start/stop command



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).



It is only possible to write commands to the engine when the Scania Coordinator is NOT mounted.

Control

In the parameter 2770 it is possible to configure the droop setting and the initial speed setting.

Volvo Penta EMS (J1939)

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 5 | - |
| Intake manifold #1 P | 102 | - | - |
| Coolant temperature | 110 | 5 | - |
| High inlet air temp. | 172 | 5 | - |
| Fuel temperature | 174 | - | - |
| Fuel pressure | 94 | 5 | - |
| Oil level | 98 | 5 | - |
| Overspeed | 190 | - | 0 |
| Coolant level low | 111 | - | 1 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |

Write commands to engine controller

None.

Volvo Penta EMS 2 (J1939)

EMS 2 and EDCIII/D6, D7, D9, D12 and D16 (GE and AUX variants only).

Warnings and shutdowns

| Warning/shutdown list | J1939 codes | | |
|-----------------------|-------------|-------------|--------------|
| | SPN | FMI warning | FMI shutdown |
| Low oil pressure | 100 | 5 | - |
| Intake manifold #1 P | 102 | - | - |
| Coolant temperature | 110 | 5 | - |
| High inlet air temp. | 172 | 5 | - |
| Fuel temperature | 174 | - | - |
| Fuel pressure | 94 | 5 | - |
| Oil level | 98 | 5 | - |
| Overspeed | 190 | - | 0 |
| Coolant level low | 111 | - | 1 |
| EIC yellow lamp | - | X | - |
| EIC red lamp | - | - | X |



FMI indication “ – “ means that the alarm in question is not supported,

Write commands to engine controller

- Engine controls
All the write commands to the engine controller (ex: speed, start/stop, etc.) are enabled in setting 7563 (EIC Controls).
- Engine speed
CANbus ID for speed control: 0x0cff4611 – Volvo Penta proprietary telegram.
- Preheat
- Start/stop

Readable states

- Preheat and running



The speed regulation is enabled in setting 2781 (Reg. output) and 7563 (EIC Controls).



Selection of primary or secondary speed is selected in setting 2774.

5. Parameters

Parameters related to engine communication can be found in settings 2770 and 7500-7660.

Please refer to the separate parameter list for details:

For MEC 310, please see the “MEC310 Installation and Operation Manual” document.

6. Modbus communication

This chapter is to be considered as additional information for option M (Modbus RS 485 RTU). 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. If option M is installed, then the data can be transmitted to a PLC, a computer, the alarm-and-monitoring system or a Scada system.



Please refer to the option M technical documentation for more information about our standard external Modbus communication.

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 M.

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 10970.

Reading of analogue values

The reading of values is independent of engine type, so all readings below are available in the Modbus protocol.

The availability of data from the individual engine types is dependent on the specific engine. Please refer to the engine manual in question.

These data refer to the common J1939 display reading list as well as the overview of readings in the MTU ADEC (CANopen) and MTU MDEC (MTU protocol).

| Measurement table (read only) function code 04h. | | | | | | |
|--|--------------------------|-------------|---------|-------|-------|------------------------|
| Addr | Content | Unit | Scaling | | | Description |
| | | | J1939 | ADEC | MDEC | |
| 593 | EIC speed | [RPM] | 1/1 | 1/1 | 1/1 | Speed |
| 594 | EIC coolant temp. | [deg] [F] | 1/1 | 1/10 | 1/10 | Coolant temperature |
| 595 | EIC oil pressure | [bar] [psi] | 1/100 | 1/100 | 1/100 | Engine oil pressure |
| 596 | EIC no of faults | [Faults] | 1/1 | 1/1 | 1/1 | Number of faults |
| 597 | EIC oil temp. | [deg] [F] | 1/10 | 1/10 | 1/10 | Engine oil temperature |
| 598 | EIC fuel temp. | [deg] [F] | 1/1 | 1/10 | 1/10 | Fuel temperature |
| 599 | EIC intake manifold #1 P | [bar] [psi] | 1/100 | 1/100 | - | Intake manifold #1 P |
| 600 | EIC air inlet temp. | [deg] [F] | 1/1 | - | - | Air inlet temperature |

