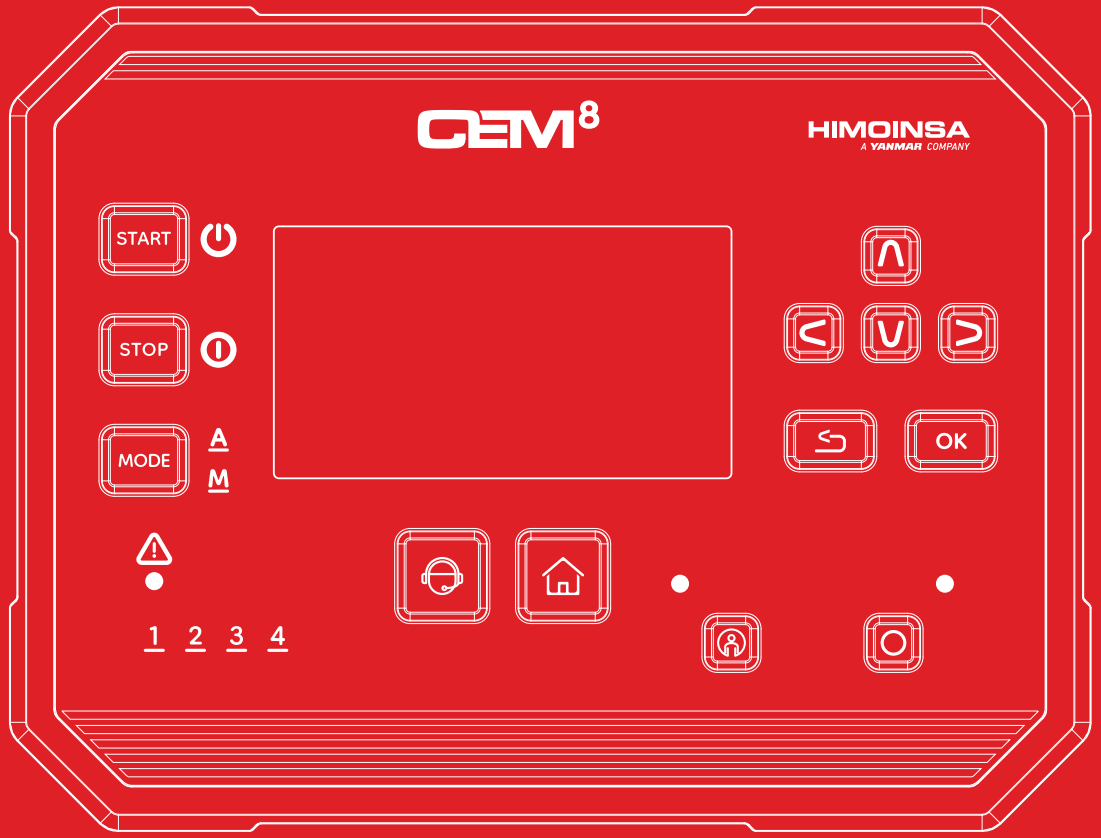


PROFESSIONAL INSTRUCTION MANUAL

CE8 DIGITAL CONTROLLER

CEM8 / CEA8

HIMOINSA
A YANMAR COMPANY

Warning on the intellectual property

HIMOINSA s.l is the owner and reserve all rights of ownership on any text or graphic image exposed in this manual. The permission to reproduce all or a part of this manual must be obtained by HIMOINSA s.l via written document. Unauthorised use of the information given in this manual, its resale and/or the damage to the Intellectual Property or Industrial rights will entail the responsabilities legally established. HIMOINSA s.l and HIMOINSA logo are HIMOINSA trademarks in Spain and other countries.

Unload and limitation of legal responsability Information given in the manual, including texts, date and/or pictures, are supplied in their current status by HIMONISA s.l in order to facilitate the access to products to its dealers and clients. HIMOINSA s.l is not responsible for the errors and/or omissions that may occur in this manual and kindly recommends the commissioning and use of the products to be carried out only by qualified personnel.

CONTENTS

1. INTRODUCTION

The **CE8** controller is an equipment for monitoring and controlling the power supply through a generator set.

There are several **CE8** controller models depending on the application managed:

- **CEM8:** Controller model for automatic and manual control of generating sets as main generation source (AMG).
- **CEA8:** Controller model for the control of back up generator set due to grid failure (AMF).

The **CE8** controller consists of 2 different electronic modules:

- **User interface (CEM8/CEM8P/CEA8).** The user interface is responsible for carrying out the tasks of providing information on the status of the device, as well as allowing the user to act. The user interface is installed on the front of the control panel and allows the controller to be controlled, programmed and configured.
- **Controller module (CPU8).** The Controller module is responsible for supervising and controlling the controller. This module is located at the back of the electrical panel to reduce wiring and thus increase the controller's immunity to electromagnetic noise. There is also the option of anchoring to the rear of the User Interface. All signals, sensors and actuators are wired to the Controller module.

The **CPU8** Controller module provides the following electrical signal characteristics, both generated and from the grid itself:

- Phase-to-neutral voltage.
- Phase-to-phase voltage.
- Phase current.
- Frequency.
- Active, apparent and reactive power.
- Power factor.
- Instantaneous generator energy (kWh) and accumulated energy (day, month and year).
- THD (harmonic distortion) of voltages and currents.
- Calculation of harmonics up to order 20.

The Controller module allows the connection of engine sensors to manage the following features of its operation:

Analog inputs from the enginer:

- Fuel level.
- Pressure.
- Temperature.
- External fuel level.
- Oil temperature.
- Heating resistance.

Configurable inputs: The Controller module has 12 inputs that can be programmed to perform the following functions:

- Fuel level engine alarm.
- Engine coolant temperature alarm.
- Engine oil pressure alarm.
- Engine coolant level alarm.
- Preheating cut-off.
- Start enablement.
- Activation of ECU power supply output.
- Engine speed increase.
- Engine speed decrease.
- Inhibition of forced regeneration.
- Request for forced regeneration.
- Safety conditions for regeneration.
- External start.
- Disabling the start.
- Parameter set selection
- Activation of the urea pump.
- Activation of the transfer pump.
- Activation of oil pump.
- Generator in reserve.
- Automatic mode activation.
- Manual mode activation.
- Test mode activation.
- Lock mode activation.
- Forced running.
- Reset of alarms.
- Change of tariffs.
- Programming configuration lock.
- User interface lock.
- Activation of dark mode.
- Enable geolocation.
- Activate geolocation location.
- Disabling activation of the grid contactor.
- Disabling activation of the generator contactor.
- Confirmation of grid contactor.
- Confirmation of generator contactor.
- Request for activation of the grid contactor.
- Request for activation of the generator contactor.
- Programmable alarms.

Engine statistics:

- Operating hours.
- Number of starts.

The Controller module controls the following **engine functions**:

- Preheating.
- IGNITION.
- STOP.
- START.
- Heating resistance.
- Transfer pump.
- Urea pump.
- Alternator activation.

The **CPU8** control module has outputs to monitor and command the status of the controller. All of them can be programmed to perform the different functions available.

The connection of the controller module and the user interface is made via a CAN communication bus, which allows the interconnection of additional modules, thus ensuring the scalability of the controller.

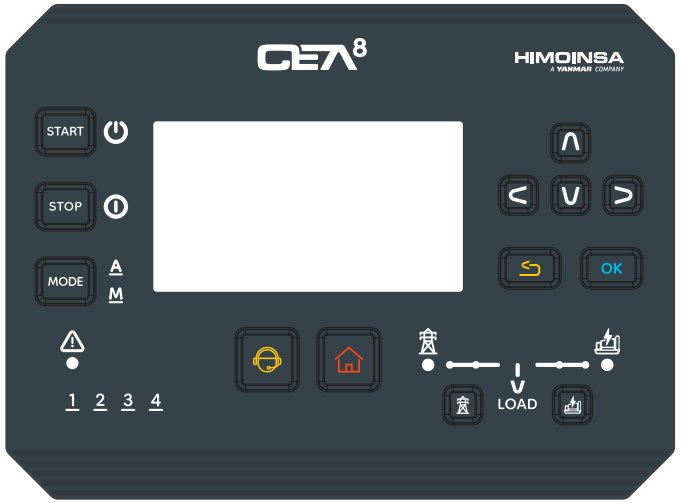
The following additional modules can be optionally added to the **CE8** controller by connecting to the CAN bus:

- Expansion of relay outputs via CCRemoteOut device.
- Expansion of digital inputs via CCIn8 device.
- Expansion of temperature sensors via CCPT100 device.
- Repetitive user interface.

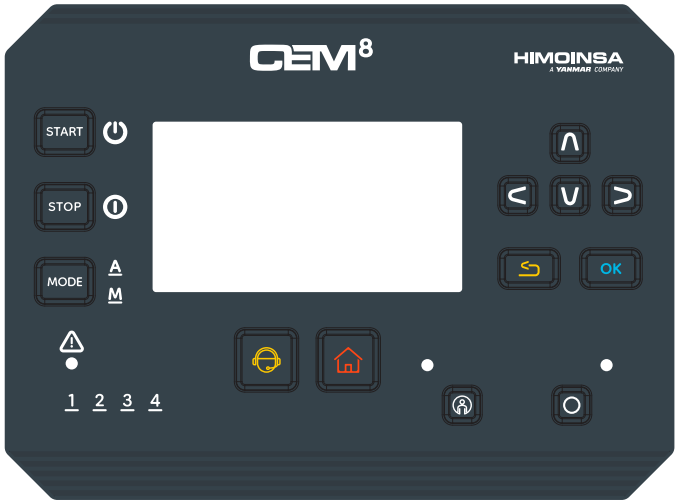
The **CPU8** control module incorporates a PLC that allows the programming of customised operations in the controller for the management of the generator set.

2. FRONT END OF THE USER INTERFACE

The user interface has a backlit display and various LEDs for monitoring the controller status. It also has buttons that allow the user to command and program the controller.



CEA8 user interface cover page controller model AMF



User interface cover page CEM8 controller model AMG

2.1 PUSHBUTTONS ON THE CONTROLLER

2.1.1 CONTROLLER OPERATING MODE PUSHBUTTONS

	**Mode selection pushbutton.** Pressing the pushbutton takes the user to the mode selection screen, where the user can activate MAN mode or AUTO mode. It is possible to activate the mode lock that prevents the controller from switching to MAN mode from the same selection screen, thus preventing any other user from changing the controller's operating mode.	**LED on:** Active mode. **LED flashing:** AUTO mode lock active. **LED off:** Mode not active.

2.1.2 CONTROLLER COMMAND BUTTONS

	**ENGINE START** pushbutton (MAN mode only). Manages the start with a single press.	**LED on:** Engine running.
	**ENGINE STOP** button (MAN mode only). The first press stops the engine following a cooling cycle. The second press stops the engine immediately.	**LED steady:** Engine STOP. **LED flashing:** Engine STOP (includes engine cool down time).

2.1.3 PUSHBUTTONS ON THE INTERFACE

	Pushbuttons: Up/down/right/left navigation through the interface screens.
	Access to the menus and validation of the data entered.
	Menu backtracking and cancellation in data editing.

2.1.4 LOGIN BUTTON (only user interface CE8 for AMG control unit)

	The CEM8 central unit is equipped with a pushbutton on the front of the user interface which allows direct access to the user access screen or, if logged in, to log out (press and hold the button for 5 seconds).	**LED on:** User access granted. **LED off:** No user logged.

2.1.5 MULTIFUNCTION PUSHBUTTON (only user interface CE8 for AMG control unit)

The CEM8 control panel has a push button on the front of the user interface to which one of the following functionalities can be assigned (Table Interface, parameter 4):

1. **Position programming.** Pressing the button programs the current position as the reference position of the anti-theft application.

   In this functionality the LED will light up when a reference position has been programmed and the anti-the application is enabled.

2. **Open/Close CG.** Pressing the button will toggle the status of the genset contactor. It is important to have an output programmed as group contactor activation for this button to have any effect

   In this functionality the LED will light up when the genset contactor is closed.

3. **Alarm reset.** Pressing the button will reset all alarms and DTCs that are not active.

   In this functionality the LED Will light up when there is an alarm DTC that can be reseted.

4. **Alarm mute.** Allows to mute the buzzer sound when an alarm is received without having to enter the alarm screen.

   In this functionality the LED will light up when the buzzer is emitting the alarm sound.

5. **Shortcut (Alarms).** Pressing the button will take you directly to the “Alarms” page without having to move through the navigation.

6. **Shortcut (Generator).** Pressing the button will take you directly to the “Generator” page without having to move through the navigation.

7. **Shortcut (Engine).** Pressing the button will take you directly to the “Engine” page without having to move through the navigation.

8. **Ignition activation.** Pressing the button will activate/deactivate manually the ignition output of the engine.

   In this functionality the LED will light up when the Ignition output is activated via this button.

9. **Fuel pump activation.** Allows manual activation of the fuel pump (as long as the pump is in manual or mixed mode) without the need to navigate to the Functions/ Fuel Pump screen.

   In this functionality the LED will light up when the fuel pump is active.

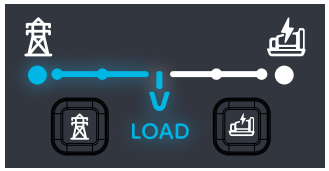
10. **DEF pump activation.** Allows manual activation of the DEF pump (as long as the pump is in manual mode) without the need to navigate to the Functions/ DEF Pump screen.

    In this functionality the LED will light up when the DEF pump is active.

11. **PLC input.** Pressing the button will toggle a flag that can be managed form the PLC program.

12. In this functionality the LED is managed from the PLC program.

2.1.6 CONTACTOR PUSHBUTTONS (only CE8 user interface for AMF controller)



Grid contactor. Activates/deactivates the grid contactor (MAN mode only).

Generator contactor. Activates/deactivates the generator contactor (MAN mode only).

GRID LED on: Presence of the grid.

GENERATOR LED on: Engine started.

LOAD LED on: Contactor closed.

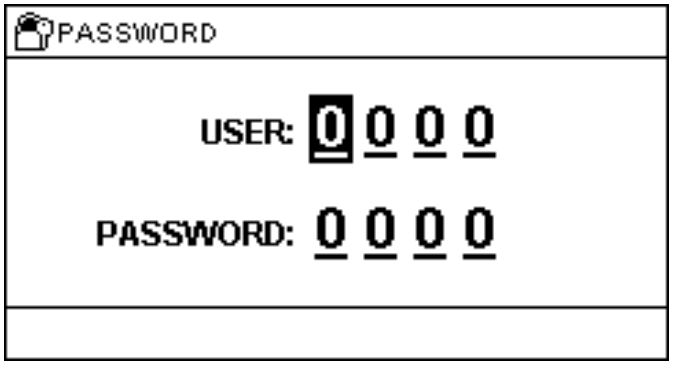
2.2 PASSWORDS

The **CE8** controller has two user levels and a 4-digit password to protect unauthorised access. The different access levels are as follows:

- **User.** The access level allows you to view the configuration of the **CE8** controller and command certain actions on the controller (change of mode, interface customisation, basic settings...). **The default user and password is 1111**.
- **Maintenance.** The access level allows access to the configuration parameter programming option and command all the controller's functionalities (customisation, functionalities, settings...). **The default user and password is 1911**.

In case you are not logged in with a user level there are two ways to log in:

- Accessing by navigation to a restricted screen with an access level. In doing so, the Log In screen will automatically pop up if no user is logged in.
- In the case of **CEM**, controller, by pressing the user access button on the front pannel .

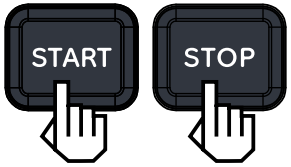


The session will automatically log out after 10 minutes without pressing any button, but can be manually logged out by pressing and holding the HOME button or, in the case of the CEM, the user access button on the front panel.

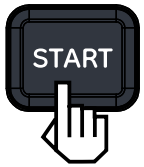
3. OPERATING MODES

3.1 MAN MODE

In MAN mode, the controller is controlled by the user via the front pannel of the User Interface. The user can start and stop the engine by pressing the **START and STOP buttons respectively**.



Pressing the **START** button initiates the engine start operation (without deactivating the grid contactor). Pressing the **STOP** button initiates the engine stop operation with cooling. **A second press of the STOP** button **stops** the engine **immediately** without waiting for the cool-down time.



x1 click
WITH cooling

x2 (double click)
WITHOUT enfriamiento

NOTE

In MAN mode, the control unit's protections remain active and alarms may be triggered which can cause the engine to stop. In MAN mode, the controller does not attend to the start conditions (programmed, by external signal or grid failure for the CE8 model of AMF control unit) that it may have programmed.

Model CEA8 AMF controller:

The grid and generator contactors are activated by pressing the buttons symbolised by the grid and generator icon respectively.

The activation of the generator contactor is conditional on the engine being started and providing a stabilised electrical signal.

Activation of the generator contactor deactivates the grid contactor and vice versa. For each contactor there is a configurable time (Time Table, parameters 40 and 41) for waiting between contactors activation.

3.2 AUTO MODE

In AUTO mode, supervision of the installation is managed by the controller. In certain programmable circumstances, the controller starts the generator by activating the genset contactor to supply the installation.

The programmable conditions for generator start and activation of the generator contactor include:

- Maximum grid voltage alarm (only model CEA8 for AMF controller).
- Minimum grid voltage alarm (only model CEA8 for AMF controller).
- Maximum grid frequency alarm (only model CEA8 for AMF controller).
- Minimum grid frequency alarm (only model CEA8 for AMF controller).
- Grid sequence alarm (only model CEA8 for AMF controller).
- Grid failure alarm (only model CEA8 for AMF controller).
- Grid contactor failure alarm (only model CEA8 for AMF controller).
- External START.
- Start programmed by schedule.
- Forced running signal.

Programmable generator start conditions without contactor activation include:

- Pricing notice.
- Engine test.
- Grid pricing (EJP1).

There are 2 additional operating modes that allow to condition the operating conditions of the **CE8** controller in AUTO mode (only CEA8 model for AMF controller):

- **TEST:** The controller causes a start of the generator following the procedure explained in the Engine Start section (see section 4.1) without power supply to the installation as it does not activate the genset contactor. The **CE8** controller will activate the genset contactor if there is another generator start condition simultaneous to the TEST mode.
- **LOCKOUT:** The controller disables the generator start under any existing power supply condition.

By pressing the MODE button and with the AUTO mode activated, the mode lock is activated via the display. This state of the controller is indicated by the flashing of the AUTO LED. The controller does not allow the deactivation of the AUTO mode when the mode lock is active. To deactivate the mode lock and allow normal operation of the controller, press the button MODE again and deactivate the mode lock from the display.

4. OPERATION

4.1 ENGINE START

In the event of a controller activation condition, the following engine start operation is performed:

1. **Start delay.** Once an activation condition is detected, a delay time (Times Table, parameter 2) can be programmed before continuing the start procedure. This delay only applies to engine starts in AUTO mode.

2. **Engine preheating.** The controller activates the preheating output for the programmed time (Times Table, parameter 3). The controller allows the programming of a temperature threshold (Thresholds Table, parameter 15) of the coolant sensor which interrupts the warm-up process and starts the engine.

3. **Enabling the engine start (positive contact activation).** The engine start enable (contact positive activation) is performed by configuring the “Engine start” output, configured as Stop by De-Excitation (output activation during engine operation) or the “PULL” output, configured as PULL excitation of the start solenoid (1 second pulse during engine start). The programmed output can be configured depending on the engine installed (diesel or gas - Regulations Table, parameter 51).

4. **Engine start.** For a maximum time (Times Table, parameter 4), the output programmed as “Engine Start” of the Controller module is activated waiting to detect at least one of the programmed start conditions. The possible engine start conditions are as follows:

- **Generator voltage** (Regulations Table, parameter 52). The engine is considered to be started when a certain Generator voltage is exceeded (Thresholds Table, parameter 5).
- **Alternator voltage** (Regulations Table, parameter 53). The engine is considered to be started when a certain battery charging alternator voltage is exceeded (Thresholds Table, parameter 6).

- **Engine speed** (Regulations Table, parameter 54). The engine is considered to be started when a certain speed calculated through pickup (Thresholds Table, parameter 7) or obtained through the engine electronics via the J1939 bus is exceeded. To activate the pick-up calculation via the engine flywheel, the number of teeth of the engine flywheel must be entered (Thresholds Table, parameter 8). If the number of teeth of the engine flywheel is zero, the engine speed is calculated with the generator frequency according to the ratio 50 Hz/1500 rpm, 50 Hz/3000 rpm or 60 Hz/1800 rpm (Regulations Table, parameter 59).
- **Low oil pressure signal** (Regulations Table, parameter 55). Due to its characteristics, it is not recommended to use the Low oil pressure signal for the detection of a started engine, however, its use is recommended as a protection to avoid a new start, while the engine is already running. Exceptions to this engine start detection are SCANIA engines and sensors that have their own power supply.

5. **Generator stabilisation.** Once any start condition is detected, the controller waits for a fixed generator signal stabilisation time before starting signal quality monitoring.

6. **Nominal condition.** Once the stabilisation of the generator has been reached, it goes to signal verification status. In this state, the quality of the signal produced by the generator is evaluated (voltage levels, frequency...).

7. **Smoke Control.** The **CE8** controller allows the management of the start with smoke limitation:

- A programmable output can be assigned to activate a smoke limiting system during the start process. This output will remain active for a programmable time (Times Table, parameter 38) after the engine start condition.
- An idle start speed (J1939 Table, parameter 8) can be programmed to be maintained for a programmable time (J1939 Table, parameter 9) before switching to rated speed.

If no engine start is detected during the programmed time, the controller waits for a time interval (Times Table, parameter 1) before retrying a new start. After exceeding a number of starts without detecting start conditions (Thresholds Table, parameter 4), the controller activates the Failure start alarm.

During the start, the battery charging alternator is energised via the output configured as “D+” for a period of time (Times Table, parameter 7). Once the alternator excitation has been completed, the Controller module monitors the correct operation of the battery charging alternator. In case of detection of a battery charging alternator failure, the Battery charging alternator failure alarm is activated.

The controller allows the management of an auxiliary start engine by means of any of the available programmable outputs. The engine start attempts will alternate between the output programmed as “Engine start” and the output programmed as “Auxiliary start”.

PRACTICAL EXAMPLE OF START OPERATION

OPERATION

When the **START** button is pressed, the start cycle is initiated, indicated by the flashing of the LED on the button. At the same time, if the engine has a glow plug, the output programmed as “Engine preheating” is activated for the programmed time.

Once the time has elapsed, the output programmed as “Engine Preheating” is deactivated and immediately the output programmed as “Engine Ignition” is activated (positive contact) and 0.5” later the output programmed as “Engine Start” is activated and remains active until the detection of any engine start condition.

Once the engine has been detected as having started, the **START** button LED remains on and the start cycle is complete.

If no engine start condition is detected during the start cycle, the output programmed as “Engine start” is deactivated. Subsequently, the controller automatically starts a new start attempt, repeating a new cycle without pressing **START** (4 cycles by default). After exhausting the attempts without achieving the start of the engine, the controller shows the “Start Failure” alarm on the interface.

To interrupt the start cycle, simply press the **STOP** button.

NOTE

An engine status screen is shown on the interface, which displays the status of the engine during the start operation. This sequence is as follows:
1. Preheating (if glow plug is fitted).
2. Starting up.
3. Ripped out.
4. Stabilised.
5. On load.
The engine start in AUTO mode (e.g. by schedule, external signal, etc.) is carried out in the same way as a manual start.

4.2 ENGINE STOP

The engine STOP process in automatic mode is carried out according to the following operation:

1. **Cooling of the engine.** Once the engine is free of load, it will continue to run for a cool-down time (Times Table, parameter 9).

2. Stop of the engine. Once the engine cooling time has elapsed, if the start was produced by the output programmed as “Engine Start”, the output is deactivated, if the start was produced by the output programmed as “PULL”, the output programmed as “Engine Stop” is activated for a programmed time (Times Table, parameter 11). The following can be selected as the engine STOP condition:

- **Generator voltage** (Regulations Table, parameter 52). The engine is considered to be stopped when the generator voltage is lower than the start threshold (Thresholds Table, parameter 5).
- **Alternator voltage** (Regulations Table, parameter 53). The engine is considered to be stopped when the battery charging alternator voltage is lower than the start threshold (Thresholds Table, parameter 6).
- **Engine speed** (Regulations Table, parameter 53). The engine is considered to be stopped when the engine speed calculated by pickup or obtained from the engine electronics via the J1939 bus is lower than the start threshold (Thresholds Table, parameter 7). To activate the pickup calculation via the engine flywheel, the number of teeth of the engine flywheel must be entered (Thresholds Table, parameter 8). If the number of teeth of the engine flywheel is zero, the engine speed is calculated with the generator frequency according to the ratio 50 Hz/1500 rpm, 50 Hz/3000 rpm or 60 Hz/1800 rpm (Regulations Table, parameter 59).
- **Low oil pressure signal** (Regulations Table, parameter 54). The Low oil pressure condition used for the STOP detection considers the engine to be stopped when the sensor is detected closed. Exceptions to this Stop detection are engines that mount sensors with their own power supply.

To validate the engine stop, all programmed Stop conditions must be detected during a time interval (Alarms Table, parameter 128). If after a configurable time (Times Table, parameter 42) an engine running condition is still detected, the Stop fault alarm is activated.

PRACTICAL EXAMPLE OF STOP OPERATION

The generator can be stopped in several ways:

1. **Manual:** By pressing the **STOP** button once. To perform a stop with cooling cycle.

2. **Manual:** By pressing the **STOP** button twice. To perform a stop without cooling cycle.

3. By turning the control panel **activation key** to the "0" position. To make a stop without cooling cycle.

4. **Automatic:** After deactivation of the command that made it start automatically, thus making a stop with cooling.

OPERATION

Pressing the **STOP** button once starts the stop cycle with cooling of the engine. This is indicated by the flashing of the **STOP** button LED.

After the end of the cooling time (120" by default), the output programmed as "Engine start" (contact positive) is deactivated or the output programmed as "Engine Stop" is activated, depending on the programming configured to carry out the stop. This is indicated by the fixed LED of the **STOP** button.

If after some time an engine start condition is still detected, the controller will show the alarm "Stop failure" on the interface and the **STOP** button LED will remain flashing.

NOTE

An engine status screen is displayed on the user interface, showing the different phases of the engine during the STOP operation. This sequence is as follows:
1. Cooling.
2. Stopping.
3. Stopped.

4.3 FUEL PUMP

It is possible to activate the transfer pump function of the **CE8** controller by associating a programmable output as "Transfer pump activation" of the Control Module (Regulations Table, parameters 39 to 50). Once the transfer pump option has been activated, its operating mode is configured (Regulations Table, parameter 86):

- **Inhibited mode**. The transfer pump is not managed.
- **MAN mode**. The transfer pump is activated via the screen associated with this operation in the User Interface (Functions - Fuel Pump) whenever the fuel level is above the maximum deactivation threshold (Thresholds Table, parameter 17). In the case of the CEM8, the functionality "Manual activation of transfer pump" (Interface Table, parameter 4, functionality 8) can be assigned to the multifunction button to activate the pump from the button on the front panel.
- **AUTO mode**. The transfer pump management operates according to a minimum activation threshold (Thresholds Table, parameter 16) below which the programmed output is activated and a maximum deactivation threshold (Thresholds Table, parameter 17) below which the programmed output is deactivated.
- **Mixed mode**. The mixed mode of the transfer pump manages it according to the automatic mode, but at the same time allows the activation of the programmed output via the associated screen on the User Interface or the multifunction. Manual activation of the programmed output is condemned by the maximum deactivation threshold (Thresholds Table, parameter 17).

4.4 HEATING

The engine heating management functionality of the **CE8** controller can be activated by associating an output. Programmable as "Heater resistor" of the Control Module (Regulation Tables, parameters 39 to 50).

The engine warm-up management has the following function:

- Below a certain engine temperature threshold (Thresholds Table, parameter 18), the programmed output is activated.
- Below a certain engine temperature threshold (Thresholds Table, parameter 53), the activation of the generator contactor is condemned and the engine "Low Temperature" alarm is managed (Alarms Table, parameters 145 to 147).

- Above a certain engine temperature threshold (Thresholds Table, parameter 19), the programmed output is disabled.

It is possible to select the temperature input function in the heating functionality by assigning this function to functionality to any of the available programmable inputs (Regulations Table, parameters 19 to 30), or by assigning the functionality to any of the available inputs of the CCPT100 external modules (External Inputs Table, parameters 1 to 32).

4.5 BATTERY CHARGING ALTERNATOR

The battery charging alternator is connected to the **CE8** controller via the digital output/analog input D+.

The **CE8** controller can be configured to produce a battery charging alternator alarm (Alarms Table, parameters 34 to 36) if a low voltage level provided by the battery charging alternator is detected via the analog input D+ of the Control Module.

You can select (Regulations Table, parameter 88) between the following modes of operation of the battery charging alternator.

4.5.1 ALTERNATOR MODE

The operation of the battery charging alternator of the **CE8** control unit configured as alternator mode, excites the alternator by means of a pulse of configurable duration (Times Table, parameter 7) during the engine start process through the D+ output of the control module. At the end of this pulse, the controller starts to test the voltage generated by the battery charging alternator.

The voltage generated by the battery charging alternator can be used as an engine start condition (Regulations Table, parameter 53). To do this, the controller expects to measure a voltage via the analog input D+ higher than an alternator voltage detection threshold (Thresholds Table, parameter 6).

The **CE8** controller can be configured to produce an Alternator voltage alarm (Alarms Table, parameters 34 to 36) if a low voltage level provided by the battery charging alternator is detected through the analog input D+ of the Controller Module if in Alternator mode.

4.5.2 DYNAMO MODE

The battery charging alternator operation of the **CE8** controller configured as dynamo mode excites the alternator via a continuous pulse through the D+ output of the Controller Module while the engine is in the START phase or in the START state.

The controller configured in dynamo mode cannot use the voltage measured through the analog input D+ to detect the engine start condition.

The **CE8** controller can be configured to produce an Alternator voltage alarm (Alarms Table, parameters 34 to 36) if a low voltage level provided by the battery charging alternator is detected via the analog input D+ of the Control Module.

4.6 START/STOP KEY

The start/stop key in the **ON** position triggers the power supply to the electronics of the **CE8** controller (control module and user interface).

The start/stop key in the **OFF** position causes a controlled stop of the engine if it is running. Once the engine has stopped, the power supply to the **CE8** controller is disconnected.

4.7 START ON DEMAND OF LOAD (only user interface CE8 for AMF controller)

This functionality allows the automatic start and activation of the generator set load depending on the power consumed in the grid.

The start is carried out according to the programming of a maximum grid power threshold (kW) that is consumed by the installation over a period of time. Once the generator has started up, the system switches from power to generator and the grid is relieved of load.

Once the power consumed by the installation is below the programmed deactivation threshold and the programmed time period has elapsed, the system transfers the load of the installation back to the grid and the generator starts its stop cycle.

PROGRAMMING: The genset will start by acquiring the load when a grid power consumption higher than a programmed limit is detected (Thresholds Table, parameter 22). The generator set will remain in operation until the measured genset power consumption decreases below a programmed limit (Thresholds Table, parameter 23). On both START and STOP of the generator set on load demand, the condition must be validated for a programmable time (Times Table, parameter 33). The load demand start function is only enabled in automatic mode of the **CE8** controller.

4.8 ELECTRONIC PROTECTION

Electronic protection is a feature that enables an output of the controller to be activated in the event of an overload and short-circuit alarm. This function enables the deactivation of the generator's general circuit breaker via the tripping coil. As long as any of these alarms that cause the engine to stop (immediate or with cooling) remains active or pending notification, the output assigned to electronic protection will remain active.

This functionality can be programmed to any of the programmable outputs available on the Controller Module (Regulations Table, parameters 39 to 50), or to any of the outputs available on the external output devices (External outputs Table, parameters 1 to 48).

4.9 HEATER

The controller's display has a heater that allows it to work at low temperatures. The controller maintains a minimum display temperature by means of a heater, which ensures the refreshing conditions of the display information.

This function is enabled by programming a controller parameter (Heater Table, parameter 1). The minimum display temperature ensured by the heater is programmed via a controller parameter (Heater Table, parameter 2).

4.10 TIME CLOCK

The **CE8** controller has a timer that informs the controller of the current date and time for use in:

- Cumulative energy meters by time period (day, month, year).
- Set a schedule for the controller operation (on-load starts, off-load starts and block).
- Schedule customised operations by PLC taking into account date and time.

The **CE8** controller must be in AUTO mode to attend the calendar programming.

The maximum limit of the controller's calendar is 32 programmes in which the following operating parameters can be configured:

- Working mode. The action to be performed by the controller is configured in this parameter:
  - Engine start under load. The engine is started to supply energy to the installation for the programmed period of time.
  - Engine start interlock. Any engine start condition is inhibited for the programmed time period.
  - Engine start without load. The engine start is carried out without load supply in the installation during the programmed period of time. In the event of any simultaneous engine start condition, the controller will activate the generator contactor in order to provide power supply to the installation.
- Date range. Date range in which the event schedule is valid. It is programmed using the parameters:
  - Start date. The day, month and year from which the calendar event is valid.
  - End date. The day, month and year from which the calendar event ceases to be valid.
- Time range of the event. Time interval in which the controller executes the action programmed by the event. It is programmed by means of the parameters:
  - Start time. The time of day at which the programmed action starts to be executed is indicated by the hour and minute of the day.
  - Duration. The time interval during which the programmed action is to be executed is indicated in hours and minutes.

- Type of repetition. Parameter indicating the type of repetition in which the programmed event is managed:
    - No repetition. The event runs only on the scheduled day. For example, the generator will start charging on 01 July 2025 from 14:15 for 1 hour and 30 minutes.
    - Selection of the day of the week. You select the days of the week on which the scheduled event is to be managed. For example, the generator will start charging from 01 July 2025 until 31 August 2025 from 14:15 for 1 hour and 30 minutes on Mondays, Tuesdays and Fridays of all weeks in the date range scheduled.
    - Daily. The event runs every day. For example, on Tuesday 01 July 2025 until 31 August 2025 from 14:15 for 1 hour and 30 minutes in the date range indicated.
    - Week. The event runs every week for the scheduled day of the week. For example, the generator will start charging from Tuesday 01 July 2025 until 31 August 2025 from 14:15 for 1 hour and 30 minutes and thereafter every Tuesday in the scheduled date range.
    - Fortnightly. The event runs every 2 weeks for the scheduled day of the week. For example, the generator will start charging from Tuesday 01 July 2025 until 31 August 2025 from 14:15 for 1 hour and 30 minutes and thereafter every Tuesday every 2 weeks for the scheduled date period.
    - Monthly. The event runs every month for the scheduled day of the week. For example, the generator will start charging from 01 July 2025 until 31 August 2025 from 14:15 for 1 hour and 30 minutes and thereafter every 1st day in the scheduled date range.

4.11 STATUS PER SET OF INPUTS

The **CE8** controller allows you to define up to 8 different states depending on the value of the controller's digital inputs and the state of the engine.

To enable this functionality, it is necessary to configure the set of digital inputs for each status (Generator Status Input Table, parameters 9 to 16) and their value (Generator Status Input Table, parameters 17 to 24). In addition, it is necessary to configure the generator status for each input set status (Generator Status Input Table, parameters 25 to 32).

The status defined by combining inputs from the controller and the group status can be used to activate any functionality associated with the controller inputs (Generator Status Input Table, parameters 1 to 8).

For example, you can define a state per set of inputs on the controller that will be active when digital inputs 1 and 2 have active and non-active values respectively while the engine is running. The programmed status is equivalent to a virtual input on the controller and can be assigned to any functionality as if it were a real digital input (programmable alarms, engine start, controller lock, etc.).

4.12 FORCED REGENERATION MODE

The **CE8** controller is used to manage the forced regeneration mode for engines complying with **STAGE V / TIER FINAL 4** standards from **YANMAR**, **SCANIA** e **IVECO**. The controller can perform three different actions:

1. **Regeneration inhibition.** The controller inhibits engine regeneration when this option is activated. Therefore, the engine ECU will not initiate catalyst regeneration, even if the required conditions are met. The active regeneration inhibit indicator is shown at the top of the display by the icon  . Regeneration inhibit is activated either from the User Interface menu (Menu - Regeneration) or by setting a programmable input on the Controller Module.

2. **Safety conditions for regeneration.** The controller indicates to the engine ECU via this option that the generator meets the safety conditions required for the initiation of a forced regeneration process. The active regeneration safety condition indicator is shown at the top of the display  . The regeneration safety condition is activated from the User Interface menu (Menu - Regeneration - Forcing) by following a few simple check steps before the regeneration is forced. For this mode to be enabled a programmable safety condition enable input must be configured and activated. This input must be wired to the load power supply switch confirmation. The **CE8** controller does not handle the following alarms while the regeneration safety conditions option is active:
    - Maximum generator frequency severe.
    - Maximum generator frequency moderate.
    - Minimal generator frequency severe.
    - Minimal generator frequency moderate.
    - Overspeed.

- Underspeed.
- Low power.

3. **Forced regeneration.** The controller forces the engine ECU to initiate a catalyst regeneration process when this option is activated. For this process to be allowed to initiate, the regeneration safety condition must be active and the regeneration inhibit condition deactivated. The regeneration condition is activated either from the User Interface menu (Menu - Regeneration - Force) after the safety conditions have been activated or by configuring a programmable input on the Controller Module as “Regeneration Forced Request”. The active forced regeneration process indicator is displayed at the bottom of the screen together with a progress bar of the regeneration status  .

The controller disables the forced regeneration and regeneration safety conditions and performs an engine cool down shutdown after the end of the forced regeneration process if triggered from the User Interface. Stop with engine cool down at the end of the forced regeneration process if it has been triggered from the User Interface. The user shall deactivate the forced regeneration and regeneration safety conditions at the end of the regeneration process if they have been activated via the programmable inputs of the Controller Module.

4.13 OIL PUMP CONTROLLER

The **CE8** controller allows the oil pump control function to be assigned to any of the programmable outputs (Regulations Table, parameters 39 to 50).

The oil pump controller performs a sequence of 90 seconds ON and 20 minutes STOP for the assigned output after 98.5 hours of engine running. Oil pump activation is only performed while the generator engine is running.

4.14 UREA PUMP

The **CE8** controller allows the control of a urea transfer pump for STV engines. To do this, any of the programmable outputs (Regulations Table, parameters 39 to 50) must be configured as “DEF pump activation” to activate the urea pump.

Thresholds must then be defined:

- Urea pump activation threshold (Thresholds Table, parameter 25) in %. Below this threshold the urea pump is activated.
- Urea pump deactivation threshold (Thresholds Table, parameter 24) in %. Above this threshold the urea pump is stopped.

The urea pump functionality has a configurable alarm that will be activated if the pump is active, and if after a certain time (Alarms Table, parameter 59) the urea tank level has not increased by a configurable percentage (Thresholds Table, parameter 26) the alarm is activated and stops the urea pump.

The functionality of the urea pump provides for the filling of the urea tank by manual transfer or automatic transfer.

MANUAL TRANSFER: The operator is in charge of activating the pump through the User Interface menu (Menu - Functions - DEF Pump). When accessing the screen for urea pump activation, the positive contact is activated in order to power supply the engine ECU and receive the urea level measurement (DEF).

The pump is deactivated when the urea level reaches the set threshold (Thresholds Table, parameter 24), or when the alarm is activated due to an error in filling the tank.

Other ways to activate the transfer pump manually are by programming a digital input (Functionality 105) or by using the “Manual DEF pump activation” functionality of the multifunction button (Interface Table, parameter 4). If there is an input configured with this functionality, it cannot be managed from the multifunction button.

AUTONOMOUS TRANSFER: To operate in this mode, a programmable input must be configured as “DEF Pump Activation”. With the engine running and the programmed input active, the DEF level is constantly monitored. When the level drops below the configured minimum threshold (Thresholds Table, parameter 25), the pump is activated until the configured maximum threshold is reached (Thresholds Table, parameter 24).

4.15 START ENABLE

Some engines require the start to be enabled from the engine ECU via an external input (“Ready to Start” signal).

The **CE8** controller allows the possibility of configuring any programmable input as “Start Enable”, so that when this input is active, the engine will be allowed to start.

The evaluation of the START enable is performed after the engine warm-up, so if it is not active, the engine will not complete the start process waiting for the start enable indicated by the input assigned to this functionality.

4.16 CG MANAGEMENT VIA MULTIFUNCTION KEY (only user interface CE8 for AMG control unit)

In control units that include a group contactor that can be operated from a digital output, the multifunction button can be programmed (Interface Table, parameter 4, functionality 1) to manually operate this contactor from the user interface front panel.

By setting this functionality to the pushbutton, the multifunction button on the front panel allows the status of the contactor to be toggled, indicating on the corresponding LED whether the contactor is closed (LED on) or open (LED off).

4.17 IGNITION ACTIVATION VIA MULTIFUNCTION KEY (only user interface CE8 for AMG control unit)

In CEM8 control panels equipped with a multifunction button, this button can be programmed to manually manage the status of the IGNITION output of the motor.

By setting this functionality to the pushbutton, the multifunction button on the front panel allows the status of the motor's IGNITION output to be toggled, indicating on the corresponding LED whether it is active (LED on) or inactive (LED off).

It is important to note that the operation of this button only applies if the engine is stopped, in order to avoid problems with starting and stopping the engine, and if there is no input programmed as Ignition activation. Finally, the LED only shows the status of the Ignition output managed from the key, if the output is active for any reason other than manual activation from the key, the LED will not show it.

5. INPUTS AND OUTPUTS

The digital inputs of the **CE8** controller are all programmable. They have an associated anti-bounce time (Times Table, parameters 14 to 31) that forces the input value to be stable during a time interval. Likewise, all the inputs of the **CE8** controller can be configured to be active when the contact is closed to ground or inactive when the contact is closed to ground (Regulations Table, parameters 2 to 18).

The status of the inputs and outputs of the **CE8** controller can be monitored from the User Interface menu (Menu - Inputs/Outputs). From this position it is possible to select the inputs/outputs to be displayed.

5.1 DIGITAL INPUTS

The Controller Control Module of the **CE8** controller has a digital input whose operation is preset and cannot be changed.

- **EMERGENCY STOP (EMS).** Digital signal that indicates to the Controller that the engine must be stopped immediately without cooling with the generator control opening. This input disconnects by hardware the activation of the power outputs P1 and P3 and the engine control output O3. These outputs must be configured to execute the engine manoeuvres (START, ignition) that need to ensure the cut-off to comply with safety regulations.

The other digital inputs (input IN1 to IN12) and the analog inputs (input AN1 to AN4) are configurable in their functionality (Regulations Table, parameters 19 to 34). The functionalities that can be associated with them are as follows:

- **FUEL RESERVE.** Digital signal indicating to the controller that a fuel reserve alarm has occurred.
- **HIGH TEMPERATURE.** Digital signal indicating to the controller that a high engine temperature alarm has occurred.
- **LOW OIL PRESSURE.** Digital signal indicating to the controller that a low oil pressure alarm has occurred.
- **WATER LEVEL.** Digital signal that indicates to the controller that a low water level alarm has occurred.
- **PREHEATING CUT-OFF.** Digital signal that indicates to the controller the STOP of the preheating start operation because the engine has already reached the required temperature.

- **START ENABLE.** Digital signal indicating to the controller that the start has been enabled to the engine ECU (required on some engines).
- **CONTACT POSITIVE.** Digital signal that tells the controller to activate the positive contact output to power supply the engine ECU.
- **SPEED INCREASE.** Digital signal that indicates to the controller that the speed should be increased by a percentage of the nominal speed.
- **SPEED DECREASE.** Digital signal that indicates to the controller that the speed should be reduced by a percentage of the nominal speed.
- **REGENERATION INHIBITION.** Digital signal indicating to the controller that catalyst regeneration has been disabled on STAGE V/TIER FINAL 4 compliant engines.
- **REQUEST FOR FORCED REGENERATION.** Digital signal indicating to the controller the request for catalyst regeneration on STAGE V/TIER FINAL 4 compliant engines.
- **REGENERATION SAFETY CONDITIONS.** Digital signal indicating to the controller that the permission has been enabled to perform the management corresponding to the regeneration inhibit and regeneration request commands.
- **EXTERNAL START.** Digital signal indicating to the controller that the generator is being forced to start when no start disabling condition is active (controller LOCK mode, start disabling input, start inhibition programmed by calendar). This function is only managed when the controller is in AUTO mode. There is a configurable delay time (Times Table, parameter 08) for the engine start and Stop.
- **START DISABLING.** Digital signal that indicates to the controller the disabling of the generator start which prevents the engine from starting in any start condition except forced running configured as high priority. This function is only managed when the controller is in AUTO mode.
- **TARIFF WARNING SIGNAL (EJP1).** Digital signal that indicates to the controller the start of the generator by pricing after a programmed time has elapsed (Times Table, parameter 10). The end of the charging ends when the signal is deactivated, causing the engine to stop and cool down. This signal starts the engine without supplying power to the installation. This function is only managed when the controller is in AUTO mode.
- **TARIFF CHANGE SIGNAL (EJP2).** Digital signal that indicates to the controller the power supply signal to the installation by tariffing, always by activating the generator contactor. This function is only managed when the controller is in AUTO mode.
- **ENABLE DEF PUMP ACTIVATION.** Digital signal that indicates to the controller the enablement to execute the automatic operation of the urea pump.
- **ENABLE FUEL PUMP ACTIVATION.** Digital signal that indicates to the controller the enablement to execute the automatic operation of the transfer pump.
- **ENABLING OIL PUMP ACTIVATION.** Digital signal that indicates to the controller the enablement to execute the automatic operation of the oil pump.
- **DEF PUMP MANUAL ACTIVATION.** Activates the DEF pump if it is in manual mode and below the maximum DEF threshold.
- **STANDBY GENERATOR PRIORITY.** Digital signal indicating to the controller that this generator set has start priority in the standby genset functionality.
- **AUTO MODE ACTIVATION.** Digital signal that indicates to the controller the activation of AUTO mode.
- **MAN MODE ACTIVATION.** Digital signal indicating MAN mode activation to the controller.
- **TEST ACTIVATION.** This function is managed in AUTO mode of the controller with the motorised MCB option. The input configured as test allows the generator to be checked without activating the load. For AMF control units, the activation of this input in MAN mode indicates to the controller the activation of the TEST mode.
- **LOCK ACTIVATION.** Digital signal indicating LOCK mode activation to the controller.
- **FORCED RUN.** Digital signal indicating to the controller that the fire regulations must be complied with, according to which the generator set must not be stopped under any condition, except for overspeed or emergency stop (either alarm, external input to disable the start or programmed block). This function is only managed when the controller is in AUTO mode.

  There are 3 modes of forced operation:

  - Forced run not enabled: The forced run process is not managed despite having an associated programmable input.
  - Mains failure start: When the input is activated, it waits for the start to occur due to some programmed condition (mains signal alarms, mains contactor failure, external start...) to start the generator. To stop the generator, it is not enough for the start condition to disappear, but the associated input must be deactivated.

- Forced start: When the input is activated, the generator starts immediately without waiting for any other start condition to occur. To stop the generator set, it is necessary to switch to manual operating mode and, from this mode, to stop the controller by pressing the stop button on the keypad.

- **ALARM RESET.** Digital signal that indicates to the controller to reset non-active alarms pending notification.
- **PARAMETER SET 1.** Digital signal indicating to the controller the selection of set 1 of configuration parameters.
- **PARAMETER SET 2.** Digital signal indicating to the controller the selection of configuration parameter set 2.
- **AUTOMATIC CONTROLLER MODE (CE8).** Digital signal indicating the AMF mode of operation AMF from the generator to the controller.
- **PROGRAMMING LOCK.** Digital signal that indicates to the controller that the programming of configuration parameters has been blocked. No controller parameters can be programmed while the programming lock mode is active.
- **SCREEN LOCK.** A digital signal that prevents navigation of the User Interface screens while it is active.
- **DARK MODE.** Digital signal that tells the controller to turn off the display backlight to prevent the display from glowing.
- **LOCATION ENABLING (IOT).** Digital signal that indicates to the controller that the positioning of the generator must be enabled.
- **LOCATION PROGRAMMING.** Digital signal indicating to the controller to set the current location of the generator set for use in the anti-theft functionality.
- **GRID CONTACTOR DISABLE (CEA8 controller only).** Digital signal that indicates to the controller the disabling of the grid contactor activation. This function is only managed when the controller is in AUTO mode.
- **GROUP CONTACTOR DISABLE.** Digital signal that indicates to the controller the disabling of the generator contactor activation. This function is only managed when the controller is in AUTO mode.
- **CONFIRMATION OF GRID CONTACTOR ACTIVATION.** Digital signal indicating to the controller the verification of the correct activation of the grid contactor. The controller waits for verification of the grid contactor closed status at the programmed digital input for a configurable maximum time (Times Table, parameter 41) after the contactor has been activated. If after this time the controller has no confirmation of the status of the grid contactor and the grid failure alarm is not active, a grid contactor alarm is generated. If the controller is operating in AUTO mode, the grid contactor confirmation alarm is an engine start condition with activation of the generator contactor to supply power to the installation.
- **CONFIRMATION OF GENERATOR CONTACTOR ACTIVATION.** Digital signal that indicates to the controller the verification of the correct activation of the generator contactor. When the genset contactor is activated, a waiting interval is opened (Times Table, parameter 40) to verify the activation of the contactor through the programmed input. If after this time there is no confirmation, a generator contactor alarm is generated. If the controller is operating in automatic mode, a STOP with engine cooling and activation of the grid contactor occurs if it is within the valid operating parameters.
- **GRID CONTACTOR ACTIVATION REQUEST (CEA8 controller only).** Digital signal indicating to the controller the request to activate the grid contactor. The controller closes the contactor as long as the grid voltage is within the defined thresholds for correct operation. This function is only managed when the controller is in MAN mode.
- **GENERATOR CONTACTOR ACTIVATION REQUEST.** Digital signal indicating to the controller the request to activate the generator contactor. The controller will close the contactor as long as the generator voltage is within the defined thresholds of correct operation. This function is only managed when the controller is in MAN mode.
- **PROGRAMMABLE ALARMS.** The **CE8** dcontroller has 64 programmable alarms that can be associated to any of the available programmable inputs to provide the controller with additional alarms whose operation is configurable. These alarms can be programmable both in the way they are triggered and in the text they display when activated in the User Interface.

5.2 ANALOG INPUTS

The **CE8** controller has 5 analog inputs and a pulse count input to measure the engine operating values. These analog inputs are used to characterise the operation of the engine in order to display its status and produce alarms if necessary. By default, the alarms produced by the analog inputs do not cause the controller to stop (engine warnings), although they can be configured to stop the engine with or without cooling.

The **CE8** controller continuously checks the presence of the installed analog sensors and displays the value of the readings on the User Interface screen.

Pick-up input (PCK1, PCK2)

The pick-up input of the controller module measures the rotational speed of the engine in revolutions per minute (rpm). To calculate the rotational speed, it is necessary to enter the number of teeth on the flywheel ring gear (Thresholds Table, parameter 8).

If a zero value is entered in the number of gear teeth parameter, the controller is configured not to have a pick-up sensor and to calculate the engine speed from the frequency of the AC electrical signal generated by the generator according to the ratio 50 Hz/1500 rpm or 50 Hz/3000 rpm, 60 Hz/1800 rpm or 60 Hz/3600 rpm (Regulations Table, parameter 59).

The **CE8** controller can be configured to produce either an overspeed (Alarms Table, parameters 118 to 120) or underspeed alarm (Alarms Table, parameters 121 to 123) depending on the mechanical speed provided by the pick-up.

Alternator voltage input (D+)

The alternator voltage analog input is used to monitor the voltage value generated by the battery charging alternator. This input is used to diagnose a possible malfunction of the alternator by detecting a low voltage level while the engine is running. In this condition, a battery alternator alarm is generated (Alarms Table, parameters 34 to 36).

Also, this voltage can be programmed to detect the start condition of the generator (Regulations Table, parameter 53) by means of an alternator voltage threshold for the started engine (Thresholds Table, parameter 6) as long as it is not configured in dynamo mode (Regulations Table, parameter 88).

Analog inputs (AN1, AN2, AN3, AN4)

The 4 analog inputs incorporated in the **CE8** controller allow the configuration of the response curve of the connected sensor and the programming of the engine variable it manages. The possible configurations that can be applied to each input are as follows:

- Resistive analog input (0 Ω -10 KΩ).
- Analog current input (0 mA - 45 mA).
- Analog voltage input (0 V - 10 V).
- Digital input.

External analog inputs

The **CE8** controller allows to add 16 analog temperature inputs to PT100 sensor by expanding up to 4 CCPT100 devices. Each of these 4 analog temperature inputs with PT100 sensor can be associated with 2 maximum temperature alarms.

The **CE8** controller allows the addition of 16 configurable analog inputs (voltage 0 to 10 V, current 4 to 20 mA or resistive) through the CCPT100 expansion. A configurable response curve can be associated to each of these 16 configurable analog inputs.

The engine sensors with predefined functionality that can be associated with any of these analog inputs are:

Fuel level

The fuel level analog input indicates the amount of fuel remaining in the tank. By programming a threshold, a fuel level limit (Thresholds Table, parameter 48) can be set to cause an engine alarm (Alarms Table, parameters 142 to 144) when a level below this limit is detected.

When one of the relay inputs is programmed to manage the transfer pump, the detection of a fuel level below a lower limit (Thresholds Table, parameter 16) causes the transfer pump to start in order to fill the tank with fuel. Deactivation of the transfer pump occurs when a fuel level above a programmable threshold is detected (Thresholds Table, parameter 17). In manual mode of operation of the transfer pump, this higher threshold condemns the activation of the transfer pump by pressing by the user.

This fuel level reading of the generator allows the management of the fuel theft alarm.

Oil pressure

The analog oil pressure input allows the oil pressure value of the engine to be monitored. The controller allows the connection of VDO type sensors to this analog input. By programming a threshold, a moderate oil pressure limit (Thresholds Table, parameter 49) and a severe oil pressure limit (Thresholds Table, parameter 50) can be set to trigger an engine alarm (Alarms Table, parameters 28 to 30) when a pressure below these limits is detected.

Engine temperature

The analog engine temperature input allows monitoring of the engine water temperature value. The controller allows the connection of VDO type sensors to this analog input. By programming a threshold, a maximum moderate engine temperature limit (Thresholds Table, parameter 51) and a maximum severe engine temperature limit (Thresholds Table, parameter 52) can be set to trigger an engine alarm (Alarms Table, parameters 130 to 136) when a temperature below this limit is detected.

The controller allows the programming of a temperature threshold (Thresholds Table, parameter 15) of the coolant sensor which interrupts the preheating process during the engine start process.

Oil temperature

The analog oil temperature input allows the engine oil temperature to be monitored. The controller allows the connection of VDO type sensors to this analog input. The controller does not manage predefined alarms associated with the engine oil temperature, being necessary to use any of the available programmable alarms to implement this functionality.

Engine Speed Adjustment (J1939)

The analog input for engine speed control adjustment allows the engine speed to be adjusted up to ±50 rpm above the nominal speed according to the equivalence curve programmed at this input. To do this, an electronic engine with J1939 communication must be used and the option must be enabled through the controller configuration (J1939 Table, parameter 5, value 3).

Heating resistance

The heating resistor analog input allows to regulate the activation of this resistor by converting it to a temperature measurement which is associated with the activation of a programmable output of the controller.

When one of the controller outputs is programmed to perform heating management, the detection of a temperature below a lower limit (Thresholds Table, parameter 18) causes the activation of the heating resistor to increase the temperature. The heating resistor is deactivated when a temperature level higher than a programmable threshold is detected (Thresholds Table, parameter 19).

External fuel level

The analog input associated with the level reading of an external fuel tank indicates the amount of fuel remaining in the external fuel tank.

This fuel level reading from the external tank enables the fuel theft alarm to be managed.

5.3 DIGITAL OUTPUTS

The **CE8** controller has 15 configurable purpose outputs:

- 8 transistor outputs.
- 4 relay outputs.
- 3 power outputs.

The operation of these outputs is preset with an initial configuration of factory values, although all of them can be modified through the configuration of the controller.

The functionalities that can be associated with these outputs are as follows:

Preheating of the engine

It is recommended to use this functionality associated with the power output P2 which is not condemned by the emergency pushbutton input of the controller.

The preheating output regulates the glow plug heating process of the engine during the start-up process. The activation time of the glow output is configurable (Times Table, parameter 3). The preheat output can also be used to control the excitation stop of engines using this type of stop or for GAS supply ramp activation (Regulations Table, parameter 51).

Engine start

It is recommended to use this functionality associated with the power output P1 which is hardware-controlled by the emergency pushbutton input of the controller.

The engine start output activates the engine start during the start-up process. The engine start activation remains active until a programmed start condition is detected (Regulations Table, parameters 52 to 55) for a programmable maximum time (Times Tbale, parameter 4).

Engine ignition

It is recommended to use this functionality associated to the power output P3 or to the transistor output O1 which is hardware-controlled by the emergency pushbutton input of the controller.

The engine ignition output controls the ignition/turn off of the engine. This output is activated 500 ms after the warm-up output is deactivated and is deactivated when the engine STOP is commanded. This output is used to enable the engine sensors, with the engine stop operation depending on the preheating output.

The **CE8** controller activates the output "Engine ignition" for as long as the user remains within the ENGINE display menu.

PULL mode

It is recommended to use this functionality in conjunction with a P3 power output that is hardware-controlled by the controller's emergency pushbutton input.

This output is activated for a fixed time of 1 second during the engine start process. It is usually associated with a HOLD output connected to the ignition output (IGNITION) of the engine.

Engine stop

It is recommended to use this functionality associated with the power output P2 which is not hardware-controlled by the emergency pushbutton input of the controller.

This output is activated during a programmable time interval (Times Table, parameter 11) when the controller commands the engine to stop.

Alternator excitation

The D+ output of the **CE8** controller is responsible for energising the battery charging alternator during the start process. This output can be configured (Regulations Table, parameter 88) to provide a START pulse (alternator mode) for a programmable time interval (Times Table, parameter 7) or to keep the alternator continuously energised (dynamo mode).

Auxiliary engine start

It is recommended to use this functionality associated with the transistor output O1 which is hardware-controlled by the emergency pushbutton input of the controller.

The auxiliary engine start output activates the starter engine during the start process alternating with the main starter engine output of the controller. The engine start activation remains active until a programmed start condition is detected (Regulations Table, parameters 52 to 55) for a programmable maximum time (Times Table, parameter 4).

Generator contactor closing

The generator contactor output of the **CE8** controller is an output that manages the closing of the generator contactor when the generator voltage signal is stable. The controller's action to close the contactor can be configured to be maintained or active during a time interval (Times Table, parameter 4).

Grid contactor closing (CEA8 controller)

The grid contactor output of the **CE8** controller is an output that manages the closing of the grid contactor when the grid voltage signal is stable.

Generator contactor opening

The generator contactor output of the **CE8** controller is an output that manages the opening of the generator contactor. The controller's action to open the contactor can be configured to be maintained or active during a time interval (Times Table, parameter 4).

Grid contactor opening

The generator contactor output of the **CE8** controller is an output that manages the opening of the grid contactor. The controller's action to open the contactor can be configured to be maintained or active during a time interval (Times Table, parameter 4).

Transfer pump

The transfer pump output of the **CE8** controller is an output that manages the refuelling function of the fuel tank by activating a transfer pump.

The output manages a fuel pump which is activated according to the fuel level for activation and deactivation in the tank programmed in the controller.

Urea pump

The urea pump output of the **CE8** controller is an output that allows the replenishment of urea into the engine from an external tank by activating a transfer pump.

The output manages a urea pump which is activated according to the urea level for activation and deactivation in the tank programmed in the controller.

Oil pump

The oil pump output of the **CE8** controller is an output that allows oil to be refilled into the engine from an external tank by activating a transfer pump.

The output manages an oil pump which is activated according to the oil level for activation and deactivation in the tank programmed in the controller.

Heating resistor

This functionality allows the activation of a heater when the engine temperature is below a programmable threshold.

The output configured as a heating resistor is activated when the measured engine coolant temperature is lower than a programmable threshold (Thresholds Table, parameter 18). The output will remain active until the measured engine coolant temperature is higher than a programmable threshold (Thresholds Table, parameter 19).

Dummy load

This function allows the activation of a load bank outside the installation's load, to prevent the generator set from operating under low load conditions, in order to avoid excessive oil consumption in the engine and to work with an optimum load.

The output configured as a dummy load is activated when a generator power consumption lower than a programmed threshold (Thresholds Table, parameter 20) is detected during a programmed time (Times Table, parameter 32). It is deactivated when the detected generator power consumption is higher than a programmed threshold (Thresholds Table, parameter 21) during a programmed time (Times Table, parameter 32). As a condition for enabling the dummy load output, the generator set must have the genset contactor active and the engine must be in a stabilised state.

NOTE

For engines with regeneration system (STV) this functionality will not be activated during the forced regeneration process.

Smoke control

This functionality is responsible for monitoring the engine start process with smoke control. This output will be activated during the start process and will remain active for a programmable time (Times Table, parameter 38) after the engine start condition.

Standby generator

This functionality allows the controller to activate an output to notify that the generator is a priority in the standby generator functionality.

Load demand (CEA8 controller only)

This functionality enables the controller to activate an output when the generator start condition is due to load demand by grid consumption.

Active alarm

The controller notifies different generator statuses via the output configured as active alarm. This output is activated simultaneously with the flashing of the alarm LED and the buzzer of the **CE8** controller User Interface. This output monitors the following controller statuses:

- **External start of the controller.** As a signalling measure for a generator start commanded via a programmable input associated with "external start", the output is activated for 5 seconds before starting the engine. The activation of the external start alarm output can be inhibited by configuration (Regulations Table, parameter 95).

- **Controller errors.** In the event of an active error or error pending notification by the user, the alarm output of the controller is activated for a maximum programmable time (Times Table, parameter 13). The errors that activate this output are both alarms that cause the engine to stop and warnings that do not cause the engine to stop. Depending on the programming of the alarm output (Regulations Table, parameters 94 to 97):
  - **For the alarm output programmed as an acoustic signal:**
    - Continuous activation of the output (value 0 in Times Table, parameter 13): The alarm output is deactivated as long as no error or warning is active.
    - Timed activation (value in seconds in Times Table, parameter 13): The alarm output is deactivated when RESET is pressed or the output activation time is exceeded.
  - **For the alarm output programmed as an error signal:** When RESET is pressed, the buzzer of the User Interface is deactivated, but the alarm output remains activated as long as a generator alarm is active or pending notification.

Moderate alarm active

This functionality allows the controller to activate an output to notify that a moderate level alarm is active or pending notification.

Severe alarm active

This functionality allows the controller to activate an output to notify that a severe level alarm is active or pending notification.

Electronic protection

The electronic protection output is activated when any alarm that causes the engine to stop is detected. The output remains active until all alarms that cause the engine to stop are cleared and reported.

MAN mode / AUTO mode / TEST mode / Active BLOCKING

These functionalities allow signalling the current operating mode of the controller by activating an output. The output is configured to indicate the current MAN/AUTO/TEST/LOCK mode of operation of the controller.

WDT

This functionality allows the operating status of the controller to be signalled. The output remains active if the correct operation of the generator control system is verified.

Controller detection

This functionality allows signalling the correct operating status of the controller. The output switches its status every 500 ms if the correct operation of the generator control system is verified.

Parameter set 1 and 2

This functionality makes it possible to signal the active parameter set by activating an output of the controller.

Correct generator status

This functionality ensures that the generator is running and generating a correct electrical signal within the programmed operating ranges.

Present grid (CEA8 controller only)

This functionality allows monitoring the status of the grid. The output remains active once the presence of the grid is detected within the programmed correct operating conditions.

ATS present grid 1 to 8 (CEM8 controller only)

This functionality allows monitoring the status of the grid. The output remains active when the CEC8 controller with ATS functionality detects the presence of the grid within the programmed correct operating conditions.

Engine started

The engine start output of the **CE8** controller is activated as soon as any engine start condition is detected and remains active as long as the engine is running. The engine start output is deactivated as soon as the engine STOP process begins. This process includes the engine cooling interval (Times Table, parameter 9) during the stop process.

Stabilised engine

This functionality is used to signal the engine status. The output remains active once the engine running conditions are detected after the start and the stabilisation time of the electrical signal has elapsed (Times Table, parameter 6).

NOTE

The genset contactor is activated within a programmable time after the engine start detection (Times Table, parameter 40), and the activation of both outputs can be deferred.

Load-stabilised engine

This functionality is used to monitor the status of the generator. The output remains active once the engine running conditions are detected after the START and the genset contactor activation time to supply load to the installation has been exceeded (Times Table, parameter 5).

Digital / External / Generator status / PLC inputs

Any of these internal, external or virtual inputs (by combination of input status or PLC) can be associated to one of the outputs available in the **CE8** controller. The output is activated when the activation of the associated input is detected.

Generator alarms and programmable alarms

Any of these alarms can be associated to one of the outputs available on the **CE8** controller. The output is activated when the associated alarm is detected as active or has not been notified by the user.

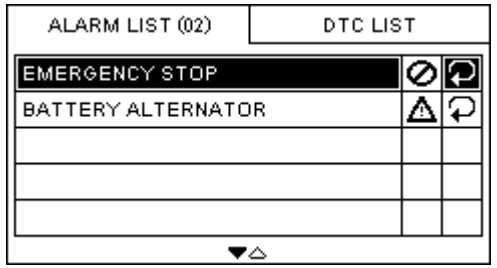
6. CONTROLLER ALARMS

The **CE8** controller has a list of alarms whose operation can be configured to perform actions or to be displayed by the user interface. It distinguishes between errors that cause the engine to stop (alarms) and errors that do not cause the engine to stop (warnings).

When an alarm or warning is detected, the controller produces an audible warning while the alarm output is activated (if programmed with this functionality) and the alarm LED and the User Interface display flashes; this status will remain as long as the error condition continues for a maximum configurable time (Times Table, parameter 13).

When alarms or warnings are active or pending notification, the alarm LED remains on. From the alarms section of the User Interface menu, the user can view the list of active and pending alarms and warnings. By pressing the RESET button on the desired alarm, the alarm is notified.

The list of active or pending alarms and warnings has the following format:



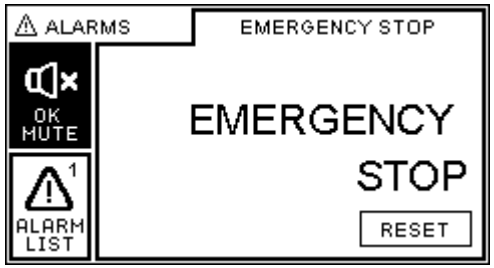
NOTE

Alarms that cause the engine to stop are not self-resetting and must be reported and reset to allow the engine to restart, as long as the alarm does not remain active.

In default configuration, the alarms produced by the analog inputs do not stop the engine, only warnings in the programming. They need to be reset to disappear from the interface, as long as the warning does not remain active, except for the fuel level which is self-resettable.

OPERATION EXAMPLE ON ALARMS

When an alarm/warning is detected, the controller will sound an audible warning and the alarm LED ⚠, will flash, the display will flash, the active alarm will be shown on the user interface and the digital output configured as “Alarm active” will be activated. In case of an alarm, the engine will be stopped. In case of a warning, the engine will not be stopped.



Pressing the OK button stops the flashing of the illumination and the audible warning. The alarm LED remains flashing as long as the alarm is still active. Once the alarm is resolved, the RESET button is enabled to reset the alarm and restart the engine.

The multifunction button on the front panel of the CEM8 can be programmed with the “Reset Alarms” or “Mute Alarms” functionalities (Functionalities 2 and 3 respectively). In the case of “Reset Alarms”, all alarms and DTCs that are not active at the moment can be notified with a single press. In this function, the LED will light up if there are any alarms or DTCs that can be reset. On the other hand, in the case of “Mute alarms”, the multifunction button will be used to silence the alarm sound from any screen, without the need to press OK MUTE.

NOTE

In case of a self-resettable warning the operation shall be identical in the activation of the warning. The only difference is that the user does not have to reset the warning manually. It is automatically reset whenever normal operating conditions are restored. It is focused on the alarms related to the fuel level in default programming and the alarms corresponding to the grid thresholds (only for CEA8 controller).

6.1 LIST OF ALARMS

The list of active alarms and warnings can be grouped as follows (according to MANUFACTURER DEFAULT PROGRAMMING).

6.1.1. CONTROLLER ALARMS

Description	Type	Action
Controller voltage	Warning	Do not stop engine
Identifier	Warning	Do not stop engine
Communication CEC8	Warning	Do not stop engine
Communication IOT module	Warning	Do not stop engine
Loss of GPS signal	Warning	Do not stop engine
Generator position	Warning	Do not stop engine
Generator impact	Warning	Do not stop engine
AUTO mode	Warning	Do not stop engine

6.1.2. ENGINE ALARMS

Description	Type	Action
High water temperature	Alarm	Immediate stop of the engine without cooling down
Low oil pressure	Alarm	Immediate stop of the engine without cooling down
Emergency STOP	Alarm	Immediate stop of the engine without cooling down
Battery charging alternator failure (with engine running)	Warning	Do not stop engine
Start failure	-	
Low water level	Alarm	Immediate stop of the engine without cooling down
Fuel reserve	Warning	Do not stop engine
Engine communication (J1939)	Warning	Do not stop engine
Water in fuel	Warning	Do not stop engine
Moderate urea level	Warning	Do not stop engine

Severe urea level	Alarm	Stop generator with cooling down
Urea pump	Warning	Do not stop engine
Fuel theft internal tank	Alarm	Stop generator with cooling down
Fuel theft external tank	Alarm	Stop generator with cooling down
Pre-clogged fuel filter	Warning	Do not stop engine
Clogged fuel filter	Alarm	Stop generator with cooling down
Low auxiliary battery voltage	Warning	Do not stop engine
Restarting during engine start	Warning	Do not stop engine
Malfunction lamp (ECU)	Alarm	Stop generator with cooling down
Protective lamp (ECU)	Alarm	Stop generator with cooling down
Yellow lamp (ECU)	Alarm	Stop generator with cooling down
Red lamp (ECU)	Alarm	Stop generator with cooling down
Rental meter	Warning	Do not stop engine
Maintenance counter	Warning	Do not stop engine
Sensor channel AN1 not connected	Warning	Do not stop engine
Sensor channel AN2 not connected	Warning	Do not stop engine
Sensor channel AN3 not connected	Warning	Do not stop engine
Sensor channel AN4 not connected	Warning	Do not stop engine
Low battery voltage	Warning	Do not stop engine
High battery voltage	Warning	Do not stop engine
Low voltage of the start battery	Warning	Do not stop engine
Overspeed	Alarm	Immediate stop of the engine without cooling down
Underspeed	Alarm	Immediate stop of the engine without cooling down
Unexpected stop	-	
Stop failure	-	
High water temperature per sensor (moderate)	Warning	Do not stop engine
High water temperature per sensor (severe)	Warning	Do not stop engine
Low oil pressure per sensor (moderate)	Warning	Do not stop engine
Low oil pressure per sensor (severe)	Warning	Do not stop engine
Low fuel level per sensor	Warning	Do not stop engine
Low engine temperature	Warning	Do not stop engine

6.1.3. GENERATOR ALARMS

Description	Type	Action
Maximum generator voltage (moderate)	Warning	Do not stop engine
Maximum generator voltage (severe)	Alarm	Immediate stop generator without cooling
Minimum generator voltage (moderate)	Warning	Do not stop engine
Minimum generator voltage (severe)	Alarm	Stop generator with cooling down
Generator voltage asymmetry	Alarm	Stop generator with cooling down
Incorrect sequence of generator phases	Alarm	Stop generator with cooling down
Signal drop generator	Alarm	Stop generator with cooling down
Maximum current (severe)	Alarm	Stop generator without cooling
Maximum current (moderate)	Warning	Do not stop engine
IDMT	Warning	Do not stop engine
Short circuit	Alarm	Stop generator with cooling down
Current asymmetry	Warning	Do not stop engine
Maximum generator power (severe)	Alarm	Stop generator with cooling down
Maximum generator power (moderate)	Warning	Do not stop engine
Minimal generator power	Alarm	Stop generator with cooling down
Reverse power	Alarm	Stop generator with cooling down
Maximum generator frequency (severe)	Alarm	Immediate stop generator without cooling
Maximum generator frequency (moderate)	Warning	Do not stop engine
Minimal generator frequency (severe)	Alarm	Stop generator with cooling down
Minimal generator frequency (moderate)	Warning	Do not stop engine
Generator contactor	Alarm	Stop generator with cooling down

6.1.4. GRID ALARMS

Description	Type	Action
Maximum grid voltage	Alarm	It is checked and if there is an error, the engine is started
Minimum grid voltage	Alarm	It is checked and if there is an error, the engine is started
Maximum grid frequency	Alarm	It is checked and if there is an error, the engine is started
Minimum grid frequency	Alarm	It is checked and if there is an error, the engine is started
Grid sequence	Alarm	It is checked and if there is an error, the engine is started
Grid signal dropout	Alarm	It is checked and if there is an error, the engine is started
ATS failure CR	Alarm	It is checked and if there is an error, the engine is started
ATS failure CG	Alarm	The engine is checked and if there is an error, the engine is stopped with cooling

6.1.5. PROGRAMMABLE ALARMS

There are 64 free programmable alarms, all programmable alarms can be configured as follows:

To be carried out:

- Never.
- Always.
- During the engine start.
- From detection of started engine condition.
- From rated condition of the engine.
- From the STOP of the engine.

To perform one of the following actions:

- No action (warning).
- No action, self-reporting (warning, automatically reported if alarm condition is terminated).
- Perform a stop with cooling of the engine.
- Perform an immediate stop of the engine.

To be saved in the controller's alarm log:

- Yes
- No

The 64 freely programmable alarms can be associated to different sources:

Programmable alarm associated with digital inputs

The alarm will be activated when the associated input is detected.

Example of programmable alarm associated with digital input

Programmable alarm 01 is to be activated when digital input IN1 is active. This alarm is to be managed from the engine started, without waiting time for verification, so that when it is activated the engine does not stop (warning) and so that it is recorded in the alarm log. The description of the alarm is "Programmable Alarm 01".

1. Set programmable alarm:
   - Management: From engine started.
   - Time: 0 seconds
   - Mode: Do not stop the engine
   - Log: Yes.
   - Source: Alarm programmable by digital input.
   - Description: Programmable Alarm 01.

2. Associate digital input to the programmable alarm functionality. Digital input IN1 is configured as "Programmable digital input 01".

Once the engine is started and the input IN1 is active, the programmable alarm 01 will be activated.

Programmable alarm associated with analog values

The alarm will be activated when the programmed conditions are met. The selected analog channel, the required thresholds and the desired condition (in range, out of range, maximum threshold or minimum threshold) must be configured.

Example of a programmable alarm associated with analog values

Programmable alarm 01 is to be activated when the analog value measured on channel AN2 is within the 2000 Ω - 4000 Ω range. This alarm is to be managed when the engine is started, without waiting time for verification, so that when it is activated the engine does not stop (warning) and so that it is recorded in the alarm log. The description of the alarm is “Programmable Alarm 01”.

1. Set programmable alarm:
    - Management: From engine started.
    - Time: 0 seconds.
    - Mode: Do not stop the engine.
    - Log: Yes.
    - Source: Alarm programmable by analog input value.
    - Minimum value: 2000 Ω.
    - Maximum value: 4000 Ω.
    - Analog channel: Analog channel AN2.
    - Condition: Values within the configured range.
    - Description: Programmable alarm 01.

Once the engine is started and the measured value on channel AN2 is within the set range, the programmable alarm 01 will be activated.

Programmable alarm associated with engine (ECU) alarm

The alarm shall be activated when the programmed conditions are met. The SPN and FMI of the engine alarm shall be configured.

Example of programmable alarm associated with engine (ECU) alarm

Programmable alarm 01 is to be activated when a specific DTC is received (SPN value: 289, FMI value: 1). This alarm is to be managed from the engine started, without waiting time for verification, that when it is activated it does not stop the engine (warning), without filtering and that it is recorded in the alarm history. The description of the alarm is “Programmable Alarm 01”.

1. Set programmable alarm:
    - Management: From engine started.
    - Time: 0 seconds.
    - Mode: Do not stop the engine.
    - Log: Yes.
    - Source: Programmable DTC error alarm from the engine ECU.
    - SPN high level: 0.
    - SPN low level: 289.
    - FMI: 1.
    - Delay: 0.
    - Description: Programmable alarm 01.

Once the engine is started and this error is received from the engine ECU, the programmable alarm 01 will be activated.

Programmable alarm associated with engine variables (ECU)

The alarm shall be activated when the programmed conditions are met. The selected variable, the required thresholds and the desired condition (in range, out of range, maximum threshold or minimum threshold) must be configured.

Example of programmable alarm associated with engine variables (ECU).

Programmable alarm 01 is to be activated when the value configured in variable PGN 02 (fuel level) is outside the 20 % - 40 % range. This alarm is to be managed when the engine is started, without waiting time for verification, and when it is activated it does not stop the engine (warning) and it is to be recorded in the alarm log. The description of the alarm is “Programmable Alarm 01”.

1. Set variable PGN 02 received from the engine ECU (J1939 Table):
    - PGN 02 text: Fuel level.
    - PGN: 18FFFE0A.
    - Starting position: 2.
    - End position: 4.
    - Scale: 100.
    - Offset: 40.

2. Set programmable alarm:
    - Management: From engine started.
    - Time: 0 seconds.
    - Mode: Do not stop the engine.
    - Log: Yes.
    - Source: Alarm programmable by PGN variable of the engine ECU.
    - Minimum value: 20.
    - Maximum value: 40.
    - PGN: 2.
    - Condition: Outside the configured range.
    - Description: Programmable alarm 01.

Once the engine is started and we are receiving the fuel level in the configured variable, if the value received is outside the configured ranges, the programmable alarm 01 will be activated.

6.2 DESCRIPTION OF ALARMS

Controller votage

The **CE8** Controller voltage alarm is triggered when the measured power supply voltage is below a non-programmable limit (10 V).

The Controller voltage alarm detection is configured by default (Alarms Table, parameter 1) to **never** occur.

An anti-bounce time can be associated to the Controller voltage alarm (Alarms Table, parameter 2) during which the battery value below the set limit must be detected.

The Controller voltage alarm is configured by default (Alarms Table, parameter 3) to **take no action** (warning).

Identifier

The **CE8** is triggered when the user interface identifier is different from the identifier of the control device.

Identifier alarm detection is set to **always** check and is not configurable.

CEC8 communication

The alarm CEC8 communication verifies the correct communication between the **CE8** controller and the ATS Control Module.

The CEC8 communication alarm detection is configured by default (Alarms Table, parameter 7) to **alway**s be performed.

An anti-bounce time can be associated to the CEC8 communication alarm to ensure correct alarm detection (Alarms Table, parameter 8).

The alarm CEC8 communication is configured by default (Alarms Table, parameter 9) to **take no action** (warning).

IOT communication

The IOT communication alarm verifies the correct communication between the **CE8** controller and the communication module.

The IOT communication alarm detection is configured by default (Alarms Table, parameter 10) to **always** be performed.

An anti-bounce time can be associated to the IOT communication alarm to ensure correct alarm detection (Alarms Table, parameter 11).

The IOT communication alarm is configured by default (Alarms Table, parameter 12) to **take no action** (warning).

Loss of GPS signal

The Loss of GPS signal alarm verifies the correct reception of the positioning signal by the communications module.

The Loss of GPS signal alarm detection is configured by default (Alarms Table, parameter 13) to **never** occur.

An anti-bounce time can be associated to the loss of GPS signal alarm to ensure correct alarm detection (Alarms Table parameter 14).

The Loss of GPS signal alarm is configured by default (Alarms Table, parameter 15) **not to perform any action** (warning).

Genset position

The Genset position alarm verifies the correct set position of the generator set by the communication module.

The detection of the Genset position alarm is configured by default (Alarms Table, parameter 16) to **never** take place.

An anti-bounce time can be associated with the Genset position alarm to ensure correct alarm detection (Alarms Table, parameter 17).

The Genset position alarm is configured by default (Alarms Table, parameter 18) **not to perform any action** (warning).

Genset impact

The Genset impact alarm verifies that no impact has been detected by the communication module.

The Genset impact alarm detection is configured by default (Alarms Table, parameter 19) to **never** take place.

An anti-bounce time can be associated with the Genset impact alarm to ensure correct alarm detection (Alarms Table, parameter 20).

The Genset impact alarm is configured by default (Alarms Table, parameter 21) **not to perform any action** (warning).

AUTO mode

The AUTO mode alarm on the generator verifies that the controller does not exit AUTO mode.

The AUTO mode alarm detection is configured by default (Alarms Table, parameter 22) to **never** take place.

An anti-bounce time can be associated with the AUTO mode alarm to ensure correct alarm detection (Alarms Table, parameter 23).

The AUTO mode alarm is configured by default (Alarms Table, parameter 24) **not to perform any action** (warning).

High water temperature

The High water temperature alarm of the **CE8** controller is associated to the digital input programmed with the coolant temperature functionality. The status of this input must be validated during a stabilisation time interval (digital input anti-bounce configuration) before generating the alarm.

The High water temperature alarm detection is configured by default (Alarms Table, parameter 25) to **always** occur.

A time can be associated to the High water temperature alarm (Alarms Table, parameter 26) to delay the instant at which the alarm conditions start to be verified.

The High water temperature alarm is set by default (Alarms Table, parameter 27) to perform an **immediate stop of the engine**.

Low oil pressure

The Low oil pressure alarm of the **CE8** controller is associated to the digital input programmed with the oil pressure functionality. The status of this input must be validated during a stabilisation time interval (digital input anti-bounce configuration) before generating the alarm.

The Low oil pressure alarm detection is set by default (Alarms Table, parameter 28) to **always** occur.

A time can be associated to the Low oil pressure alarm (Alarms Table, parameter 29) to delay the instant at which the alarm conditions start to be verified.

The Low oil pressure alarm is set by default (Alarms Table, parameter 30) to perform an **immediate stop of the engine**.

Emergency stop

The Emergency Stop alarm of the **CE8** controller is associated with the Emergency Stop Specific Purpose (EMS) digital input.

It can be configured as normally open or normally closed (Regulations Table, parameter 18).

The Emergency stop alarm removes the power supply to the power outputs (P1, P3 and D+) of the Controller Module, ensuring the stop of the engines configured as stop with de-excitation independently of the electronics of the controller. In engines configured as stop by excitation, this input must be connected to battery negative.

The Emergency stop alarm always produces the engine stop action without cooling. No delay time can be associated with this action, and it is executed immediately after detection of the emergency stop input (EMS).

Battery charging alternator failure

The Battery charging alternator failure alarm of the **CE8** controller is associated with the battery charging alternator voltage analog input (D+). The voltage measured through this input must exceed the programmed voltage threshold for engine start detection (Thresholds Table, parameter 6). Otherwise, the battery charging alternator failure alarm is activated.

Battery charging alternator failure detection is configured by default (Alarms Table, parameter 34) to be performed from the **engine start condition detection**.

An anti-bounce time can be associated to the Battery charging alternator failure alarm (Alarms Table, parameter 35) during which the Voltage measured through the D+ input must be kept below the engine start detection threshold as an alarm activation condition.

The Battery charging alternator failure alarm is configured by default (Alarms Table, parameter 36) to **take no action** (warning).

Start failure

The **CE8** controller Start failure alarm occurs if the number of consecutive unsuccessful retries (Thresholds Table, parameter 4) is exceeded during the engine start process. Between each start attempt a programmed waiting time is respected (Times Table, parameter 1). Once the alarm has occurred, the controller waits for notification from the user before retrying the engine start process.

Low water level

The Low water level alarm of the **CE8** controller is associated to the digital input programmed with the water level functionality. The status of this input must be validated during a stabilisation time interval (digital input anti-bounce configuration) before generating the alarm.

The Low water level alarm detection is configured by default (Alarms Table, parameter 40) to **always** occur.

A time can be associated to the Low water level alarm (Alarms Table, parameter 41) to delay the instant at which the alarm conditions start to be verified.

The Low water level alarm is configured by default (Alarms Table, parameter 42) to perform an **immediate stop of the engine** if the engine is not stopped.

Fuel reserve

The Fuel reserve alarm of the **CE8** controller is associated with the digital input programmed with the fuel reserve functionality. The status of this input must be validated during a stabilisation time interval (digital input anti-bounce configuration) before the alarm is generated.

The Fuel reserve alarm detection is set by default (Alarms Table, parameter 43) to **always** occur.

A time can be associated to the Fuel reserve alarm (Alarms Table, parameter 44) to delay the instant at which the alarm conditions start to be verified.

The Fuel reserve alarm is set by default (Alarms Table, parameter 45) to **take no action** (warning).

No user intervention is required to reset the generator set from a fuel reserve alarm (self-retifying alarm).

Engine communication (J1939)

The Engine communication alarm verifies the correct communication between the **CE8** controller and the engine via the J1939 bus.

The Engine communication alarm detection during start is configured by default (Alarms Table, parameter 46) to be performed during engine start.

An anti-bounce time can be associated to the Engine communication alarm to ensure correct alarm detection (Alarms Table, parameter 47).

The Engine communication alarm is configured by default (Alarms Table, parameter 48) **not to perform any action** (warning).

Water in fuel

The Water in fuel alarm detection is configured by default (Alarms Table, parameter 49) to **always** be performed.

A time can be associated to the Water in fuel alarm (Alarms Table, parameter 50) to delay the instant at which the alarm conditions start to be verified.

The Water in fuel alarm is set by default (Alarms Table, parameter 51) to **take no action**.

Urea level (DEF)

The Urea level alarm of the **CE8** control unit is associated with the urea level measured by the engine control electronics and is communicated to the controller via the J1939 protocol. This alarm allows two configurations to define both a warning (moderate level) and a stop of the engine (severe level).

The **CE8** controller detects a warning (moderate level) when the measured urea level is below a programmable threshold (Thresholds Table, parameter 55). The controller activates the warning when the engine control electronics detects the moderate low level condition during a programmable time interval (Alarms Table, parameter 53).

Moderate urea level detection is set by default (Alarms Table, parameter 52) to **always** occur.

The moderate Urea level alarm is set by default (Alarms Table, parameter 54) to **take no action** (warning).

The **CE8** controller detects an alarm (severe level) when the measured urea level is below a programmable threshold (Thresholds Table, parameter 56). The controller activates the alarm when the engine control electronics detects the moderate low level condition during a programmable time interval (Alarms Table, parameter 56).

Severe urea level detection is set by default (Alarms Table, parameter 55) to **always** occur.

The severe Urea level alarm is set by default (Alarms Table, parameter 57) to **perform an engine stop**.

Urea pump

The Urea pump alarm of the **CE8** controller is responsible for verifying that the urea transfer is carried out correctly. To do this, it checks every time period defined by the user (Alarms Table, parameter 59) that the urea level in the tank increases by the configured percentage (Thresholds Table, parameter 26). If this condition is not met, the urea pump will stop (not configurable), and the engine may stop according to its configuration (Alarms Table, parameter 60).

The Urea pump alarm detection is configured by default (Alarms Table, parameter 58) to **always** occur.

The Urea pump alarm is configured by default (Alarms Table, parameter 60) **not to perform any action** (warning).

Internal fuel theft

The Internal fuel theft alarm of the **CE8** controller is responsible for verifying that there is no fuel theft in the internal fuel tank. To do this, it checks every time period defined by default that the fuel percentage difference in the internal tank is not less than a configured percentage (Fuel Table, Parameter 08).

The Internal fuel theft alarm detection is configured by default (Alarms Table, parameter 61) to **never** occur.

The Internal fuel theft alarm is configured by default (Alarms Table, parameter 63) **not to perform any action** (warning).

External fuel theft

The External fuel theft alarm of the **CE8** controller is responsible for verifying that fuel theft does not occur in the external fuel tank. To do this, it checks every time period defined by default that the fuel percentage difference in the external tank is not less than a configured percentage (Fuel Table, Parameter 18).

The External fuel theft alarm detection is configured by default (Alarms Table, parameter 64) to **never** occur.

The External fuel theft alarm is configured by default (Alarms Table, parameter 66) **not to perform any action** (warning).

Fuel filter (Pre-clogged and clogged)

The fuel filter alarms of the **CE8** controller are triggered when the engine ECU informs the measurement module of the fuel filter status.

Fuel filter alarm detection is set by default (Alarms Table, parameter 67, 70) to **never** occur.

The Fuel filter alarm is configured by default (Alarms Table, parameter 69, 72) **not to perform any action** (warning).

Low auxiliary battery voltage

The **CE8** controller Low auxiliary battery voltage alarm is activated when the measured voltage of the connected battery configured as an analog input is lower than a programmed limit (Thresholds Table, parameter 54).

The Low auxiliary battery voltage alarm detection is configured by default (Alarms Table, parameter 73) to **always** occur.

An anti-bounce time can be associated to the Low auxiliary battery voltage alarm (Alarms Table, parameter 74) during which the battery value lower than the programmed limit must be detected (Thresholds Table, parameter 54).

The Low auxiliary battery voltage alarm is configured by default (Alarms Table, parameter 75) **not to perform any action** (warning).

Reset during engine start

The Reset during engine start alarm of the **CE8** control unit is triggered when a reset occurs in the control module during engine start.

The detection of the Reset during engine start alarm is configured by default (Alarms Table, parameter 76) to be **always** performed.

The Reset during engine start alarm is configured by default (Alarms Table, parameter 78) **not to perform any action** (warning).

Lamps

The Lamp alarms (grid, amber, malfunction, protection) of the **CE8** controller are activated when the engine ECU triggers an error code including them.

The Lamp alarm detection (grid, amber, malfunction, protection) is configured by default (Alarms Table, parameters 79, 82, 85, 88) to **always** be performed.

The Lamp alarm (grid, amber, malfunction, protection) is configured by default (Alarms Table, parameters 81, 84, 87, 90) **not to perform any action** (warning).

Rental meter

The **CE8** controller's Rental counter alarm is activated when the programmed counter expires.

The Rental counter alarm detection is configured by default (Alarms Table, parameter 91) to **never** take place.

The Rental counter alarm is configured by default (Alarms Table parameter 93) **not to perform any action** (warning).

Maintenance meter

The **CE8** controller's Maintenance counter alarm is triggered when one of the four programmed counters expires.

The detection of the Maintenance counter alarm is configured by default (Alarms Table, parameter 94) to **never** take place.

The Maintenance counter alarm is configured by default (Alarms Table, parameter 96) **not to perform any action** (warning).

Analog sensor not connected

The **CE8** controller's Analog sensor not connected alarm is triggered when a sensor is configured as an analog sensor (Regulations Table, parameters 66 to 69) and is not connected to the configured analog input of the measurement board.

The detection of the Analog sensor not connected alarm is configured by default (Alarms Table, parameters 97, 100, 103 and 106) to **never** occur.

An anti-bounce time (Alarms Table, parameters 98, 101, 104 and 107) can be associated to the analog sensor not connected alarm during which the minimum channel detection value must be detected.

The alarm for an Analog sensor not connected is configured by default (Alarms Table, parameters 99, 102, 105 and 108) **not to perform any action** (warning).

Low battery voltage

The Low battery voltage alarm of the **CE8** controller is activated when the measured battery voltage is lower than a programmed limit (Thresholds Table, parameter 47).

Low battery voltage alarm detection is configured by default (Alarms Table, parameter 109) to **never** occur.

An anti-bounce time can be associated with the Low battery voltage alarm (Alarms Table, parameter 110) during which the battery value below the programmed limit must be detected (Thresholds Table, parameter 47).