| Measurement table (read only) function code 04h. | | | | | | |
|---|---|-------------|----------------|-------------|-------------|---|
| Addr | Content | Unit | Scaling | | | Description |
| | | | J1939 | ADEC | MDEC | |
| 601 | EIC coolant level | [%] | 1/10 | - | - | Coolant level |
| 602 | EIC fuel rate | [L/h] | 1/10 | - | - | Fuel rate |
| 603 | EIC charge air press | [bar] [psi] | - | - | 1/100 | Charge air press |
| 604 | EIC intake manifold 1 T (or EIC charge air T) | [deg] [F] | 1/1 | - | 1/10 | Intake manifold 1 temperature |
| 605 | EIC d.d. % torque | [%] | 1/1 | - | - | Driver's demand engine - percent torque |
| 606 | EIC actual % torque | [%] | 1/1 | - | - | Actual engine - percent torque |
| 607 | EIC acc. pedal pos. | [%] | 1/1 | - | - | Accelerator pedal position |
| 608 | EIC % load, c. speed | [%] | 1/1 | - | - | Percent load at current speed |
| 609 | EIC air inlet pressure | [bar] [psi] | 1/100 | - | - | Air inlet pressure |
| 610 | EIC exhaust gas temp. | [deg] [F] | 1/10 | - | - | Exhaust gas temperature |
| 611 | EIC engine hours | [H] | 1/1 | 1/1 | - | ENGINE HOURS |
| 612 | EIC oil filter diff. press. | [bar] [psi] | 1/100 | - | - | Oil filter diff press |
| 613 | EIC battery voltage | [V] | 1/10 | 1/10 | - | Keyswitch battery potential |
| 614 | EIC fuel del. press. | [bar] [psi] | 1/100 | 1/100 | - | Fuel delivery pressure |
| 615 | EIC oil level | [%] | 1/10 | - | - | Engine oil level |
| 616 | EIC crankcase press. | [bar] [psi] | 1/100 | - | - | Crankcase pressure |
| 617 | EIC coolant pressure | [bar] [psi] | 1/100 | - | - | Coolant pressure |
| 618 | EIC water in fuel | [2 bits] | 1/1 | - | - | Water in fuel (1 = Yes, 0 =NO) |
| 619 | Reserved | - | - | - | - | - |
| 620 | Reserved | - | - | - | - | - |
| 621 | Reserved | - | - | - | - | - |
| 622 | Reserved | - | - | - | - | - |
| 623 | EIC turbo oil temp. | [deg] [F] | 1/10 | - | - | Turbo oil temp. |
| 624 | EIC trap inlet | [bar] [psi] | 1/100 | - | - | Trap inlet |
| 625 | EIC Air filter diff press | [bar] [psi] | 1/1000 | - | - | Air filter diff press |
| 626 | EIC Cool filter diff press | [bar] [psi] | 1/100 | - | - | Cool filter diff press |
| 627 | EIC Atm press | [bar] [psi] | 1/100 | - | - | Atmospheric pressure |
| 628 | EIC Ambient air temp | [deg] [F] | 1/10 | - | - | Ambient air temp [F/10] |

| Measurement table (read only) function code 04h. | | | | | | |
|---|--------------------------------|-------------|----------------|-------------|-------------|----------------------------|
| Addr | Content | Unit | Scaling | | | Description |
| | | | J1939 | ADEC | MDEC | |
| 629 | EIC exch. temp A | [deg] [F] | - | 1/10 | - | Exh. temp bank A |
| 630 | EIC exch. temp B | [deg] [F] | - | 1/10 | - | Exch. temp bank B |
| 631 | EIC Winding 1 temp | [deg] [F] | - | 1/1 | - | Gen winding 1 temp |
| 632 | EIC Winding 2 temp | [deg] [F] | - | 1/1 | - | Gen winding 2 temp |
| 633 | EIC Winding 3 temp | [deg] [F] | - | 1/1 | - | Gen winding 3 temp |
| 634 | Reserved | - | - | - | - | - |
| 635 | Reserved | - | - | - | - | - |
| 636 | EIC Turbo 1 compr outlet press | [bar] [psi] | - | 1/10 | - | Turbo 1 compr outlet press |
| 637 | EIC Intercooler temp | [deg][F] | - | 1/10 | - | Intercooler temp |
| 638 | EIC trip fuel_gaseous | [kg] | 1/1 | - | - | Trip fuel, gaseous |
| 639 | EIC total fuel used_gaseous | [ton] | 1/10 | - | - | Total fuel used, gaseous |
| 640 | EIC engine trip fuel | [L] | 1/1 | - | - | Engine trip fuel |
| 641 | EIC engine total fuel used | [kL] | 1/10 | - | - | Engine total fuel used |

Alarms, Caterpillar/Perkins

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|-------------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM1) | Bit 1 EIC low oil pressure, warning Bit 2 EIC low oil pressure, shutdown Bit 3 EIC boost pressure, warning Bit 4 EIC high coolant temperature, warning Bit 5 EIC low coolant level, shutdown Bit 6 EIC high inlet air temperature, warning Bit 7 EIC fuel temperature, warning Bit 8 EIC ECM yellow lamp, warning Bit 9 EIC ECM red lamp, shutdown Bit 10 EIC overspeed, warning Bit 11 EIC overspeed, shutdown |