The Low battery voltage alarm is configured by default (Alarms Table, parameter 111) **not to perform any action** (warning).

High battery voltage

The **CE8** controller's High battery voltage alarm is activated when the measured battery voltage is higher than a programmed limit (Thresholds Table, parameter 57).

High battery voltage alarm detection is configured by default (Alarms Table, parameter 112) to **never** occur.

An anti-bounce time can be associated with the High battery voltage alarm (Alarms Table, parameter 113) during which the battery value above the programmed limit must be detected (Thresholds Table, parameter 57).

The High battery voltage alarm is configured by default (Alarms Table, parameter 114) **not to perform any action** (warning).

Low voltage of the start battery

The **CE8** controller Low voltage of the start battery alarm is activated when the measured battery voltage is below a programmed limit (Thresholds Table, parameter 58).

The detection of the Low voltage of the start battery alarm is configured by default and cannot be modified (Alarms Table, parameter 115) to be performed **at start**.

An anti-bounce time (Alarms Table, parameter 116) can be associated with the Low voltage of the start battery alarm, during which the battery value below the programmed limit must be detected (Thresholds Table, parameter 58).

The Low voltage of the start battery alarm is configured by default (Alarms Table, parameter 117) **not to perform any action** (warning).

Overspeed

The Overspeed alarm of the **CE8** controller is associated with the measurement of the rotational speed of the flywheel crown wheel or through the J1939 channel of communication with the engine. This measurement is made through the pick-up input of the Controller Module. The alarm management is conditional on the parameter that sets the number of teeth of the flywheel crown wheel (Thresholds Table, parameter 8) not being zero or on the engine control electronics transmitting the speed via the J1939 bus.

The Overspeed alarm detection is configured by default (Alarms Table, parameter 118) to be performed from the nominal condition of the engine.

A configurable anti-bounce time can be associated with the Overspeed alarm (Alarms Table, parameter 119) during which the engine speed must be maintained above the maximum rotational speed limit (Thresholds Table, parameter 45). The Overspeed alarm is configured by default (Alarms Table, parameter 120) to perform an immediate stop of the engine.

NOTE

For engines with regeneration system (STV) this alarm will remain disabled as long as the safety conditions are activated.

Underspeed

The Underspeed alarm of the **CE8** controller is associated with the measurement of the rotational speed of the flywheel crown wheel or through the J1939 channel of communication with the engine. This measurement is made through the pick-up input of the Controller module. The alarm management is conditional on the parameter that sets the number of teeth of the flywheel crown wheel (Thresholds Table, parameter 8) not being zero or on the engine control electronics transmitting the speed via the J1939 bus.

Underspeed alarm detection is set by default (Alarms Table, parameter 121) to be performed from the nominal condition of the engine.

The Underspeed alarm can be associated with a configurable anti-bounce time (Alarms Table, parameter 122) during which the engine speed must be kept below the programmed minimum rotational speed limit (Thresholds Table, parameter 46). The underspeed alarm is configured by default (Alarms Table, parameter 122) to perform a stop with engine cooling.

NOTE

For engines with regeneration system (STV) this alarm will remain disabled as long as the safety conditions are activated.

Unexpected stop

The **CE8** controller Unexpected stop alarm occurs if, while the engine is running, the start conditions of the engine are no longer detected (Regulations Table, parameters 52 to 55).

Stop failure

The **CE8** controller Stop failure alarm occurs if after a time (Times Table, parameter 11) after commanding the engine to stop, all the conditions programmed for the engine stop detection are not fulfilled (Regulations Table, parameters 52 to 55).

If the Stop failure alarm management is disabled (Alarms Table, parameter 127), after the maximum waiting time of 15 seconds for the stop conditions has elapsed, the controller considers the engine to be stopped.

To detect engine stop, all stop conditions must be detected for a programmed time (Alarms Table, parameter 129).

High water temperature (sensor)

The **CE8** controller's High water temperature sensor alarm is associated with the analog input programmed as a water temperature sensor.

The **CE8** controller detects a warning (moderate level) when a temperature value higher than the programmed limit is detected (Thresholds Table, parameter 51).

The detection of the High water temperature sensor warning is configured by default (Alarms Table, parameter 130) to **always** take place.

An anti-bounce time (Alarms Table, parameter 131) can be associated with the High water temperature sensor warning, during which a water temperature value higher than the programmed limit must be detected (Thresholds Table, parameter 51).

The High water temperature sensor warning is configured by default (Alarms Table, parameter 132) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a temperature value higher than the programmed limit is detected (Thresholds Table, parameter 52).

The High water temperature sensor alarm detection is configured by default (Alarms Table, parameter 133) to **always** occur.

An anti-bounce time (Alarms Table, parameter 134) can be associated to the High water temperature sensor alarm, during which a water temperature value higher than the programmed limit must be detected (Thresholds Table, parameter 52).

The High water temperature sensor alarm is configured by default (Alarms Table, parameter 135) to **stop the engine**.

Low oil pressure (sensor)

The Low oil pressure sensor alarm of the **CE8** controller is associated with the analog input programmed as oil pressure sensor.

The **CE8** controller detects a warning (moderate level) when a pressure value below than the programmed limit is detected (Thresholds Table, parameter 49).

The Low oil pressure sensor warning detection is configured by default (Alarms Table, parameter 136) to **always** be performed.

An anti-bounce time (Alarms Table, parameter 137) can be associated with the low oil pressure sensor warning, during which an oil pressure value lower than the programmed limit (Thresholds Table, parameter 49) must be detected.

The Llow oil pressure sensor warning is configured by default (Alarms Table, parameter 138) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a pressure value below than the programmed limit is detected (Thresholds Table, parameter 50).

The Low oil pressure alarm detection by sensor is configured by default (Alarms Table, parameter 139) to **always** be performed.

An anti-bounce time (Alarms Table, parameter 140) can be associated to the Low oil pressure sensor alarm during which an oil pressure value lower than the programmed limit (Thresholds Table, parameter 50) must be detected.

The Low oil pressure alarm is configured by default (Alarms Table, parameter 141) to **stop the engine**.

Low fuel level (sensor)

The Low fuel level alarm of the **CE8** controller is associated with the analog input programmed as fuel level sensor. The low fuel level alarm is activated when a fuel level lower than the programmed limit is detected (Thresholds Table, parameter 48).

The Low fuel level alarm detection is set by default (Alarms Table, parameter 142) to **always** occur.

An anti-bounce time can be associated with the Low fuel level warning (Alarms Table, parameter 143) during which a fuel level value below the programmed limit (Thresholds Table, parameter 48) must be detected.

The Low fuel level warning is set by default (Alarms Table, parameter 144) to **take no action** (warning).

Low engine temperature

The Low engine temperature alarm of the **CE8** controller is associated with the analog input programmed as water temperature sensor. The Low engine temperature alarm is activated when a temperature value below than the programmed limit is detected (Thresholds Table, parameter 53).

The Low engine temperature alarm detection is configured by default (Alarms Table, parameter 145) to **never** occur.

An anti-bounce time can be associated with the Low engine temperature alarm (Alarms Table, parameter 146) during which a water temperature value lower than the programmed limit must be detected (Thresholds Table, parameter 53).

The Low engine temperature alarm is configured by default (Alarms Table, parameter 147) **not to perform any action** (warning).

The activation of the genset contactor (GC) is condemned if the engine low temperature threshold (Thresholds Table, parameter 53) is programmed with a value other than zero and the engine coolant measurement temperature is lower than the programmed threshold.

Maximum generator voltage

The Maximum generator voltage alarm of the **CE8** controller is associated with the generator RMS voltage. The phases that are evaluated for the detection of the generator maximum voltage alarm are selected depending on the configuration of the installation phases (Thresholds Table, parameter 1):

- In single-phase configuration the voltage V1N is tested.
- In two-phase configuration the voltage V12 is tested.
- In two-phase selector configuration, phases 1 and 3 are tested.
- In three-phase configuration with neutral or three-phase without neutral, the voltages V12, V23 and V13 are tested.

The **CE8** controller detects a warning (moderate level) when an RMS voltage value higher than the programmed maximum voltage limit is detected (Thresholds Table, parameter 27).

The detection of the Maximum generator voltage warning is configured by default (Alarms Table, parameter 151) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator voltage warning (Alarms Table, parameter 152) during which the generator RMS voltage must be maintained above the programmed maximum limit (Thresholds Table, parameter 27).

The Maximum generator voltage warning is configured by default (Alarms Table, parameter 153) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when an RMS voltage value higher than the maximum programmed voltage limit is detected (Thresholds Table, parameter 28).

The Maximum generator voltage alarm detection is configured by default (Alarms Table, parameter 148) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator voltage alarm (Alarms Table, parameter 149) during which the generator RMS Voltage must be maintained above the maximum programmed limit (Thresholds Table, parameter 28).

The Maximum generator voltage alarm is configured by default (Alarms Table, parameter 150) to **perform an immediate stop of the engine**.

Minimum generator voltage

The Minimum generator voltage alarm of the **CE8** controller is associated with the generator RMS voltage. The phases that are evaluated for the detection of the Minimum generator voltage alarm are selected depending on the configuration of the installation phases (Thresholds Table, parameter 1):

- In single-phase configuration the voltage V1N is tested.
- In two-phase configuration the voltage V12 is tested.
- In two-phase selector configuration, phases 1 and 3 are tested.
- In three-phase configuration with neutral or three-phase without neutral, the voltages V12, V23 and V13 are tested..

The **CE8** controller detects a warning (moderate level) when an RMS voltage value lower than the programmed minimum voltage limit is detected (Thresholds Table, parameter 29).

The detection of the Minimum generator voltage warning is configured by default (Alarms Table, parameter 157) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Minimum generator voltage warning (Alarms Table, parameter 158) during which the generator's RMS voltage must be kept below the programmed minimum limit (Thresholds Table, parameter 29).

The Minimum generator voltage warning is configured by default (Alarms Table, parameter 159) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when an RMS voltage value lower than the programmed minimum voltage limit (Thresholds Table, parameter 30) is detected.

The detection of the Minimum generator voltage alarm is configured by default (Alarms Table, parameter 154) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Minimum generator voltage alarm (Alarms Table, parameter 155) during which the generator's RMS voltage must be kept below the programmed minimum limit (Thresholds Table, parameter 30).

The Minimum generator voltage alarm is configured by default (Alarms Table, parameter 156) to **perform a shutdown with engine cooling**.

Generator voltage asymmetry

The Generator voltage asymmetry alarm of the **CE8** controller is associated with the difference between the RMS voltage measurements between phases in three-phase groups being greater than the maximum asymmetry limit programmed (Thresholds Table, parameter 31). The Generator voltage asymmetry alarm is only activated when the controller is configured for voltage measurements with three-phase with neutral or three-phase without neutral. The detection of the Generator voltage asymmetry alarm is configured by default (Alarms Table, parameter 160) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Generator voltage asymmetry alarm (Alarms Table, parameter 161) during which the difference between any pair of generator phase voltage values (VG12, VG23 or VG31) must be maintained above the maximum programmed limit (Thresholds Table, parameter 31). The Generator voltage asymmetry alarm is configured by default (Alarms Table, parameter 163) to perform **a stop with cooling of the engine**.

Incorrect generator phase sequence

The Incorrect generator phase sequence alarm of the **CE8** controller is associated with the group voltage inputs of each phase being in order (phases 1, 2, 3 for direct sequence configuration or phases 3, 2, 1 for reverse sequence configuration) (Regulations Table, parameter 89).

The Incorrect generator phase sequence alarm is only active when the controller is configured to work with three-phase with neutral or three-phase without neutral.

The detection of the Incorrect generator phase sequence alarm is configured by default (Alarms Table, parameter 163) to be **performed from the nominal condition of the engine**.

An anti-bounce time (Alarms Table, parameter 164) can be associated to the Incorrect generator phase sequence alarm, during which an incorrect order of the generator voltage maxima must be detected.

The Incorrect generator phase sequence alarm is configured by default (Alarms Table, parameter 165) to perform **a stop with cooling of the engine**.

Generator signal failure

The **CE8** controller Generator signal failure alarm occurs if no genset voltage is detected on any phase while the engine is running.

The Generator signal failure alarm detection is configured by default (Alarms Table, parameter 166) to be performed **from the nominal engine condition**.

An anti-bounce time (Alarms Table, parameter 167) can be associated to the Generator signal failure alarm, during which no signal must be detected on any phase before the alarm is activated.

The Generator signal failure alarm is configured by default (Alarms Table, parameter 168) to perform **a stop with engine cooling**.

Maximum generator current

The Maximum generator current alarm of the **CE8** controller is associated with the generator current.

The **CE8** controller detects a warning (moderate level) when a current value higher than the programmed maximum current limit is detected (Thresholds Table, parameter 36).

The detection of the Maximum generator current warning is configured by default (Alarms Table, parameter 172) to be **performed from the nominal condition of the engine**.

An anti-bounce time (Alarms Table, parameter 173) during which the generator current must be maintained above the maximum programmed limit (Thresholds Table, parameter 36) can be associated with the Maximum generator current warning.

The Maximum generator current warning is configured by default (Alarms Table, parameter 174) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a current value higher than the programmed maximum current limit is detected (Thresholds Table, parameter 37).

The Maximum generator current alarm detection is configured by default (Alarms Table, parameter 169) to be **performed from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator current alarm (Alarms Table, parameter 170) during which the generator current must be maintained above the maximum programmed limit (Thresholds Table, parameter 37).

The Maximum generator current alarm is configured by default (Alarms Table, parameter 171) to **perform an immediate stop of the engine**.

IDMT

The IDMT alarm of the **CE8** controller is associated with the measurement of the generator intensity. The alarm detection time (td) is set to the curve corresponding to the formula:

$$t_d = \frac{T}{\left(\frac{I}{I_n} - 1\right)^2}$$

Where the time constant parameter T in seconds (Times Table, parameter 39, default value 36 seconds) and a percentage of the maximum genset overload current (Thresholds Table, parameter 41, default value 200 %) are defined. With these default values, the defined time base is equivalent to one hour for a current flow corresponding to 110 % of the generator overload threshold.

The purpose of the IDMT alarm is to prevent heating due to current flow in the installation components (meters, cables...). Therefore, the alarm tripping time is a function of the current flow, where the higher the generator current, the shorter the alarm tripping time. Moreover, this condition implies that consecutive IDMT alarm tripping may occur in less time than the set time (Times Table, parameter 39) due to the fact that not enough cooling time has elapsed during which the generator current has been lower than the overload current threshold.

The cooling time is determined by the formula:

$$t_d = \frac{T}{\left(1 - \frac{I}{I_n}\right)}$$

IDMT alarm detection is configured by default (Alarms Table, parameter 175) to **never** occur.

Once the IDMT alarm has been generated, in order for it to cease to be active and the alarm to be reported, the generator current must be lower than the rated current defined in the IDMT curve (Thresholds Table, parameter 41) for a programmable time interval (Alarms Table, parameter 176).

The IDMT alarm is configured by default (Alarms Table, parameter 177) **not to perform any action** (warning).

Value 0 for the time constant (Times Table, parameter 39) or nominal current (Thresholds Table, parameter 41) of the IDMT curve disables the management of this alarm.

EXAMPLE OF CALCULATION OF THE TIME CONSTANT OF (T) OF THE IDMT CURVE:

For a generator current (I) with a value 110 % of nominal, the tripping time (td) is desired to be 1 hour (3600 seconds).

From the equation of the IDMT curve, the time constant is obtained:

$$T = \left(\frac{I}{I_n} - 1\right)^2 \times t_d$$

For a generator current value 110% of I_n, the value of the fraction is set.

$$\frac{I}{I_n} = \frac{\frac{110}{100} \times I_n}{I_n} = 1{,}1$$

The value of the time constant for a tripping time of 3,600 seconds at 110 % of the rated current is thus established as follows:

$$T = \left(\frac{I}{I_n} - 1\right)^2 \times t_d = (1{,}1 - 1) \times 3.600 = 36\ seg$$

Short circuit

The Short circuit alarm of the **CE8** controller is associated with the measurement of the RMS current when any of the phases is higher than the maximum programmed short-circuit limit (Thresholds Table, parameter 38). The phases that are evaluated for the detection of the overload alarm are selected depending on the configuration of the phases of the installation (Thresholds Table, parameter 1):

- In single-phase configuration, phase 1 is tested.
- In two-phase configuration, phase 1 and 2 are tested.
- In two-phase selector configuration, phases 1 and 3 are tested.
- In three-phase configuration with neutral or three-phase without neutral, phases 1, 2 and 3 are tested.

The Short circuit alarm detection is configured by default (Alarms Table, parameter 178) to be performed **from the rated condition of the engine**.

The Short circuit alarm is configured by default (Alarms Table, parameter 180) to perform **a stop with engine cooling**.

Current asymmetry

The Current asymmetry alarm of the **CE8** controller is associated with the current measured in each phase of the generator. This alarm only applies to generators with more than one phase. The alarm is detected when the difference between the current generated by the phase with the highest consumption and the phase with the lowest consumption of the alternator is greater than the value calculated by the product of the number of genset phases by a programmable percentage (Thresholds Table, parameter 39) of the maximum generator current (Thresholds Table, parameter 37) during a programmable time interval (Alarms Table, parameter 182).

The Current asymmetry alarm detection is configured by default (Alarms Table, parameter 181) to be performed **from the nominal condition of the engine**.

The Current asymmetry alarm is configured by default (Alarms Table, parameter 183) **not to perform any action** (warning).

Maximum generator power

The Maximum generator power alarm of the **CE8** controller is associated with the generator power.

The **CE8** controller detects a warning (moderate level) when a power value higher than the programmed maximum power limit is detected (Thresholds Table, parameter 43).

The detection of the Maximum generator power warning is configured by default (Alarms Table, parameter 187) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator power warning (Alarms Table, parameter 188) during which the generator power must be maintained above the maximum programmed limit (Thresholds Table, parameter 43).

The Maximum generator power warning is configured by default (Alarms Table, parameter 189) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a power value higher than the programmed maximum power limit is detected (Thresholds Table, parameter 44).

The Maximum generator power alarm detection is configured by default (Alarms Table, parameter 184) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator power alarm (Alarms Table, parameter 185) during which the generator power must be maintained above the maximum programmed limit (Thresholds Table, parameter 44).

The Maximum generator power alarm is configured by default (Alarms Table, parameter 186) to perform **an immediate stop of the engine**.

Minimum generator power

The Minimum generator power alarm of the **CE8** controller is associated with the measurement of the actual generator power. The alarm is generated when the power generated by the generator is lower than a programmable percentage (Thresholds Table, parameter 42) of the programmed nominal power (Thresholds Table, parameter 3) during a programmable time interval (Alarms Table, parameter 191).

The detection of the Minimum generator power alarm is configured by default (Alarms Table, parameter 190) to be performed **from the nominal condition of the engine**.

The Minimum generator power alarm is configured by default (Alarms Table, parameter 192) **not to perform any action** (warning).

No user intervention is required to reset the generator set from a minimum genset power alarm (self-retifying alarm).

Reverse power

The Reverse power alarm of the **CE8** controller is activated when the measured power (for both grid and generator) is negative and higher than a % (Thresholds Table, parameter 40) of the nominal power (Thresholds Table, parameter 3).

In some cases the reverse power alarm may be due to incorrect connection of the current transformers.

The Reverse power alarm detection is configured by default (Alarms Table, parameter 193) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated to the Reverse power alarm (Alarms Table, parameter 194) during which the measured power is outside the programmed limit.

The Reverse power alarm is configured by default (Alarms Table, parameter 195) to perform **a stop with engine cooling**.

Maximum generator frequency

The Maximum generator frequency alarm of the **CE8** controller is associated with the frequency generated by the generator. The phase on which the generator frequency is measured is the first phase. If no signal is detected in this phase, the frequency is measured in the second phase. Likewise, if no signal is detected in the second phase, the frequency is measured in the third phase.

The **CE8** controller detects a warning (moderate level) when a frequency value higher than the programmed maximum frequency limit is detected (Thresholds, Table parameter 32).

The detection of the Maximum generator frequency warning is set by default (Alarms Table, parameter 199) to be performed **from the nominal condition of the engine**.

The Maximum generator frequency warning can be associated with an anti-bounce time (Alarms Table, parameter 200) during which the generator frequency must be maintained above the maximum programmed limit (Thresholds Table, parameter 32).

The Maximum generator frequency warning is configured by default (Alarms Table, parameter 201) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a frequency value higher than the programmed maximum frequency limit is detected (Thresholds Table, parameter 33).

The Maximum generator frequency alarm detection is configured by default (Alarms Table, parameter 196) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated with the Maximum generator frequency alarm (Alarms Table, parameter 197) during which the generator frequency must be maintained above the maximum programmed limit (Thresholds Table, parameter 33).

The Maximum generator frequency alarm is configured by default (Alarms Table, parameter 198) to perform **an immediate stop of the engine**.

Minimum generator frequency

The Minimum generator frequency alarm of the **CE8** controller is associated with the frequency generated by the generator. The phase on which the generator frequency is measured is the first phase. If no signal is detected in this phase, the frequency is measured in the second phase. Likewise, if no signal is detected in the second phase, the frequency is measured in the third phase.

The **CE8** controller detects a warning (moderate level) when a frequency value lower than the programmed minimum frequency limit is detected (Thresholds Table, parameter 34).

The detection of the Minimum generator frequency warning is configured by default (Alarms Table, parameter 205) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated with the Minimum generator frequency warning (Alarms Table, parameter 206) during which the generator frequency must be kept below the programmed minimum limit (Thresholds Table, parameter 34).

The Minimum generator frequency warning is configured by default (Alarms Table, parameter 207) **not to perform any action** (warning).

The **CE8** controller detects an alarm (severe level) when a frequency value lower than the programmed minimum frequency limit is detected (Thresholds Table, parameter 35).

The Minimum generator frequency alarm detection is configured by default (Alarms Table, parameter 202) to be performed **from the nominal condition of the engine**.

An anti-bounce time can be associated with the Minimum generator frequency alarm (Alarms Table, parameter 203) during which the generator frequency must be kept below the programmed minimum limit (Thresholds Table, parameter 35).

The Minimum generator frequency alarm is configured by default (Alarms Table, parameter 204) to perform **a stop with cooling of the engine**.

Generator contactor

The Generator contactor alarm of the **CE8** control unit occurs if the group contactor is activated via the CG relay of the Controller Module and the activation is not verified via the input associated with the generator contactor confirmation function for a programmed time (Times Table, parameter 40).

The Generator contactor alarm detection is set by default (Alarms Table, parameter 208) to **never** take place.

The Generator contactor alarm is configured by default (Alarms Table, parameter 209) **not to perform any action** (warning).

Maximum grid voltage

The Maximum grid voltage alarm of the **CE8** controller is associated with the mains RMS voltage being higher than the maximum voltage limit programmed (Thresholds Table, parameter 59). The phases that are evaluated for the detection of the Maximum grid voltage alarm are selected depending on the configuration of the phases of the installation (Thresholds Table, parameter 2):

- In single-phase configuration the V1N phase of the grid is tested.
- In two-phase configuration, the voltage V12 of the grid is tested.
- In two-phase selector configuration, phases 1 and 3 are tested.
- In three-phase configuration with neutral or three-phase without neutral, the voltages V12, V23 and V13 of the grid are tested.

The detection of the Maximum grid voltage alarm can be configured (ATS Alarms Table, parameter 1) for:

0: Not verified.

1: Is checked and if there is an error, the engine is started.

An anti-bounce time can be associated with the Maximum grid voltage alarm (Alarms Table, parameter 2) during which the measured RMS mains voltage must be maintained above the configured maximum limit (Thresholds Table, parameter 59).

The detection of the Maximum grid voltage alarm is a start condition for the generator.

Minimum grid voltage

The Minimum grid voltage alarm of the **CE8** controller is associated with the mains RMS voltage being lower than the programmed minimum voltage limit (Thresholds Table, parameter 60). The phases that are evaluated for the detection of the minimum grid voltage alarm are selected depending on the configuration of the installation phases (Thresholds Table, parameter 2):

- In single-phase configuration the V1N phase of the grid is tested.
- In two-phase configuration, the voltage V12 of the grid is tested.
- In two-phase selector configuration, phases 1 and 3 are tested.
- In three-phase configuration with neutral or three-phase without neutral, the voltages V12, V23 and V13 of the grid are tested.

The detection of the Minimum grid voltage alarm can be configured (ATS Alarms Table, parameter 3) to:

0: Not verified.

1: Is checked and if there is an error, the engine is started.

An anti-bounce time can be associated with the Minimum grid voltage alarm (Alarms Table, parameter 4) during which the measured mains RMS voltage must be kept below the configured minimum limit (Thresholds Table, parameter 60).

The detection of the Minimum grid voltage alarm is a start condition for the generator.

Maximum grid frequency

The Maximum grid frequency alarm of the **CE8** econtroller is associated with the frequency generated by the grid being higher than the maximum frequency limit programmed (Thresholds Table, parameter 61).

The phase on which the grid frequency is measured is the first phase. If no signal is detected in this phase, the frequency is measured in the second phase. Similarly, if no signal is detected in the second phase, the third phase frequency is measured.

The Maximum grid frequency alarm detection can be configured (Alarms Table, parameter 5) to:

0: Not verified.

1: Is checked and, if there is an error, the engine is started.

An anti-bounce time can be associated with the Maximum mains frequency alarm (Alarms Table, parameter 6) during which the measured mains signal frequency must be maintained above the programmed maximum limit (Thresholds Table, parameter 61).

The detection of the Maximum grid frequency alarm is a generator start condition.

Minimum grid frequency

The **CE8** controller's Minimum grid frequency alarm is associated with the frequency generated by the grid being lower than the programmed minimum frequency limit (Thresholds Table, parameter 62).

The phase on which the grid frequency is measured is the first phase. If no signal is detected in this phase, the frequency is measured in the second phase. Similarly, if no signal is detected in the second phase, the third phase frequency is measured.

The detection of the Minimum grid frequency alarm can be configured (ATS Alarms Table, parameter 7) to:

0: Not verified.

1: Is checked and, if there is an error, the engine is started.

An anti-bounce time can be associated with the Minimum mains frequency alarm (Alarms Table, parameter 8) during which the measured mains signal frequency must be kept below the programmed minimum limit (Thresholds Table, parameter 62).

The detection of the Minimum grid frequency alarm is a generator start condition.

Grid sequence

The Grid sequence alarm of the **CE8** controller is associated with the generator voltage inputs of each phase being in order (phases 1, 2, 3 for direct configuration or phases 3, 2, 1 for reverse configuration) (Regulations Table, parameter 89). The Grid sequence alarm is only managed when the controller is configured to work with three-phase with neutral or three-phase without neutral.

The Grid sequence alarm detection can be configured (ATS Alarms Table, parameter 9) for:

0: Not verified.

1: Check and if there is an error, the engine is started.

An anti-bounce time can be associated to the Grid sequence alarm (Alarms Table, parameter 10) during which an incorrect order in the maximums of the grid voltages must be detected.

The detection of the Grid sequence alarm is a **generator start condition**.

Grid signal failure

The **CE8** controller's Grid signal failure alarm occurs if no grid voltage is detected on any phase.

The detection of the grid signal failure alarm can be configured (ATS Alarms Table, parameter 11) to:

0: Not verified.

1: Is checked and, if there is an error, the engine is started.

An anti-bounce time can be associated to the Grid signal failure alarm (Alarms Table, parameter 12) during which no grid signal must be detected on any phase before the alarm is activated.

The detection of the Grid signal failure alarm is a **start condition of the generator**.

ATS switching failure CR

The ATS switching failure CR alarm of the **CE8** controller occurs if the mains contactor is activated via the CR relay of the Control Module and activation is not verified via the input associated with the mains contactor confirmation functionality for a programmed time (Times Table, parameter 41). The status of the programmable input associated with the mains contactor confirmation mode must be validated for a time interval (anti-bounce configured in the input) before being validated.

The detection of the ATS switching failure CR alarm can be configured (ATS Alarms Table, parameter 29) to:

- 0: Not verified.
- 1: Is checked and, if there is an error, the engine is started.

ATS switching failure CG

The **CE8** controller's ATS switching failure CG alarm occurs if the group contactor is activated via the CG relay of the Control Module and activation is not verified via the input associated with the group contactor confirmation functionality for a programmed time (Times Table, parameter 40). The status of the programmable input associated with the group contactor confirmation mode must be validated for a time interval (anti-bounce configured in the input) before being validated.

The detection of the ATS switching failure CG alarm can be configured (ATS Alarms Table, parameter 31) for:

- 0: Not verified.
- 1: Is checked and, if there is an error, the engine is started.

Programmable alarms

The Programmable alarms of the **CE8** controller occur when the conditions programmed for each alarm (digital input activation, analog value thresholds, DTC detection or PGN variable threshold) are met.

The detection of Programmable alarms is set by default (Programmable Alarms Table) to **never** occur.

A time can be associated to the programmable alarms (Programmable Alarms Table) to delay the instant at which the alarm conditions start to be verified.

Programmable alarms are configured by default (Programmable Alarms Table) **not to perform any action** (warning).

7. MAINTENANCE

7.1 OPERATING METERS

The **CE8** controller registers different accumulated operating values of the controller. The counters recorded by the controller are:

- **Total running hours counter.** The controller records the number of running hours the engine of the generator has been running. The total running hours counter cannot be reset.
- **Partial running hours counter.** The controller records the number of running hours the engine of the generator has been running. The partial running hours counter can be reset to zero.
- **Correct start counter.** The controller counts the number of correct starts made by the controller. The correct start counter can be reset to zero.
- **Failed start counter.** The controller counts the number of failed starts performed by the controller. The failed start counter can be reset to zero.
- **Total energy counter.** The controller counts the total energy generated by the generator in MWh. The total energy meter is not resettable.
- **Partial energy counter.** The controller counts the total energy generated by the generator in MWh. The partial energy meter can be reset to zero.
- **Energy counter per day.** The energy per day counter counts the energy generated by the generator from 00:00 hours of the current day until the time of display. With the change of day, the energy accumulated during the day is added to the energy of the month and the energy per day counter is reset to zero.
- **Energy counter per month.** The energy meter per month counts the energy generated by the generator from the 1st day of the current month until the day before the display. With the change of month, the accumulated energy is added to the annual energy counter and the monthly energy counter is reset to zero.
- **Energy counter per year.** The energy meter per month counts the energy generated by the generator from 1 January until the month prior to the display. At the change of year, the annual energy counter is reset to zero.

7.2 MAINTENANCE COUNTERS

The **CE8** controller has five programmable counters that are loaded with a certain time that decreases with the detection of the engine running.

The maintenance counters are:

- **4 engine maintenance counters.** When the counters reach zero, they generate an engine not stopped alarm. The alarm disappears when the associated counter is reloaded. The engine running time exceeding the programmed maintenance counter is shown flashing on the controller interface with a – sign in front of the counter value.
- **1 rental counter.** The engine running time that exceeds the programmed rental counter is shown flashing on the controller interface with a – sign in front of the counter value.

The operation of the maintenance counters allows:

Programming. The maintenance counter is programmed from the Functions -> Counters menu. In the case of the rental counter, after programming the limit of hours in operation, the alarm mode must be entered. The following values are allowed:

0: Warning.

1: Stop without cooling down.

2: Stop with cooling down.

Display. The remaining operating time before a maintenance alarm occurs is displayed in the Functions -> Counters menu.

Notification. To notify the maintenance alarm, it must be programmed from the menu Functions -> Counters and writing any value different from zero.

Cancellation. To cancel the counter of maintenance in progress, it must be programmed from the menu Functions -> Counters by typing the value zero in hours.

7.3 ERROR HISTORY

The **CE8** controller records the alarms detected and stores the status of the controller when they occurred. The **CE8** controller stores in detail (alarm information) the last 100 errors detected and without detail the last 1000 errors detected.

7.4 LIST OF EQUIPMENT

7.4.1. EQUIPMENT LISTING INFORMATION

The **CE8** controller allows the identification and display of all electronic equipment currently connected to the controller. To do this, access the Functions -> Devices menu. In this menu option, all the electronic devices of the type measurements (CPU8 and CEC8) and interface (**CE8**) currently connected are listed, indicating with an asterisk (*) the module from which the list of devices is being displayed.

Information on such equipment is specified as follows:

- The model of the electronic module.
- The electronic module identifier (0 to 14).
- Firmware version.
- For display modules, the associated control device is indicated in brackets.

For display modules, the master display module must have the same identifier as the associated Controller Module. For repetitive display modules, the module must have a different identifier than the master display and must be associated with the same Controller Module.

For the display modules of ATS controllers, the display module must have the same identifier as the Control Module of the associated ATS controller and in brackets the identifier of the Control Module of the generator to which the manual controller is associated.

NOTE

Modules with the same identifier are not allowed. If a User Interface detects another analog module with the same identifier at startup, an error message is displayed.

NOTE

When changing the identifier of a module, the module is automatically reset. Caution should be taken NOT to change the identifier of control devices while the generator is running.

7.4.2. IDENTIFIER ASSIGNMENT OPERATION

Due to the fact that by default all the electronic modules have the identifier 0, for the start-up of installations with several controllers connected to each other, it is necessary to assign identifiers to the different modules. To do this, the different controllers must be progressively switched on, assigning different identifiers to each of them as they are connected.

8. COMMUNICATIONS

8.1 CAN BUS

The **CE8** controller has two channel buses for transmitting information. The first channel bus is used for communication between the connected devices. The second can bus is configured at 250 Kbit/s and is only used to communicate with the engine, if the engine installed in the generator allows it.

8.2 MODBUS RS-485

The **CE8** controller has an RS-485 connection on the User Interface to communicate via the Modbus RTU protocol.

See mapping of registers in ANNEX II.

8.3 MODBUS TCP

The **CE8** controller allows a connection to be made between the controller and any device that implements the MODBUS TCP protocol.

8.3.1. IMPLEMENTED FUNCTIONS

The controller implements the following protocol functions:

- Code 01h: READ COIL Status.
- Code 02h: READ INPUT Status.
- Code 03h: READ HOLDING REGISTER.
- Code 04h: READ INPUT REGISTER.
- Code 05h: FORCE SINGLE COIL.
- Code 06h: WRITE SINGLE REGISTER.
- Code 10h: WRITE MULTIPLE REGISTERS.

8.3.2. ERROR CODES

The implemented MODBUS error codes are as follows:

- Cod 0x02: **Illegal data address**: Returned when the address does not correspond to any valid parameter.
- Cod 0x03: **Illegal data value**: Returned when the number of read/write records exceeds the maximum allowed.
- Cod 0x06: **Busy**: It is returned when, when performing a write/read of a parameter that reads/writes values to the measurement board, the action is not performed within the set timeout (10 seconds).

See mapping of registers in ANNEX II.

8.4 SNMP

The **CE8** controller allows a connection to be made between the controller and any device that implements the SNMP protocol.

Simple Network Management Protocol (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices. Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks and many more. It allows administrators to monitor the operation of the network, find and resolve problems.

The device responds to GET/SET requests from the SNMP manager to configure parameters and monitor controller measurements. In addition, when an alarm occurs in the controller, it sends alarm information via SNMP TRAP to the IP of the configured manager.

8.4.1. IMPLEMENTED FUNCTIONS

The controller implements the following protocol functions:

- GetRequest.
- GetNextRequest.
- SetRequest.
- SetNextRequest.
- Traps.

8.4.2. ERROR CODES

The controller implements the following error codes for the SNMP protocol:

- Cod 0x01 – **tooBig**: The PDU is too big.
- Cod 0x02 – **noSuchName**: No such name, variable does not exist.
- Cod 0x03 – **badValue**: Incorrect value, does not match the variable definition.
- Cod 0x04 – **genErr**: General error.
- Cod 0x05 – **noAcces**: The specified SNMP variable is not accessible.

NOTE

If the community of the request does not match the community configured in the controller, nothing will be returned and the request timeout will be triggered.

See mapping of registers in ANNEX III.

8.4.3. ORGANISATION OF INFORMATION (MIB file)

The SNMP protocol does not specify the type of information and functions supported by the controller. This information is defined in the MIB (Management Information File) of the device (HIMCE8vXX.mib). From the Himoinsa website you can download the MIB file to load it into an SNMP Manager and thus be able to operate the device.

The information is organised as follows at iso.org.dod.internet.enterprises.himoinsa (3.6.1.4.1.41809):

List of information	Description	Supported functions	Port No.	Community String by default
Measures	Controller dimensions	Get, GetNext	161	Public
Parameters	Configurable parameters of the controller	Get. GetNext, Set, SetNext	161	
Traps	Controller alarms	Trap	162	

NOTE

The controller uses the same community string for all functions. This community string can be modified via the device configuration. It is recommended to create a new community string for security reasons.

8.5 USB

The **CE8** controller has two USB ports, one on the Controller Module and one on the User Interface. From both ports you can access the controller's configuration and monitoring platform (Genset WorkBench).

The USB port of the Controller Module is also used to communicate with the PLC integrated in the controller. The PLC programming and monitoring access functionalities are integrated in the Genset WorkBench platform.

9. IOT

The **CE8** controller integrates an IOT device in the user interface that allows supervision and monitoring of the controller via the HG Web application over a 4G connection. This device incorporates GPS global positioning technology, with which it is possible to locate the generator and detect movements when the unit is switched off, in order to warn of possible theft. For more information on the HG Web application, please consult the manual for this application.

9.1 INSTALLATION

In order for the device to work properly, the following connections must be properly installed:

- 4G connector. In order for the device to register and connect via the 4G network it is necessary to connect the LTE antenna to the appropriate SMA connector. It is important that the LTE antenna is connected to the 4G SMA connector.
- GPS connector. In order for the device to establish a correct GPS position it is necessary to connect the GPS antenna to the appropriate SMA connector. It is important that the GPS antenna is connected to the SMA GPS connector.
- SIM connector. In order for the device to be able to use the 4G network of the SIM card provider, the card must be inserted correctly into the reader. The card must be inserted in the direction marked on the cover of the device and inserted until you hear the connector click. To remove the card, simply push the card inwards until you hear the connector click.

9.2 FUNCTIONALITIES

The IOT device offers the following functionalities that facilitate the management and control of the generator sets of the **CE8** range:

- Remote connection of the generators via HG Web over a 4G connection.
- Connection of the generators via SNMP over an Ethernet connection.
- Connection of the generators via MODBUS TCP over an Ethernet connection.
- Non-volatile memory storage of system events and alarms to be transmitted in case a connection to the HG Web server cannot be established.

- Device configuration via PC applications (Genset WorkBench).
- Configuration of the system in low consumption mode to extend the autonomy of the batteries when the installation is switched off.
- Anti-theft management system using GPS positioning.
- Interaction with the system via SMS and/or E-MAIL.
- Device update via the HG Web server.

9.3 ANTI-THEFT FUNCTION

The anti-theft management function allows alarm notification to be received when the generator set is detected to be stolen. There are two theft detection modes that can work independently or in combination.

Perimeter Mode. In this mode, the system detects when the generator leaves a configurable security perimeter, sending a warning to the configured mobiles via Genset WorkBench.

Movement mode. In this mode the system detects when the generator has moved a configurable distance from the last stable position, sending a warning to the configured mobiles through Genset WorkBench. This mode is useful to obtain the route followed by the generator set.

Combined Mode. This mode combines perimeter and motion detection, so that the mobiles configured from the Genset WorkBench will receive a warning when the generator leaves the security perimeter and every time it exceeds the motion detection distance.

For the correct operation of the anti-theft manager it is necessary to correctly configure the device through the Anti-Theft section of Genset WorkBench.

Reference position. This is the position from which the system takes the reference for calculating the safety perimeter. The reference position is defined by the latitude and longitude values, with the format, **XX.XXXXXN/S**, **YY.YYYYYYW/E**.

Radius of the security perimeter. Determines the value in metres of the radius that defines the security perimeter. This value only needs to be defined if perimeter or combined detection mode is selected.

Motion detection distance. Determines the value in metres of the distance from the last reference point at which the system warns the user. This value only needs to be set if motion detection or combined mode is selected.

9.4 LOW CONSUMPTION FUNCTION

The IOT device offers a low power mode to preserve the battery charge while maintaining all other functionalities. The low power mode is activated and configured in the Low Power tab of the Genset WorkBbench.

The low power mode comes into operation when the generator set and the CEA8 controller are switched off. This functionality is divided into two states, Sleep and Active. When the generator and the controller are switched off, the device enters Sleep mode. In this mode the consumption of the system is greatly reduced.

For the IOT device to enter the sleep state, two conditions must be met: the idle time (period of time without detection of CAN frames from the controller) must have expired and the MAN input must be deactivated.

The system can be configured to exit the Sleep state under two conditions: by time and by change of state of the MAN input. The first is configurable through the Genset WorkBench, setting the time it remains in the Sleep state. When one of the two output conditions of the Sleep state occurs, the device goes to Active state and sends the system status and GPS position to return to the Sleep state. If for some reason the device is unable to establish a connection, it will return to the Sleep state after 15 minutes of inactivity. It will also return to the Sleep state if any of the 2 input conditions mentioned above are met.

9.5 SMS FUNCTION

The IOT device allows the user to interact with the system via SMS commands. With them it is possible:

- Query the status of the generator connected to the device.
- Command a start, stop, change of operating mode, change the status of the grid and generator contactors and read or write configuration parameters.
- Query status of inputs and outputs.
- Set the anti-theft management mode.
- Query the GPS position of the device.

In addition to remote control of the system, this function allows the user to receive alarms from the controller.

9.5.1. SMS COMMANDS

Sending any SMS message will be answered with the result of the action. Text commands must be written in capital letters and with the correct structure. The commands that can be performed are listed below.

Request for generator information. By sending an SMS with the text GET STATUS ID X, where X is the CAN/MODBUS identifier of the installation, the device shall reply with the following information:

Field	Description	Units
MODE	Generator operating mode: · LOCKED · MAN · AUTO · TEST	-
PHASES	Number of signal phases	-
GEN	Signal frequency	Hz
	Measured signal voltage: Single phase: Voltage between phase 1 and neutral Two-phase: Voltage between phase 1 and 2 Three-phase: Voltage between phases	V
P	Active power of the generator	kW
MAIN	Signal frequency	Hz
	Measured signal voltage: Single phase: Voltage between phase 1 and neutral Two-phase: Voltage between phase 1 and 2 Three-phase: Voltage between phases	V
	Status of contactors: KR: active grid contactor KG: active generator contactor	
ENG	State of the engine: Run: On the move Stop: Stopped	-
HOUR	Total hours of operation	Hours
BAT	Battery voltage (V)	V
FUEL	Fuel level Only displayed if sensor is detected	%
NUM ALARM	Number of alarms present on the generator set	-

Start command. Sending an SMS with the text SET START ID X, where X is the CAN/MODBUS identifier of the installation. If the action has been performed successfully the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X START OK.

Stop command. Sending an SMS with the text SET STOP ID X, where X is the CAN/MODBUS identifier of the installation. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X STOP OK.

Command to change the status of the grid contactor. Sending an SMS with the text SET MB ID X, where X is the CAN/MODBUS identifier of the installation. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X MAIN BREAKER TOGGLE OK.

Command to change the status of the generator contactor. Sending an SMS with the text SET GB ID X, where X is the CAN/MODBUS identifier of the installation. If the action has been performed successfully the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X GENSET BREAKER TOGGLE OK.

Command to change the generator operating mode. Sending an SMS with the text SET MODE ID X AUTO / LOCKED/ MAN / TEST, where X is the CAN/MODBUS identifier of the installation. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X SET MODE AUTO / LOCKED / MAN/ TEST OK.

Request for controller parameter. Sending an SMS with the text GET PARAMETER ID X (Y, Z) (Y, Z)..., where X is the CAN identifier of the installation, Y the index of the controller parameter table and Z the index of the value to be read. With this command, up to 7 values can be read at the same time. If the action is successful, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X PARAMETER VALUE: (Y, Z, T), where T is the value of the requested parameter. To know more about the parameter table indexes see ANNEX I.

Controller parameter writing command. Sending an SMS with the text SET PARAMETER ID X (Y, Z, T), where X is the CAN identifier of the installation, Y the index of the controller parameter table, Z the index of the value to be read and T the value to be written. This command allows up to 7 values to be written at the same time. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X PARAMETER VALUE: (Y, Z, T)... For more information on the parameter table indexes, see ANNEX I.

Alarm reset command. With this command it is possible to reset alarms whose alarm condition is not present. Sending an SMS with the text SET RESET ALARMS ID X, where X is the CAN identifier of the installation. If the action is successful, the user will receive an SMS with the text IOT_HOSTNAME GROUP ID X RESET ALARMS OK. Only valid for Himoinsa controllers.

Requesting the status of the inputs and outputs. By sending an SMS with the text GET IO STATUS the user will receive an SMS with the text IOT_HOSTNAME INPUT STATUS: IN1: ON / OFF, IN2: ON / OFF, IN3: ON / OFF, IN4: ON / OFF. OUTPUT STAUTS: OUT1: ON / OFF, OUT2: ON / OFF, OUT3: ON / OFF.

Requesting the status of an input. Sending an SMS with the text GET IN ID X, where x is the index of the input to be consulted. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME INPUT X STATUS: ON / OFF.

Requesting the status of an output. Sending an SMS with the text GET OUT ID X, where x is the index of the output to be consulted. If the action has been carried out successfully, the user will receive an SMS with the text IOT_HOSTNAME OUTPUT X STATUS: ON / OFF.

Requesting the GPS position. Sending an SMS with the text GET GPS. If the action is successful the user will receive an SMS with the text IOT_HOSTNAME GPS POSITION: XX.XXX, YY.YYY **https://www.google.es/maps/place/xx.xxx,yy.yyy**

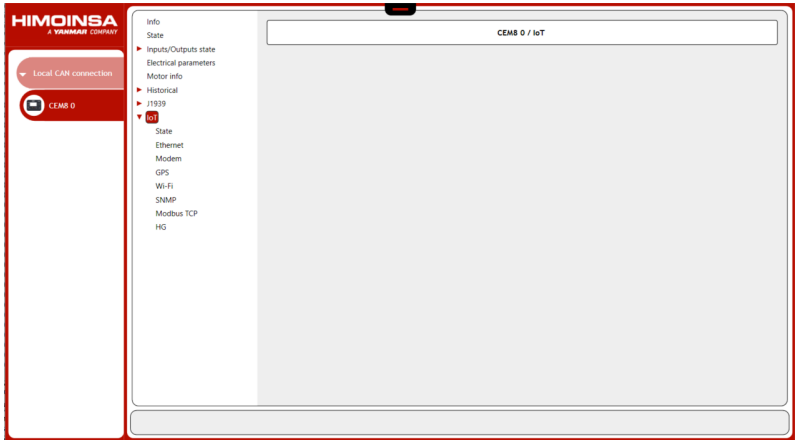
Configuration of burglary management. Sending an SMS with the text SET GPS (X, Y), where X is the radius in metres of the security perimeter and Y is the distance in metres of the movement detection. This command will activate the active burglary and is valid when the device has a GPS position set, taking this position as the reference point for anti-theft management. If the action is successful, the user will receive an SMS with the text IOT_HOSTNAME COMAND OK. To deactivate the anti-theft device, an SMS with the text SET GPS (0,0) must be sent.

9.6 CONFIGURATION

The IOT device can be configured and monitored from the Genset Workbench application, which allows diagnosing the status of TCP, 4G, Wifi, GPS communications, and configuring the different functionalities of the device, resetting the default parameters or restarting the device. The application consists of several information and configuration sections. When the configuration is finished in each of the sections, it is necessary to save the changes using the “Write parameters” button and finally restart the device to apply the changes using the “Apply changes” button. For more information on Genset WorkBench, please consult the manual for this application.

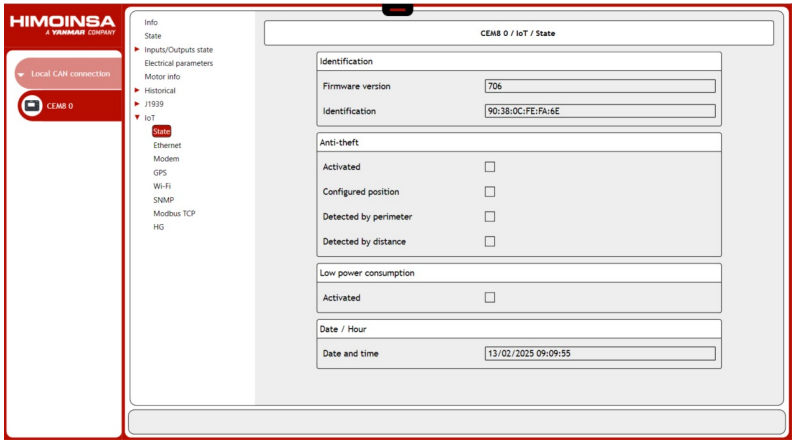
9.6.1. IOT MONITORING

The MONITORING section contains useful information about the status of the IOT device, for diagnosing the system and the different communication buses. The information is distributed in different sections that make it easy to access and facilitate system diagnostics.



IOT Monitoring section

9.6.1.1 GENERAL CONDITION

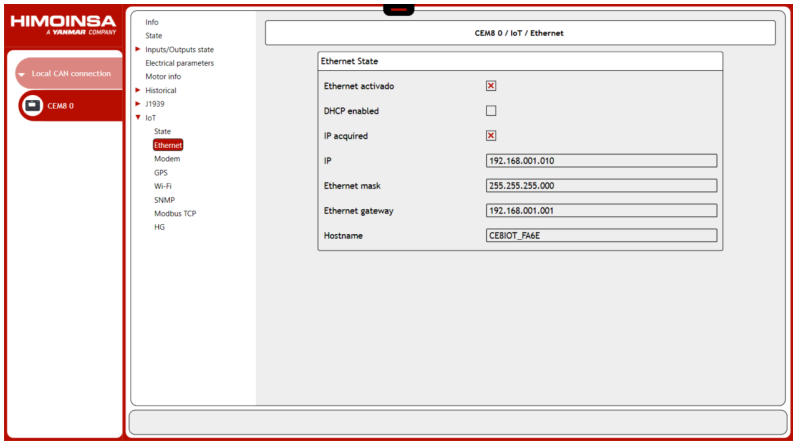


General IOT status section

IOT General Status section fields

Generator	Field	Description	Values
IDENTIFICATION	Firmware version	Version installed on the IoT device	-
	Identification	Device identifier	-
ANTI-THIEF	Activated	Indicates if anti-theft is enabled	Enabled Disabled
	Configured position	Indicates whether a reference position has been fixed	Enabled Disabled
	Perimeter-detected	Indicates whether perimeter anti-theft has been activated	Detected Not detected
	Distance-detected	Indicates whether the remote anti-theft device has been activated	Detected Not detected
LOW CONSUMPTION	Activated	Indicates if low power is enabled	Enabled Disabled
DATE / TIME	Date and time	Displays the current date and time of the device	-

9.6.1.2 ETHERNET STATUS

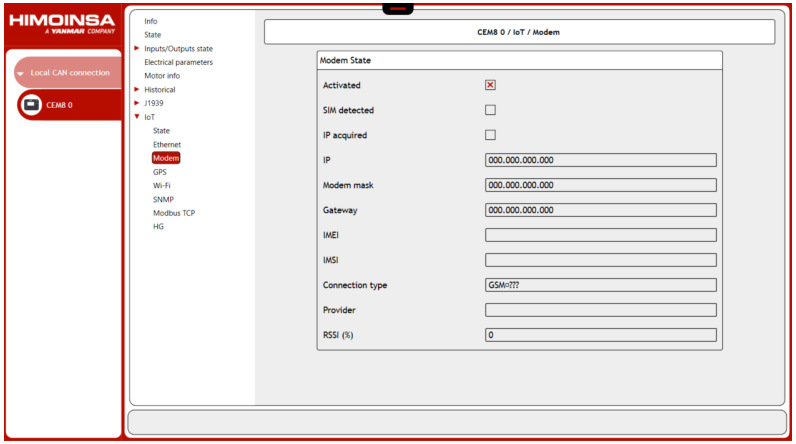


Ethernet IOT status section

Fields in the Ethernet IOT Status section

Generator	Field	Description	Values
ETHERNET	Activated	Indicates whether Ethernet is enabled	Enabled Disabled
	DHCP	Indicates whether DHCP is enabled	Enabled Disabled
	Acquired IP	Indicates whether IP has been detected	Detected Not detected
	IP	IP address assigned to the device	-
	Grid mask	Subnet mask assigned to the device	-
	Gateway	Gateway assigned to the device	-
	Hostname	Device name	-

9.6.1.3 MODEM STATUS

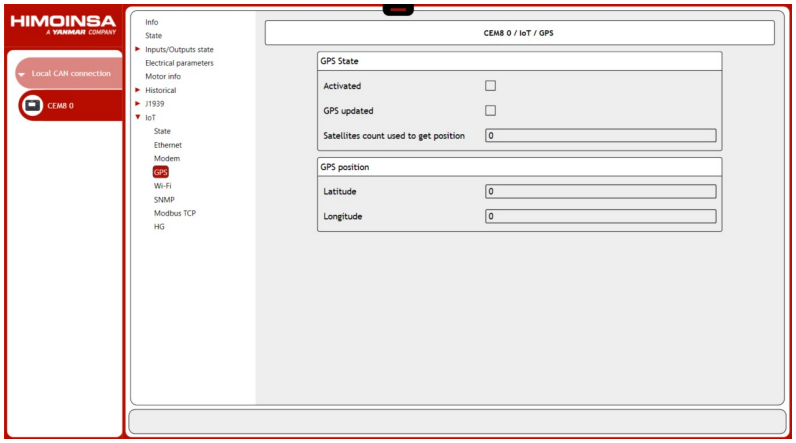


IOT Modem status section

IOT Modem Status section fields

Generator	Field	Description	Values
MODEM	Activated	Indicates if modem is enabled	Enabled Disabled
	SIM detected	Indicates whether SIM has been detected	Detected Not detected
	Acquired IP	Indicates whether IP has been acquired	Detected Not detected
	IP	IP address obtained from the grid provider	-
	Grid mask	Subnet mask obtained from the grid provider	-
	Gateway	Gateway obtained from the grid provider	-
	IMEI	Identification number of the module integrated in the device	-
	IMSI	International mobile subscriber identity	-
	Type of connection	Type of connection established in the mobile grid	GSM UTRAN GSM W/EGPRS UTRAN 0 (UTRAN W/HSDPA) UTRAN 1 (UTRAN W/HSUPA) UTRAN 2 (UTRAN W/HSDPA and HSUPA) E-UTRAN LTECatM1 LTECatNB1 CDMA
	Operator	Telephone provider	-
	RSSI (%)	Level of coverage	0 - 100

9.6.1.4 GPS STATUS

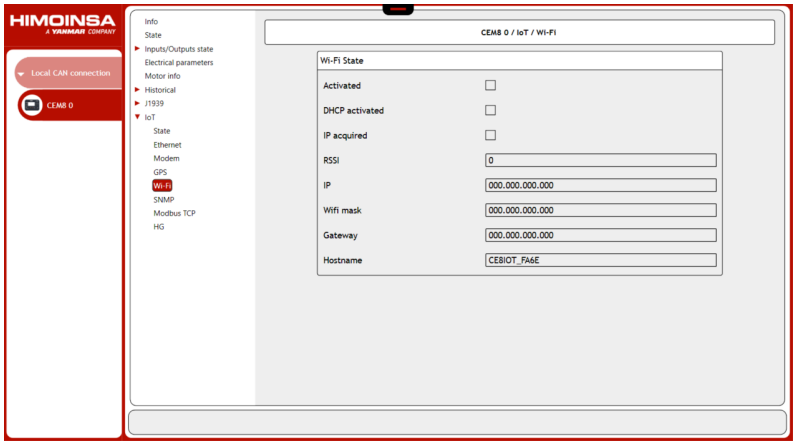


GNSS IOT status section

GPS IOT Status section fields

Generator	Field	Description	Values
GPS	Activated	Indicates whether GPS is enabled	Enabled Disabled
	GPS update	Indicates whether the GPS position has been updated	Updated Not updated
	Satellites	Number of satellites to get position	-
POSITION	Latitude	Latitude value of GPS position	-
	Length	GPS position longitude value	

9.6.1.5 WIFI STATUS

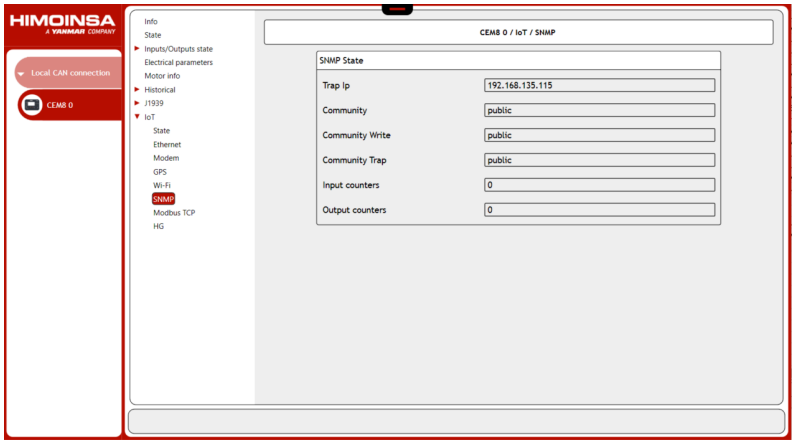


WIFI IOT status section

Fields in the WIFI IOT Status section

Generator	Field	Description	Values
WIFI	Activated	Indicates if WIFI is enabled	Enabled Disabled
	DHCP enabled	Indicates whether DHCP is enabled	Enabled Disabled
	Acquired IP	Indicates whether IP has been acquired	Detected Not detected
	RSSI	Signal strength	-
	IP	IP address assigned to the device	-
	Grid mask	Subnet mask assigned to the device	-
	Gateway	Gateway assigned to the device	-
	Hostname	Device name	-

9.6.1.6 SNMP STATUS

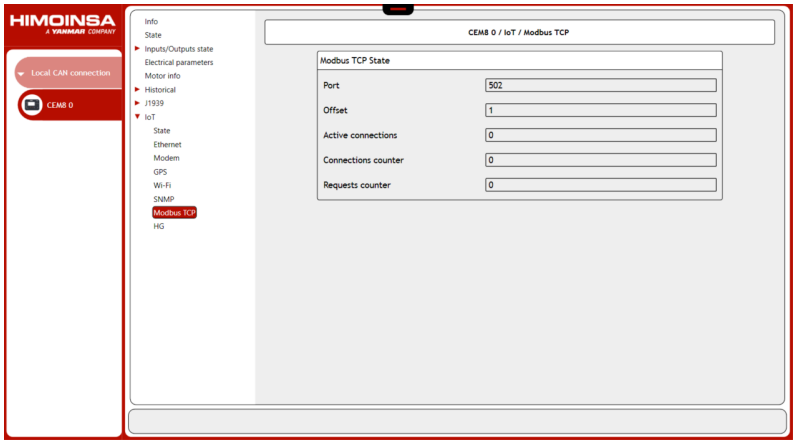


SNMP status section

SNMP IOT Status section fields

Generator	Field	Description	Values
SNMP	Traps receiver address	IP address to which traps will be sent to	-
	Community	Community string for reading	-
	Community write	Community string writing	-
	Community trap	Community string for writing traps	-
	Packages received	Received packet counter	-
	Packages sent	Sent packet counter	-

9.6.1.7 MODBUS STATUS

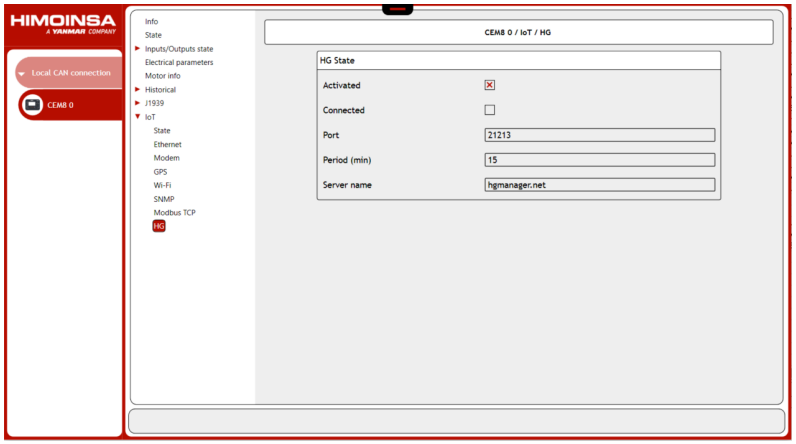


MODBUS TCP IOT status section

MODBUS IOT Status section fields

Generator	Field	Description	Values
MODBUS TCP	TCP port	MODBUS TCP protocol listening port	-
	Offset	Offset of IOT - accessible slaves	-
	Active connections	Number of clients connected by MODBUS TCP	-
	Connection counter	Number of connections that have been established with the IOT via MODBUS TCP	-
	Request counter	Number of requests the IOT has received via MODBUS TCP	-

9.6.1.8 HG STATUS



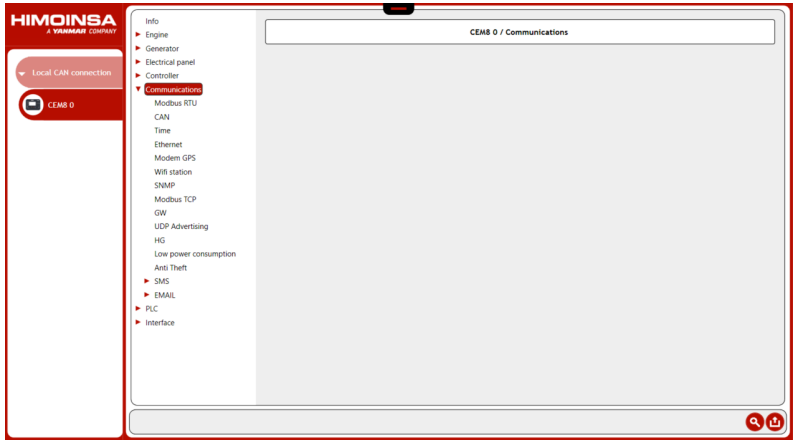
HG IOT status section

HG Status section fields

Generator	Field	Description	Values
HG	Activated	Indicates whether HG is enabled	Enabled Disabled
	Wired	Indicates whether a connection to the HG server has been established	Connected Not connected
	Port	HG server connection port	-
	Period (min)	Time period for sending the system status to the server in minutes	-
	Server name	IP address or name of the HG Web server	-

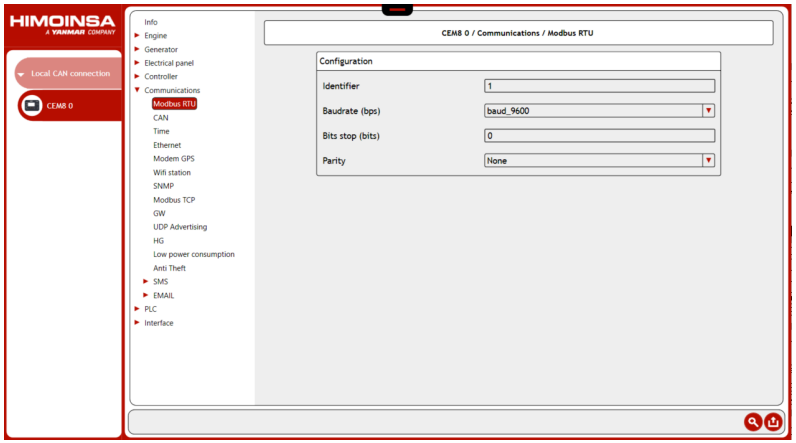
9.6.2. IOT CONFIGURATION

The CONFIGURATION section contains the configuration parameters of the IOT device. The parameters are distributed in different sections that make it easy to access and configure each of the functionalities. When a parameter is configured, it is necessary to save and then apply the changes by pressing the “Write parameter” and “Apply changes” buttons respectively.



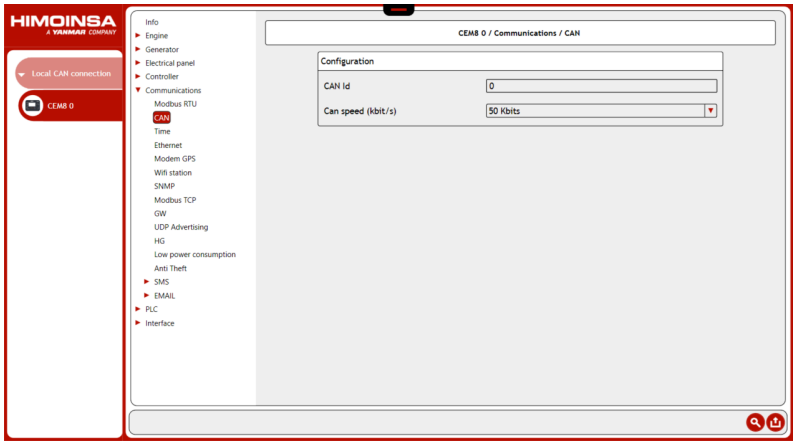
IOT configuration section

9.6.2.1 MODBUS RTU



MODBUS RTU configuration section

9.6.2.2 CAN

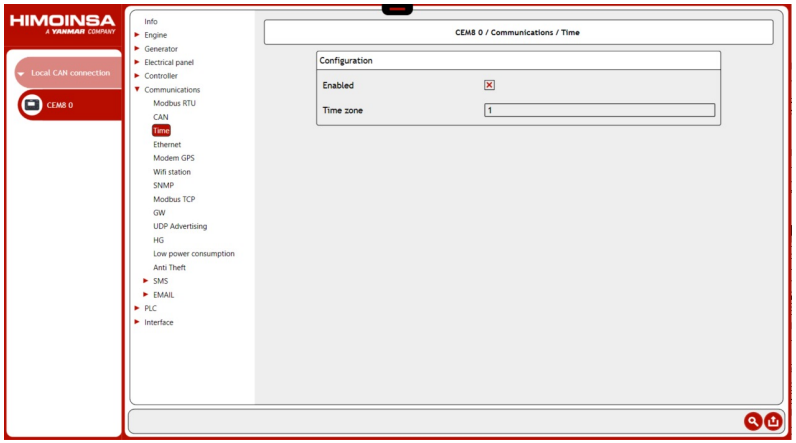


CAN IOT configuration section

Fields in the CAN IOT Configuration section

Generator	Field	Description	Values
CAN	CAN ID	Device identifier on the CAN communication bus	-
	CAN speed (kbit/s)	CAN bus operating speed	25 kbits 50 kbits 100 kbits 125 kbit 250 kbits 500 kbits 800 kbits 1000 kbits

9.6.2.3 TIME

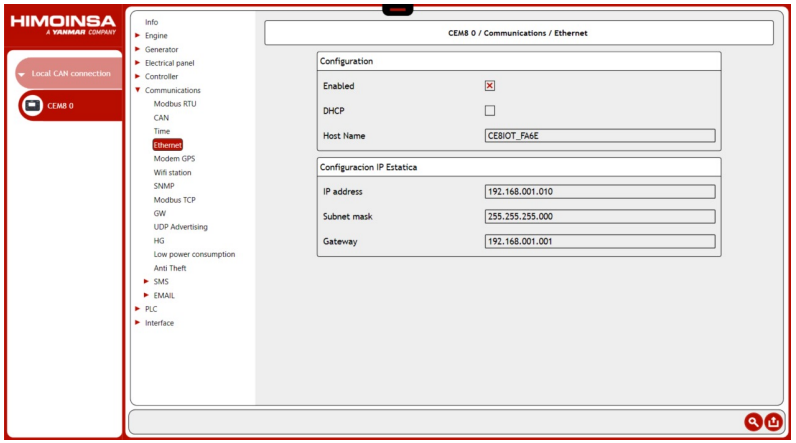


Time IOT configuration section

Fields in the Time IOT Configuration section

Generator	Field	Description	Values
CAN	Enable	Enabling time synchronisation	Enabled Disabled
	Time zone	Time zone for device time setting. If an internet connection is available, the time zone will be updated automatically	-

9.6.2.4 ETHERNET

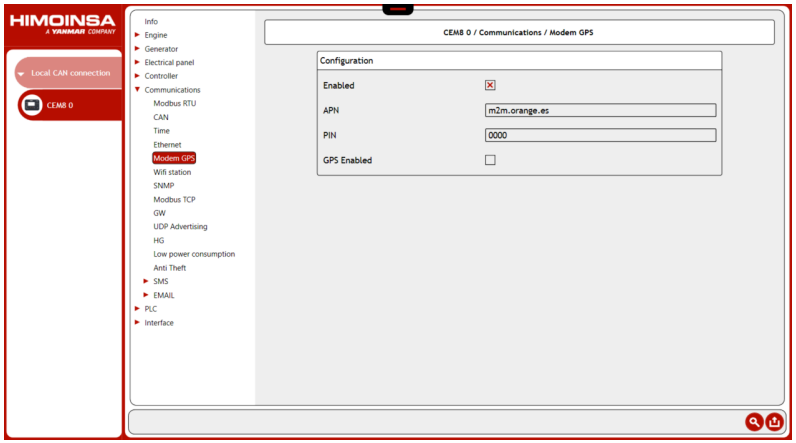


Ethernet IOT configuration section

Fields in the Ethernet IOT Configuration section

Generator	Field	Description	Values
ETHERNET CONFIGURATION	Enabled	Enables Ethernet communication	Enabled Disabled
	DHCP	Enables IP fetching via DHCP	Enabled Disabled
	Host name	Device name	-
STATIC IP CONFIGURATION	IP address	Static IP address assigned to the device	-
	Subnet mask	Subnet mask assigned to the device	-
	Gateway	Gateway assigned to the device	-

9.6.2.5 MODEM/GPS

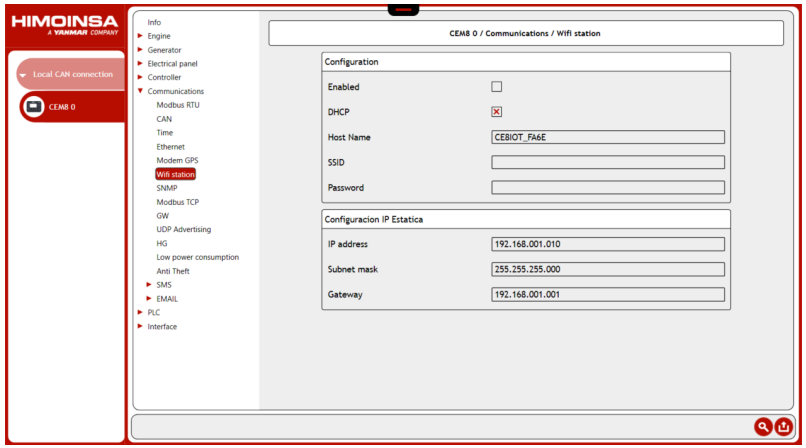


Modem/GPS IOT configuration section

MODEM/GPS IOT Configuration section fields

Generator	Field	Description	Values
MODEM/GPS	Enabled	Enables modem communication	Enabled Disabled
	APN	Name of the GPRS access point of the SIM provider	-
	PIN	Inserted SIM card code	-
	GPS Enabled	Enables GPS positioning	Enabled Disabled

9.6.2.6 WIFI STATION

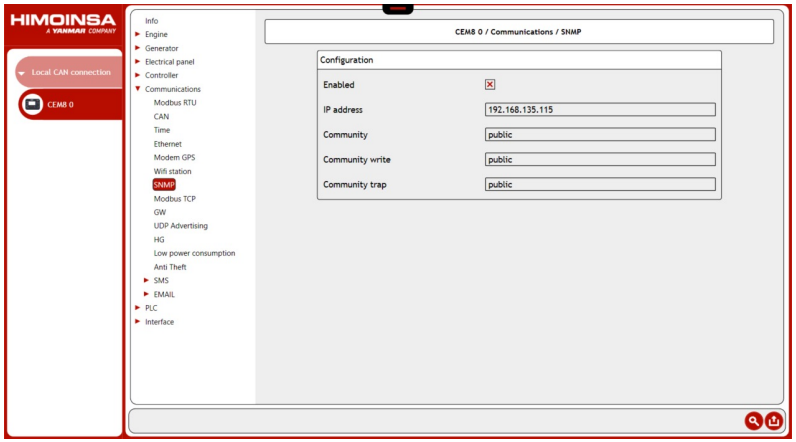


WIFI STATION IOT configuration section

Fields in the WIFI STATION IOT Configuration section

Generator	Field	Description	Values
CONFIGURATION WIFI STATION	Enabled	Enable WIFI connection	Enabled Disabled
	DHCP	Enables DHCP IP fetching	Enabled Disabled
	Host name	Device name	-
	SSID	Name of the WIFI grid the device will connect to	-
	Password	Password of the WIFI grid to which the device is to connect to	-
STATIC IP CONFIGURATION	Static IP	IP address assigned to the device	-
	Subnet mask	Subnet mask assigned to the device	-
	Gateway	Gateway assigned to the device	-

9.6.2.7 SNMP

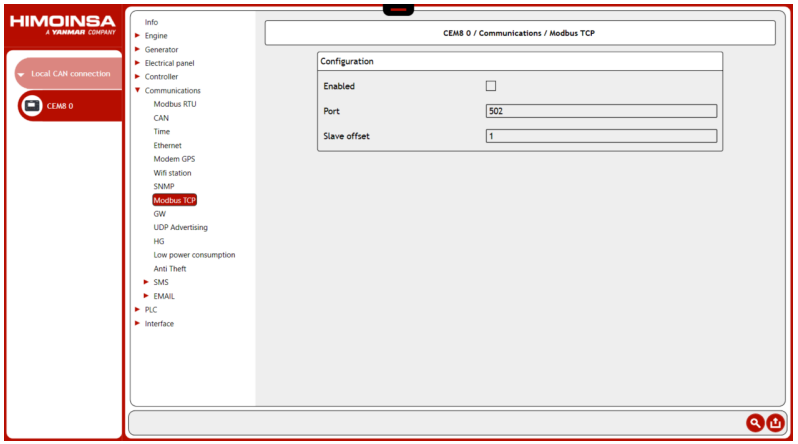


SNMP IOT configuration section

SNMP IOT Configuration section fields

Generator	Field	Description	Values
SNMP	Enabled	Enables SNMP communication	Enabled Disabled
	IP address	IP address to which traps will be sent to	-
	Community	Community string for reading	Public
	Community write	Community string writing	Public
	Community trap	Community string for writing traps	Public

9.6.2.8 MODBUS TCP

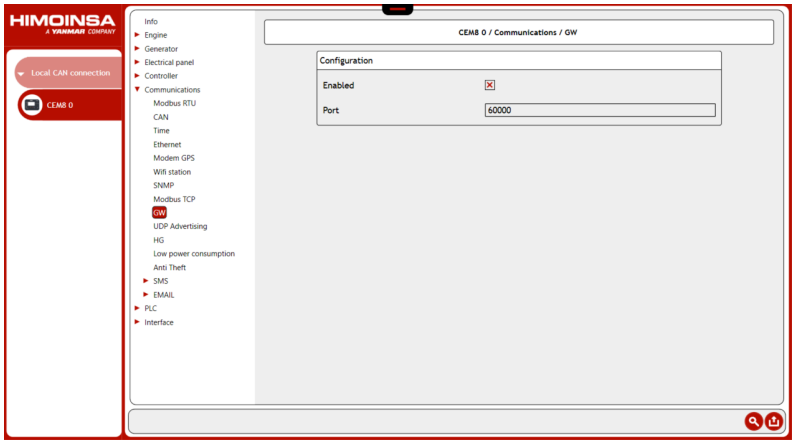


MODBUS TCP IOT configuration section

MODBUS Configuration section fields

Generator	Field	Description	Values
MODBUS TCP	Enabled	Enables communication by MODBUS TCP	Enabled Disabled
	TCP port	MODBUS TCP protocol listening port	-
	Slave offset	Offset of IOT - accessible slaves	-

9.6.2.9 GW

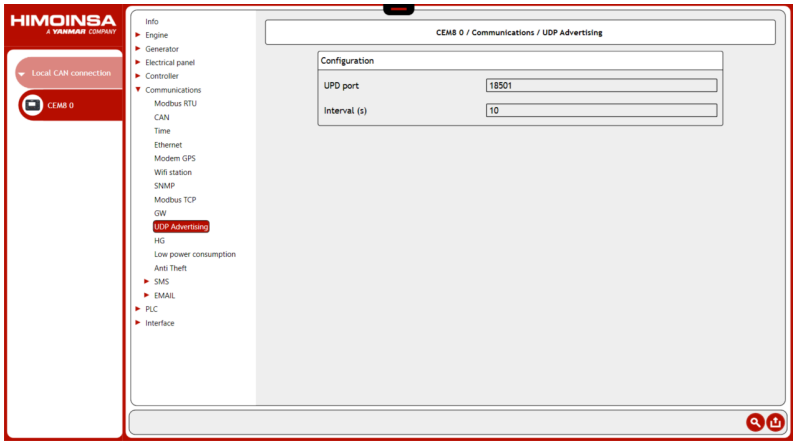


GW IOT configuration section

Fields in the GW IOT Configuration section

Generator	Field	Description	Values
GW	Enabled	Enables connection to Genset WorkBench	Enabled Disabled
	Port	Listening gate to establish connection to Genset WorkBench	-

9.6.2.10 UDP

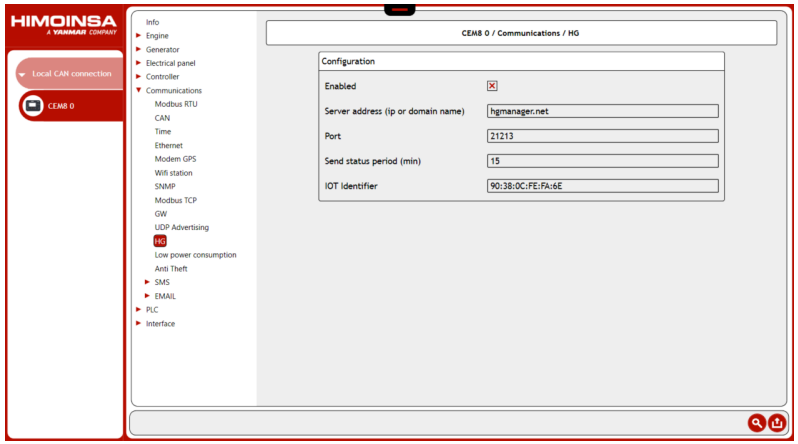


UDP IOT configuration section

UDP IOT Configuration section fields

Generator	Field	Description	Values
UDP	UDP Port	Local port used for transmission of frames	-
	Interval (s)	Time period between sending frames	-

9.6.2.11 HG

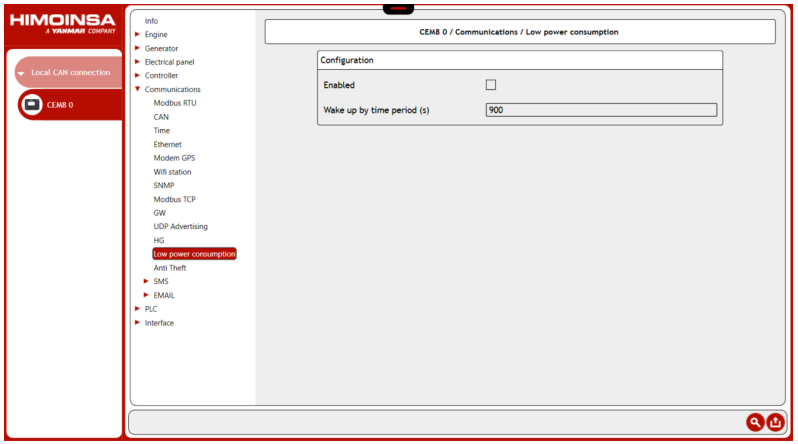


HG IOT configuration section

Fields in the HG IOT Configuration section

Generator	Field	Description	Values
HG	Enabled	Enables the connection to the HG Web server	Enabled Disabled
	Server address	IP address or Host Name of HG Web server	hgmanager.net
	Port	HG Web server connection port	21213
	Sending period (min)	Time period for sending the system status to the server in minutes	15
	IOT Identifier	Device identification MAC	-

9.6.2.12 LOW CONSUMPTION

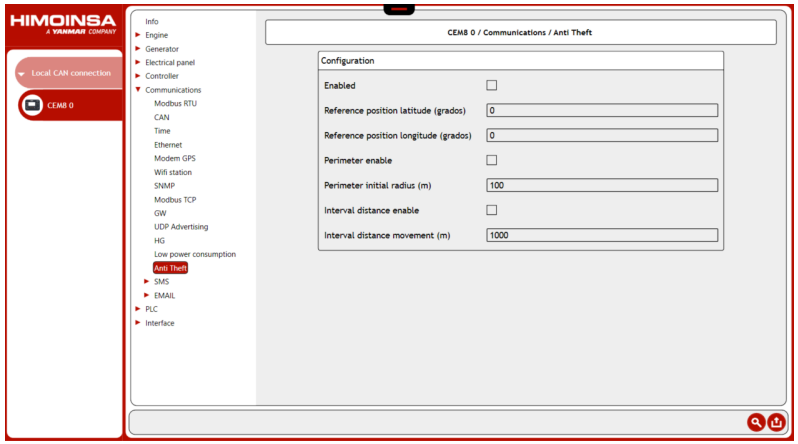


IOT low power configuration section

Fields in the IOT Low Power Configuration section

Generator	Field	Description	Values
LOW CONSUMPTION	Enabled	Enables low power mode	Enabled Disabled
	Wake up by time period (sec)	Low power output time period to send data to the server	-

9.6.2.13 ANTI-THEFT

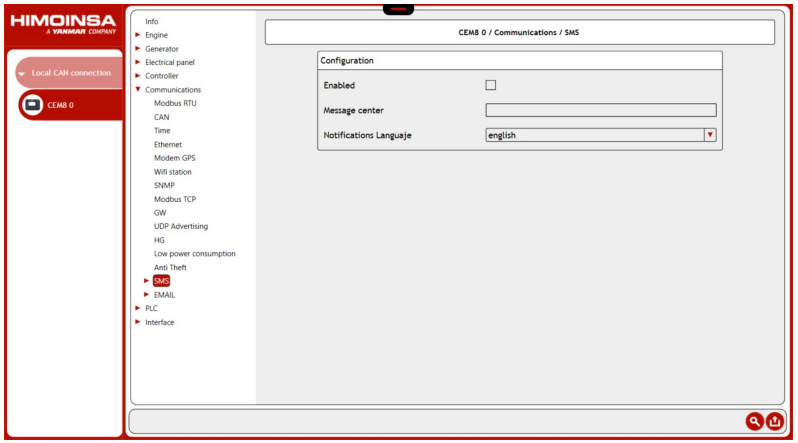


IOT Anti-Theft configuration section

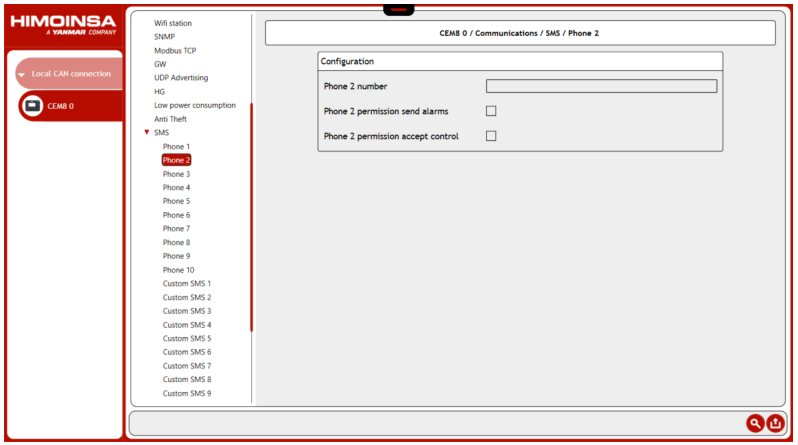
IOT Anti-Theft configuration section fields

Generator	Field	Description	Values
ANTI-THIEF	Enabled	Enables GPS anti-theft management	Enabled Disabled
	Reference position latitude	Latitude of the reference position	
	Reference position longitude	Length of the reference position	
	Perimeter enable	Enable perimeter anti-theft mode	Enabled Disabled
	Perimeter initial radius (m)	Radius in metres of the security perimeter	
	Interval distance enable	Enables anti-theft by distance mode	Enabled Disabled
	Interval distance movement (m)	Distance in metres of motion detection for route following	

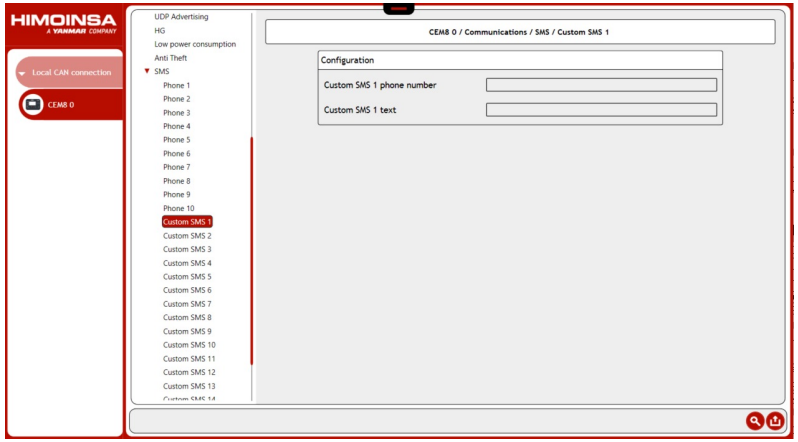
9.6.2.14 SMS



IOT SMS configuration section



SMS Phone IOT configuration section

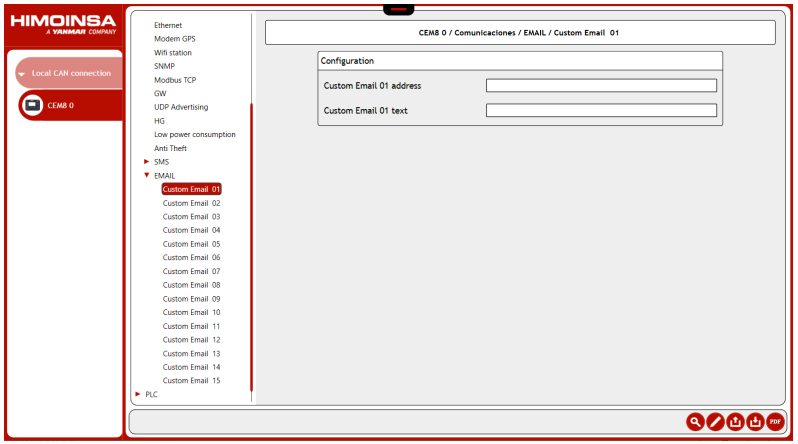


CUSTOM SMS IOT configuration section

Fields in the IOT SMS configuration section

Generator	Field	Description	Values
SMS	Enabled	Enables SMS sending from IoT device	Enabled Disabled
	Message center	SIM provider's message centre number	-
	Notifications language	Language of notification messages	English Spanish French German Portuguese
PHONES	Phone number 1 - 10	Mobile number to receive notifications	-
	Phone permission alarms 1 - 10	Enable permission to receive alarms	Enabled Disabled
	Phone permission control 1 - 10	Enable permission to control the controller by SMS	Enabled Disabled
CUSTOM SMS	Phone number 1 - 15	Mobile number that will receive the personalised message	-
	Text 1 - 15	Personalised message to be sent	-

9.6.2.15 EMAIL



Tabs in the EMAIL IOT configuration section

IOT EMAIL configuration section

Generator	Field	Description	Values
EMAIL	Address 1 - 15	E-mail address to which the message is to be sent	-
	Text 1 - 15	Personalised message to be sent	-

9.7 FIRMWARE UPDATE

The IOT device can be updated via the HG Web server. For more information, please refer to the manual of this application.

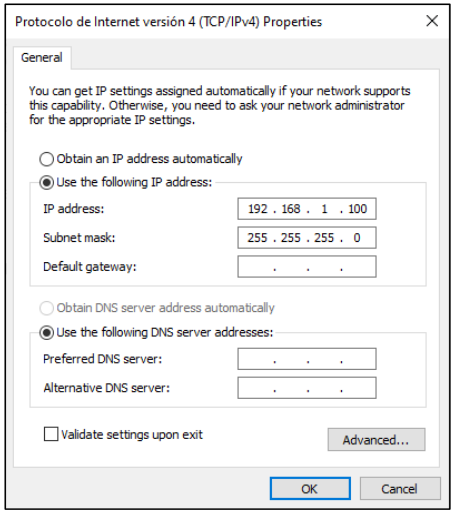
It can also be updated via the built-in web server, which communicates via the HTTP protocol on port 80. The server consists of 2 sections, one to display basic information about the device and the other to update the firmware, protected by password (User: himoinsa, Password: ce8iot).

In case of updating the firmware through the web server, it is necessary to verify that communications via modem or Wifi are not enabled. For security reasons, the IOT device disables its web server whenever communications via these means are enabled.

To access the web server for the first time, it is necessary to connect a PC to the device via a point-to-point Ethernet cable. Once connected, it is necessary to adjust the Ethernet grid range of the PC to be able to access the device, following the steps described below:

1) Access the PC's network configuration window by clicking on:

Start -> Controller -> Network and Sharing Center -> Change adapter settings -> Ethernet Properties -> Internet Protocol version 4 (TCP/IPv4) -> Properties.



Network adapter configuration window

2) Configure the PC to use a fixed IP. Define the IP address 192.168.1.100, a subnet mask 255.255.255.0 and accept the changes.

3) Open a web browser (Google Chrome, Mozilla Firefox, Internet Explorer) and enter the address 192.168.1.10 in the search bar.

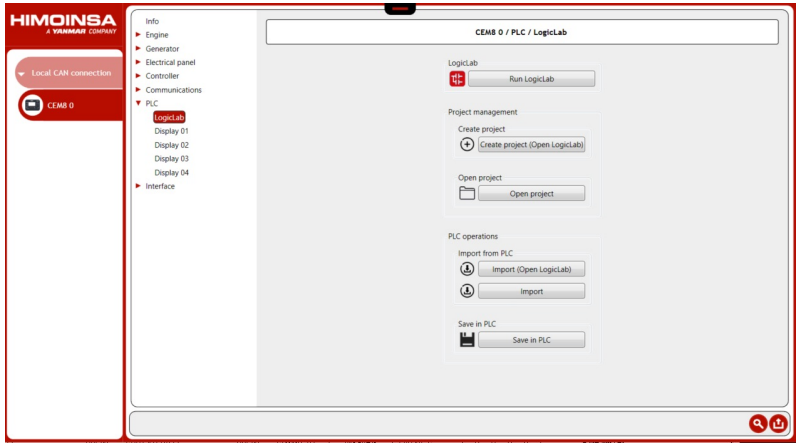
To access from an Ethernet grid to which the device is connected, if the DHCP connection has been previously configured, it must be accessed via the IP address provided by the grid router.

Once the page is loaded, go to the Config section, ADMIN tab and load the firmware. At the end of the process, the IOT device will reboot with the new version.

IOT firmware update via web server

10. PLC

The CEM8 controller integrates the functionality to program a PLC. The PLC can be programmed and monitored from an external platform called LogicLab, accessible from the Genset WorkBench platform. It is also possible to download/ upload the PLC program without accessing its interface (LogicLab). For more information on the operation of the LogicLab application, please consult the manual of this application.



PLC management screen from Genset WorkBench

11. OPTIONALS

New functionalities can be added to the **CE8** controller via the CAN bus connection by means of expansion modules.

11.1 DISPLAY SCREEN (Repetitive)

The **CE8** controller allows the addition of display screens to the installation. This device shows the current status of the controller, and if the controller is in AUTO operating mode, it can control the operation of the generator. The display screen does not allow changing the mode of the master controller.