Alarms, Cummins

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|-------------------------------------|--|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM1) | Bit 0 EIC DEC communication error Bit 1 EIC low oil pressure, warning Bit 2 EIC low oil pressure, shutdown Bit 3 EIC high coolant temp, warning Bit 4 EIC high coolant temperature, shutdown Bit 5 EIC low coolant level, warning Bit 6 EIC low coolant level, shutdown Bit 7 EIC intake manifold temp, warning Bit 8 EIC intake manifold, shutdown Bit 9 EIC fuel temp., warning Bit 10 EIC fuel temp, shutdown Bit 11 EIC coolant pressure, shutdown Bit 12 EIC oil temp., warning Bit 13 EIC oil temp., warning Bit 14 EIC overspeed shutdown |

| Addr. | Content | Type |
|--------------|----------------|---------------------------------------|
| | | Bit 15 EIC crankcase press., shutdown |

Alarms, DDEC – Detroit engines

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|-------------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM1) | Bit 0 EIC communication error, warning Bit 1 EIC warning Bit 2 EIC shutdown |

Alarms, EMR 2 – Deutz engines

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM 1) | Bit 0 EIC high coolant temperature, shutdown Bit 1 EIC low oil pressure, shutdown Bit 2 EIC overspeed, shutdown Bit 3 EIC EMR shutdown (LS: lamp status) Bit 4 EIC EMR warning (LS: lamp status) |

Alarms, General J1939

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |

Alarms, Iveco

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------------|--|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM 1) | Bit 1 EIC low oil pressure, warning Bit 2 EIC low oil pressure, shutdown Bit 3 EIC boost pressure, warning Bit 4 EIC high coolant temperature, warning Bit 5 EIC high coolant temperature, shutdown Bit 6 EIC high inlet air temperature, warning Bit 7 EIC fuel temperature, warning Bit 8 EIC ECM yellow lamp, warning Bit 9 EIC ECM red lamp, shutdown Bit 10 EIC overspeed, warning Bit 11 EIC overspeed, shutdown |

Alarms, JDEC – John Deere engines

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------------|--|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms, engine controller (DM 1) | Bit 0 EIC high coolant temperature, shutdown Bit 1 EIC low oil pressure, shutdown Bit 2 EIC fuel temperature, shutdown Bit 3 EIC fuel control valve, shutdown Bit 4 EIC ECU failure, shutdown Bit 5 EIC oil pressure, warning Bit 6 EIC intake manifold, warning Bit 7 EIC coolant temperature, warning Bit 8 EIC fuel injection pump, warning Bit 9 EIC JDEC shutdown (LS: lamp status) Bit 10 EIC JDEC warning (LS: lamp status) |

Alarms, MTU ADEC

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | 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 |
| 1022 | EIC alarms, engine controller | Bit 0 EIC ECU power supp voltage LoLo Bit 1 EIC Fuel high temp Bit 2 EIC Exhaust A high temp Bit 3 EIC Exhaust B high temp Bit 4 EIC Pressure 1 high (Aux 1) Bit 5 EIC Pressure 2 high (Aux 2) Bit 6 EIC Day tank high level Bit 7 EIC Day tank low level Bit 8 EIC Run-up speed not reached Bit 9 EIC Idle speed not reached |
| 1023 | EIC alarms, engine controller | Bit 0 EIC Common alarm red Bit 1 EIC Overspeed Bit 2 EIC Lube oil press LowLow Bit 3 EIC Coolant temperature HiHi Bit 4 EIC Lube oil temp HiHi Bit 5 EIC Charge air temp HiHi Bit 6 EIC ECU power supp voltage HiHi Bit 7 EIC Generator temp high warning Bit 8 EIC Holding tank high level Bit 9 EIC Holding tank low level Bit 10 EIC Winding 1 temp high Bit 11 EIC Winding 2 temp high Bit 12 EIC Winding 3 temp high Bit 13 EIC Ambient temp high Bit 14 EIC Water in fuel 1 Bit 15 EIC Water in fuel 2 |
| 1024 | EIC alarms, engine controller | Bit 0 EIC Coolant high temp Bit 1 EIC Charge air high temp Bit 2 EIC Intercooler coolant high temp Bit 3 EIC Lube oil high temp Bit 4 EIC ECU high temp Bit 5 EIC Engine speed low Bit 6 EIC Prelube fail Bit 7 EIC Start speed not reached Common alarm Bit 8 EIC yellow Bit 9 EIC Lube oil pressure low Bit 10 EIC Coolant level low Bit 11 EIC Intercooler coolant level low Bit 12 EIC ECU defect Bit 13 EIC Speed demand defect Bit 14 EIC Power supply low voltage |

| Addr. | Content | Type |
|--------------|----------------|--------------------------------------|
| | | Bit 15 EIC Power supply high voltage |