In addition, the display screen allows the controller status to be displayed by means of error and status LEDs and the programming of operating parameters.

11.2 EXTERNAL OUTPUT DEVICE

The **CE8** controller allows the connection of an external output device. The external output device has 12 relay outputs (4 with NO and NC contact; 8 with NO contact).

The outputs of the external output device can be programmed to activate depending on:

- Any active alarm or pending notification from the controller.
- Any active input of the controller.
- Any active output from the controller.
- Controller mode (AUTO or MAN).

Each output of the external output device is activated when at least one of its programmed activation conditions occurs.

11.3 ANNUNCIATOR PANNEL

The **CE8** controller allows the connection of an annunciator pannel device which allows the implementation of a user interface based on 16 LEDs to each of which one of the following states of the **CE8** controller can be associated:

- Alarms.
- Status of inputs.
- Status of outputs.
- Controller operating modes.
- Controller status.

11.4 EXPANSION OF ANALOG INPUTS CCPT100

The **CE8** controller allows the connection of several CPT100 devices to measure up to 4 temperature sensors for displaying and managing generator alarms for each device.

12. ANNEX I: TABLE OF PARAMETERS

The **CE8** controller allows 3 levels of access to the configuration. To modify any parameter of the **CE8** controller, validation is required by entering the corresponding password. The 3 access levels are:

1. **User.** Allows the reading of level 1 values.
2. **Maintenance.** Allows the writing of level 1 and 2 parameters.
3. **Supervisor.** Allows the writing of level 1, 2 and 3 parameters.

Times Table

Index	Psw	Description	Value	Range
1	2	Time between starts Period between starts during which all outputs are deactivated	5”	3” ...15”
2	2	Delayed START Elapsed time between grid failure and engine start	0”	0” ...10000”
3	2	Glow plug preheating time	0”	0” ...180”
4	2	Start-up time Maximum waiting time for the start condition to occur. During this period the start output is active	5”	1” ...600”
5	2	Charge activation time Time from detection of the engine start condition to the activation of the generator contactor	3”	1” ...600”
6	2	Stabilisation time Time from when the engine start condition is detected until the quality of the generated signal starts to be validated	2”	2” ...15”
7	2	Alternator activation time (D+) At the end of this time, the voltage level at the input will be checked and the output D+ will remain active or not until the engine is stopped according to the configuration parameter	3”	1” ...10”
8	2	Waiting time for engine stop by external start	10”	1" ... 1800"
9	2	Cooling time	120”	2" ...1800"
10	2	Activation delay time EJP1	1”	1" ...1800"
11	2	Engine stop time	10”	1” ... 3600”
12	2	Stop time of the engine by return from grid	60”	1” ... 3600”

Index	Psw	Description	Value	Range
13	2	Maximum alarm activation time The alarm output shall be activated during this time limit	15”	0: Indefinido 1” ...1800”
14	2	Filtering of input 01	1”	0.0" ...5000.0"
15	2	Filtering of input 02	1”	0.0" ...5000.0"
16	2	Filtering of input 03	1”	0.0" ...5000.0"
17	2	Filtering of input 04	1”	0.0" ...5000.0"
18	2	Filtering of input 05	1”	0.0" ...5000.0"
19	2	Filtering of input 06	1”	0.0" ...5000.0"
20	2	Filtering of input 07	1”	0.0" ...5000.0"
21	2	Filtering of input 08	1”	0.0" ...5000.0"
22	2	Filtering of input 09	1”	0.0" ...5000.0"
23	2	Filtering of input 10	1”	0.0" ...5000.0"
24	2	Filtering of input 11	1”	0.0" ...5000.0"
25	2	Filtering of input 12	1”	0.0" ...5000.0"
26	2	Filtering of input An1	1”	0.0" ...5000.0"
27	2	Filtering of input An2	1”	0.0" ...5000.0"
28	2	Filtering of input An3	1”	0.0" ...5000.0"
29	2	Filtering of input An4	1”	0.0" ...5000.0"
30	2	Filtering of input EMS	0”	0.0" ...5000.0"
31	2	Filtering of input MAN	0”	0.0" ...5000.0"
32	2	Dummy load power detection time	5”	1” ...3000”
33	2	Load start power detection time	5”	1” ...3000”
34	2	Free	-	-
35	2	Activation delay time gas ignition	3”	0” ...100”
36	2	Gas valve activation delay time	1”	0” ...10”
37	2	Deactivation delay time gas ignition	1”	0” ...10”
38	2	Smoke control activation time	0”	0” ...600”
39	2	Time IDMT curve	36”	0” ...3600”
40	2	Activation delay time of the generator contactor	2”	1” ...250”
41	2	Activation delay time of the grid contactor	2”	1” ...250”
42	2	Stop failure detection time	90”	1” ...3600”

Regulations Table

Index	Psw	Description	Value	Range
1	2	Control device identifier	0	0 - 14
2	2	Configuration of input 01	1	0: OFF 1: Normally open 2: Normally closed
3	2	Configuration of input 02	1	
4	2	Configuration of input 03	1	
5	2	Configuration of input 04	1	
6	2	Configuration of input 05	1	
7	2	Configuration of input 06	1	
8	2	Configuration of input 07	1	
9	2	Configuration of input 08	1	
10	2	Configuration of input 09	1	
11	2	Configuration of input 10	1	
12	2	Configuration of input 11	1	
13	2	Configuration of input 12	1	
14	2	Configuration of input AN1	1	
15	2	Configuration of input AN2	1	
16	2	Configuration of input AN3	1	
17	2	Configuration of input AN4	1	
18	2	Configuration of input EMS	2	

19	2	Functionality associated to input 01	0	See Table of input functionalities
20	2	Functionality associated to input 02	0	
21	2	Functionality associated to input 03	0	
22	2	Functionality associated to input 04	0	
23	2	Functionality associated to input 05	0	
24	2	Functionality associated to input 06	0	
25	2	Functionality associated to input 07	0	
26	2	Functionality associated to input 08	0	
27	2	Functionality associated to input 09	0	
28	2	Functionality associated to input 10	0	
29	2	Functionality associated to input 11	0	
30	2	Functionality associated to input 12	0	
31	2	Functionality associated to input AN1	0	
32	2	Functionality associated to input AN2	0	
33	2	Functionality associated to input AN3	0	
34	2	Functionality associated to input AN4	0	
35	2	Functionality associated to output P1	0	See Table of output functionalities
36	2	Functionality associated to output P2	0	
37	2	Functionality associated to output P3	0	
38	2	Functionality associated to output D+	0	
39	2	Functionality associated to output 01	0	
40	2	Functionality associated to output 02	0	
41	2	Functionality associated to output 03	0	
42	2	Functionality associated to output 04	0	
43	2	Functionality associated to output 05	0	
44	2	Functionality associated to output 06	0	
45	2	Functionality associated to output 07	0	
46	2	Functionality associated to output 08	0	
47	2	Functionality associated to output C1	0	
48	2	Functionality associated to output C2	0	
49	2	Functionality associated to output C3	0	
50	2	Functionality associated to output C4	0	
51	2	Start configuration	0	0: Diesel 1: Gas

52	2	Phase voltage as start condition	3	0: No consultation 1: Stabilised 2: Pre-start 3: Stabilisation and pre-start-up
53	2	Alternator voltage as start condition	1	
54	2	Pick-up as start condition	0	
55	2	Low oil pressure as start condition	0	
56	2	Position intensity measurement	0	0: Generator table 1: Output line
57	2	Selection of controller type	0	0: MAN 1: AUTO
58	3	Forced running management	0	0: Not allowed 1: Start via grid failure 2: Forced start
59	2	Ratio of flywheel crown speed of the engine and frequency of the generator voltage	0	0: 50 Hz/1500 rpm 60 Hz/1800 rpm 1: 50 Hz/3000 rpm
60	2	Temperature units	0	0: Celsius 1: Fahrenheit
61	2	Pressure units	0	0: Bars 1: Psi
62	3	Analog channel configuration AN1	1	0: Digital 1: Resistive 2: Intensity 3: Voltage
63	3	Analog channel configuration AN2	1	
64	3	Analog channel configuration AN3	1	
65	3	Analog channel configuration AN4	1	

66	2	Associated sensor analog channel 1	1	0: Not configured 1: Fuel level 2: Oil pressure 3: Water temperature 4: External fuel level 5: Oil temperature 6: Speed J1939 7: Heating resistor
67	2	Associated sensor analog channel 2	2	
68	2	Associated sensor analog channel 3	3	
69	2	Associated sensor analog channel 4	0	
70	2	Associated sensor external analog channel 01	0	
71	2	Associated sensor external analog channel 02	0	
72	2	Associated sensor external analog channel 03	0	
73	2	Associated sensor external analog channel 04	0	
74	2	Associated sensor external analog channel 05	0	
75	2	Associated sensor external analog channel 06	0	
76	2	Associated sensor external analog channel 07	0	
77	2	Associated sensor external analog channel 08	0	
78	2	Associated sensor external analog channel 09	0	
79	2	Associated sensor external analog channel 10	0	
80	2	Associated sensor external analog channel 11	0	
81	2	Associated sensor external analog channel 12	0	
82	2	Associated sensor external analog channel 13	0	
83	2	Associated sensor external analog channel 14	0	
84	2	Associated sensor external analog channel 15	0	
85	2	Associated sensor external analog channel 16	0	
86	2	Mode of operation of the transfer pump	3	0: OFF 1: MAN 2: AUTO 3: Controller/combined mode
87	2	Default start mode	0	0: MAN 1: AUTO 2: Test 3: Blocked
88	2	Dynamo mode	0	0: Alternator 1: Dynamo
89	2	Phase sequence	0	0: Direct 1: Inverse
90	2	Associated functionality led 1 interface	0	See Table of interface LED functionalities
91	2	Associated functionality led 2 interface	0	
92	2	Associated functionality led 3 interface	0	
93	2	Associated functionality led 4 interface	0	
94	2	External start without time delay	0	0: Not active 1: Active
95	2	External start without alarm	0	
96	2	External start generator on stand-by	0	
97	2	Alarm output deactivated	0	

Thresholds Table

Index	Psw	Description	Value	Range
1	2	Electrical configuration of the generator	1	0: Three-phase without neutral 1: Three-phase 2: Two-phase 3: Single-phase 4: Delta 5: Delta without neutral 6: Two-phase selector
2	2	Electrical configuration of the grid	1	
3	2	Rated generator power	200 kW	-
4	2	Number of starts	4	1 - 10
5	2	Voltage of start at generator signal	40 V	30 - 100
6	2	Voltage at alternator start battery charging	8 V	6 - 23
7	2	Start speed (pick-up)	1000 rpm	300 - 1000
8	2	Engine flywheel teeth	0	0 - 300
9	2	Primary Voltage transformer configuration	0	0 - 65535
10	2	Secondary Voltage transformer configuration	0	0 - 65535
11	2	Voltage offset transformer configuration	0	0 - 65535
12	2	Primary current transformer configuration	0	0 - 65535
13	2	Secondary current transformer configuration	0	0 - 65535
14	2	Phase shift current transformer configuration	0	0 - 65535
15	2	Preheat cut-off temperature	0	0: Cut off disabled 1 – 125 °C
16	2	Transfer pump: Minimum fuel level	30 %	5 % – 90 %

Index	Psw	Description	Value	Range
17	2	Transfer pump: Maximum fuel level	80 %	10 % – 100 %
18	2	Minimum heating temperature	25 °C	5 – 30 °C
19	2	Maximum heating temperature	35 °C	10 – 40 °C
20	2	Dummy load activation power	0 kW	0: Disabled 1 - 10000
21	2	Dummy load shedding power	0 kW	0: Disabled 1 - 10000
22	2	Power on load demand start activation	0 kW	0: Disabled 1 - 10000
23	2	Load demand start disabling power	0 kW	0: Disabled 1 - 10000
24	2	Maximum urea pump level	65 %	0 – 100 %
25	2	Minimum urea pump level	25 %	0 – 100 %
26	2	Filling threshold urea pump	5 %	0 – 100 %
27	2	Moderate threshold maximum generator voltage	400 V	-
28	2	Severe threshold maximum generator Voltage	400 V	-
29	2	Moderate threshold minimum generator voltage	360 V	-
30	2	Severe threshold minimum generator Voltage	360 V	-
31	2	Maximum generator asymmetry value	-	-
32	2	Moderate threshold maximum frequency of generator	58 Hz	-
33	2	Severe threshold maximum generator frequency	58 Hz	-
34	2	Moderate threshold minimum generator frequency	45 Hz	-
35	2	Severe threshold severe minimum generator frequency	45 Hz	-
36	2	Moderate threshold maximum generator current	1000 A	-
37	2	Severe threshold maximum generator current	1000 A	-
38	2	Short-circuit detection current threshold	3000 A	-
39	2	Threshold current asymmetry value	30 %	0 – 100 %
40	2	Maximum inverse power threshold	10 %	0 – 20 %
41	2	Threshold current IDMT curve	200 %	101 – 200 %
42	2	Threshold low generator power	20	0 - 100
43	2	Moderate threshold maximum generator output	-	-
44	2	Severe threshold maximum generator power	-	-
45	2	Maximum pick-up speed	1740 rpm	-
46	2	Minimum pick-up speed	1350 rpm	-
47	2	Minimum battery voltage threshold	8 V	8 - 23
48	2	Low fuel level threshold	10 %	0 - 30
49	2	Moderate low oil pressure threshold	1.2 bar	0.5 - 3
50	2	Severe low oil pressure threshold	1.2 bar	0.5 - 3
51	2	Moderate high water temperature threshold	98 °C	80 - 105
52	2	Severe high water temperature threshold	98 °C	80 - 105
53	2	Engine low temperature threshold	OFF	OFF (0 °C) - 40 °C
54	2	Minimum auxiliary battery voltage threshold	8	5 - 40
55	2	Threshold warning urea level	10 %	0 - 100
56	2	Urea level alarm threshold	5 %	0 - 100
57	2	Maximum battery voltage threshold	32	8 - 40
58	2	Voltage threshold minimum battery voltage for start	10	8 - 23
59	2	Maximum grid voltage threshold	440 V	-
60	2	Grid voltage min. threshold	360 V	-
61	2	Maximum grid frequency threshold	55 Hz	-
62	2	Minimum grid frequency threshold	45 Hz	-

Alarms Table

Index	Psw	Description	Value	Range
1	2	Alarm management Voltage of controller	0	0: Not verified 1: Always checked 2: On START 3: From START (stabilised) condition 4: From nominal (running) condition 5: From engine STOP
2	2	Alarm delay Voltage of controller	0	0” - 255”

Index	Psw	Description	Value	Range
3	2	Alarm mode Voltage of controller	0	0: Do not stop engine 1: Stop engine 2: For engine with cooling
4	2	Alarm management Controller identifier	0	0 - 5
5	2	Alarm delay Controller identifier	0	0” - 30”
6	2	Alarm mode Controller identifier	0	0 - 2
7	2	Alarm management Communication CEC8	0	0 - 5
8	2	Alarm delay Communication CEC8	0	0” - 30”
9	2	Alarm mode Communication CEC8	0	0 - 2
10	2	Alarm management IOT Communication	0	0 - 5
11	2	Alarm delay IOT Communication	0	0” - 30”
12	2	Alarm mode IOT Communication	0	0 - 2
13	2	Alarm management Loss of GPS signal	0	0 - 5
14	2	Alarm delay Loss of GPS signal	0	0” - 30”
15	2	Alarm mode Loss of GPS signal	0	0 - 2
16	2	Alarm management Generator position	0	0 - 5
17	2	Alarm delay Generator position	0	0” - 30”
18	2	Alarm mode Generator position	0	0 - 2
19	2	Alarm management Generator impact	0	0 - 5
20	2	Alarm delay Generator impact	0	0” - 30”
21	2	Alarm mode Generator impact	0	0 - 2
22	2	Alarm management AUTO mode change	0	0 - 5
23	2	Alarm delay AUTO mode change	0	0” - 30”
24	2	Alarm mode AUTO mode change	0	0 - 2
25	3	Alarm management Water temperature	1	0 - 5
26	3	Alarm delay Water temperature	0	0” - 30”
27	3	Alarm mode Water temperature	1	0 - 2
28	3	Alarm management Oil pressure	4	0 - 5
29	3	Alarm delay Oil pressure	15	0” - 30”
30	3	Alarm mode Oil pressure	1	0 - 2
31	2	Alarm management Emergency STOP	1	0 - 5
32	2	Alarm delay Emergency STOP	0	0” - 30”
33	2	Alarm mode Emergency STOP	1	0 - 2
34	2	Alarm management Battery charging alternator	3	0 - 5
35	2	Alarm delay Battery charging alternator	5	0” - 30”
36	2	Alarm mode Battery charging alternator	0	0 - 2
37	2	Alarm management Start failure	1	0 - 5
38	2	Alarm delay Start failure	5	0” - 30”
39	2	Alarm mode Start failure	-	0 - 2
40	3	Alarm management Low water level	1	0 - 5
41	3	Alarm delay Low water level	5	0” - 30”
42	3	Alarm mode Low water level	1	0 - 2
43	2	Alarm management Fuel reserve	1	0 - 5
44	2	Alarm delay Fuel reserve	5	0” - 30”
45	2	Alarm mode Fuel reserve	0	0 - 2
46	2	Alarm management Communication engine J1939	2	0 - 5
47	2	Alarm delay Communication engine J1939	5	0” - 30”
48	2	Alarm mode Communication engine J1939	0	0 - 2
49	2	Alarm management Water in fuel	1	0 - 5
50	2	Alarm delay Water in fuel	5	0” - 30”

Index	Psw	Description	Value	Range
51	2	Alarm mode Water in fuel	0	0 - 2
52	2	Alarm management Moderate urea level	0	0 - 5
53	2	Alarm delay Moderate urea level	5	0” - 30”
54	2	Alarm mode Moderate urea level	0	0 - 2
55	2	Alarm management Severe urea level	0	0 - 5
56	2	Alarm delay Severe urea level	5	0” - 30”
57	2	Alarm mode Severe urea level	1	0 - 2
58	2	Alarm management Urea pump	0	0 - 5
59	2	Alarm delay Urea pump	50	0” - 255”
60	2	Alarm mode Urea pump	0	0 - 2
61	2	Alarm management Fuel theft internal tank	1	0 - 5
62	2	Alarm delay Fuel theft internal tank	1	0” - 30”
63	2	Alarm mode Fuel theft internal tank	0	0 - 2
64	2	Alarm management Fuel theft external tank	1	0 - 5
65	2	Alarm delay Fuel theft external tank	1	0” - 30”
66	2	Alarm mode Fuel theft external tank	0	0 - 2
67	2	Alarm management Pre-clogged fuel filter	0	0 - 5
68	2	Alarm delay Pre-clogged fuel filter	1	0” - 30”
69	2	Alarm mode Pre-clogged fuel filter	0	0 - 2
70	2	Alarm management Fuel filter clogged	0	0 - 5
71	2	Alarm delay Fuel filter clogged	1	0” - 30”
72	2	Alarm mode Fuel filter clogged	1	0 - 2
73	2	Alarm management Auxiliary battery low voltage	0	0 - 5
74	2	Alarm delay Auxiliary battery low voltage	5	0” - 30”

Index	Psw	Description	Value	Range
75	2	Alarm mode Auxiliary battery low voltage	0	0 - 2
76	2	Alarm management Restarting during engine start	1	0 - 5
77	2	Alarm delay Restarting during engine start	-	0” - 30”
78	2	Alarm mode Restarting during engine start	2	0 - 2
79	2	Alarm management Engine malfunction lamp	0	0 - 5
80	2	Alarm delay Engine malfunction lamp	0	0” - 30”
81	2	Alarm mode Engine malfunction lamp	0	0 - 2
82	2	Alarm management Engine lamp for protection	0	0 - 5
83	2	Alarm delay Engine lamp for protection	0	0” - 30”
84	2	Alarm mode Engine lamp for protection	0	0 - 2
85	2	Alarm management Yellow engine lamp	0	0 - 5
86	2	Alarm delay Yellow engine lamp	0	0” - 30”
87	2	Alarm mode Yellow engine lamp	0	0 - 2
88	2	Alarm management Engine red lamp	0	0 - 5
89	2	Alarm delay Engine red lamp	0	0” - 30”
90	2	Alarm mode Engine red lamp	0	0 - 2
91	2	Alarm management Rental meter	0	0 - 5
92	2	Alarm delay Rental meter	0	0” - 30”
93	2	Alarm mode Rental meter	0	0 - 2
94	2	Alarm management Maintenance counter	0	0 - 5
95	2	Alarm delay Maintenance counter	0	0” - 30”
96	2	Alarm mode Maintenance counter	0	0 - 2
97	2	Alarm management Sensor channel AN1 not connected	0	0 - 5
98	2	Alarm delay Sensor channel AN1 not connected	0	0” - 30”

Index	Psw	Description	Value	Range
99	2	Alarm mode Sensor channel AN1 not connected	0	0 - 2
100	2	Alarm management Sensor channel AN2 not connected	0	0 - 5
101	2	Alarm delay Sensor channel AN2 not connected	0	0” - 30”
102	2	Alarm mode Sensor channel AN2 not connected	0	0 - 2
103	2	Alarm management Sensor channel AN3 not connected	0	0 - 5
104	2	Alarm delay Sensor channel AN3 not connected	0	0” - 30”
105	2	Alarm mode Sensor channel AN3 not connected	0	0 - 2
106	2	Alarm management Sensor channel AN4 not connected	0	0 - 5
107	2	Alarm delay Sensor channel AN4 not connected	0	0” - 30”
108	2	Alarm mode Sensor channel AN4 not connected	0	0 - 2
109	2	Alarm management Low battery voltage	1	0 - 5
110	2	Alarm delay Low battery voltage	15	0” - 30”
111	2	Alarm mode Low battery voltage	0	0 - 2
112	2	Alarm management High battery voltage	0	0 - 5
113	2	Alarm delay High battery voltage	0	0” - 30”
114	2	Alarm mode High battery voltage	0	0 - 2
115	2	Alarm management Low battery voltage at start	0	0 - 5
116	2	Alarm delay Low battery voltage at start	0	0” - 30”
117	2	Alarm mode Low battery voltage at the start	0	0 - 2
118	2	Alarm management Overspeed	4	0 - 5
119	2	Alarm delay Overspeed	5	0” - 30”
120	2	Alarm mode Overspeed	1	0 - 2
121	2	Alarm management Underspeed	4	0 - 5
122	2	Alarm delay Underspeed	15	0” - 30”

Index	Psw	Description	Value	Range
123	2	Alarm mode Underspeed	2	0 - 2
124	2	Alarm management Unexpected STOP	0	0 - 5
125	2	Alarm delay Unexpected STOP	0	0” - 30”
126	2	Alarm mode Unexpected STOP	0	0 - 2
127	2	Alarm management Failure at Stop	1	0 - 5
128	2	Alarm delay Failure at Stop	5	0” - 30”
129	2	Alarm mode Failure at Stop	-	0 - 2
130	2	Alarm management High water temperature per sensor (moderate)	0	0 - 5
131	2	Alarm delay High water temperature per sensor (moderate)	0	0” - 30”
132	2	Alarm mode High water temperature per sensor (moderate)	0	0 - 2
133	2	Alarm management High water temperature per sensor (severe)	0	0 - 5
134	2	Alarm delay High water temperature per sensor (severe)	0	0” - 30”
135	2	Alarm mode High water temperature per sensor (severe)	0	0 - 2
136	2	Alarm management Low oil pressure by sensor (moderate)	0	0 - 5
137	2	Alarm delay Low oil pressure by sensor (moderate)	0	0” - 30”
138	2	Alarm mode Low oil pressure by sensor (moderate)	0	0 - 2
139	2	Alarm management Low oil pressure per sensor (severe)	0	0 - 5
140	2	Alarm delay Low oil pressure per sensor (severe)	0	0” - 30”
141	2	Alarm mode Low oil pressure per sensor (severe)	0	0 - 2
142	2	Alarm management Low fuel level per sensor	0	0 - 5
143	2	Alarm delay Low fuel level per sensor	0	0” - 30”
144	2	Alarm mode Low fuel level per sensor	0	0 - 2
145	2	Alarm management Low engine temperature	0	0 - 5
146	2	Alarm delay Low engine temperature	15	0” - 30”

Index	Psw	Description	Value	Range
147	2	Alarm mode Low engine temperature	0	0 - 2
148	2	Alarm management Maximum generator voltage (severe)	3	0 - 5
149	2	Alarm delay Maximum generator voltage (severe)	5	0” - 30”
150	2	Alarm mode Maximum generator voltage (severe)	1	0 - 2
151	2	Alarm management Maximum generator voltage (moderate)	3	0 - 5
152	2	Alarm delay Maximum generator voltage (moderate)	5	0” - 30”
153	2	Alarm mode Maximum generator voltage (moderate)	1	0 - 2
154	2	Alarm management Minimum generator voltage (severe)	3	0 - 5
155	2	Alarm delay Minimum generator voltage (severe)	15	0” - 30”
156	2	Alarm mode Minimum generator voltage (severe)	2	0 - 2
157	2	Alarm management Minimum generator voltage (moderate)	3	0 - 5
158	2	Alarm delay Minimum generator voltage (moderate)	15	0” - 30”
159	2	Alarm mode Minimum generator voltage (moderate)	2	0 - 2
160	2	Alarm management Voltage asymmetry	3	0 - 5
161	2	Alarm delay Voltage asymmetry	8	0” - 30”
162	2	Alarm mode Voltage asymmetry	2	0 - 2
163	2	Alarm management Voltage phase sequence	4	0 - 5
164	2	Alarm delay Voltage phase sequence	5	0” - 30”
165	2	Alarm mode Voltage phase sequence	2	0 - 2
166	2	Alarm management Group drop	3	0 - 5
167	2	Alarm delay Group drop	30	0” - 30”
168	2	Alarm mode Group drop	2	0 - 2
169	2	Alarm management Maximum generator current (severe)	0	0 - 5
170	2	Alarm delay Maximum generator current (severe)	0	0” - 30”

Index	Psw	Description	Value	Range
171	2	Alarm mode Maximum generator current (severe)	0	0 - 2
172	2	Alarm management Maximum generator current (moderate)	0	0 - 5
173	2	Alarm delay Maximum generator current (moderate)	0	0” - 30”
174	2	Alarm mode Maximum generator current (moderate)	0	0 - 2
175	2	Alarm management IDMT	0	0 - 5
176	2	Alarm delay IDMT	0	0” - 30”
177	2	Alarm mode IDMT	0	0 - 2
178	2	Alarm management Current short-circuit	4	0 - 5
179	2	Alarm delay Current short-circuit	-	0” - 30”
180	2	Alarm mode Current short-circuit	2	0 - 2
181	2	Alarm management Current asymmetry	4	0 - 5
182	2	Alarm delay Current asymmetry	60	0” - 255”
183	2	Alarm mode Current asymmetry	0	0 - 2
184	2	Alarm management Maximum generator power (severe)	0	0 - 5
185	2	Alarm delay Maximum generator power (severe)	0	0” - 30”
186	2	Alarm mode Maximum generator power (severe)	0	0 - 2
187	2	Alarm management Maximum generator power (moderate)	0	0 - 5
188	2	Alarm delay Maximum generator power (moderate)	0	0” - 30”
189	2	Alarm mode Maximum generator power (moderate)	0	0 - 2
190	2	Alarm management Minimum power	4	0 - 5
191	2	Alarm delay Minimum power	4	0” - 30”
192	2	Alarm mode Minimum power	0	0 - 2
193	2	Alarm management Reverse power	4	0 - 5
194	2	Alarm delay Reverse power	15	0” - 30”

Index	Psw	Description	Value	Range
195	2	Alarm mode Reverse power	2	0 - 2
196	2	Alarm management Maximum generator frequency (severe)	4	0 - 5
197	2	Alarm delay Maximum generator frequency (severe)	1	0” - 30”
198	2	Alarm mode Maximum generator frequency (severe)	1	0 - 2
199	2	Alarm management Maximum generator frequency (moderate)	4	0 - 5
200	2	Alarm delay Maximum generator frequency (moderate)	1	0” - 30”
201	2	Alarm mode Maximum generator frequency (moderate)	1	0 - 2
202	2	Alarm management Minimum generator frequency (severe)	3	0 - 5
203	2	Alarm delay Minimum generator frequency (severe)	15	0” - 30”
204	2	Alarm mode Minimum generator frequency (severe)	2	0 - 2
205	2	Alarm management Minimum frequency of generator (moderate)	3	0 - 5
206	2	Alarm delay Minimum frequency of generator (moderate)	15	0” - 30”
207	2	Alarm mode Minimum generator frequency (moderate)	2	0 - 2
208	2	Alarm management Closing of generator contactor (CEM8 controller only)	0	0 - 5
209	2	Alarm delay Closing of generator contactor (CEM8 controller only)	0	0” - 30”
210	2	Alarm mode Closing of generator contactor (CEM8 controller only)	0	0 - 2

Programmable alarms Table

Index	Psw	Description	Value	Range
1	2	Management Programmable alarm 01	0	0: Not verified 1: Always checked 2: On START 3: From START (stabilised) condition 4: From nominal (running) condition 5: From engine STOP
2	2	Time Programmable alarm 01	0	0” - 255”
3	2	Mode Programmable alarm 01	0	0: Do not stop engine 1: Stop engine 2: For engine with cooling 3: Do not stop engine Self-certifiable
4	2	Log Programmable alarm 01	0	0: Log disabled 1: Log enabled
5	2	Source Programmable alarm 01	0	0: Digital input 1: Analog input 2: DTC error (ECU) 3: PGN variables (ECU)
6	2	Minimum value / SPNh Programmable alarm 01	0	0 - 65535
7	2	Maximum value / SPNl Programmable alarm 01	0	0 - 65535
8	2	Canal / IMF / PGN Programmable alarm 01	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
9	2	Condition / filter Programmable alarm 01	0	Condition: 0: Maximum threshold 1: Minimum threshold 2: Within range 3: Out of range Filter: 0” - 255
10	2	Management Programmable alarm 02	0	0 - 5
11	2	Time Programmable alarm 02	0	0” - 255”
12	2	Mode Programmable alarm 02	0	0 - 2

Index	Psw	Description	Value	Range
13	2	Log Programmable alarm 02	0	0 - 1
14	2	Source Programmable alarm 02	0	0 - 3
15	2	Minimum value / SPNh Programmable alarm 02	0	0 - 65535
16	2	Maximum value / SPNl Programmable alarm 02	0	0 - 65535
17	2	Canal / IMF / PGN Programmable alarm 02	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
18	2	Condition / filter Programmable alarm 02	0	Condición: 0 – 3 Filtro: 0” - 255”
19	2	Management Programmable alarm 03	0	0 - 5
20	2	Time Programmable alarm 03	0	0” - 255”
21	2	Mode Programmable alarm 03	0	0 - 2
22	2	Log Programmable alarm 03	0	0 - 1
23	2	Source Programmable alarm 03	0	0 - 3
24	2	Minimum value / SPNh Programmable alarm 03	0	0 - 65535
25	2	Maximum value / SPNl Programmable alarm 03	0	0 - 65535
26	2	Canal / IMF / PGN Programmable alarm 03	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
27	2	Condition / filter Programmable alarm 03	0	Condition: 0 - 3 Filter: 0” - 255”
28	2	Management Programmable alarm 04	0	0 - 5
29	2	Time Programmable alarm 04	0	0” - 255”
30	2	Mode Programmable alarm 04	0	0 - 2
31	2	Log Programmable alarm 04	0	0 - 1
32	2	Source Programmable alarm 04	0	0 - 3
33	2	Minimum value / SPNh Programmable alarm 04	0	0 - 65535
34	2	Maximum value / SPNl Programmable alarm 04	0	0 - 65535
35	2	Canal / IMF / PGN Programmable alarm 04	0	Channel: 0 - 20 IMF / PGN: 0 - 65535

Index	Psw	Description	Value	Range
36	2	Condition / filter Programmable alarm 04	0	Condition: 0 - 3 Filter: 0” - 255”
37	2	Management Programmable alarm 05	0	0 - 5
38	2	Time Programmable alarm 05	0	0” - 255”
39	2	Mode Programmable alarm 05	0	0 - 2
40	2	Log Programmable alarm 05	0	0 - 1
41	2	Source Programmable alarm 05	0	0 - 3
42	2	Minimum value / SPNh Programmable alarm 05	0	0 - 65535
43	2	Maximum value / SPNl Programmable alarm 05	0	0 - 65535
44	2	Canal / IMF / PGN Programmable alarm 05	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
45	2	Condition / filter Programmable alarm 05	0	Condition: 0 - 3 Filter: 0” - 255”
46	2	Management Programmable alarm 06	0	0 - 5
47	2	Time Programmable alarm 06	0	0” - 255”
48	2	Mode Programmable alarm 06	0	0 - 2
49	2	Log Programmable alarm 06	0	0 - 1
50	2	Source Programmable alarm 06	0	0 - 3
51	2	Minimum value / SPNh Programmable alarm 06	0	0 - 65535
52	2	Maximum value / SPNl Programmable alarm 06	0	0 - 65535
53	2	Canal / IMF / PGN Programmable alarm 06	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
54	2	Condition / filter Programmable alarm 06	0	Condition: 0 - 3 Filter: 0” - 255”
55	2	Management Programmable alarm 07	0	0 - 5
56	2	Time Programmable alarm 07	0	0” - 255”
57	2	Mode Programmable alarm 07	0	0 - 2
58	2	Log Programmable alarm 07	0	0 - 1
59	2	Source Programmable alarm 07	0	0 - 3

Index	Psw	Description	Value	Range
60	2	Minimum value / SPNh Programmable alarm 07	0	0 - 65535
61	2	Maximum value / SPNl Programmable alarm 07	0	0 - 65535
62	2	Canal / IMF / PGN Programmable alarm 07	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
63	2	Condition / filter Programmable alarm 07	0	Condition: 0 - 3 Filter: 0” - 255”
64	2	Management Programmable alarm 08	0	0 - 5
65	2	Time Programmable alarm 08	0	0” - 255”
66	2	Mode Programmable alarm 08	0	0 - 2
67	2	Log Programmable alarm 08	0	0 - 1
68	2	Source Programmable alarm 08	0	0 - 3
69	2	Minimum value / SPNh Programmable alarm 08	0	0 - 65535
70	2	Maximum value / SPNl Programmable alarm 08	0	0 - 65535
71	2	Canal / IMF / PGN Programmable alarm 08	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
72	2	Condition / filter Programmable alarm 08	0	Condition: 0 - 3 Filter: 0” - 255”
73	2	Management Programmable alarm 09	0	0 - 5
74	2	Time Programmable alarm 09	0	0” - 255”
75	2	Mode Programmable alarm 09	0	0 - 2
76	2	Log Programmable alarm 09	0	0 - 1
77	2	Source Programmable alarm 09	0	0 - 3
78	2	Minimum value / SPNh Programmable alarm 09	0	0 - 65535
79	2	Maximum value / SPNl Programmable alarm 09	0	0 - 65535
80	2	Canal / IMF / PGN Programmable alarm 09	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
81	2	Condition / filter Programmable alarm 09	0	Condition: 0 - 3 Filter: 0” - 255”
82	2	Management Programmable alarm 10	0	0 - 5
83	2	Time Programmable alarm 10	0	0” - 255”
84	2	Mode Programmable alarm 10	0	0 - 2
85	2	Log Programmable alarm 10	0	0 - 1
86	2	Source Programmable alarm 10	0	0 - 3
87	2	Minimum value / SPNh Programmable alarm 10	0	0 - 65535
88	2	Maximum value / SPNl Programmable alarm 10	0	0 - 65535
89	2	Canal / IMF / PGN Programmable alarm 10	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
90	2	Condition / filter Programmable alarm 10	0	Condition: 0 - 3 Filter: 0” - 255”
91	2	Management Programmable alarm 11	0	0 - 5
92	2	Time Programmable alarm 11	0	0” - 255”
93	2	Mode Programmable alarm 11	0	0 - 2
94	2	Log Programmable alarm 11	0	0 - 1
95	2	Source Programmable alarm 11	0	0 - 3
96	2	Minimum value / SPNh Programmable alarm 11	0	0 - 65535
97	2	Maximum value / SPNl Programmable alarm 11	0	0 - 65535
98	2	Canal / IMF / PGN Programmable alarm 11	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
99	2	Condition / filter Programmable alarm 11	0	Condition: 0 - 3 Filter: 0” - 255”
100	2	Management Programmable alarm 12	0	0 - 5
101	2	Time Programmable alarm 12	0	0” - 255”
102	2	Mode Programmable alarm 12	0	0 - 2
103	2	Log Programmable alarm 12	0	0 - 1
104	2	Source Programmable alarm 12	0	0 - 3
105	2	Minimum value / SPNh Programmable alarm 12	0	0 - 65535
106	2	Maximum value / SPNl Programmable alarm 12	0	0 - 65535
107	2	Canal / IMF / PGN Programmable alarm 12	0	Channel: 0 - 20 IMF / PGN: 0 - 65535

Index	Psw	Description	Value	Range
108	2	Condition / filter Programmable alarm 12	0	Condition: 0 - 3 Filter: 0” - 255”
109	2	Management Programmable alarm 13	0	0 - 5
110	2	Time Programmable alarm 13	0	0” - 255”
111	2	Mode Programmable alarm 13	0	0 - 2
112	2	Log Programmable alarm 13	0	0 - 1
113	2	Source Programmable alarm 13	0	0 - 3
114	2	Minimum value / SPNh Programmable alarm 13	0	0 - 65535
115	2	Maximum value / SPNl Programmable alarm 13	0	0 - 65535
116	2	Canal / IMF / PGN Programmable alarm 13	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
117	2	Condition / filter Programmable alarm 13	0	Condition: 0 - 3 Filter: 0” - 255”
118	2	Management Programmable alarm 14	0	0 - 5
119	2	Time Programmable alarm 14	0	0” - 255”
120	2	Mode Programmable alarm 14	0	0 - 2
121	2	Log Programmable alarm 14	0	0 - 1
122	2	Source Programmable alarm 14	0	0 - 3
123	2	Minimum value / SPNh Programmable alarm 14	0	0 - 65535
124	2	Maximum value / SPNl Programmable alarm 14	0	0 - 65535
125	2	Canal / IMF / PGN Programmable alarm 14	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
126	2	Condition / filter Programmable alarm 14	0	Condition: 0 - 3 Filter: 0” - 255”
127	2	Management Programmable alarm 15	0	0 - 5
128	2	Time Programmable alarm 15	0	0” - 255”
129	2	Mode Programmable alarm 15	0	0 - 2
130	2	Log Programmable alarm 15	0	0 - 1
131	2	Source Programmable alarm 15	0	0 - 3

Index	Psw	Description	Value	Range
132	2	Minimum value / SPNh Programmable alarm 15	0	0 - 65535
133	2	Maximum value / SPNl Programmable alarm 15	0	0 - 65535
134	2	Canal / IMF / PGN Programmable alarm 15	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
135	2	Condition / filter Programmable alarm 15	0	Condition: 0 - 3 Filter: 0” - 255”
136	2	Management Programmable alarm 16	0	0 - 5
137	2	Time Programmable alarm 16	0	0” - 255”
138	2	Mode Programmable alarm 16	0	0 - 2
139	2	Log Programmable alarm 16	0	0 - 1
140	2	Source Programmable alarm 16	0	0 - 3
141	2	Minimum value / SPNh Programmable alarm 16	0	0 - 65535
142	2	Maximum value / SPNl Programmable alarm 16	0	0 - 65535
143	2	Canal / IMF / PGN Programmable alarm 16	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
144	2	Condition / filter Programmable alarm 16	0	Condition: 0 - 3 Filter: 0” - 255”
145	2	Management Programmable alarm 17	0	0 - 5
146	2	Time Programmable alarm 17	0	0” - 255”
147	2	Mode Programmable alarm 17	0	0 - 2
148	2	Log Programmable alarm 17	0	0 - 1
149	2	Source Programmable alarm 17	0	0 - 3
150	2	Minimum value / SPNh Programmable alarm 17	0	0 - 65535
151	2	Maximum value / SPNl Programmable alarm 17	0	0 - 65535
152	2	Canal / IMF / PGN Programmable alarm 17	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
153	2	Condition / filter Programmable alarm 17	0	Condition: 0 - 3 Filter: 0” - 255”
154	2	Management Programmable alarm 18	0	0 - 5
155	2	Time Programmable alarm 18	0	0” - 255”

Index	Psw	Description	Value	Range
156	2	Mode Programmable alarm 18	0	0 - 2
157	2	Log Programmable alarm 18	0	0 - 1
158	2	Source Programmable alarm 18	0	0 - 3
159	2	Minimum value / SPNh Programmable alarm 18	0	0 - 65535
160	2	Maximum value / SPNl Programmable alarm 18	0	0 - 65535
161	2	Canal / IMF / PGN Programmable alarm 18	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
162	2	Condition / filter Programmable alarm 18	0	Condition: 0 - 3 Filter: 0” - 255”
163	2	Management Programmable alarm 19	0	0 - 5
164	2	Time Programmable alarm 19	0	0” - 255”
165	2	Mode Programmable alarm 19	0	0 - 2
166	2	Log Programmable alarm 19	0	0 - 1
167	2	Source Programmable alarm 19	0	0 - 3
168	2	Minimum value / SPNh Programmable alarm 19	0	0 - 65535
169	2	Maximum value / SPNl Programmable alarm 19	0	0 - 65535
170	2	Canal / IMF / PGN Programmable alarm 19	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
171	2	Condition / filter Programmable alarm 19	0	Condition: 0 - 3 Filter: 0” - 255”
172	2	Management Programmable alarm 20	0	0 - 5
173	2	Time Programmable alarm 20	0	0” - 255”
174	2	Mode Programmable alarm 20	0	0 - 2
175	2	Log Programmable alarm 20	0	0 - 1
176	2	Source Programmable alarm 20	0	0 - 3
177	2	Minimum value / SPNh Programmable alarm 20	0	0 - 65535
178	2	Maximum value / SPNl Programmable alarm 20	0	0 - 65535

Index	Psw	Description	Value	Range
179	2	Canal / IMF / PGN Programmable alarm 20	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
180	2	Condition / filter Programmable alarm 20	0	Condition: 0 - 3 Filter: 0” - 255”
181	2	Management Programmable alarm 21	0	0 - 5
182	2	Time Programmable alarm 21	0	0” - 255”
183	2	Mode Programmable alarm 21	0	0 - 2
184	2	Log Programmable alarm 21	0	0 - 1
185	2	Source Programmable alarm 21	0	0 - 3
186	2	Minimum value / SPNh Programmable alarm 21	0	0 - 65535
187	2	Maximum value / SPNl Programmable alarm 21	0	0 - 65535
188	2	Canal / IMF / PGN Programmable alarm 21	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
189	2	Condition / filter Programmable alarm 21	0	Condition: 0 - 3 Filter: 0” - 255”
190	2	Management Programmable alarm 22	0	0 - 5
191	2	Time Programmable alarm 22	0	0” - 255”
192	2	Mode Programmable alarm 22	0	0 - 2
193	2	Log Programmable alarm 22	0	0 - 1
194	2	Source Programmable alarm 22	0	0 - 3
195	2	Minimum value / SPNh Programmable alarm 22	0	0 - 65535
196	2	Maximum value / SPNl Programmable alarm 22	0	0 - 65535
197	2	Canal / IMF / PGN Programmable alarm 22	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
198	2	Condition / filter Programmable alarm 22	0	Condition: 0 - 3 Filter: 0” - 255”
199	2	Management Programmable alarm 23	0	0 - 5
200	2	Time Programmable alarm 23	0	0” - 255”
201	2	Mode Programmable alarm 23	0	0 - 2

Index	Psw	Description	Value	Range
202	2	Log Programmable alarm 23	0	0 - 1
203	2	Source Programmable alarm 23	0	0 - 3
204	2	Minimum value / SPNh Programmable alarm 23	0	0 - 65535
205	2	Maximum value / SPNl Programmable alarm 23	0	0 - 65535
206	2	Canal / IMF / PGN Programmable alarm 23	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
207	2	Condition / filter Programmable alarm 23	0	Condition: 0 - 3 Filter: 0” - 255”
208	2	Management Programmable alarm 24	0	0 - 5
209	2	Time Programmable alarm 24	0	0” - 255”
210	2	Mode Programmable alarm 24	0	0 - 2
211	2	Log Programmable alarm 24	0	0 - 1
212	2	Source Programmable alarm 24	0	0 - 3
213	2	Minimum value / SPNh Programmable alarm 24	0	0 - 65535
214	2	Maximum value / SPNl Programmable alarm 24	0	0 - 65535
215	2	Canal / IMF / PGN Programmable alarm 24	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
216	2	Condition / filter Programmable alarm 24	0	Condition: 0 - 3 Filter: 0” - 255”
217	2	Management Programmable alarm 25	0	0 - 5
218	2	Time Programmable alarm 25	0	0” - 255”
219	2	Mode Programmable alarm 25	0	0 - 2
220	2	Log Programmable alarm 25	0	0 - 1
221	2	Source Programmable alarm 25	0	0 - 3
222	2	Minimum value / SPNh Programmable alarm 25	0	0 - 65535
223	2	Maximum value / SPNl Programmable alarm 25	0	0 - 65535
224	2	Canal / IMF / PGN Programmable alarm 25	0	Channel: 0 - 20 IMF / PGN 0 - 65535

Index	Psw	Description	Value	Range
225	2	Condition / filter Programmable alarm 25	0	Condition: 0 - 3 Filter: 0” - 255”
226	2	Management Programmable alarm 26	0	0 - 5
227	2	Time Programmable alarm 26	0	0” - 255”
228	2	Mode Programmable alarm 26	0	0 - 2
229	2	Log Programmable alarm 26	0	0 - 1
230	2	Source Programmable alarm 26	0	0 - 3
231	2	Minimum value / SPNh Programmable alarm 26	0	0 - 65535
232	2	Maximum value / SPNl Programmable alarm 26	0	0 - 65535
233	2	Canal / IMF / PGN Programmable alarm 26	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
234	2	Condition / filter Programmable alarm 26	0	Condition: 0 - 3 Filter: 0” - 255”
235	2	Management Programmable alarm 27	0	0 - 5
236	2	Time Programmable alarm 27	0	0” - 255”
237	2	Mode Programmable alarm 27	0	0 - 2
238	2	Log Programmable alarm 27	0	0 - 1
239	2	Source Programmable alarm 27	0	0 - 3
240	2	Minimum value / SPNh Programmable alarm 27	0	0 - 65535
241	2	Maximum value / SPNl Programmable alarm 27	0	0 - 65535
242	2	Canal / IMF / PGN Programmable alarm 27	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
243	2	Condition / filter Programmable alarm 27	0	Condition: 0 - 3 Filter: 0” - 255”
244	2	Management Programmable alarm 28	0	0 - 5
245	2	Time Programmable alarm 28	0	0” - 255”
246	2	Mode Programmable alarm 28	0	0 - 2
247	2	Log Programmable alarm 28	0	0 - 1
248	2	Source Programmable alarm 28	0	0 - 3

Index	Psw	Description	Value	Range
249	2	Minimum value / SPNh Programmable alarm 28	0	0 - 65535
250	2	Maximum value / SPNl Programmable alarm 28	0	0 - 65535
251	2	Canal / IMF / PGN Programmable alarm 28	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
252	2	Condition / filter Programmable alarm 28	0	Condition: 0 - 3 Filter: 0” - 255”
253	2	Management Programmable alarm 29	0	0 - 5
254	2	Time Programmable alarm 29	0	0” - 255”
255	2	Mode Programmable alarm 29	0	0 - 2
256	2	Log Programmable alarm 29	0	0 - 1
257	2	Source Programmable alarm 29	0	0 - 3
258	2	Minimum value / SPNh Programmable alarm 29	0	0 - 65535
259	2	Maximum value / SPNl Programmable alarm 29	0	0 - 65535
260	2	Canal / IMF / PGN Programmable alarm 29	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
261	2	Condition / filter Programmable alarm 29	0	Condition: 0 - 3 Filter: 0” - 255”
262	2	Management Programmable alarm 30	0	0 - 5
263	2	Time Programmable alarm 30	0	0” - 255”
264	2	Mode Programmable alarm 30	0	0 - 2
265	2	Log Programmable alarm 30	0	0 - 1
266	2	Source Programmable alarm 30	0	0 - 3
267	2	Minimum value / SPNh Programmable alarm 30	0	0 - 65535
268	2	Maximum value / SPNl Programmable alarm 30	0	0 - 65535
269	2	Canal / IMF / PGN Programmable alarm 30	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
270	2	Condition / filter Programmable alarm 30	0	Condition: 0 - 3 Filter: 0” - 255”
271	2	Management Programmable alarm 31	0	0 - 5

Index	Psw	Description	Value	Range
272	2	Time Programmable alarm 31	0	0” - 255”
273	2	Mode Programmable alarm 31	0	0 - 2
274	2	Log Programmable alarm 31	0	0 - 1
275	2	Source Programmable alarm 31	0	0 - 3
276	2	Minimum value / SPNh Programmable alarm 31	0	0 - 65535
277	2	Maximum value / SPNl Programmable alarm 31	0	0 - 65535
278	2	Canal / IMF / PGN Programmable alarm 31	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
279	2	Condition / filter Programmable alarm 31	0	Condition: 0 - 3 Filter: 0” - 255”
280	2	Management Programmable alarm 32	0	0 - 5
281	2	Time Programmable alarm 32	0	0” - 255”
282	2	Mode Programmable alarm 32	0	0 - 2
283	2	Log Programmable alarm 32	0	0 - 1
284	2	Source Programmable alarm 32	0	0 - 3
285	2	Minimum value / SPNh Programmable alarm 32	0	0 - 65535
286	2	Maximum value / SPNl Programmable alarm 32	0	0 - 65535
287	2	Canal / IMF / PGN Programmable alarm 32	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
288	2	Condition / filter Programmable alarm 3	0	Condition: 0 - 3 Filter: 0” - 255”
289	2	Management Programmable alarm 33	0	0 - 5
290	2	Time Programmable alarm 33	0	0” - 255”
291	2	Mode Programmable alarm 33	0	0 - 2
292	2	Log Programmable alarm 33	0	0 - 1
293	2	Source Programmable alarm 33	0	0 - 3
294	2	Minimum value / SPNh Programmable alarm 33	0	0 - 65535
295	2	Maximum value / SPNl Programmable alarm 33	0	0 - 65535

Index	Psw	Description	Value	Range
296	2	Canal / IMF / PGN Programmable alarm 33	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
297	2	Condition / filter Programmable alarm 33	0	Condition: 0 - 3 Filter: 0” - 255”
298	2	Management Programmable alarm 34	0	0 - 5
299	2	Time Programmable alarm 34	0	0” - 255”
300	2	Mode Programmable alarm 34	0	0 - 2
301	2	Log Programmable alarm 34	0	0 - 1
302	2	Source Programmable alarm 34	0	0 - 3
303	2	Minimum value / SPNh Programmable alarm 34	0	0 - 65535
304	2	Maximum value / SPNl Programmable alarm 34	0	0 - 65535
305	2	Canal / IMF / PGN Programmable alarm 34	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
306	2	Condition / filter Programmable alarm 34	0	Condition: 0 - 3 Filter: 0” - 255”
307	2	Management Programmable alarm 35	0	0 - 5
308	2	Time Programmable alarm 35	0	0” - 255”
309	2	Mode Programmable alarm 35	0	0 - 2
310	2	Log Programmable alarm 35	0	0 - 1
311	2	Source Programmable alarm 35	0	0 - 3
312	2	Minimum value / SPNh Programmable alarm 35	0	0 - 65535
313	2	Maximum value / SPNl Programmable alarm 35	0	0 - 65535
314	2	Canal / IMF / PGN Programmable alarm 35	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
315	2	Condition / filter Programmable alarm 35	0	Condition: 0 - 3 Filter: 0” - 255”
316	2	Management Programmable alarm 36	0	0 - 5
317	2	Time Programmable alarm 36	0	0” - 255”
318	2	Mode Programmable alarm 36	0	0 - 2

Index	Psw	Description	Value	Range
319	2	Log Programmable alarm 36	0	0 - 1
320	2	Source Programmable alarm 36	0	0 - 3
321	2	Minimum value / SPNh Programmable alarm 36	0	0 - 65535
322	2	Maximum value / SPNl Programmable alarm 36	0	0 - 65535
323	2	Canal / IMF / PGN Programmable alarm 36	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
324	2	Condition / filter Programmable alarm 36	0	Condition: 0 - 3 Filter: 0” - 255”
325	2	Management Programmable alarm 37	0	0 - 5
326	2	Time Programmable alarm 37	0	0” - 255”
327	2	Mode Programmable alarm 37	0	0 - 2
328	2	Log Programmable alarm 37	0	0 - 1
329	2	Source Programmable alarm 37	0	0 - 3
330	2	Minimum value / SPNh Programmable alarm 37	0	0 - 65535
331	2	Maximum value / SPNl Programmable alarm 37	0	0 - 65535
332	2	Canal / IMF / PGN Programmable alarm 37	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
333	2	Condition / filter Programmable alarm 37	0	Condition: 0 - 3 Filter: 0” - 255”
334	2	Management Programmable alarm 38	0	0 - 5
335	2	Time Programmable alarm 38	0	0” - 255”
336	2	Mode Programmable alarm 38	0	0 - 2
337	2	Log Programmable alarm 38	0	0 - 1
338	2	Source Programmable alarm 38	0	0 - 3
339	2	Minimum value / SPNh Programmable alarm 38	0	0 - 65535
340	2	Maximum value / SPNl Programmable alarm 38	0	0 - 65535
341	2	Canal / IMF / PGN Programmable alarm 38	0	Channel: 0 - 20 IMF / PGN: 0 - 65535

Index	Psw	Description	Value	Range
342	2	Condition / filter Programmable alarm 38	0	Condition: 0 - 3 Filter: 0” - 255”
343	2	Management Programmable alarm 39	0	0 - 5
344	2	Time Programmable alarm 39	0	0” - 255”
345	2	Mode Programmable alarm 39	0	0 - 2
346	2	Log Programmable alarm 39	0	0 - 1
347	2	Source Programmable alarm 39	0	0 - 3
348	2	Minimum value / SPNh Programmable alarm 39	0	0 - 65535
349	2	Maximum value / SPNl Programmable alarm 39	0	0 - 65535
350	2	Canal / IMF / PGN Programmable alarm 39	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
351	2	Condition / filter Programmable alarm 39	0	Condition: 0 - 3 Filter: 0” - 255”
352	2	Management Programmable alarm 40	0	0 - 5
353	2	Time Programmable alarm 40	0	0” - 255”
354	2	Mode Programmable alarm 40	0	0 - 2
355	2	Log Programmable alarm 40	0	0 - 1
356	2	Source Programmable alarm 40	0	0 - 3
357	2	Minimum value / SPNh Programmable alarm 40	0	0 - 65535
358	2	Maximum value / SPNl Programmable alarm 40	0	0 - 65535
359	2	Canal / IMF / PGN Programmable alarm 40	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
360	2	Condition / filter Programmable alarm 40	0	Condition: 0 - 3 Filter: 0” - 255”
361	2	Management Programmable alarm 41	0	0 - 5
362	2	Time Programmable alarm 41	0	0” - 255”
363	2	Mode Programmable alarm 41	0	0 - 2
364	2	Log Programmable alarm 41	0	0 - 1
365	2	Source Programmable alarm 41	0	0 - 3

Index	Psw	Description	Value	Range
366	2	Minimum value / SPNh Programmable alarm 41	0	0 - 65535
367	2	Maximum value / SPNl Programmable alarm 41	0	0 - 65535
368	2	Canal / IMF / PGN Programmable alarm 41	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
369	2	Condition / filter Programmable alarm 41	0	Condition: 0 - 3 Filter: 0” - 255”
370	2	Management Programmable alarm 42	0	0 - 5
371	2	Time Programmable alarm 42	0	0” - 255”
372	2	Mode Programmable alarm 42	0	0 - 2
373	2	Log Programmable alarm 42	0	0 - 1
374	2	Source Programmable alarm 42	0	0 - 3
375	2	Minimum value / SPNh Programmable alarm 42	0	0 - 65535
376	2	Maximum value / SPNl Programmable alarm 42	0	0 - 65535
377	2	Canal / IMF / PGN Programmable alarm 42	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
378	2	Condition / filter Programmable alarm 42	0	Condition: 0 - 3 Filter: 0” - 255”
379	2	Management Programmable alarm 43	0	0 - 5
380	2	Time Programmable alarm 43	0	0” - 255”
381	2	Mode Programmable alarm 43	0	0 - 2
382	2	Log Programmable alarm 43	0	0 - 1
383	2	Source Programmable alarm 43	0	0 - 3
384	2	Minimum value / SPNh Programmable alarm 43	0	0 - 65535
385	2	Maximum value / SPNl Programmable alarm 43	0	0 - 65535
386	2	Canal / IMF / PGN Programmable alarm 43	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
387	2	Condition / filter Programmable alarm 43	0	Condition: 0 - 3 Filter: 0” - 255”
388	2	Management Programmable alarm 44	0	0 - 5

Index	Psw	Description	Value	Range
389	2	Time Programmable alarm 44	0	0” - 255”
390	2	Mode Programmable alarm 44	0	0 - 2
391	2	Log Programmable alarm 44	0	0 - 1
392	2	Source Programmable alarm 44	0	0 - 3
393	2	Minimum value / SPNh Programmable alarm 44	0	0 - 65535
394	2	Maximum value / SPNl Programmable alarm 44	0	0 - 65535
395	2	Canal / IMF / PGN Programmable alarm 44	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
396	2	Condition / filter Programmable alarm 44	0	Condition: 0 - 3 Filter: 0” - 255”
397	2	Management Programmable alarm 45	0	0 - 5
398	2	Time Programmable alarm 45	0	0” - 255”
399	2	Mode Programmable alarm 45	0	0 - 2
400	2	Log Programmable alarm 45	0	0 - 1
401	2	Source Programmable alarm 45	0	0 - 3
402	2	Minimum value / SPNh Programmable alarm 45	0	0 - 65535
403	2	Maximum value / SPNl Programmable alarm 45	0	0 - 65535
404	2	Canal / IMF / PGN Programmable alarm 45	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
405	2	Condition / filter Programmable alarm 45	0	Condition: 0 - 3 Filter: 0” - 255”
406	2	Management Programmable alarm 46	0	0 - 5
407	2	Time Programmable alarm 46	0	0” - 255”
408	2	Mode Programmable alarm 46	0	0 - 2
409	2	Log Programmable alarm 46	0	0 - 1
410	2	Source Programmable alarm 46	0	0 - 3
411	2	Minimum value / SPNh Programmable alarm 46	0	0 - 65535
412	2	Maximum value / SPNl Programmable alarm 46	0	0 - 65535
413	2	Canal / IMF / PGN Programmable alarm 46	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
414	2	Condition / filter Programmable alarm 46	0	Condition: 0 - 3 Filter: 0” - 255”
415	2	Management Programmable alarm 47	0	0 - 5
416	2	Time Programmable alarm 47	0	0” - 255”
417	2	Mode Programmable alarm 47	0	0 - 2
418	2	Log Programmable alarm 47	0	0 - 1
419	2	Source Programmable alarm 47	0	0 - 3
420	2	Minimum value / SPNh Programmable alarm 47	0	0 - 65535
421	2	Maximum value / SPNl Programmable alarm 47	0	0 - 65535
422	2	Canal / IMF / PGN Programmable alarm 47	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
423	2	Condition / filter Programmable alarm 47	0	Condition: 0 - 3 Filter: 0” - 255”
424	2	Management Programmable alarm 48	0	0 - 5
425	2	Time Programmable alarm 48	0	0” - 255”
426	2	Mode Programmable alarm 48	0	0 - 2
427	2	Log Programmable alarm 48	0	0 - 1
428	2	Source Programmable alarm 48	0	0 - 3
429	2	Minimum value / SPNh Programmable alarm 48	0	0 - 65535
430	2	Maximum value / SPNl Programmable alarm 48	0	0 - 65535
431	2	Canal / IMF / PGN Programmable alarm 48	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
432	2	Condition / filter Programmable alarm 48	0	Condition: 0 - 3 Filter: 0” - 255”
433	2	Management Programmable alarm 49	0	0 - 5
434	2	Time Programmable alarm 49	0	0” - 255”
435	2	Mode Programmable alarm 49	0	0 - 2
436	2	Log Programmable alarm 49	0	0 - 1

Index	Psw	Description	Value	Range
437	2	Source Programmable alarm 49	0	0 - 3
438	2	Minimum value / SPNh Programmable alarm 49	0	0 - 65535
439	2	Maximum value / SPNl Programmable alarm 49	0	0 - 65535
440	2	Canal / IMF / PGN Programmable alarm 49	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
441	2	Condition / filter Programmable alarm 49	0	Condition: 0 - 3 Filter: 0” - 255”
442	2	Management Programmable alarm 50	0	0 - 5
443	2	Time Programmable alarm 50	0	0” - 255”
444	2	Mode Programmable alarm 50	0	0 - 2
445	2	Log Programmable alarm 50	0	0 - 1
446	2	Source Programmable alarm 50	0	0 - 3
447	2	Minimum value / SPNh Programmable alarm 50	0	0 - 65535
448	2	Maximum value / SPNl Programmable alarm 50	0	0 - 65535
449	2	Canal / IMF / PGN Programmable alarm 50	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
450	2	Condition / filter Programmable alarm 50	0	Condition: 0 - 3 Filter: 0” - 255”
451	2	Management Programmable alarm 51	0	0 - 5
452	2	Time Programmable alarm 51	0	0” - 255”
453	2	Mode Programmable alarm 51	0	0 - 2
454	2	Log Programmable alarm 51	0	0 - 1
455	2	Source Programmable alarm 51	0	0 - 3
456	2	Minimum value / SPNh Programmable alarm 51	0	0 - 65535
457	2	Maximum value / SPNl Programmable alarm 51	0	0 - 65535
458	2	Canal / IMF / PGN Programmable alarm 51	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
459	2	Condition / filter Programmable alarm 51	0	Condition: 0 - 3 Filter: 0” - 255”

Index	Psw	Description	Value	Range
460	2	Management Programmable alarm 52	0	0 - 5
461	2	Time Programmable alarm 52	0	0” - 255”
462	2	Mode Programmable alarm 52	0	0 - 2
463	2	Log Programmable alarm 52	0	0 - 1
464	2	Source Programmable alarm 52	0	0 - 3
465	2	Minimum value / SPNh Programmable alarm 52	0	0 - 65535
466	2	Maximum value / SPNl Programmable alarm 52	0	0 - 65535
467	2	Canal / IMF / PGN Programmable alarm 52	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
468	2	Condition / filter Programmable alarm 52	0	Condition: 0 - 3 Filter: 0” - 255”
469	2	Management Programmable alarm 53	0	0 - 5
470	2	Time Programmable alarm 53	0	0” - 255”
471	2	Mode Programmable alarm 53	0	0 - 2
472	2	Log Programmable alarm 53	0	0 - 1
473	2	Source Programmable alarm 53	0	0 - 3
474	2	Minimum value / SPNh Programmable alarm 53	0	0 - 65535
475	2	Maximum value / SPNl Programmable alarm 53	0	0 - 65535
476	2	Canal / IMF / PGN Programmable alarm 53	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
477	2	Condition / filter Programmable alarm 53	0	Condition: 0 - 3 Filter: 0” - 255”
478	2	Management Programmable alarm 54	0	0 - 5
479	2	Time Programmable alarm 54	0	0” - 255”
480	2	Mode Programmable alarm 54	0	0 - 2
481	2	Log Programmable alarm 54	0	0 - 1
482	2	Source Programmable alarm 54	0	0 - 3
483	2	Minimum value / SPNh Programmable alarm 54	0	0 - 65535

Index	Psw	Description	Value	Range
484	2	Maximum value / SPNl Programmable alarm 54	0	0 - 65535
485	2	Canal / IMF / PGN Programmable alarm 54	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
486	2	Condition / filter Programmable alarm 54	0	Condition: 0 - 3 Filter: 0” - 255”
487	2	Management Programmable alarm 55	0	0 - 5
488	2	Time Programmable alarm 55	0	0” - 255”
489	2	Mode Programmable alarm 55	0	0 - 2
490	2	Log Programmable alarm 55	0	0 - 1
491	2	Source Programmable alarm 55	0	0 - 3
492	2	Minimum value / SPNh Programmable alarm 55	0	0 - 65535
493	2	Maximum value / SPNl Programmable alarm 55	0	0 - 65535
494	2	Canal / IMF / PGN Programmable alarm 55	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
495	2	Condition / filter Programmable alarm 55	0	Condition: 0 - 3 Filter: 0” - 255”
496	2	Management Programmable alarm 56	0	0 - 5
497	2	Time Programmable alarm 56	0	0” - 255”
498	2	Mode Programmable alarm 56	0	0 - 2
499	2	Log Programmable alarm 56	0	0 - 1
500	2	Source Programmable alarm 56	0	0 - 3
501	2	Minimum value / SPNh Programmable alarm 56	0	0 - 65535
502	2	Maximum value / SPNl Programmable alarm 56	0	0 - 65535
503	2	Canal / IMF / PGN Programmable alarm 56	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
504	2	Condition / filter Programmable alarm 56	0	Condition: 0 - 3 Filter: 0” - 255”
505	2	Management Programmable alarm 57	0	0 - 5
506	2	Time Programmable alarm 57	0	0” - 255”

Index	Psw	Description	Value	Range
507	2	Mode Programmable alarm 57	0	0 - 2
508	2	Log Programmable alarm 57	0	0 - 1
509	2	Source Programmable alarm 57	0	0 - 3
510	2	Minimum value / SPNh Programmable alarm 57	0	0 - 65535
511	2	Maximum value / SPNl Programmable alarm 57	0	0 - 65535
512	2	Canal / IMF / PGN Programmable alarm 57	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
513	2	Condition / filter Programmable alarm 57	0	Condition: 0 - 3 Filter: 0” - 255”
514	2	Management Programmable alarm 58	0	0 - 5
515	2	Time Programmable alarm 58	0	0” - 255”
516	2	Mode Programmable alarm 58	0	0 - 2
517	2	Log Programmable alarm 58	0	0 - 1
518	2	Source Programmable alarm 58	0	0 - 3
519	2	Minimum value / SPNh Programmable alarm 58	0	0 - 65535
520	2	Maximum value / SPNl Programmable alarm 58	0	0 - 65535
521	2	Canal / IMF / PGN Programmable alarm 58	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
522	2	Condition / filter Programmable alarm 58	0	Condition: 0 - 3 Filter: 0” - 255”
523	2	Management Programmable alarm 59	0	0 - 5
524	2	Time Programmable alarm 59	0	0” - 255”
525	2	Mode Programmable alarm 59	0	0 - 2
526	2	Log Programmable alarm 59	0	0 - 1
527	2	Source Programmable alarm 59	0	0 - 3
528	2	Minimum value / SPNh Programmable alarm 59	0	0 - 65535
529	2	Maximum value / SPNl Programmable alarm 59	0	0 - 65535
530	2	Canal / IMF / PGN Programmable alarm 59	0	Channel: 0 - 20 IMF / PGN: 0 - 65535

Index	Psw	Description	Value	Range
531	2	Condition / filter Programmable alarm 59	0	Condition: 0 - 3 Filter: 0” - 255”
532	2	Management Programmable alarm 60	0	0 - 5
533	2	Time Programmable alarm 60	0	0” - 255”
534	2	Mode Programmable alarm 60	0	0 - 2
535	2	Log Programmable alarm 60	0	0 - 1
536	2	Source Programmable alarm 60	0	0 - 3
537	2	Minimum value / SPNh Programmable alarm 60	0	0 - 65535
538	2	Maximum value / SPNl Programmable alarm 60	0	0 - 65535
539	2	Canal / IMF / PGN Programmable alarm 60	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
540	2	Condition / filter Programmable alarm 60	0	Condition: 0 - 3 Filter: 0” - 255”
541	2	Management Programmable alarm 61	0	0 - 5
542	2	Time Programmable alarm 61	0	0” - 255”
543	2	Mode Programmable alarm 61	0	0 - 2
544	2	Log Programmable alarm 61	0	0 - 1
545	2	Source Programmable alarm 61	0	0 - 3
546	2	Minimum value / SPNh Programmable alarm 61	0	0 - 65535
547	2	Maximum value / SPNl Programmable alarm 61	0	0 - 65535
548	2	Canal / IMF / PGN Programmable alarm 61	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
549	2	Condition / filter Programmable alarm 61	0	Condition: 0 - 3 Filter: 0” - 255”
550	2	Management Programmable alarm 62	0	0 - 5
551	2	Time Programmable alarm 62	0	0” - 255”
552	2	Mode Programmable alarm 62	0	0 - 2
553	2	Log Programmable alarm 62	0	0 - 1
554	2	Source Programmable alarm 62	0	0 - 3

Index	Psw	Description	Value	Range
555	2	Minimum value / SPNh Programmable alarm 62	0	0 - 65535
556	2	Maximum value / SPNl Programmable alarm 62	0	0 - 65535
557	2	Canal / IMF / PGN Programmable alarm 62	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
558	2	Condition / filter Programmable alarm 62	0	Condition: 0 - 3 Filter: 0” - 255”
559	2	Management Programmable alarm 63	0	0 - 5
560	2	Time Programmable alarm 63	0	0” - 255”
561	2	Mode Programmable alarm 63	0	0 - 2
562	2	Log Programmable alarm 63	0	0 - 1
563	2	Source Programmable alarm 63	0	0 - 3
564	2	Minimum value / SPNh Programmable alarm 63	0	0 - 65535
565	2	Maximum value / SPNl Programmable alarm 63	0	0 - 65535
566	2	Canal / IMF / PGN Programmable alarm 63	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
567	2	Condition / filter Programmable alarm 63	0	Condition: 0 - 3 Filter: 0” - 255”
568	2	Management Programmable alarm 64	0	0 - 5
569	2	Time Programmable alarm 64	0	0” - 255”
570	2	Mode Programmable alarm 64	0	0 - 2
571	2	Log Programmable alarm 64	0	0 - 1
572	2	Source Programmable alarm 64	0	0 - 3
573	2	Minimum value / SPNh Programmable alarm 64	0	0 - 65535
574	2	Maximum value / SPNl Programmable alarm 64	0	0 - 65535
575	2	Canal / IMF / PGN Programmable alarm 64	0	Channel: 0 - 20 IMF / PGN: 0 - 65535
576	2	Condition / filter Programmable alarm 64	0	Condition: 0 - 3 Filter: 0” - 255”

J1939 Table

Index	Psw	Description	Value	Range
1	3	Engine model	0	IVECO NEF67 IVECO F34 DOOSAN YANMAR STV MAN SCANIA STV IVECO MD1 ROHS2 YANMAR FT4 YANMAR X11 FORD BAUDOUIN WISE15 BAUDOUIN WISE10B SCANIA EMS8 YANMAR GAS ADM3 IVECO CURSOR TIER3 MTU SAM TEDOM PSI MTU (Smart Connect) YANMAR JOHN DEERE IVECO NEF IVECO CURSOR TIER2 VOLVO EMS1 VOLVO EMS2 VOLVO EDC4 SCANIA EMS6 J1939-75 VOLVO
2	-	Free	-	-
3	3	Engine speed	1500	-
4	2	Fine speed adjustment	125	-
5	3	Speed control via analog input	0	0: Regulation disabled 1: Regulation enabled 2: CiU mode 3: Analog input speed setting
6	3	Droop value	0	0: Droop not enabled 1 ... 250: Droop value (x0,1 %)
7	2	Speed change limiter	0	0: Disabled 1 ... 250: Maximum speed change threshold (rom/250 ms)
8	2	Idle start speed	0	0: Disabled Valor: Enabled. Disables the engine speed
9	2	Idle start time	0	1” ... 3600”
10	2	Identifier	0	-
11	-	Free	-	-
12	2	Speed change via digital input	2 %	1 % - 10 %
13	-	Free	-	-
14	-	Free	-	-
15	-	Free	-	-
16	-	Free		
17	2	SPNh - Filtering DTC 01	0	0 - 65535
18	2	SPNl - Filtering DTC 01	0	0 - 65535
19	2	FMI - Filtering DTC 01	0	0 - 65535
20	2	Filtering time DTC 01	0	0” - 255”
21	2	SPNh - DTC 02 filtering	0	0 - 65535
22	2	SPNl - DTC 02 filtering	0	0 - 65535
23	2	FMI - Filtering DTC 02	0	0 - 65535
24	2	Filtering time DTC 02	0	0” - 255”
25	2	SPNh - Filtering DTC 03	0	0 - 65535
26	2	SPNl - Filtering DTC 03	0	0 - 65535
27	2	FMI - Filtering DTC 03	0	0 - 65535
28	2	Filtering time DTC 03	0	0” - 255”
29	2	SPNh - Filtering DTC 04	0	0 - 65535
30	2	SPNl - Filtering DTC 04	0	0 - 65535
31	2	FMI - Filtering DTC 04	0	0 - 65535
32	2	Filtering time DTC 04	0	0” - 255”
33	2	SPNh - Filtering DTC 05	0	0 - 65535
34	2	SPNl - Filtering DTC 05	0	0 - 65535
35	2	FMI - Filtering DTC 05	0	0 - 65535
36	2	Filtering time DTC 05	0	0” - 255”
37	2	SPNh - Filtering DTC 06	0	0 - 65535
38	2	SPNl - DTC 06 filtering	0	0 - 65535
39	2	FMI - Filtering DTC 06	0	0 - 65535

Index	Psw	Description	Value	Range
40	2	Filtering time DTC 06	0	0” - 255”
41	2	SPNh - DTC 07 Filtering	0	0 - 65535
42	2	SPNl - DTC 07 filtering	0	0 - 65535
43	2	FMI - Filtering DTC 07	0	0 - 65535
44	2	Filtering time DTC 07	0	0” - 255”
45	2	SPNh - Filtering DTC 08	0	0 - 65535
46	2	SPNl - Filtering DTC 08	0	0 - 65535
47	2	FMI - Filtering DTC 08	0	0 - 65535
48	2	Filtering time DTC 08	0	0” - 255”
49	2	SPNh - DTC 09 filtering	0	0 - 65535
50	2	SPNl - DTC 09 Filtering	0	0 - 65535
51	2	FMI - Filtering DTC 09	0	0 - 65535
52	2	Time filtered DTC 09	0	0” - 255”
53	2	SPNh - DTC 10 filtering	0	0 - 65535
54	2	SPNl - DTC 10 filtering	0	0 - 65535
55	2	FMI - DTC 10 filtering	0	0 - 65535
56	2	Filtering time DTC 10	0	0” - 255”
57	2	SPNh - Filtering DTC 11	0	0 - 65535
58	2	SPNl - Filtering DTC 11	0	0 - 65535
59	2	FMI - Filtering DTC 11	0	0 - 65535
60	2	Filtering time DTC 11	0	0” - 255”
61	2	SPNh - DTC 12 filtering	0	0 - 65535
62	2	SPNl - DTC 12 filtering	0	0 - 65535
63	2	FMI - Filtering DTC 12	0	0 - 65535
64	2	Filtering time DTC 12	0	0” - 255”
65	2	SPNh - Filtering DTC 13	0	0 - 65535
66	2	SPNl - Filtering DTC 13	0	0 - 65535
67	2	FMI - Filtering DTC 13	0	0 - 65535
68	2	Filtering time DTC 13	0	0” - 255”
69	2	SPNh - Filtering DTC 14	0	0 - 65535

Index	Psw	Description	Value	Range
70	2	SPNl - Filtering DTC 14	0	0 - 65535
71	2	FMI - Filtering DTC 14	0	0 - 65535
72	2	Filtering time DTC 14	0	0” - 255”
73	2	SPNh - Filtering DTC 15	0	0 - 65535
74	2	SPNl - Filtering DTC 15	0	0 - 65535
75	2	FMI - Filtering DTC 15	0	0 - 65535
76	2	Filtering time DTC 15	0	0” - 255”
77	2	SPNh - Filtering DTC 16	0	0 - 65535
78	2	SPNl - Filtering DTC 16	0	0 - 65535
79	2	FMI - Filtering DTC 16	0	0 - 65535
80	2	Filtering time DTC 16	0	0” - 255”
81	2	Identifier Variable PGN 01	0	0 - 65535
82	2	Start byte Variable PGN 01	0	1 - 8
83	2	Final byte Variable PGN 01	0	1 - 8
84	2	Scale Variable PGN 01	0	0 - 65535
85	2	Offset Variable PGN 01	0	0 - 65535
86	2	Identifier Variable PGN 02	0	0 - 65535
87	2	Start bit Variable PGN 02	0	1 - 8
88	2	Final bit Variable PGN 02	0	1 - 8
89	2	Scale Variable PGN 02	0	0 - 65535
90	2	Offset Variable PGN 02	0	0 - 65535
91	2	Identifier Variable PGN 03	0	0 - 65535
92	2	Start bit Variable PGN 03	0	1 - 8
93	2	Final bit Variable PGN 03	0	1 - 8
94	2	Scale Variable PGN 03	0	0 - 65535
95	2	Offset Variable PGN 03	0	0 - 65535

Index	Psw	Description	Value	Range
96	2	Identifier Variable PGN 04	0	0 - 65535
97	2	Start bit Variable PGN 04	0	1 - 8
98	2	Final bit Variable PGN 04	0	1 - 8
99	2	Scale Variable PGN 04	0	0 - 65535
100	2	Offset Variable PGN 04	0	0 - 65535
101	2	Identifier Variable PGN 05	0	0 - 65535
102	2	Start bit Variable PGN 05	0	1 - 8
103	2	Final bit Variable PGN 05	0	1 - 8
104	2	Scale Variable PGN 05	0	0 - 65535
105	2	Offset Variable PGN 05	0	0 - 65535
106	2	Identifier Variable PGN 06	0	0 - 65535
107	2	Start bit Variable PGN 06	0	1 - 8
108	2	Final bit Variable PGN 06	0	1 - 8
109	2	Scale Variable PGN 06	0	0 - 65535
110	2	Offset Variable PGN 06	0	0 - 65535
111	2	Identifier Variable PGN 07	0	0 - 65535
112	2	Start bit Variable PGN 07	0	1 - 8
113	2	Final bit Variable PGN 07	0	1 - 8
114	2	Scale Variable PGN 07	0	0 - 65535
115	2	Offset Variable PGN 07	0	0 - 65535
116	2	Identifier Variable PGN 08	0	0 - 65535
117	2	Start bit Variable PGN 08	0	1 - 8
118	2	Final bit Variable PGN 08	0	1 - 8
119	2	Scale Variable PGN 08	0	0 - 65535

Index	Psw	Description	Value	Range
120	2	Offset Variable PGN 08	0	0 - 65535
121	2	Identifier Variable PGN 09	0	0 - 65535
122	2	Start bit Variable PGN 09	0	1 - 8
123	2	Final bit Variable PGN 09	0	1 - 8
124	2	Scale Variable PGN 09	0	0 - 65535
125	2	Offset Variable PGN 09	0	0 - 65535
126	2	Identifier Variable PGN 10	0	0 - 65535
127	2	Start bit Variable PGN 10	0	1 - 8
128	2	Final bit Variable PGN 10	0	1 - 8
129	2	Scale Variable PGN 10	0	0 - 65535
130	2	Offset Variable PGN 10	0	0 - 65535
131	2	Identifier Variable PGN 11	0	0 - 65535
132	2	Start bit Variable PGN 11	0	1 - 8
133	2	Final bit Variable PGN 11	0	1 - 8
134	2	Scale Variable PGN 11	0	0 - 65535
135	2	Offset Variable PGN 11	0	0 - 65535
136	2	Identifier Variable PGN 12	0	0 - 65535
137	2	Start bit Variable PGN 12	0	1 - 8
138	2	Final bit Variable PGN 12	0	1 - 8
139	2	Scale Variable PGN 12	0	0 - 65535
140	2	Offset Variable PGN 12	0	0 - 65535
141	2	Identifier Variable PGN 13	0	0 - 65535
142	2	Start bit Variable PGN 13	0	1 - 8
143	2	Final bit Variable PGN 13	0	1 - 8

Index	Psw	Description	Value	Range
144	2	Scale Variable PGN 13	0	0 - 65535
145	2	Offset Variable PGN 13	0	0 - 65535
146	2	Identifier Variable PGN 14	0	0 - 65535
147	2	Start bit Variable PGN 14	0	1 - 8
148	2	Final bit Variable PGN 14	0	1 - 8
149	2	Scale Variable PGN 14	0	0 - 65535
150	2	Offset Variable PGN 14	0	0 - 65535
151	2	Identifier Variable PGN 15	0	0 - 65535
152	2	Start bit Variable PGN 15	0	1 - 8
153	2	Final bit Variable PGN 15	0	1 - 8
154	2	Scale Variable PGN 15	0	0 - 65535
155	2	Offset Variable PGN 15	0	0 - 65535
156	2	Identifier Variable PGN 16	0	0 - 65535
157	2	Start bit Variable PGN 16	0	1 - 8
158	2	Final bit Variable PGN 16	0	1 - 8
159	2	Scale Variable PGN 16	0	0 - 65535
160	2	Offset Variable PGN 16	0	0 - 65535

Parameter set selector Table

Index	Psw	Description	Value	Range
1	2	Set 1: Generator signal type	1	0: Three-phase without neutral 1: Three-phase 2: Two-phase 3: Single-phase 4: Delta with neutral 5: Delta without neutral 6: Two-phase selector
2	2	Set 1: Type of grid signal	1	
3	2	Set 1: Threshold maximum severe voltage	440 V	-
4	2	Set 1: Maximum threshold moderate vltage	440 V	-
5	2	Set 1: Severe minimum voltage	360 V	-
6	2	Set 1: Moderate low voltage	360 V	-
7	2	Set 1: Maximum severe current	1000 A	-
8	2	Set 1: Maximum moderate current	1000 A	-
9	2	Set 1: Short circuit detection	3000 A	-
10	2	Set 1: Severe maximum frequency	58 Hz	-
11	2	Set 1: Maximum moderate frequency	58 Hz	-
12	2	Set 1: Minimal severe frequency	45 Hz	-
13	2	Game 1: Moderate minimum frequency	45 Hz	-
14	2	Set 1: Nominal power generator set	220 kW	-
15	2	Set 1: Nominal engine speed	1500 rpm	-
16	2	Set 1: Minimum engine speed	1350 rpm	-
17	2	Set 1: Maximum engine speed	1740 rpm	-
18	2	Set 1: Minimum grid voltage	360 V	-
19	2	Set 1: Maximum grid voltage	440 V	-
20	2	Set 1: Minimum grid frequency	55 Hz	-
21	2	Set 1: Maximum grid frequency	45 Hz	-
22	-	Free	-	-
23	-	Free	-	-
24	-	Free	-	-
25	-	Free	-	-
26	-	Free	-	-

Index	Psw	Description	Value	Range
27	-	Free	-	-
28	-	Free	-	-
29	-	Free	-	-
30	-	Free	-	-
31	-	Free	-	-
32	-	Free	-	-
33	-	Free	-	-
34	-	Free	-	-
35	-	Free	-	-
36	-	Free	-	-
37	-	Free	-	-
38	-	Free	-	-
39	-	Free	-	-
40	-	Free	-	-
41	-	Free	-	-
42	2	Set 2: Generator signal type	1	0: Three-phase without neutral 1: Three-phase 2: Two-phase 3: Single-phase 4: Delta with neutral 5: Delta without neutral 6: Two-phase selector
43	2	Set 2: Type of grid signal	1	
44	2	Set 2: Threshold maximum severe voltage	440 V	-
45	2	Set 2: Maximum threshold moderate voltage	440 V	-
46	2	Set 2: Severe minimum voltage	360 V	-
47	2	Set 2: Moderate low voltage	360 V	-
48	2	Set 2: Maximum severe current	1000 A	-
49	2	Set 2: Maximum moderate current	1000 A	-
50	2	Set 2: Short circuit detection	3000 A	-
51	2	Game 2: Severe maximum frequency	58 Hz	-
52	2	Set 2: Maximum moderate frequency	58 Hz	-
53	2	Set 2: Minimal severe frequency	45 Hz	-

Index	Psw	Description	Value	Range
54	2	Game 2: Moderate minimum frequency	45 Hz	-
55	2	Set 2: Nominal power generator set	220 kW	-
56	2	Set 2: Nominal engine speed	1500 rpm	-
57	2	Set 2: Minimum engine speed	1350 rpm	-
58	2	Set 2: Maximum engine speed	1740 rpm	-
59	2	Set 2: Minimum grid voltage	360 V	-
60	2	Set 2: Maximum grid voltage	440 V	-
61	2	Set 2: Minimum grid frequency	55 Hz	-
62	2	Set 2: Maximum grid frequency	45 Hz	-
63	-	Free	-	-
64	-	Free	-	-
65	-	Free	-	-
66	-	Free	-	-
67	-	Free	-	-
68	-	Free	-	-
69	-	Free	-	-
70	-	Free	-	-
71	-	Free	-	-
72	-	Free	-	-
73	-	Free	-	-
74	-	Free	-	-
75	-	Free	-	-
76	-	Free	-	-
77	-	Free	-	-
78	-	Free	-	-
79	-	Free	-	-
80	-	Free	-	-
81	-	Free	-	-
82	-	Free	-	-

Fuel Table

Index	Psw	Description	Value	Range
1	2	Units internal tank volume	0	
2	2	Enabling fuel consumption log internal tank	0	-
3	2	Free	-	-
4	2	Free	-	-
5	2	Internal tank volume	0	-
6	2	Fuel loss internal tank with engine running (L)	0	-
7	2	Fuel loss internal tank when engine is stopped (L)	0	-
8	2	Fuel loss detection threshold internal tank	0	-
9	2	Filling start detection time in inner tank	0	-
10	2	End-of-fill detection time on internal tank	0	-
11	-	Free	-	-
12	-	Free	-	-
13	-	Free	-	-
14	-	Free	-	-
15	2	External tank volume	0	-
16	2	Fuel leakage external tank with engine running (L)	0	-
17	2	Fuel leakage external tank with engine STOP (L)	0	-
18	2	Fuel loss detection threshold external tank	0	-
19	2	Filling start detection time in external tank	0	-
20	2	End-of-fill detection time on external tank	0	-

External inputs Table

Index	Psw	Description	Value	Range
1	2	Configuration input 01 external module 01	0	
2	2	Configuration input 02 external module 01	0	
3	2	Configuration input 03 external module 01	0	
4	2	Configuration input 04 external module 01	0	
5	2	Configuration input 05 external module 01	0	
6	2	Configuration input 06 external module 01	0	
7	2	Configuration input 07 external module 01	0	
8	2	Configuration input 08 external module 01	0	
9	2	Configuration input 01 external module 02	0	
10	2	Configuration input 02 external module 02	0	
11	2	Configuration input 03 external module 02	0	
12	2	Configuration of input 04 external module 02	0	
13	2	Configuration input 05 external module 02	0	
14	2	Configuration input 06 external module 02	0	
15	2	Configuration input 07 external module 02	0	Table of Input functionalities
16	2	Configuration input 08 external module 02	0	
17	2	Configuration input 01 external module 03	0	
18	2	Configuration input 02 external module 03	0	
19	2	Configuration input 03 external module 03	0	
20	2	Configuration input 04 external module 03	0	
21	2	Configuration input 05 external module 03	0	
22	2	Configuration input 06 external module 03	0	
23	2	Configuration input 07 external module 03	0	
24	2	Configuration input 08 external module 03	0	
25	2	Configuration input 01 external module 04	0	
26	2	Configuration input 02 external module 04	0	
27	2	Configuration input 03 external module 04	0	
28	2	Configuration input 04 external module 04	0	
29	2	Configuration input 05 external module 04	0	

Index	Psw	Description	Value	Range
30	2	Configuration input 06 external module 04	0	
31	2	Configuration input 07 external module 04	0	
32	2	Configuration input 08 external module 04	0	
33	2	Configuration input 01 controller CEC8 01	0	
34	2	Configuration input 02 controller CEC8 01	0	
35	2	Configuration input 03 controller CEC8 01	0	
36	2	Configuration input 04 controller CEC8 01	0	
37	2	Configuration input 05 controller CEC8 01	0	
38	2	Configuration input 06 controller CEC8 01	0	
39	2	Configuration input 07 controller CEC8 01	0	
40	2	Configuration input 08 controller CEC8 01	0	
41	2	Configuration input 09 controller CEC8 01	0	
42	2	Configuration input 10 controller CEC8 01	0	
43	2	Configuration input 11 controller CEC8 01	0	
44	2	Configuration input 12 controller CEC8 01	0	Table of Input functionalities
45	2	Configuration input 01 controller CEC8 02	0	
46	2	Configuration input 02 controller CEC8 02	0	
47	2	Configuration input 03 controller CEC8 02	0	
48	2	Configuration input 04 controller CEC8 02	0	
49	2	Configuration input 05 controller CEC8 02	0	
50	2	Configuration input 06 controller CEC8 02	0	
51	2	Configuration input 07 controller CEC8 02	0	
52	2	Configuration input 08 controller CEC8 02	0	
53	2	Configuration input 09 controller CEC8 02	0	
54	2	Configuration input 10 controller CEC8 02	0	
55	2	Configuration input 11 controller CEC8 02	0	
56	2	Configuration input 12 controller CEC8 02	0	
57	2	Configuration input 01 CEC8 controller 03	0	
58	2	Configuration input 02 CEC8 controller 03	0	
59	2	Configuration input 03 controller CEC8 03	0	

Index	Psw	Description	Value	Range
60	2	Configuration input 04 controller CEC8 03	0	
61	2	Configuration input 05 CEC8 controller 03	0	
62	2	Configuration input 06 CEC8 controller 03	0	
63	2	Configuration input 07 controller CEC8 03	0	
64	2	Configuration input 08 controller CEC8 03	0	
65	2	Configuration input 09 CEC8 controller 03	0	
66	2	Configuration input 10 controller CEC8 03	0	
67	2	Configuration input 11 controller CEC8 03	0	
68	2	Configuration input 12 controller CEC8 03	0	
69	2	Configuration input 01 controller CEC8 04	0	
70	2	Configuration input 02 controller CEC8 04	0	
71	2	Configuration input 03 controller CEC8 04	0	
72	2	Configuration input 04 controller CEC8 04	0	
73	2	Configuration input 05 controller CEC8 04	0	
74	2	Configuration input 06 controller CEC8 04	0	Table of Input functionalities
75	2	Configuration input 07 controller CEC8 04	0	
76	2	Configuration input 08 controller CEC8 04	0	
77	2	Configuration input 09 controller CEC8 04	0	
78	2	Configuration input 10 controller CEC8 04	0	
79	2	Configuration input 11 controller CEC8 04	0	
80	2	Configuration input 12 controller CEC8 04	0	
81	2	Configuration input 01 controller CEC8 05	0	
82	2	Configuration input 02 controller CEC8 05	0	
83	2	Configuration input 03 controller CEC8 05	0	
84	2	Configuration input 04 controller CEC8 05	0	
85	2	Configuration input 05 controller CEC8 05	0	
86	2	Configuration input 06 controller CEC8 05	0	
87	2	Configuration input 07 controller CEC8 05	0	
88	2	Configuration input 08 controller CEC8 05	0	
89	2	Configuration input 09 controller CEC8 05	0	