Alarms, MTU MDEC series – 2000/4000 – module 302 & 303

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|--------------|--------------------------------|--|
| 1020 | EIC alarms, MEC 310 controller | 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 |
| 1024 | EIC alarms, engine controller | Bit 0 EIC overspeed, shutdown Bit 1 EIC low oil pressure, warning Bit 2 EIC low oil pressure, shutdown Bit 3 EIC low coolant level, shutdown Bit 4 EIC MDEC ECU failure, shutdown Bit 5 EIC high coolant temperature, warning Bit 6 EIC high coolant temperature, shutdown Bit 7 EIC high intercooler coolant temp, warning Bit 8 EIC high oil temperature, shutdown Bit 9 EIC high charge air temperature, shutdown Bit 10 EIC defect coolant level switch, warning Bit 11 EIC MDEC yellow alarm, warning Bit 12 EIC MDEC red alarm, shutdown |

Alarms, Scania

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|-------|-----------------------|--|
| 1026 | EIC alarms (KWP 2000) | Bit 0 EIC overrevving Bit 1 EIC speed sensor 1 Bit 2 EIC speed sensor 2 Bit 3 EIC water temp. sensor Bit 4 EIC charge air temp. sensor Bit 5 EIC charge air pressure sensor Bit 6 EIC oil temp. sensor Bit 7 EIC oil pressure sensor Bit 8 EIC fault in cor. Bit 9 EIC throttle pedal Bit 10 EIC emergency stop override Bit 11 EIC oil pressure prot. Bit 12 EIC wrong parameter Bit 13 EIC battery voltage Bit 14 EIC oil pressure prot. Bit 15 EIC emergency stop cor. |
| 1027 | EIC alarms (KWP 2000) | Bit 0 EIC CAN cir. defect Bit 1 EIC CAN mess. DLN1 Bit 2 EIC Wrong CAN version Bit 3 EIC un. inj. cyl. 1 Bit 4 EIC un. inj. cyl. 2 Bit 5 EIC un. inj. cyl. 3 Bit 6 EIC un. inj. cyl. 4 Bit 7 EIC un. inj. cyl. 5 Bit 8 EIC un. inj. cyl. 6 Bit 9 EIC un. inj. cyl. 7 Bit 10 EIC un. inj. cyl. 8 Bit 11 EIC extra ana. inp. Bit 12 EIC system shutdown Bit 13 EIC coola. L. prot. Bit 14 EIC HW watchdog Bit 15 EIC fault in RAM |
| 1028 | EIC alarms (KWP 2000) | Bit 0 EIC seal Bit 1 EIC coola. shut OFF Bit 2 EIC overheat prot. Bit 3 Fault in TPU Bit 4 Not used Bit 5 Not used Bit 6 Not used Bit 7 Not used Bit 8 Not used Bit 9 Not used Bit 10 Not used Bit 11 Not used Bit 12 Not used Bit 13 Not used Bit 14 Not used Bit 15 Not used |

Alarms, Volvo Penta

Alarm, status and measurement table (read only) function code 04h.

| Addr. | Content | Type |
|-------|--------------------------------|---|
| 1020 | EIC alarms, MEC 310 controller | Bit 0 7570 EIC communication error Bit 1 7580 EIC warning Bit 2 7590 EIC shutdown Bit 3 7600 EIC overspeed Bit 4 7610 EIC coolant water temperature 1 Bit 5 7620 EIC coolant water temperature 2 Bit 6 7630 EIC oil pressure 1 Bit 7 7640 EIC oil pressure 2 |
| 1024 | EIC alarms (DM 1) | Bit 0 EIC overspeed, warning Bit 1 EIC oil pressure, warning Bit 2 EIC oil temperature, warning Bit 3 EIC high coolant temperature, warning Bit 4 EIC low coolant level, warning Bit 5 EIC fuel pressure, warning Bit 6 EIC ECM yellow lamp, warning Bit 7 EIC ECM red lamp, shutdown Bit 8 EIC high inlet air temperature, warning Bit 10 EIC battery voltage, warning Bit 11 EIC low oil level, warning |

Thomson Technology reserves the right to change any of the above.