Index	Psw	Description	Value	Range
90	2	Configuration input 10 controller CEC8 05	0	
91	2	Configuration input 11 controller CEC8 05	0	
92	2	Configuration input 12 controller CEC8 05	0	
93	2	Configuration input 01 controller CEC8 06	0	
94	2	Configuration input 02 controller CEC8 06	0	
95	2	Configuration input 03 controller CEC8 06	0	
96	2	Configuration input 04 controller CEC8 06	0	
97	2	Configuration input 05 controller CEC8 06	0	
98	2	Configuration input 06 controller CEC8 06	0	
99	2	Configuration input 07 controller CEC8 06	0	
100	2	Configuration input 08 controller CEC8 06	0	
101	2	Configuration input 09 controller CEC8 06	0	
102	2	Configuration input 10 controller CEC8 06	0	
103	2	Configuration input 11 controller CEC8 06	0	
104	2	Configuration input 12 controller CEC8 06	0	Table of Input functionalities
105	2	Configuration input 01 controller CEC8 07	0	
106	2	Configuration input 02 controller CEC8 07	0	
107	2	Configuration input 03 controller CEC8 07	0	
108	2	Configuration input 04 controller CEC8 07	0	
109	2	Configuration input 05 controller CEC8 07	0	
110	2	Configuration input 06 controller CEC8 07	0	
111	2	Configuration input 07 controller CEC8 07	0	
112	2	Configuration input 08 controller CEC8 07	0	
113	2	Configuration input 09 controller CEC8 07	0	
114	2	Configuration input 10 controller CEC8 07	0	
115	2	Configuration input 11 controller CEC8 07	0	
116	2	Configuration input 12 controller CEC8 07	0	
117	2	Configuration input 01 controller CEC8 08	0	
118	2	Configuration input 02 controller CEC8 08	0	
119	2	Configuration input 03 controller CEC8 08	0	
120	2	Configuration input 04 controller CEC8 08	0	
121	2	Configuration input 05 controller CEC8 08	0	
122	2	Configuration input 06 controller CEC8 08	0	
123	2	Configuration input 07 controller CEC8 08	0	
124	2	Configuration input 08 controller CEC8 08	0	Table of Input functionalities
125	2	Configuration input 09 controller CEC8 08	0	
126	2	Configuration input 10 controller CEC8 08	0	
127	2	Configuration input 11 controller CEC8 08	0	
128	2	Configuration input 12 controller CEC8 08	0	

Generator status input Table

Index	Psw	Description	Value	Range
1	2	Functionality status generator 01		
2	2	Functionality status generator 02		
3	2	Functionality status generator 03		
4	2	Functionality status generator 04		Table of Input functionalities
5	2	Functionality status generator 05		
6	2	Functionality status generator 06		
7	2	Functionality status generator 07		
8	2	Functionality status generator 08		
9	2	Inputs associated with generator status 01		
10	2	Inputs associated with generator status 02		
11	2	Inputs associated with generator status 03		
12	2	Inputs associated with generator status 04		0: Status not defined 1 – 65535: Associated inputs
13	2	Inputs associated with generator status 05		
14	2	Inputs associated with generator status 06		
15	2	Inputs associated with generator status 07		
16	2	Inputs associated with generator status 08		

Index	Psw	Description	Value	Range
17	2	Status of the inputs generator status 01		0 - 65535
18	2	Status of the inputs generator status 02		
19	2	Status of the inputs generator status 03		
20	2	Status of the inputs generator status 04		
21	2	Status of the inputs generator status 05		
22	2	Status of the inputs generator status 06		
23	2	Status of the inputs generator status 07		
24	2	Status of the inputs generator status 08		
25	2	Engine status associated with generator status group 01		0: Always 1: With engine running 2: With stabilised engine 3: With engine STOP
26	2	Engine status associated with generator status group 02		
27	2	Engine status associated with generator status group 03		
28	2	Engine status associated with generator status group 04		
29	2	Engine status associated with generator status group 05		
30	2	Engine status associated with generator status group 06		
31	2	Engine status associated with generator status group 07		
32	2	Engine status associated with generator status group 08		

PLC External inputs Table

Index	Psw	Description	Value	Range
1	2	Input 01 configuration	0	Table of Input functionalities
2	2	Input 02 configuration	0	
3	2	Input 03 configuration	0	
4	2	Input 04 configuration	0	
5	2	Input 05 configuration	0	
6	2	Input 06 configuration	0	
7	2	Input 07 configuration	0	
8	2	Input 08 configuration	0	
9	2	Input 09 configuration	0	
10	2	Input 10 configuration	0	
11	2	Input 11 configuration	0	
12	2	Input 12 configuration	0	
13	2	Input 13 configuration	0	
14	2	Input 14 configuration	0	
15	2	Input 15 configuration	0	
16	2	Input 16 configuration	0	

External outputs Table

Index	Psw	Description	Value	Range
1	2	Configuration output 01 external output device module 01	0	
2	2	Configuration output 02 external output device module 01	0	
3	2	Configuration output 03 external output device module 01	0	
4	2	Configuration output 04 external output device module 01	0	
5	2	Configuration output 05 external output device module 01	0	
6	2	Configuration output 06 external output device module 01	0	
7	2	Configuration output 07 external output device module 01	0	
8	2	Configuration output 08 external output device module 01	0	
9	2	Configuration output 09 external output device module 01	0	
10	2	Configuration output 10 external output device module 01	0	
11	2	Configuration output 11 external output device module 01	0	
12	2	Configuration output 12 external output device module 01	0	
13	2	Configuration output 01 external output device module 02	0	Table of Output functionalities
14	2	Configuration output 02 external output device module 02	0	
15	2	Configuration output 03 external output device module 02	0	
16	2	Configuration output 04 external output device module 02	0	
17	2	Configuration output 05 external output device module 02	0	
18	2	Configuration output 06 external output device module 02	0	
19	2	Configuration output 07 external output device module 02	0	
20	2	Configuration output 08 external output device module 02	0	
21	2	Configuration output 09 external output device module 02	0	
22	2	Configuration output 10 external output device module 02	0	
23	2	Configuration output 11 external output device module 02	0	
24	2	Configuration output 12 external output device module 02	0	
25	2	Configuration output 01 external output device module 03	0	
26	2	Configuration output 02 external output device module 03	0	
27	2	Configuration output 03 external output device module 03	0	
28	2	Configuration output 04 external output device module 03	0	
29	2	Configuration output 05 external output device module 03	0	
30	2	Configuration output 06 external output device module 03	0	
31	2	Configuration output 07 external output device module 03	0	
32	2	Configuration output 08 external output device module 03	0	
33	2	Configuration output 09 external output device module 03	0	
34	2	Configuration output 10 external output device module 03	0	
35	2	Configuration output 11 external output device module 03	0	
36	2	Configuration output 12 external output device module 03	0	
37	2	Configuration output 01 external output device module 04	0	Table of Output functionalities
38	2	Configuration output 02 external output device module 04	0	
39	2	Configuration output 03 external output device module 04	0	
40	2	Configuration output 04 external output device module 04	0	
41	2	Configuration output 05 external output device module 04	0	
42	2	Configuration output 06 external output device module 04	0	
43	2	Configuration output 07 external output device module 04	0	
44	2	Configuration output 08 external output device module 04	0	
45	2	Configuration output 09 external output device module 04	0	
46	2	Configuration output 10 external output device module 04	0	
47	2	Configuration output 11 external output device module 04	0	
48	2	Configuration output 12 external output device module 04	0	

Interface Table

Index	Psw	Description	Value	Range
1	1	Buzzer inhibition	0	0: Buzzer enabled 1: Buzzer disabled
2	3	Inhibit ECU ignition in menu	0	0: Enable ECU ignition activation 1: Inhibition of ECU ignition activation
3	1	Controller dark mode	0	0: Disabled 1: Enabled
4	2	Multifunction Button	2	0: Anti-theft position programming 1: Open/Close CG 2: Alarm reset 3: Alarm Mute 4: “Alarms” screen shortcut 5: “Generator” screen shortcut 6: “Engine” screen shortcut 7: Engine Ignition activation 8: Fuel pump manual activation 9: DEF pump manual activation 10: PLC input
5	3	Gas version	0	0: Not active 1: Active
6	1	Language	0	0: Spanish 1: English
7	1	Display contrast	5	0 - 10

Heating Table

Index	Psw	Description	Value	Range
1	2	Heater enablement		0: Disabled 1: Enabled
2	2	Heater controller	5	0 - 30
3	2	Integral heater coefficient	0	0 - 255
4	2	Heater proportional coefficient	20	0 - 255

Modbus Table

Index	Psw	Description	Value	Range
1	2	Modbus communication identifier	1	0 - 14
2	2	Baud rate setting	0	0: 9600 baud 1: 19200 baud 2: 31250 baud 3: 38400 baud 4: 75000 baud 5: 150000 baud 6: 325000 baud 7: 375000 baud
3	2	Stop bit configuration	0	0: 1 bit 1: 2 bits
4	2	Parity configuration	0	0: none 1: STOP 2: odd

Widgets Table

Index	Psw	Description	Value	Range
1	2	Configuration widget 01 screen 01	1	Widget functionalities Table
2	2	Configuration widget 02 screen 01	2	
3	2	Configuration widget 03 screen 01	3	
4	2	Configuration widget 04 screen 01	4	
5	2	Configuration widget 01 screen 02	5	
6	2	Configuration widget 02 screen 02	6	
7	2	Configuration widget 03 screen 02	0	
8	2	Configuration widget 04 screen 02	0	
9	2	Configuration widget 01 screen 03	0	
10	2	Configuration widget 02 screen 03	0	
11	2	Configuration widget 03 screen 03	0	
12	2	Configuration widget 04 screen 03	0	
13	2	Configuration widget 01 screen 04	0	
14	2	Configuration widget 02 screen 04	0	
15	2	Configuration widget 03 screen 04	0	
16	2	Configuration widget 04 screen 04	0	

Index	Psw	Description	Value	Range
17	2	Configuration widget 01 screen 05	0	Widget functionalities Table
18	2	Configuration widget 02 screen 05	0	
19	2	Configuration widget 03 screen 05	0	
20	2	Configuration widget 04 screen 05	0	
21	2	Configuration widget 01 screen 06	0	
22	2	Configuration widget 02 screen 06	0	
23	2	Configuration widget 03 screen 06	0	
24	2	Configuration widget 04 screen 06	0	
25	2	Configuration widget 01 screen 07	0	
26	2	Configuration widget 02 screen 07	0	
27	2	Configuration widget 03 screen 07	0	
28	2	Configuration widget 04 screen 07	0	
29	2	Configuration widget 01 screen 08	0	
30	2	Configuration widget 02 screen 08	0	
31	2	Configuration widget 03 screen 08	0	
32	2	Configuration widget 04 screen 08	0	

Input functionalities Table

Index	Description
0	Not programmed
1	Engine fuel level alarm
2	Engine coolant temperature alarm
3	Oil pressure engine alarm
4	Engine coolant level alarm
5	Preheating cut
6	Start enablement (X11)
7	ECU ignition activation
8	Speed increase over nominal (%)
9	Decrease of speed over nominal speed (%)

Index	Description
10	Inhibition of forced regeneration
11	Request for forced regeneration
12	Activation of safety conditions for forced regeneration
13	External START
14	Start disablement
15	Load demand (EJP1)
16	Load demand (EJP2)
17	Urea pump activation request
18	Transfer pump activation request
19	Oil pump activation request
20	Priority group in reserve
21	Activation of the controller in automatic mode
22	Activation of the controller in manual mode
23	Activation of the controller test mode
24	Activation of the controller's locked mode
25	Activation of the controller forced operation
26	Reset of controller alarms
27	Parameter set 1
28	Parameter set 2
29	Activation of CE8 controller
30	Parameter programming lock
31	Locking the user Interface
32	Activation of non-illuminated display
33	Geofence enablement
34	Geofence programming
35	Disabling the activation of the grid contactor
36	Disabling the activation of the generator contactor
37	Confirmation of grid contactor activation
38	Confirmation of activation of the generator contactor
39	Request for activation of the grid contactor in manual mode

Index	Description
40	Request for activation of generator contactor in manual mode
41	Programmable alarm 01
42	Programmable alarm 02
43	Programmable alarm 03
44	Programmable alarm 04
45	Programmable alarm 05
46	Programmable alarm 06
47	Programmable alarm 07
48	Programmable alarm 08
49	Programmable alarm 09
50	Programmable alarm 10
51	Programmable alarm 11
52	Programmable alarm 12
53	Programmable alarm 13
54	Programmable alarm 14
55	Programmable alarm 15
56	Programmable alarm 16
57	Programmable alarm 17
58	Programmable alarm 18
59	Programmable alarm 19
60	Programmable alarm 20
61	Programmable alarm 21
62	Programmable alarm 22
63	Programmable alarm 23
64	Programmable alarm 24
65	Programmable alarm 25
66	Programmable alarm 26
67	Programmable alarm 27
68	Programmable alarm 28
69	Programmable alarm 29

Index	Description
70	Programmable alarm 30
71	Programmable alarm 31
72	Programmable alarm 32
73	Programmable alarm 33
74	Programmable alarm 34
75	Programmable alarm 35
76	Programmable alarm 36
77	Programmable alarm 37
78	Programmable alarm 38
79	Programmable alarm 39
80	Programmable alarm 40
81	Programmable alarm 41
82	Programmable alarm 42
83	Programmable alarm 43
84	Programmable alarm 44
85	Programmable alarm 45
86	Programmable alarm 46
87	Programmable alarm 47
88	Programmable alarm 48
89	Programmable alarm 49
90	Programmable alarm 50
91	Programmable alarm 51
92	Programmable alarm 52
93	Programmable alarm 53
94	Programmable alarm 54
95	Programmable alarm 55
96	Programmable alarm 56
97	Programmable alarm 57
98	Programmable alarm 58
99	Programmable alarm 59

Index	Description
100	Programmable alarm 60
101	Programmable alarm 61
102	Programmable alarm 62
103	Programmable alarm 63
104	Programmable alarm 64
105	Manual activation of DEF pump

Output functionalities Table

Index	Description
0	Not programmed
1	Engine preheating (power output)
2	Engine START (power output)
3	Engine ignition (power output)
4	PULL (power output)
5	Engine STOP (power output)
6	Battery charging alternator excitation
7	Engine start (auxiliary engine)
8	Closing of the generator contactor
9	Closing of grid contactor
10	Generator contactor opening
11	Opening of grid contactor
12	Transfer pump
13	Urea pump
14	Oil pump (Yanmar)
15	Heating resistance
16	Dummy load
17	Smoke control
18	Priority group in reserve
19	Load demand

Index	Description
20	Active alarm
21	Moderate alarm active
22	Severe alarm active
23	Electronic protection
24	MAN mode active
25	AUTO mode active
26	Test mode active
27	Lock mode active
28	Watchdog
29	Detection Controller module (HearBeat)
30	Parameter set 1
31	Parameter set 2
32	Generator working properly
33	Grid present controller CE8
34	Grid present controller CEC8 01
35	Grid present controller CEC8 02
36	Grid present controller CEC8 03
37	Grid present controller CEC8 04
38	Grid present controller CEC8 05
39	Grid present controller CEC8 06
40	Grid present controller CEC8 07
41	Grid present controller CEC8 08
42	Engine started
43	Stabilised engine
44	Load-stabilised engine
45	Input 01 controller CE8
46	Input 02 controller CE8
47	Input 03 controller CE8
48	Input 04 controller CE8
49	Input 05 controller CE8

Index	Description
50	Input 06 controller CE8
51	Input 07 controller CE8
52	Input 08 controller CE8
53	Input 09 controller CE8
54	Input 10 controller CE8
55	Input 11 controller CE8
56	Input 12 controller CE8
57	MAN input controller CE8
58	EMS input controller CE8
59	Input AN1 controller CE8
60	Input AN2 controller CE8
61	Input AN3 controller CE8
62	Input AN4 controller CE8
63	Input 01 external module 01
64	Input 02 external module 01
65	Input 03 external module 01
66	Input 04 external module 01
67	Input 05 external module 01
68	Input 06 external module 01
69	Input 07 external module 01
70	Input 08 external module 01
71	Input 01 external module 02
72	Input 02 external module 02
73	Input 03 external module 02
74	Input 04 external module 02
75	Input 05 external module 02
76	Input 06 external module 02
77	Input 07 external module 02
78	Input 08 external module 02
79	Input 01 external module 03

Index	Description
80	Input 02 external module 03
81	Input 03 external module 03
82	Input 04 external module 03
83	Input 05 external module 03
84	Input 06 external module 03
85	Input 07 external module 03
86	Input 08 external module 03
87	Input 01 external module 04
88	Input 02 external module 04
89	Input 03 external module 04
90	Input 04 external module 04
91	Input 05 external module 04
92	Input 06 external module 04
93	Input 07 external module 04
94	Input 08 external module 04
95	Input 01 controller CEC8 01
96	Input 02 controller CEC8 01
97	Input 03 controller CEC8 01
98	Input 04 controller CEC8 01
99	Input 05 controller CEC8 01
100	Input 06 controller CEC8 01
101	Input 07 controller CEC8 01
102	Input 08 controller CEC8 01
103	Input 09 controller CEC8 01
104	Input 10 controller CEC8 01
105	Input 11 controller CEC8 01
106	Input 12 controller CEC8 01
107	Input 01 controller CEC8 02
108	Input 02 controller CEC8 02
109	Input 03 controller CEC8 02

Index	Description
110	Input 04 controller CEC8 02
111	Input 05 controller CEC8 02
112	Input 06 controller CEC8 02
113	Input 07 controller CEC8 02
114	Input 08 controller CEC8 02
115	Input 09 controller CEC8 02
116	Input 10 controller CEC8 02
117	Input 11 controller CEC8 02
118	Input 12 controller CEC8 02
119	Input 01 controller CEC8 03
120	Input 02 controller CEC8 03
121	Input 03 controller CEC8 03
122	Input 04 controller CEC8 03
123	Input 05 controller CEC8 03
124	Input 06 controller CEC8 03
125	Input 07 controller CEC8 03
126	Input 08 controller CEC8 03
127	Input 09 controller CEC8 03
128	Input 10 controller CEC8 03
129	Input 11 controller CEC8 03
130	Input 12 controller CEC8 03
131	Input 01 controller CEC8 04
132	Input 02 controller CEC8 04
133	Input 03 controller CEC8 04
134	Input 04 controller CEC8 04
135	Input 05 controller CEC8 04
136	Input 06 controller CEC8 04
137	Input 07 controller CEC8 04
138	Input 08 controller CEC8 04
139	Input 09 controller CEC8 04

Index	Description
140	Input 10 controller CEC8 04
141	Input 11 controller CEC8 04
142	Input 12 controller CEC8 04
143	Input 01 controller CEC8 05
144	Input 02 controller CEC8 05
145	Input 03 controller CEC8 05
146	Input 04 controller CEC8 05
147	Input 05 controller CEC8 05
148	Input 06 controller CEC8 05
149	Input 07 controller CEC8 05
150	Input 08 controller CEC8 05
151	Input 09 controller CEC8 05
152	Input 10 controller CEC8 05
153	Input 11 controller CEC8 05
154	Input 12 controller CEC8 05
155	Input 01 controller CEC8 06
156	Input 02 controller CEC8 06
157	Input 03 controller CEC8 06
158	Input 04 controller CEC8 06
159	Input 05 controller CEC8 06
160	Input 06 controller CEC8 06
161	Input 07 controller CEC8 06
162	Input 08 controller CEC8 06
163	Input 09 controller CEC8 06
164	Input 10 controller CEC8 06
165	Input 11 controller CEC8 06
166	Input 12 controller CEC8 06
167	Input 01 controller CEC8 07
168	Input 02 controller CEC8 07
169	Input 03 controller CEC8 07

Index	Description
170	Input 04 controller CEC8 07
171	Input 05 controller CEC8 07
172	Input 06 controller CEC8 07
173	Input 07 controller CEC8 07
174	Input 08 controller CEC8 07
175	Input 09 controller CEC8 07
176	Input 10 controller CEC8 07
177	Input 11 controller CEC8 07
178	Input 12 controller CEC8 07
179	Input 01 controller CEC8 08
180	Input 02 controller CEC8 08
181	Input 03 controller CEC8 08
182	Input 04 controller CEC8 08
183	Input 05 controller CEC8 08
184	Input 06 controller CEC8 08
185	Input 07 controller CEC8 08
186	Input 08 controller CEC8 08
187	Input 09 controller CEC8 08
188	Input 10 controller CEC8 08
189	Input 11 controller CEC8 08
190	Input 12 controller CEC8 08
191	Generator status 01
192	Generator status 02
193	Generator status 03
194	Generator status 04
195	Generator status 05
196	Generator status 06
197	Status of generator 07
198	Generator status 08
199	PLC input 01

Index	Description
200	PLC input 02
201	PLC input 03
202	PLC input 04
203	PLC input 05
204	PLC input 06
205	PLC input 07
206	PLC input 08
207	PLC input 09
208	PLC input 10
209	PLC input 11
210	PLC input 12
211	PLC input 13
212	PLC input 14
213	PLC input 15
214	PLC input 16
215	Controller voltage alarm
216	Alarm identifier controller
217	Communication alarm CEC8
218	IOT communication alarm
219	Alarm loss of GPS signal
220	Generator position alarm
221	Generator impact alarm
222	Automatic mode change alarm
223	Water temperature alarm
224	Oil pressure alarm
225	Emergency stop alarm
226	Battery charging alternator alarm
227	Failed start alarm
228	Low water level alarm
229	Fuel reserve alarm

Index	Description
230	Engine communication alarm J1939
231	Fuel water alarm
232	Moderate urea level alarm
233	Severe urea level alarm
234	Urea pump alarm
235	Alarm fuel theft internal tank
236	Fuel theft alarm external tank
237	Pre-clogged fuel filter alarm
238	Clogged fuel filter alarm
239	Auxiliary battery low voltage alarm
240	Restart alarm during engine start
241	Malfunctioning engine lamp alarm
242	Engine lamp protection alarm
243	Yellow engine lamp alarm
244	Engine red lamp alarm
245	Rental meter alarm
246	Maintenance counter alarm
247	Alarm sensor channel AN1 not connected
248	Alarm sensor channel AN2 not connected
249	Alarm sensor channel AN3 not connected
250	Alarm sensor channel AN4 not connected
251	Low battery voltage alarm
252	High battery voltage alarm
253	Low battery voltage alarm at start
254	Overspeed alarm
255	Underspeed alarm
256	Unexpected stop alarm
257	STOP failure alarm
258	Moderate high water temperature sensor alarm
259	Severe high water temperature alarm per sensor

Index	Description
260	Moderate low oil pressure alarm by sensor
261	Severe low oil pressure alarm per sensor
262	Low fuel level sensor alarm
263	Low engine temperature alarm
264	Severe alarm maximum generator voltage
265	Moderate alarm maximum generator voltage
266	Severe alarm generator undervoltage
267	Moderate alarm minimum generator voltage
268	Voltage asymmetry alarm
269	Voltage phase sequence alarm
270	Generator drop alarm
271	Severe alarm generator peak current
272	Moderate alarm maximum generator current
273	IDMT alarm
274	Current short circuit alarm
275	Current asymmetry alarm
276	Generator maximum power severe alarm
277	Generator maximum power moderate alarm
278	Minimum power alarm
279	Reverse power alarm
280	Generator maximum frequency severe alarm
281	Generator maximum frequency moderate alarm
282	Generator minimum frequency severe alarm
283	Generator minimum frequency moderate alarm
284	Generator contactor closing alarm (CEM8 controller only)
285	Free
286	Free
287	Free
288	Free
289	Free

Index	Description
290	Free
291	Free
292	Free
293	Free
294	Free
295	Free
296	Free
297	Free
298	Free
299	Free
300	Free
301	Free
302	Free
303	Free
304	Free
305	Free
306	Free
307	Free
308	Free
309	Free
310	Free
311	Programmable alarm 01
312	Programmable alarm 02
313	Programmable alarm 03
314	Programmable alarm 04
315	Programmable alarm 05
316	Programmable alarm 06
317	Programmable alarm 07
318	Programmable alarm 08
319	Programmable alarm 09

Index	Description
320	Programmable alarm 10
321	Programmable alarm 11
322	Programmable alarm 12
323	Programmable alarm 13
324	Programmable alarm 14
325	Programmable alarm 15
326	Programmable alarm 16
327	Programmable alarm 17
328	Programmable alarm 18
329	Programmable alarm 19
330	Programmable alarm 20
331	Programmable alarm 21
332	Programmable alarm 22
333	Programmable alarm 23
334	Programmable alarm 24
335	Programmable alarm 25
336	Programmable alarm 26
337	Programmable alarm 27
338	Programmable alarm 28
339	Programmable alarm 29
340	Programmable alarm 30
341	Programmable alarm 31
342	Programmable alarm 32
343	Programmable alarm 33
344	Programmable alarm 34
345	Programmable alarm 35
346	Programmable alarm 36
347	Programmable alarm 37
348	Programmable alarm 38
349	Programmable alarm 39

Index	Description
350	Programmable alarm 40
351	Programmable alarm 41
352	Programmable alarm 42
353	Programmable alarm 43
354	Programmable alarm 44
355	Programmable alarm 45
356	Programmable alarm 46
357	Programmable alarm 47
358	Programmable alarm 48
359	Programmable alarm 49
360	Programmable alarm 50
361	Programmable alarm 51
362	Programmable alarm 52
363	Programmable alarm 53
364	Programmable alarm 54
365	Programmable alarm 55
366	Programmable alarm 56
367	Programmable alarm 57
368	Programmable alarm 58
369	Programmable alarm 59
370	Programmable alarm 60
371	Programmable alarm 61
372	Programmable alarm 62
373	Programmable alarm 63
374	Programmable alarm 64

Interface led functionalities Table

Index	Description	Colour
0	Not programmed	-
1	Controller voltage alarm	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
2	Alarm identifier controller	
3	Communication alarm CEC8	
4	IOT communication alarm	
5	Alarm loss of GPS signal	
6	Generator position alarm	
7	Generator impact alarm	
8	Automatic mode change alarm	
9	Water temperature alarm	
10	Oil pressure alarm	
11	Emergency stop alarm	
12	Battery charging alternator alarm	
13	Failed start alarm	
14	Low water level alarm	
15	Fuel reserve alarm	
16	Engine communication alarm J1939	
17	Fuel water alarm	
18	Moderate urea level alarm	
19	Severe urea level alarm	
20	Urea pump alarm	
21	Alarm fuel theft internal tank	
22	Fuel theft alarm external tank	
23	Pre-clogged fuel filter alarm	
24	Clogged fuel filter alarm	
25	Auxiliary battery low voltage alarm	
26	Restart alarm during engine start	
27	Engine lamp malfunction alarm	
28	Engine lamp protection alarm	

Index	Description	Colour
29	Yellow engine lamp alarm	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
30	Engine red lamp alarm	
31	Rental meter alarm	
32	Maintenance counter alarm	
33	Alarm sensor channel AN1 not connected	
34	Alarm sensor channel AN2 not connected	
35	Alarm sensor channel AN3 not connected	
36	Alarm sensor channel AN4 not connected	
37	Low battery voltage alarm	
38	High battery voltage alarm	
39	Low battery voltage alarm at start	
40	Overspeed alarm	
41	Underspeed alarm	
42	Unexpected stop alarm	
43	STOP failure alarm	
44	Moderate high water temperature sensor alarm	
45	Severe high water temperature alarm by sensor	
46	Moderate low oil pressure alarm by sensor	
47	Severe low oil pressure alarm by sensor	
48	Low fuel level sensor alarm	
49	Low engine temperature alarm	
50	Severe alarm maximum generator voltage	
51	Moderate alarm maximum generator voltage	
52	Severe alarm generator undervoltage	
53	Moderate alarm minimum generator voltage	
54	Voltage asymmetry alarm	
55	Voltage phase sequence alarm	
56	Generator drop alarm	
57	Severe alarm generator peak current	
58	Moderate alarm maximum generator current	

Index	Description	Colour
59	IDMT alarm	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
60	Current short circuit alarm	
61	Current asymmetry alarm	
62	Generator maximum power severe alarm	
63	Generator maximum power moderate alarm	
64	Minimum power alarm	
65	Reverse power alarm	
66	Generator maximum frequency severe alarm	
67	Generator maximum frequency moderate alarm	
68	Generator minimum frequency severe alarm	
69	Generator minimum frequency moderate alarm	
70	Generator contactor closing alarm (CEM8 controller only)	
71	Free	
72	Free	
73	Free	
74	Free	
75	Free	
76	Free	
77	Free	
78	Free	
79	Free	
80	Free	
81	Free	
82	Free	
83	Free	
84	Free	
85	Free	
86	Free	
87	Free	

Index	Description	Colour
88	Free	
89	Free	
90	Free	
91	Free	
92	Free	
93	Free	
94	Free	
95	Free	
96	Free	
97	Programmable alarm 01	
98	Programmable alarm 02	
99	Programmable alarm 03	
100	Programmable alarm 04	
101	Programmable alarm 05	
102	Programmable alarm 06	
103	Programmable alarm 07	
104	Programmable alarm 08	
105	Programmable alarm 09	
106	Programmable alarm 10	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
107	Programmable alarm 11	
108	Programmable alarm 12	
109	Programmable alarm 13	
110	Programmable alarm 14	
111	Programmable alarm 15	
112	Programmable alarm 16	
113	Programmable alarm 17	
114	Programmable alarm 18	
115	Programmable alarm 19	
116	Programmable alarm 20	
117	Programmable alarm 21	

Index	Description	Colour
118	Programmable alarm 22	
119	Programmable alarm 23	
120	Programmable alarm 24	
121	Programmable alarm 25	
122	Programmable alarm 26	
123	Programmable alarm 27	
124	Programmable alarm 28	
125	Programmable alarm 29	
126	Programmable alarm 30	
127	Programmable alarm 31	
128	Programmable alarm 32	
129	Programmable alarm 33	
130	Programmable alarm 34	
131	Programmable alarm 35	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
132	Programmable alarm 36	
133	Programmable alarm 37	
134	Programmable alarm 38	
135	Programmable alarm 39	
136	Programmable alarm 40	
137	Programmable alarm 41	
138	Programmable alarm 42	
139	Programmable alarm 43	
140	Programmable alarm 44	
141	Programmable alarm 45	
142	Programmable alarm 46	
143	Programmable alarm 47	
144	Programmable alarm 48	
145	Programmable alarm 49	
146	Programmable alarm 50	
147	Programmable alarm 51	

Index	Description	Colour
148	Programmable alarm 52	
149	Programmable alarm 53	
150	Programmable alarm 54	
151	Programmable alarm 55	
152	Programmable alarm 56	
153	Programmable alarm 57	Solid yellow: Warning pending Flashing yellow: Warning active Solid red: Error pending Flashing red: Error active
154	Programmable alarm 58	
155	Programmable alarm 59	
156	Programmable alarm 60	
157	Programmable alarm 61	
158	Programmable alarm 62	
159	Programmable alarm 63	
160	Programmable alarm 64	
161	Input 01 controller CE8	
162	Input 02 controller CE8	
163	Input 03 controller CE8	
164	Input 04 controller CE8	
165	Input 05 controller CE8	
166	Input 06 controller CE8	
167	Input 07 controller CE8	
168	Input 08 controller CE8	
169	Input 09 controller CE8	Solid green: Input active
170	Input 10 controller CE8	
171	Input 11 controller CE8	
172	Input 12 controller CE8	
173	Input AN1 controller CE8	
174	Input AN2 controller CE8	
175	Input AN3 controller CE8	
176	Input AN4 controller CE8	
177	EMS input controller CE8	

Index	Description	Colour
178	MAN input controller CE8	
179	Input 01 external module 01	
180	Input 02 external module 01	
181	Input 03 external module 01	
182	Input 04 external module 01	
183	Input 05 external module 01	
184	Input 06 external module 01	
185	Input 07 external module 01	
186	Input 08 external module 01	
187	Input 01 external module 02	
188	Input 02 external module 02	
189	Input 03 external module 02	
190	Input 04 external module 02	
191	Input 05 external module 02	
192	Input 06 external module 02	
193	Input 07 external module 02	Solid green: Input active
194	Input 08 external module 02	
195	Input 01 external module 03	
196	Input 02 external module 03	
197	Input 03 external module 03	
198	Input 04 external module 03	
199	Input 05 external module 03	
200	Input 06 external module 03	
201	Input 07 external module 03	
202	Input 08 external module 03	
203	Input 01 external module 04	
204	Input 02 external module 04	
205	Input 03 external module 04	
206	Input 04 external module 04	
207	Input 05 external module 04	

Index	Description	Colour
208	Input 06 external module 04	
209	Input 07 external module 04	
210	Input 08 external module 04	
211	Input 01 controller CEC8 01	
212	Input 02 controller CEC8 01	
213	Input 03 controller CEC8 01	
214	Input 04 controller CEC8 01	
215	Input 05 controller CEC8 01	
216	Input 06 controller CEC8 01	
217	Input 07 controller CEC8 01	
218	Input 08 controller CEC8 01	
219	Input 09 controller CEC8 01	
220	Input 10 controller CEC8 01	
221	Input 11 controller CEC8 01	
222	Input 12 controller CEC8 01	
223	Input 01 controller CEC8 02	Solid green: Input active
224	Input 02 controller CEC8 02	
225	Input 03 controller CEC8 02	
226	Input 04 controller CEC8 02	
227	Input 05 controller CEC8 02	
228	Input 06 controller CEC8 02	
229	Input 07 controller CEC8 02	
230	Input 08 controller CEC8 02	
231	Input 09 controller CEC8 02	
232	Input 10 controller CEC8 02	
233	Input 11 controller CEC8 02	
234	Input 12 controller CEC8 02	
235	Input 01 controller CEC8 03	
236	Input 02 controller CEC8 03	
237	Input 03 controller CEC8 03	

Index	Description	Colour
238	Input 04 controller CEC8 03	
239	Input 05 controller CEC8 03	
240	Input 06 controller CEC8 03	
241	Input 07 controller CEC8 03	
242	Input 08 controller CEC8 03	
243	Input 09 controller CEC8 03	
244	Input 10 controller CEC8 03	
245	Input 11 controller CEC8 03	
246	Input 12 controller CEC8 03	
247	Input 01 controller CEC8 04	
248	Input 02 controller CEC8 04	
249	Input 03 controller CEC8 04	
250	Input 04 controller CEC8 04	
251	Input 05 controller CEC8 04	
252	Input 06 controller CEC8 04	
253	Input 07 controller CEC8 04	Solid green: Input active
254	Input 08 controller CEC8 04	
255	Input 09 controller CEC8 04	
256	Input 10 controller CEC8 04	
257	Input 11 controller CEC8 04	
258	Input 12 controller CEC8 04	
259	Input 01 controller CEC8 05	
260	Input 02 controller CEC8 05	
261	Input 03 controller CEC8 05	
262	Input 04 controller CEC8 05	
263	Input 05 controller CEC8 05	
264	Input 06 controller CEC8 05	
265	Input 07 controller CEC8 05	
266	Input 08 controller CEC8 05	
267	Input 09 controller CEC8 05	

Index	Description	Colour
268	Input 10 controller CEC8 05	
269	Input 11 controller CEC8 05	
270	Input 12 controller CEC8 05	
271	Input 01 controller CEC8 06	
272	Input 02 controller CEC8 06	
273	Input 03 controller CEC8 06	
274	Input 04 controller CEC8 06	
275	Input 05 controller CEC8 06	
276	Input 06 controller CEC8 06	
277	Input 07 controller CEC8 06	
278	Input 08 controller CEC8 06	
279	Input 09 controller CEC8 06	
280	Input 10 controller CEC8 06	
281	Input 11 controller CEC8 06	
282	Input 12 controller CEC8 06	
283	Input 01 controller CEC8 07	Solid green: Input active
284	Input 02 controller CEC8 07	
285	Input 03 controller CEC8 07	
286	Input 04 controller CEC8 07	
287	Input 05 controller CEC8 07	
288	Input 06 controller CEC8 07	
289	Input 07 controller CEC8 07	
290	Input 08 controller CEC8 07	
291	Input 09 controller CEC8 07	
292	Input 10 controller CEC8 07	
293	Input 11 controller CEC8 07	
294	Input 12 controller CEC8 07	
295	Input 01 controller CEC8 08	
296	Input 02 controller CEC8 08	
297	Input 03 controller CEC8 08	

Index	Description	Colour
298	Input 04 controller CEC8 08	
299	Input 05 controller CEC8 08	
300	Input 06 controller CEC8 08	
301	Input 07 controller CEC8 08	
302	Input 08 controller CEC8 08	
303	Input 09 controller CEC8 08	
304	Input 10 controller CEC8 08	
305	Input 11 controller CEC8 08	
306	Input 12 controller CEC8 08	
307	Generator status 01	
308	Generator status 02	
309	Generator status 03	
310	Generator status 04	
311	Generator status 05	
312	Generator status 06	
313	Generator status 07	Solid green: Input active
314	Generator status 08	
315	Input 01 PLC	
316	Input 02 PLC	
317	Input 03 PLC	
318	Input 04 PLC	
319	Input 05 PLC	
320	Input 06 PLC	
321	Input 07 PLC	
322	Input 08 PLC	
323	Input 09 PLC	
324	Input 10 PLC	
325	Input 11 PLC	
326	Input 12 PLC	
327	Input 13 PLC	

Index	Description	Colour
328	Input 14 PLC	
329	Input 15 PLC	Solid green: Input active
330	Input 16 PLC	
331	Output P1 controller CE8	
332	Output P2 controller CE8	
333	Output P3 controller CE8	
334	Output D+ controller CE8	
335	Output 01 controller CE8	
336	Output 02 controller CE8	
337	Output 03 controller CE8	
338	Output 04 controller CE8	
339	Output 05 controller CE8	
340	Output 06 controller CE8	
341	Output 07 controller CE8	
342	Output 08 controller CE8	
343	Output C1 controller CE8	
344	Output C2 controller CE8	Solid green: Output active
345	Output C3 controller CE8	
346	Output C4 controller CE8	
347	Output 01 external output device module 01	
348	Output 02 external output device module 01	
349	Output 03 external output device module 01	
350	Output 04 external output device module 01	
351	Output 05 external output device module 01	
352	Output 06 external output device module 01	
353	Output 07 external output device module 01	
354	Output 08 external output device module 01	
355	Output 09 external output device module 01	
356	Output 10 external output device module 01	
357	Output 11 external output device module 01	

Index	Description	Colour
358	Output 12 external output device module 01	
359	Output 01 external output device module 02	
360	Output 02 external output device module 02	
361	Output 03 external output device module 02	
362	Output 04 external output device module 02	
363	Output 05 external output device module 02	
364	Output 06 external output device module 02	
365	Output 07 external output device module 02	
366	Output 08 external output device module 02	
367	Output 09 external output device module 02	
368	Output 10 external output device module 02	
369	Output 11 external output device module 02	
370	Output 12 external output device module 02	
371	Output 01 external output device module 03	
372	Output 02 external output device module 03	
373	Output 03 external output device module 03	Solid green: Output active
374	Output 04 external output device module 03	
375	Output 05 external output device module 03	
376	Output 06 external output device module 03	
377	Output 07 external output device module 03	
378	Output 08 external output device module 03	
379	Output 09 external output device module 03	
380	Output 10 external output device module 03	
381	Output 11 external output device module 03	
382	Output 12 external output device module 03	
383	Output 01 external output device module 04	
384	Output 02 external output device module 04	
385	Output 03 external output device module 04	
386	Output 04 external output device module 04	
387	Output 05 external output device module 04	

Index	Description	Colour
388	Output 06 external output device module 04	Solid green: Output active
389	Output 07 external output device module 04	
390	Output 08 external output device module 04	
391	Output 09 external output device module 04	
392	Output 10 external output device module 04	
393	Output 11 external output device module 04	
394	Output 12 external output device module 04	
395	CAN bus communication	Flashing green: Communication active
396	Engine communication (ECU)	Solid green: Communication active
397	Communication controller CEC8 01	Flashing green: Communication active
398	Communication controller CEC8 02	
399	Communication controller CEC8 03	
400	Communication controller CEC8 04	
401	Communication controller CEC8 05	
402	Communication controller CEC8 06	
403	Communication controller CEC8 07	
404	Controller communication CEC8 08	
405	STOP engine status	Solid green: Engine status active
406	Engine preheating state	
407	Engine status inhibited	
408	Engine starting state	
409	Engine running status	
410	Stable engine condition	
411	Engine cooling state	
412	Engine STOP status	Flashing green: Engine status active
413	After-run engine status	
414	Engine status alternator battery charge	Solid green: Active status
415	Engine under forced regeneration	Flashing green: Active status
416	Engine in safe condition	Solid green: Active status

Index	Description	Colour
417	Engine in controller inhibited	Solid yellow: Active status
418	Engine on automatic regeneration	Flashing green: Active status
419	Generator with active ignition output	
420	Generator with active smoke output	Solid green: Active status
421	Transfer pump	Solid red: Level lower than programmed threshold Flashing red: Pump active with level lower than programmed threshold Solid green: Level higher than threshold Solid yellow: Level within programmed threshold Flashing yellow: Pump active with level within programmed threshold
422	Urea pump	
423	Oil pump	Solid green: Pump active
424	Heating resistance	Solid red: Level lower than programmed threshold Flashing red: Pump active with level lower than programmed threshold Solid green: Level higher than threshold Solid yellow: Level within programmed threshold Flashing yellow: Pump active with level within programmed threshold
425	Dummy load	Solid green: Active status
426	Load demand	
427	Fuel reserve	
428	Forced march	
429	Tariff signal EJP1	
430	Charging signal EJP2	
431	Communication with IOT device	
432	Connected IoT device	
433	IOT device GPS presence	
434	Programmed anti-theft IOT device	Solid green: Anti-theft programmed and inside perimeter Flashing red: Anti-theft programmed and out of perimeter

Index	Description	Colour
435	Modbus TCP communication	
436	Modbus RTU communication	
437	SNMP communication	
438	Test mode	
439	Locked mode	
440	Hourly START mode	
441	Time-locked mode	
442	Time mode inhibited	
443	Parameter set 1	Solid green: Active status
444	Parameter set 2	
445	Disabling the generator contactor	
446	Disabling the grid contactor	
447	Red lamp (ECU)	
448	Yellow lamp (ECU)	
449	Malfunction lamp (ECU)	
450	Protective lamp (ECU)	
451	Emergency STOP	

Widget functionalities Table

Index	Description
0	Not programmed
1	Generator: Voltage phase/phase
2	Generator: Voltage phase/neutral
3	Generator: Energy
4	Grid: Voltage phase/phase
5	Grid: Phase/neutral voltage
6	Grid: Energy
7	Current
8	Power
9	Power factor

Index	Description
10	Charge
11	Engine: Speed
12	Engine: Sensors: Water temperature/Oil pressure/Oil temperature
13	Engine: Fuel level
14	Engine: DEF level
15	Engine: Regeneration
16	Engine: Electricity: Voltages battery/Alternator/Aux battery
17	Counter: Hours
18	Counter: STARTS
19	Counter: Maintenance 01
20	Counter: Maintenance 02
21	Counter: Maintenance 03
22	Counter: Maintenance 04
23	PGN 01
24	PGN 02
25	PGN 03
26	PGN 04
27	PGN 05
28	PGN 06
29	PGN 07
30	PGN 08
31	PGN 09
32	PGN 10
33	PGN 11
34	PGN 12
35	PGN 13
36	PGN 14
37	PGN 15
38	PGN 16
39	Alarms/Warnings
40	Status Group

13. ANNEX II: MODBUS REGISTER MAPPING

Coil status Table

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
0	Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset generator alarms
1	START	Returns 1 if the generator is in operation	00h	-
			FFh	Commands a generator START
2	Stop	Returns 1 if the generator is stopped	00h	-
				Command a generator STOP
3	AUTO mode	Returns 1 if the controller is in automatic mode	00h	-
			FFh	Commands a change to AUTO mode
4	MAN mode	Returns 1 if the generator is in manual mode	00h	-
			FFh	Commands a change to MAN mode
5	Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Command a change in test mode
6	Locking Mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Commands a change to lock mode
7	Transfer pump	Returns 1 if the transfer pump is active	00h	-
			FFh	Command activation of transfer pump
8	DEF pump	Returns 1 if the urea pump is active	00h	-
				Commands the activation of the urea pump

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
9	Generator contactor	Returns 1 if the generator contactor is closed	00h	-
			FFh	On-off status change of generator contactor
10	Grid contactor	Returns 1 if the grid contactor is closed	00h	-
			FFh	Change of state (on-off) of the grid contactor
11	Controller Ext. Room	Returns 1 if external enablement is active	00h	-
			FFh	Enables External Controller
20	Accountant Maintenance 01	Returns 1 if maintenance counter active	00h	Deactivate maintenance counter
			FFh	Refresh counter maintenance
21	Accountant Maintenance 02	Returns 1 if maintenance counter active	00h	Deactivate maintenance counter
			FFh	Refresh counter maintenance
22	Accountant Maintenance 03	Returns 1 if maintenance counter active	00h	Deactivate maintenance counter
			FFh	Refresh counter maintenance
23	Accountant Maintenance 04	Returns 1 if maintenance counter active	00h	Deactivate maintenance counter
			FFh	Refresh counter maintenance
24	Rental meter	Returns 1 if rental counter active	00h	Deactivate rental meter
			FFh	Refresca rental counter
30	J1939: Red lamp	Returns 1 if lamp is active	-	-
			-	-
31	J1939: Yellow lamp	Returns 1 if lamp is active	-	-
			-	-
32	J1939: Lamp malfunction	Returns 1 if lamp is active	-	-
			-	-

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
33	J1939: Protective lamp	Returns 1 if lamp is active	-	-
				-
34	J1939: Forced regeneration	Returns 1 if regeneration command active	00h	Deactivates regeneration action
			FFh	Active regenerative action
35	J1939: Safety conditions	Returns 1 if regeneration command active	00h	Deactivates regeneration action
			FFh	Active regenerative action
36	J1939: Inhibited regeneration	Returns 1 if regeneration command active	00h	Deactivates regeneration action
			FFh	Active regenerative action
40	Dark mode	Returns 1 if dark mode is active	00h	Deactivate dark mode
			FFh	Activate dark mode
41	Locked screen mode	Returns 1 if locked mode active	00h	Deactivate the screen lock
			FFh	Activate the screen lock
42	Locked configuration mode	Returns 1 if the configuration is locked	00h	Deactivate the configuration lock
			FFh	Activates the configuration lock
50	IOT: Operator connection	Returns 1 if connection to operator active	00h	-
			FFh	Sending SMS 01
51	IOT: HG Web Connection	Returns 1 if connection to HG Web is active.	00h	-
			FFh	Sending SMS 02
52	IOT: Anti-Theft Programming	Returns 1 if anti-theft programmed	00h	-
			FFh	Sending SMS 03
53	IOT: Anti-Theft Detected	Returns 1 if anti-theft detected	00h	-
				Sending SMS 04
54	IOT	-	00h	-
				Sending SMS 05
55	IOT	-	00h	-
			FFh	Sending SMS 06

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
56	IOT	-	00h	-
			FFh	Sending SMS 07
57	IOT	-	00h	-
			FFh	Sending SMS 08
58	IOT	-	00h	-
			FFh	Sending SMS 09
59	IOT	-	00h	-
			FFh	Sending SMS 10
60	IOT	-	00h	-
			FFh	Sending SMS 11
61	IOT	-	00h	-
			FFh	Sending SMS 12
62	IOT	-	00h	-
			FFh	Sending SMS 13
63	IOT	-	00h	-
			FFh	Sending SMS 14
64	IOT	-	00h	-
			FFh	Sending SMS 15
65	IOT	-	00h	-
			FFh	Sending EMAIL 01
66	IOT	-	00h	-
			FFh	Sending EMAIL 02
67	IOT	-	00h	-
			FFh	Sending EMAIL 03
68	IOT	-	00h	-
			FFh	Sending EMAIL 04
69	IOT	-	00h	-
			FFh	Sending EMAIL 05
70	IOT	-	00h	-
			FFh	Sending EMAIL 06
71	IOT	-	00h	-
			FFh	Sending EMAIL 07
72	IOT	-	00h	-
			FFh	Sending EMAIL 08
73	IOT	-	00h	-
			FFh	Sending EMAIL 09
74	IOT	-	00h	-
			FFh	Sending EMAIL 10
75	IOT	-	00h	-
			FFh	Sending EMAIL 11
76	IOT	-	00h	-
			FFh	Sending EMAIL 12
77	IOT	-	00h	-
			FFh	Sending EMAIL 13
78	IOT	-	00h	-
			FFh	Sending EMAIL 14
79	IOT	-	00h	-
			FFh	Sending EMAIL 15
100	Default configuration valid	Returns 1 if there is configuration in memory	00h	-
			FFh	Reset default configuration
101	Valid factory settings	Returns 1 if there is configuration in memory	00h	-
			FFh	Reset factory settings
200	CEC 01: Reset	Returns whether there are any alarms in the generator	00h	-
				Reset active alarms of the generator

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
201	CEC 01: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
202	CEC 01: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
203	CEC 01: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
204	CEC 01: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
205	CEC 01: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
206	CEC 01: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
300	CEC 02: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
301	CEC 02: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
302	CEC 02: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
303	CEC 02: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
304	CEC 02: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
				Command to switch to lock mode
305	CEC 02: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
306	CEC 02: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
400	CEC 03: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
401	CEC 03: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
402	CEC 03: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
403	CEC 03: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
404	CEC 03: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
405	CEC 03: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
406	CEC 03: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
500	CEC 04: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
501	CEC 04: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
				Commands change to AUTO mode
502	CEC 04: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
503	CEC 04: Test mode	Returns 1 if the generator is in test mode	00h	-
				Commands change to test mode

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
504	CEC 04: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
505	CEC 04: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
506	CEC 04: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
600	CEC 05: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
601	CEC 05: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
602	CEC 05: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
603	CEC 05: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
604	CEC 05: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
605	CEC 05: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
606	CEC 05: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
700	CEC 06: Reset	Returns whether there are any alarms in the generator	00h	-
				Reset active alarms of the generator

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
701	CEC 06: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
702	CEC 06: MAN mode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
703	CEC 06: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
704	CEC 06: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
705	CEC 06: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
706	CEC 06: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
800	CEC 07: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
801	CEC 07: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
802	CEC 07: MANmode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
803	CEC 07: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
804	CEC 07: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
				Command to switch to lock mode
805	CEC 07: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor

Address	Name	Description		
		READ COIL Status (01h)	FORCE SINGLE COIL (05h)	
			Value	Action
806	CEC 07: Grid contactor	Returns 1 if the grid contactor is active	00h	-
			FFh	Commands change of state (on/off) on grid contactor
900	CEC 08: Reset	Returns whether there are any alarms in the generator	00h	-
			FFh	Reset active alarms of the generator
901	CEC 08: AUTO mode	Returns 1 if the generator is in AUTO mode	00h	-
			FFh	Commands change to AUTO mode
902	CEC 08: MANmode	Returns 1 if the generator is in MAN mode	00h	-
			FFh	Command to switch to MAN mode
903	CEC 08: Test mode	Returns 1 if the generator is in test mode	00h	-
			FFh	Commands change to test mode
904	CEC 08: Lock mode	Returns 1 if the generator is in blocking mode	00h	-
			FFh	Command to switch to lock mode
905	CEC 08: Generator contactor	Returns 1 if the generator contactor is active	00h	-
			FFh	Commands status change (on/off) on generator contactor
906	CEC 08: Grid contactor	Returns 1 if the grid contactor is active	00h	-
				Commands change of state (on/off) on grid contactor

Input status Table

Address	Controller error
0	Voltage of controller
1	Identifier
2	Communication CEC8
3	Communication IOT module
4	Loss of GPS signal
5	Generator position
6	Generator impact
7	AUTO mode
8	High water temperature
9	Low oil pressure
10	Emergency STOP
11	Battery charging alternator failure (with engine running)
12	Start failure
13	Low water level
14	Fuel reserve
15	Engine communication (J1939)
16	Water in fuel
17	Moderate urea level
18	Severe urea level
19	Urea pump
20	Fuel theft internal tank
21	Fuel theft external tank
22	Pre-clogged fuel filter
23	Clogged fuel filter
24	Low auxiliary battery Voltage
25	Restarting during engine start
26	Malfunction lamp (ECU)
27	Protective lamp (ECU)
28	Yellow lamp (ECU)

Address	Controller error
29	Red lamp (ECU)
30	Rental meter
31	Maintenance counter
32	Sensor channel AN1 not connected
33	Sensor channel AN2 not connected
34	Sensor channel AN3 not connected
35	Sensor channel AN4 not connected
36	Low battery voltage
37	High battery voltage
38	Low voltage of the start battery
39	Overspeed
40	Underspeed
41	Unexpected STOP
42	STOP failure
43	High water temperature per sensor (moderate)
44	High water temperature per sensor (severe)
45	Low oil pressure per sensor (moderate)
46	Low oil pressure per sensor (severe)
47	Low fuel level per sensor
48	Low engine temperature
49	Maximum generator voltage (moderate)
50	Maximum voltage of generator (severe)
51	Min. generator voltage (moderate)
52	Minimum voltage of generator (severe)
53	Generator voltage asymmetry
54	Incorrect sequence of generator phases
55	Signal drop generator
56	Maximum current (severe)
57	Maximum current (moderate)
58	IDMT

Address	Controller error
59	Short circuit
60	Current asymmetry
61	Maximum generator power (severe)
62	Maximum generator power (moderate)
63	Minimal generator power
64	Reverse power
65	Maximum frequency of generator (severe)
66	Maximum frequency of generator (moderate)
67	Minimal frequency of generator (severe)
68	Minimal generator frequency (moderate)
69	Generator contactor
96	Programmable alarm 01
97	Programmable alarm 02
98	Programmable alarm 03
99	Programmable alarm 04
100	Programmable alarm 05
101	Programmable alarm 06
102	Programmable alarm 07
103	Programmable alarm 08
104	Programmable alarm 09
105	Programmable alarm 10
106	Programmable alarm 11
107	Programmable alarm 12
108	Programmable alarm 13
109	Programmable alarm 14
110	Programmable alarm 15
111	Programmable alarm 16
112	Programmable alarm 17
113	Programmable alarm 18
114	Programmable alarm 19

Address	Controller error
115	Programmable alarm 20
116	Programmable alarm 21
117	Programmable alarm 22
118	Programmable alarm 23
119	Programmable alarm 24
120	Programmable alarm 25
121	Programmable alarm 26
122	Programmable alarm 27
123	Programmable alarm 28
124	Programmable alarm 29
125	Programmable alarm 30
126	Programmable alarm 31
127	Programmable alarm 32
128	Programmable alarm 33
129	Programmable alarm 34
130	Programmable alarm 35
131	Programmable alarm 36
132	Programmable alarm 37
133	Programmable alarm 38
134	Programmable alarm 39
135	Programmable alarm 40
136	Programmable alarm 41
137	Programmable alarm 42
138	Programmable alarm 43
139	Programmable alarm 44
140	Programmable alarm 45
141	Programmable alarm 46
142	Programmable alarm 47
143	Programmable alarm 48
144	Programmable alarm 49

Address	Controller error
145	Programmable alarm 50
146	Programmable alarm 51
147	Programmable alarm 52
148	Programmable alarm 53
149	Programmable alarm 54
150	Programmable alarm 55
151	Programmable alarm 56
152	Programmable alarm 57
153	Programmable alarm 58
154	Programmable alarm 59
155	Programmable alarm 60
156	Programmable alarm 61
157	Programmable alarm 62
158	Programmable alarm 63
159	Programmable alarm 64
200	Controller voltage switching 01
201	Switching identifier 01
202	Communication CEC8 switching 01
203	Communication IOT module switching 01
204	Loss of GPS signal switching 01
205	Switching generator position 01
206	Switching generator impact 01
207	Automatic switching mode 01
208	Voltage asymmetry of switching generator 01
209	Maximum voltage of generator (severe) switching 01
210	Maximum generator voltage (moderate) switching 01
211	Minimum voltage of generator (severe) switching 01
212	Minimum voltage of generator (moderate) switching 01
213	Maximum generator frequency (severe) switching 01
214	Maximum generator frequency (moderate) switching 01

Address	Controller error
215	Minimum generator frequency (severe) switching 01
216	Minimum generator frequency (moderate) switch 01
217	Incorrect phase sequence of switching generator 01
218	Switching generator signal drop 01
219	Emergency STOP 01 switching
220	STOP fault switching 01
231	Programmable alarm 01 switching 01
232	Programmable alarm 02 switching 01
233	Programmable alarm 03 switching 01
234	Programmable alarm 04 switching 01
235	Programmable alarm 05 switching 01
236	Programmable alarm 06 switching 01
237	Programmable alarm 07 switching 01
238	Programmable alarm 08 switching 01
239	Maximum grid voltage switching 01
240	Minimum grid voltage switching 01
241	Maximum grid frequency switching 01
242	Minimum grid frequency switching 01
243	Incorrect grid phase sequence switching 01
244	Signal drop grid switching 01
300	Voltage of controller switching 02
301	Switching identifier 02
302	Communication CEC8 switching 02
303	Communication IOT module switching 02
304	Loss of GPS signal switching 02
305	Switching generator position 02
306	Impact of switching generator 02
307	Automatic switching mode 02
308	Voltage asymmetry of switching generator 02
309	Maximum voltage of generator (severe) switching 02

Address	Controller error
310	Maximum generator voltage (moderate) switching 02
311	Minimum voltage of generator (severe) switching 02
312	Minimum voltage of generator (moderate) switching 02
313	Maximum generator frequency (severe) switching 02
314	Maximum generator frequency (moderate) switching 02
315	Minimum generator frequency (severe) switching 02
316	Minimum generator frequency (moderate) switching 02
317	Incorrect phase sequence of switching generator 02
318	Switching generator signal drop 02
319	Emergency STOP switch 02
320	STOP failure switch 02
331	Programmable alarm 01 switching 02
332	Programmable alarm 02 switching 02
333	Programmable alarm 03 switching 02
334	Programmable alarm 04 switching 02
335	Programmable alarm 05 switching 02
336	Programmable alarm 06 switching 02
337	Programmable alarm 07 switching 02
338	Programmable alarm 08 switching 02
339	Maximum grid voltage switching 02
340	Minimum grid voltage switching 02
341	Maximum grid frequency switching 02
342	Minimum grid frequency switching 02
343	Incorrect grid phase sequence switching 02
344	Signal drop grid switching 02
400	Controller voltage switching 03
401	Switching identifier 03
402	Communication CEC8 switching 03
403	Communication IOT module switching 03
404	Loss of GPS signal switching 03

Address	Controller error
405	Switching generator position 03
406	Impact of switching generator 03
407	Automatic switching mode 03
408	Voltage asymmetry of switching generator 03
409	Maximum voltage of generator (severe) switching 03
410	Max. generator voltage (moderate) switching 03
411	Minimum voltage of generator (severe) switching 03
412	Minimum voltage of generator (moderate) switching 03
413	Maximum generator frequency (severe) switching 03
414	Maximum generator frequency (moderate) switching 03
415	Minimum frequency of generator (severe) switching 03
416	Minimum generator frequency (moderate) switching 03
417	Incorrect phase sequence of switching generator 03
418	Switching generator signal dropout 03
419	Emergency STOP 03 switching
420	STOP failure switch 03
431	Programmable alarm 01 switching 03
432	Programmable alarm 02 switching 03
433	Programmable alarm 03 switching 03
434	Programmable alarm 04 switching 03
435	Programmable alarm 05 switching 03
436	Programmable alarm 06 switching 03
437	Programmable alarm 07 switching 03
438	Programmable alarm 08 switching 03
439	Maximum grid voltage switching 03
440	Minimum grid voltage switching 03
441	Maximum grid frequency switching 03
442	Minimum grid frequency switching 03
443	Incorrect sequence of grid phases switching 03
444	Signal drop grid switching 03

Address	Controller error
500	Controller voltage switching 04
501	Switching identifier 04
502	Communication CEC8 switching 04
503	Communication IOT module switching 04
504	Loss of GPS signal switching 04
505	Switching generator position 04
506	Switching generator impact 04
507	Automatic switching mode 04
508	Voltage asymmetry of switching generator 04
509	Maximum voltage of generator (severe) switching 04
510	Maximum voltage of generator (moderate) switching 04
511	Minimum generator voltage (severe) switching 04
512	Minimum generator voltage (moderate) switching 04
513	Maximum generator frequency (severe) switching 04
514	Maximum generator frequency (moderate) switching 04
515	Minimum generator frequency (severe) switching 04
516	Minimum generator frequency (moderate) switching 04
517	Incorrect phase sequence of switching generator 04
518	Switching generator signal drop 04
519	Emergency STOP switch 04
520	STOP fault switching 04
531	Programmable alarm 01 switching 04
532	Programmable alarm 02 switching 04
533	Programmable alarm 03 switching 04
534	Programmable alarm 04 switching 04
535	Programmable alarm 05 switching 04
536	Programmable alarm 06 switching 04
537	Programmable alarm 07 switching 04
538	Programmable alarm 08 switching 04
539	Maximum grid voltage switching 04

Address	Controller error
540	Minimum grid voltage switching 04
541	Maximum grid frequency switching 04
542	Minimum grid frequency switching 04
543	Incorrect grid phase sequence switching 04
544	Signal drop grid switching 04
600	Voltage of controller switching 05
601	Switching identifier 05
602	Communication CEC8 switching 05
603	Communication IOT module switching 05
604	Loss of GPS signal switching 05
605	Switching generator position 05
606	Switching generator impact 05
607	Automatic switching mode 05
608	Voltage asymmetry of switching generator 05
609	Max. generator voltage (severe) switching 05
610	Maximum voltage of generator (moderate) switching 05
611	Minimum voltage of generator (severe) switching 05
612	Minimum voltage of generator (moderate) switching 05
613	Maximum frequency of generator (severe) switching 05
614	Maximum frequency of generator (moderate) switching 05
615	Minimum generator frequency (severe) switching 05
616	Minimum generator frequency (moderate) switching 05
617	Incorrect phase sequence of switching generator 05
618	Switching generator signal drop 05
619	Emergency STOP switch 05
620	STOP failure switching 05
631	Programmable alarm 01 switching 05
632	Programmable alarm 02 switching 05
633	Programmable alarm 03 switching 05
634	Programmable alarm 04 switching 05

Address	Controller error
635	Programmable alarm 05 switching 05
636	Programmable alarm 06 switching 05
637	Programmable alarm 07 switching 05
638	Programmable alarm 08 switching 05
639	Maximum grid voltage switching 05
640	Minimum grid voltage switching 05
641	Maximum grid frequency switching 05
642	Minimum grid frequency switching 05
643	Incorrect grid phase sequence switching 05
644	Signal drop grid switching 05
700	Voltage of controller switching 06
701	Switching identifier 06
702	Communication CEC8 switching 06
703	Communication IOT module switching 06
704	Loss of GPS signal switching 06
705	Switching generator position 06
706	Switching generator impact 06
707	Automatic switching mode 06
708	Voltage asymmetry of switching generator 06
709	Maximum voltage of generator (severe) switching 06
710	Max. generator voltage (moderate) switching 06
711	Minimum voltage of generator (severe) switching 06
712	Minimum generator voltage (moderate) switching 06
713	Maximum generator frequency (severe) switching 06
714	Maximum generator frequency (moderate) switching 06
715	Minimum generator frequency (severe) switching 06
716	Minimum generator frequency (moderate) switching 06
717	Incorrect phase sequence of switching generator 06
718	Switching generator signal dropout 06
719	Emergency STOP 06 switching

Address	Controller error
720	STOP failure switching 06
731	Programmable alarm 01 switching 06
732	Programmable alarm 02 switching 06
733	Programmable alarm 03 switching 06
734	Programmable alarm 04 switching 06
735	Programmable alarm 05 switching 06
736	Programmable alarm 06 switching 06
737	Programmable alarm 07 switching 06
738	Programmable alarm 08 switching 06
739	Maximum grid switching voltage 06
740	Minimum grid voltage switching 06
741	Maximum grid frequency switching 06
742	Minimum grid frequency switching 06
743	Incorrect grid phase sequence switching 06
744	Signal drop grid switching 06
800	Voltage of controller switching 07
801	Switching identifier 07
802	Communication CEC8 switching 07
803	Communication IOT module switching 07
804	Loss of GPS signal switching 07
805	Switching generator position 07
806	Impact of switching generator 07
807	Automatic switching mode 07
808	Voltage asymmetry of switching generator 07
809	Max. generator voltage (severe) switching 07
810	Max. generator voltage (moderate) switching 07
811	Minimum generator voltage (severe) switching 07
812	Minimum generator voltage (moderate) switching 07
813	Maximum generator frequency (severe) switching 07
814	Max. generator frequency (moderate) switching 07

Address	Controller error
815	Minimum generator frequency (severe) switching 07
816	Minimum generator frequency (moderate) switching 07
817	Incorrect phase sequence of switching generator 07
818	Switching generator signal drop 07
819	Emergency STOP 07 switching
820	STOP failure switch 07
831	Programmable alarm 01 switching 07
832	Programmable alarm 02 switching 07
833	Programmable alarm 03 switching 07
834	Programmable alarm 04 switching 07
835	Programmable alarm 05 switching 07
836	Programmable alarm 06 switching 07
837	Programmable alarm 07 switching 07
838	Programmable alarm 08 switching 07
839	Maximum grid voltage switching 07
840	Minimum grid voltage switching 07
841	Maximum grid frequency switching 07
842	Minimum frequency of grid switching 07
843	Incorrect grid phase sequence switching 07
844	Signal drop grid switching 07
900	Controller voltage switching 08
901	Switching identifier 08
902	Communication CEC8 switching 08
903	Communication IOT module switching 08
904	Loss of GPS signal switching 08
905	Switching generator position 08
906	Switching generator impact 08
907	Automatic switching mode 08
908	Voltage asymmetry of generator switching 08
909	Maximum voltage of generator (severe) switching 08

Address	Controller error
910	Max. generator voltage (moderate) switching 08
911	Minimum voltage of generator (severe) switching 08
912	Min. generator voltage (moderate) switching 08
913	Maximum frequency of generator (severe) switching 08
914	Maximum generator frequency (moderate) switching 08
915	Minimum generator frequency (severe) switching 08
916	Minimum generator frequency (moderate) switching 08
917	Incorrect phase sequence of switching generator 08
918	Switching generator signal drop 08
919	Emergency STOP switch 08
920	STOP failure switch 08
931	Programmable alarm 01 switching 08
932	Programmable alarm 02 switching 08
933	Programmable alarm 03 switching 08
934	Programmable alarm 04 switching 08
935	Programmable alarm 05 switching 08
936	Programmable alarm 06 switching 08
937	Programmable alarm 07 switching 08
938	Programmable alarm 08 switching 08
939	Maximum grid switching Voltage 08
940	Minimum grid voltage switching 08
941	Maximum grid frequency switching 08
942	Minimum grid frequency switching 08
943	Incorrect grid phase sequence switching 08
944	Signal drop grid switching 08

Holding register Table

Address	Description	Range
0	Time between starts	3” ...15”
1	Start delay time grid downtime	0” ...10000”
2	Preheating time	0” ...180”
3	Start time	1” ...600”
4	Load time	1” ...600”
5	Stabilisation time	2” ...15”
6	Alternator activation time	1” ...10”
7	Stop delay time for external start	
8	Cooling time	2” ...1800”
9	Start delay time EJP1	1” ...1800”
10	Engine stop time	
11	Stop delay time return to grid	
12	Alarm activation time	0: Indefinite 1” ...1800”
13	Filtering time input 01	0.0” ...5.0”
14	Filtering time input 02	0.0” ...5.0”
15	Filtering time input 03	0.0” ...5.0”
16	Filtering time input 04	0.0” ...5.0”
17	Filtering time input 05	0.0” ...5.0”
18	Filtering time input 06	0.0” ...5.0”
19	Filtering time input 07	0.0” ...5.0”
20	Filtering time input 08	0.0” ...5.0”
21	Filtering time input 09	0.0” ...5.0”
22	Filtering time input 10	0.0” ...5.0”
23	Filtering time input 11	0.0” ...5.0”
24	Filtering time input 12	0.0” ...5.0”
25	Filtering time input AN1	0.0” ...5.0”
26	Filtering time input AN2	0.0” ...5.0”
27	Filtering time input AN3	0.0” ...5.0”
28	Filtering time input AN4	0.0” ...5.0”
29	PEM input filtering time	0.0” ...5.0”
30	MAN input filtering time	0.0” ...5.0”

Address	Description	Range
31	Dummy load filter time	1” ...3000”
32	Start filter time demand load	1” ...3000”
33	Pulse time CG	-
34	Delay time gas ignition start	0” ...100”
35	Time delay gas EV	0” ...10”
36	Delay time gas ignition stop	0” ...10”
37	Smoke control time	0” ...30”
38	Time IDMT	0” ...3600”
39	Delay time CG	1” ...250”
40	Delay time CR	1” ...250”
41	Stop failure detection time	1” ...3600”
100	Electrical configuration of alternator generator	0: Three-phase without neutral 1: Three-phase 2: Two-phase 3: Single-phase 4: Delta 5: Delta without neutral 6: Two-phase selector
101	Electrical configuration grid	
102	Power rating generator	-
103	Number of starts	1 - 10
104	Voltage of the start in generator	30 - 100
105	Voltage of alternator start	6 - 23
106	Start speed	300 - 1000
107	Engine flywheel teeth	0 - 300
108	Voltage primary transformer configuration	0 - 65535
109	Voltage secondary transformer configuration	0 - 65535
110	Voltage offset voltage transformer configuration	0 - 65535
111	Primary current transformer configuration	0 - 65535
112	Secondary current transformer configuration	0 - 65535
113	Phase shift current transformer configuration	0 - 65535
114	Preheating cut-off temperature	0: Cut off disabled 1 – 125 ºC
115	Minimum fuel level	5 % – 90 %
116	Maximum fuel level	10 % – 100 %
117	Minimum heating temperature	5 – 30 ºC

Address	Description	Range
118	Maximum heating temperature	10 – 40 ºC
119	Dummy load activation power	0: Disabled 1 - 10000
120	Power deactivation dummy load	0: Disabled 1 - 10000
121	Power activation load demand	0: Disabled 1 - 10000
122	Power deactivation load demand	0: Disabled 1 - 10000
123	Maximum DEF level	0 – 100 %
124	Minimum level DEF	0 – 100 %
125	Threshold filled DEF	0 – 100 %
126	Maximum moderate generator voltage	-
127	Max. severe generator voltage	-
128	Minimum voltage of the moderate generator	-
129	Minimum voltage of severe generator	-
130	Maximum voltage asymmetry of the generator	-
131	Maximum frequency of moderate generator	-
132	Maximum frequency of severe generator	-
133	Moderate generator minimum frequency	-
134	Minimal severe generator frequency	-
135	Maximum moderate generator current	-
136	Maximum severe generator current	-
137	Maximum short circuit current	-
138	Maximum current asymmetry	0 – 100 %
139	Maximum reverse power	0 – 20 %
140	Intensity TMDI curve	101 – 200 %
141	Low power threshold	0 - 100
142	Percentage of maximum power moderate	-
143	Percentage of maximum power severe	-
144	Maximum speed	-
145	Minimum speed	-
146	Minimum battery voltage	8 - 23
147	Low fuel level	0 - 30
148	Moderate low oil pressure	0.5 - 3

Address	Description	Range
149	Severe low oil pressure	0.5 - 3
150	High temperature moderate	80 - 105
151	Severe high temperature	80 - 105
152	Engine temperature per sensor	OFF (0 °C) - 40 °C
153	Minimum voltage auxiliary battery	5 - 40
154	Moderate DEF level	0 - 100
155	Severe DEF level	0 - 100
156	Maximum battery voltage	8 - 40
157	Minimum battery voltage at START	8 - 23
158	Maximum grid voltage	-
159	Minimum voltage of the grid	-
160	Maximum grid frequency	-
161	Minimum grid frequency	-
200	Generator identifier	0 - 14
201	Digital input polarity 01	0: OFF 1: Normally open 2: Normally closed
202	Digital input polarity 02	
203	Digital input polarity 03	
204	Digital input polarity 04	
205	Digital input polarity 05	
206	Digital input polarity 06	
207	Digital input polarity 07	
208	Digital input polarity 08	
209	Digital input polarity 09	
210	Digital input polarity 10	
211	Digital input polarity 11	
212	Digital input polarity 12	
213	Analog input polarity 01	
214	Analog input polarity 02	
215	Analog input polarity 03	
216	Analog input polarity 04	
217	Emergency stop input polarity	

Address	Description	Range
218	Digital input function 01	See Table of Input functionalities
219	Digital input function 02	
220	Digital input function 03	
221	Digital input function 04	
222	Digital input function 05	
223	Digital input function 06	
224	Digital input function 07	
225	Digital input function 08	
226	Digital input function 09	
227	Digital input function 10	
228	Digital input function 11	
229	Digital input function 12	
230	Analog input function 01	
231	Analog input function 02	
232	Analog input function 03	
233	Analog input function 04	
234	Output function 01	See Table of Output functionalities
235	Output function 02	
236	Output function 03	
237	Output function 04	
238	Output function 05	
239	Output function 06	
240	Output function 07	
241	Output function 08	
242	Output function 09	
243	Output function 10	
244	Output function 11	
245	Output function 12	
246	Output function C1	
247	Output function C2	
248	Output function C3	
249	Output function C4	

Address	Description	Range
250	Engine configuration	0: Diesel 1: Gas
251	Voltage AC as engine status condition	0: No consultation 1: Stabilised 2: Pre-start 3: Stabilisation and pre-start-up
252	Alternator battery charging as engine status condition	
253	Engine speed as condition engine state	
254	Low oil pressure as engine status condition	
255	TC position	0: Generator Table 1: Output line
256	AMF controller	0: MAN 1: AUTO
257	Forced running management mode	0: Not allowed 1: START by grid failure 2: Forced start
258	Engine speed/frequency ratio AC 3000 rpm/50 Hz	0: 50 Hz/1500 rpm 60 Hz/1800 rpm 1: 50 Hz/3000 rpm
259	Temperature units	0: Celsius 1: Fahrenheit
260	Pressure units	0: Bars 1: Psi
261	Analog input 1 configuration	0: Digital 1: Resistive 2: Intensity 3: Voltage
262	Analog input 2 configuration	
263	Analog input 3 configuration	
264	Analog input 4 configuration	

Address	Description	Range
265	Engine sensor associated with analog input 1	0: Not configured 1: Fuel level 2: Oil pressure 3: Water temperature 4: External fuel level 5: Oil temperature 6: Speed J1939 7: Heating resistor
266	Engine sensor associated with analog input 2	
267	Engine sensor associated with analog input 3	
268	Engine sensor associated with analog input 4	
269	Engine sensor associated with external analog input 1	
270	Engine sensor associated with external analog input 2	
271	Engine sensor associated with external analog input 3	
272	Engine sensor associated with external analog input 4	
273	Engine sensor associated with external analog input 5	
274	Engine sensor associated with external analog input 6	
275	Engine sensor associated with external analog input 7	
276	Engine sensor associated with external analog input 8	
277	Engine sensor associated with external analog input 9	
278	Engine sensor associated with external analog input 10	
279	Engine sensor associated with external analog input 11	
280	Engine sensor associated with external analog input 12	
281	Engine sensor associated with external analog input 13	
282	Engine sensor associated with external analog input 14	
283	Engine sensor associated with external analog input 15	
284	Engine sensor associated with external analog input 16	
285	Fuel oil transfer pump mode	0: OFF 1: MAN 2: AUTO 3: Controller/combined mode
286	Controller default mode	0: Blocked 1: MAN 2: AUTO 3: Test
287	Maintained excitation of alternator charges battery	0: Alternator 1: Dynamo
288	Sense sequence of phases	0: Direct 1: Inverse
289	Functionality associated with led 1	See Table of Interface LED functionalities
290	Functionality associated with led 2	
291	Functionality associated with led 3	
292	Functionality associated with led 4	

Address	Description	Range
293	AUTO mode generator immediate start configuration	0: Not active 1: Active
294	Alarm inhibition at generator start in AUTO mode	
295	Enabling generator in reserve	
296	Deactivation of alarm output via button	

Input register Table

Address	Description	Units
0	Grid frequency	dHz
1	Voltage grid between phases 12	V
2	Voltage of the grid between phases 23	V
3	Voltage grid between phases 31	V
4	Voltage grid phase 1	V
5	Voltage grid phase 2	V
6	Voltage grid phase 3	V
7	Frequency generator	dHz
8	Voltage generator between phases 12	V
9	Voltage generator between phases 23	V
10	Voltage generator between phases 31	V
11	Voltage generator phase 1	V
12	Voltage generator phase 2	V
13	Voltage generator phase 3	V
14	Current phase 1	A
15	Current phase 2	A
16	Current phase 3	A
17	Power factor phase 1	%
18	Power factor phase 2	%
19	Power factor phase 3	%
20	Power factor type phase 1	0: C 1: L
21	Power factor type phase 2	0: C 1: L
22	Power factor type phase 3	0: C 1: L
23	Active power	kW
24	Apparent power	kVA
25	Reactive power	kVAr
26	Power factor	-
27	Power factor type	0: L 1: C
28	THD voltage phase 1	%
29	THD voltage phase 2	%
30	THD voltage phase 3	%
31	THD current phase 1	%
32	THD current phase 2	%
33	THD current phase 3	%
40	Engine status	-
41	Speed	rpm
42	Fuel level	%
43	Battery charging alternator voltage	dV
44	Battery voltage	dV
45	Coolant temperature	d°C/d°F
46	Oil pressure	dBar/dPsi
47	Oil temperature	d°C/d°F
48	DEF level	%
49	Internal fuel tank volume	L
50	Fuel oil volume external tank	L
51	DTC number	
52	Conversion input AN1	uds
53	Conversion input AN2	uds
54	Conversion input AN3	uds
55	Conversion input AN4	uds

Address	Description	Units
70	Total energy meter generator (lower part)	kWh
71	Total generator energy meter (high part)	kWh
72	Daily accumulated generator energy	kWh
73	Accumulated monthly generator energy	kWh
74	Annual accumulated generator energy	kWh
75	Total engine running counter (lower part)	sec
76	Total engine running counter (high part)	sec
77	Counter for failed starts of the engine	-
78	Counter for correct engine starts	-
79	Total energy meter grid (lower part)	kWh
80	Total grid energy meter (high side)	kWh
81	Daily accumulated energy grid	kWh
82	Accumulated monthly grid energy	kWh
83	Annual accumulated grid energy	kWh
84	Maintenance counter 1 (lower part)	sec
85	Maintenance counter 1 (upper part)	sec
86	Maintenance counter 2 (lower part)	sec
87	Maintenance counter 2 (upper part)	sec
88	Maintenance counter 3 (lower part)	sec
89	Maintenance counter 3 (upper part)	sec
90	Maintenance counter 4 (lower part)	sec
91	Maintenance counter 4 (upper part)	sec
92	Rental meter (lower part)	sec
93	Rental meter (upper part)	sec
100	Drivers demand engine percent torque	%
101	Actual engine percent torque	%
102	Engine speed	RPM
103	Total engine hours low	-
104	Total engine hours high	-
105	Total engine revolution low	-

Address	Description	Units
106	Total engine revolution high	-
107	Trip fuel low	L
108	Trip fuel high	L
109	Total fuel low	L
110	Total fuel high	L
111	Engine coolant	ºC
112	Fuel temperature	ºC
113	Oil temperature	ºC
114	Turbo oil temperature	ºC
115	Intercooler temperature	ºC
116	Fuel delivery pressure	KPa
117	Extended crankcase blow-by pressure	KPa
118	Engine oil level	%
119	Engine oil pressure	KPa
120	Crankcase pressure	KPa
121	Coolant pressure	KPa
122	Coolant level	%
123	Fuel rate	L/h
124	Particulate trap inlet pressure	KPa
125	Boost pressure	KPa
126	Intake manifold temperature	ºC
127	Air inlet pressure	KPa
128	Air filter differential pressure	KPa
129	Exhaust gas temperature	ºC
130	Coolant filter differential pressure	KPa
131	Battery potential, switched	A
150	PGN 01: Low level	-
151	PGN 01: High level	-
152	PGN 02: Low level	-
153	PGN 02: High level	-

Address	Description	Units
154	PGN 03: Low level	-
155	PGN 03: High level	-
156	PGN 04: Low level	-
157	PGN 04: High level	-
158	PGN 05: Low level	-
159	PGN 05: High level	-
160	PGN 06: Low level	-
161	PGN 06: High level	-
162	PGN 07: Low level	-
163	PGN 07: High level	-
164	PGN 08: Llow level	-
165	PGN 08: High level	-
166	PGN 09: Low level	-
167	PGN 09: High level	-
168	PGN 10: Low level	-
169	PGN 10: High level	-
170	PGN 11: Low level	-
171	PGN 11: High level	-
172	PGN 12: Llow level	-
173	PGN 12: High level	-
174	PGN 13: Low level	-
175	PGN 13: High level	-
176	PGN 14: Low level	-
177	PGN 14: High level	-
178	PGN 15: Low level	-
179	PGN 15: High level	-
180	PGN 16: Low level	-
181	PGN 16: High level	-
200	Frequency of grid generator ATS 01	Hz
201	Voltage grid between phases 12 generator ATS 01	V

Address	Description	Units
202	Voltage grid between phases 23 generator ATS 01	V
203	Voltage grid between phases 31 generator ATS 01	V
204	Voltage grid phase 1 generator ATS 01	V
205	Voltage grid phase 2 generator ATS 01	V
206	Voltage grid phase 3 generator ATS 01	V
207	Frequency generator ATS 01	Hz
208	Voltage generator between phases 12 generator ATS 01	V
209	Voltage generator between phases 23 generator ATS 01	V
210	Voltage generator between phases 31 generator ATS 01	V
211	Voltage generator group phase 1 generator ATS 01	V
212	Voltage generator group phase 2 generator ATS 01	V
213	Voltage generator group phase 3 generator ATS 01	V
214	Current phase 1 generator ATS 01	A
215	Current phase 2 generator ATS 01	A
216	Current phase 3 generator ATS 01	A
217	Current bitmap current generator ATS 01	-
218	Power factor bitmap generator ATS 01	-
219	Power factor phase 1 generator ATS 01	-
220	Power factor phase 2 generator ATS 01	-
221	Power factor phase 3 generator ATS 01	-
222	Active power generator ATS 01	kW
223	Apparent power generator ATS 01	kW
224	Reactive power generator ATS 01	kW
300	Grid frequency generator ATS 02	Hz
301	Voltage grid between phases 12 generator ATS 02	V
302	Voltage grid between phases 23 generator ATS 02	V
303	Voltage grid between phases 31 generator ATS 02	V
304	Voltage grid phase 1 generator ATS 02	V
305	Voltage grid phase 2 generator ATS 02	V
306	Voltage grid phase 3 generator ATS 02	V

Address	Description	Units
307	Frequency generator ATS 02	Hz
308	Voltage generator between phases 12 generator ATS 02	V
309	Voltage generator between phases 23 generator ATS 02	V
310	Voltage generator between phases 31 generator ATS 02	V
311	Voltage generator group phase 1 generator ATS 02	V
312	Voltage generator group phase 2 generator ATS 02	V
313	Voltage generator group phase 3 generator ATS 02	V
314	Current phase 1 generator ATS 02	A
315	Current phase 2 generator ATS 02	A
316	Current phase 3 generator ATS 02	A
317	Current bitmap generator current ATS 02	-
318	Power factor bitmap generator ATS 02	-
319	Power factor phase 1 generator ATS 02	-
320	Power factor phase 2 generator ATS 02	-
321	Power factor phase 3 generator ATS 02	-
322	Active power generator ATS 02	kW
323	Apparent power generator ATS 02	kW
324	Reactive power generator ATS 02	kW
400	Grid frequency generator ATS 03	Hz
401	Voltage grid between phases 12 generator ATS 03	V
402	Voltage grid between phases 23 generator ATS 03	V
403	Voltage grid between phases 31 generator ATS 03	V
404	Voltage grid phase 1 generator ATS 03	V
405	Voltage grid phase 2 generator ATS 03	V
406	Voltage grid phase 3 generator ATS 03	V
407	Frequency generator ATS 03	Hz
408	Voltage generator between phases 12 generator ATS 03	V
409	Voltage generator between phases 23 generator ATS 03	V
410	Voltage generator between phases 31 generator ATS 03	V
411	Voltage generator group phase 1 generator ATS 03	V

Address	Description	Units
412	Voltage generator group phase 2 generator ATS 03	V
413	Voltage generator group phase 3 generator ATS 03	V
414	Current phase 1 generator ATS 03	A
415	Current phase 2 generator ATS 03	A
416	Current phase 3 generator ATS 03	A
417	Current bitmap current generator ATS 03	-
418	Power factor bitmap generator ATS 03	-
419	Power factor phase 1 generator ATS 03	-
420	Power factor phase 2 generator ATS 03	-
421	Power factor phase 3 generator ATS 03	-
422	Active power generator ATS 03	kW
423	Apparent power of generator ATS 03	kW
424	Reactive power generator ATS 03	kW
500	Frequency of grid generator ATS 04	Hz
501	Voltage grid between phases 12 generator ATS 04	V
502	Voltage grid between phases 23 generator ATS 04	V
503	Voltage grid between phases 31 generator ATS 04	V
504	Voltage grid phase 1 generator ATS 04	V
505	Voltage grid phase 2 generator ATS 04	V
506	Voltage grid phase 3 generator ATS 04	V
507	Frequency generator ATS 04	Hz
508	Voltage generator between phases 12 generator ATS 04	V
509	Voltage generator between phases 23 generator ATS 04	V
510	Voltage generator between phases 31 generator ATS 04	V
511	Voltage generator group phase 1 generator ATS 04	V
512	Voltage generator group phase 2 generator ATS 04	V
513	Voltage generator group phase 3 generator ATS 04	V
514	Current phase 1 generator ATS 04	A
515	Current phase 2 generator ATS 04	A
516	Current phase 3 generator ATS 04	A

Address	Description	Units
517	Current bitmap current generator ATS 04	-
518	Power factor bitmap generator ATS 04	-
519	Power factor phase 1 generator ATS 04	-
520	Power factor phase 2 generator ATS 04	-
521	Power factor phase 3 generator ATS 04	-
522	Active power generator ATS 04	kW
523	Apparent power generator ATS 04	kW
524	Reactive power generator ATS 04	kW
600	Frequency of grid generator ATS 05	Hz
601	Voltage grid between phases 12 generator ATS 05	V
602	Voltage grid between phases 23 generator ATS 05	V
603	Voltage grid between phases 31 generator ATS 05	V
604	Voltage grid phase 1 generator ATS 05	V
605	Voltage grid phase 2 generator ATS 05	V
606	Voltage grid phase 3 generator ATS 05	V
607	Frequency generator ATS 05	Hz
608	Voltage generator between phases 12 generator ATS 05	V
609	Voltage generator between phases 23 generator ATS 05	V
610	Voltage generator between phases 31 generator ATS 05	V
611	Voltage generator group phase 1 generator ATS 05	V
612	Voltage generator group phase 2 generator ATS 05	V
613	Voltage generator group phase 3 generator ATS 05	V
614	Current phase 1 generator ATS 05	A
615	Current phase 2 generator ATS 05	A
616	Current phase 3 generator ATS 05	A
617	Current bitmap current generator ATS 05	-
618	Power factor bitmap generator ATS 05	-
619	Power factor phase 1 generator ATS 05	-
620	Power factor phase 2 generator ATS 05	-
621	Power factor phase 3 generator ATS 05	-

Address	Description	Units
622	Active power generator ATS 05	kW
623	Apparent power of generator ATS 05	kW
624	Reactive power generator ATS 05	kW
700	Grid frequency generator ATS 06	Hz
701	Voltage grid between phases 12 generator ATS 06	V
702	Voltage grid between phases 23 generator ATS 06	V
703	Voltage grid between phases 31 generator ATS 06	V
704	Voltage grid phase 1 generator ATS 06	V
705	Voltage grid phase 2 generator ATS 06	V
706	Voltage grid phase 3 generator ATS 06	V
707	Frequency generator ATS 06	Hz
708	Voltage generator between phases 12 generator ATS 06	V
709	Voltage generator between phases 23 generator ATS 06	V
710	Voltage generator between phases 31 generator ATS 06	V
711	Voltage generator group phase 1 generator ATS 06	V
712	Voltage generator group phase 2 generator ATS 06	V
713	Voltage generator group phase 3 generator ATS 06	V
714	Current phase 1 generator ATS 06	A
715	Current phase 2 generator ATS 06	A
716	Current phase 3 generator ATS 06	A
717	Current bitmap current generator ATS 06	-
718	Power factor bitmap generator ATS 06	-
719	Power factor phase 1 generator ATS 06	-
720	Power factor phase 2 generator ATS 06	-
721	Power factor phase 3 generator ATS 06	-
722	Active power generator ATS 06	kW
723	Apparent power generator ATS 06	kW
724	Reactive power generator ATS 06	kW
800	Frequency of grid generator ATS 07	Hz
801	Voltage grid between phases 12 generator ATS 07	V

Address	Description	Units
802	Voltage grid between phases 23 generator ATS 07	V
803	Voltage grid between phases 31 generator ATS 07	V
804	Voltage grid phase 1 generator ATS 07	V
805	Voltage grid phase 2 generator ATS 07	V
806	Voltage grid phase 3 generator ATS 07	V
807	Frequency of generator ATS 07	Hz
808	Voltage generator between phases 12 generator ATS 07	V
809	Voltage generator between phases 23 generator ATS 07	V
810	Voltage generator between phases 31 generator ATS 07	V
811	Voltage generator group phase 1 generator ATS 07	V
812	Voltage generator group phase 2 generator ATS 07	V
813	Voltage generator group phase 3 generator ATS 07	V
814	Current phase 1 generator ATS 07	A
815	Current phase 2 generator ATS 07	A
816	Current phase 3 generator ATS 07	A
817	Current bitmap current generator ATS 07	-
818	Power factor bitmap generator ATS 07	-
819	Power factor phase 1 generator ATS 07	-
820	Power factor phase 2 generator ATS 07	-
821	Power factor phase 3 generator ATS 07	-
822	Active power generator ATS 07	kW
823	Apparent power of generator ATS 07	kW
824	Reactive power generator ATS 07	kW
900	Frequency of grid generator ATS 08	Hz
901	Voltage grid between phases 12 generator ATS 08	V
902	Voltage grid between phases 23 generator ATS 08	V
903	Voltage grid between phases 31 generator ATS 08	V
904	Voltage grid phase 1 generator ATS 08	V
905	Voltage grid phase 2 generator ATS 08	V
906	Voltage grid phase 3 generator ATS 08	V

Address	Description	Units
907	Frequency generator ATS 08	Hz
908	Voltage generator between phases 12 generator ATS 08	V
909	Voltage generator between phases 23 generator ATS 08	V
910	Voltage generator between phases 31 generator ATS 08	V
911	Voltage generator group phase 1 generator ATS 08	V
912	Voltage generator group phase 2 generator ATS 08	V
913	Voltage generator group phase 3 generator ATS 08	V
914	Current phase 1 generator ATS 08	A
915	Current phase 2 generator ATS 08	A
916	Current phase 3 generator ATS 08	A
917	Current bitmap current generator ATS 08	-
918	Power factor bitmap generator ATS 08	-
919	Power factor phase 1 generator ATS 08	-
920	Power factor phase 2 generator ATS 08	-
921	Power factor phase 3 generator ATS 08	-
922	Active power generator ATS 08	kW
923	Apparent power generator ATS 08	kW
924	Reactive power generator ATS 08	kW

14. ANNEX III: MAPPING OF SNMP RECORDS

Measures Table

ID. Object (OID)	Description	Units
mainsFreq	Frequency grid[1]	dHz
mainsVL12	Voltage grid between phases 12[1]	V
mainsVL23	Voltage grid between phases 23[1]	V
mainsVL13	Voltage grid between phases 31[1]	V
mains VL1N	Voltage grid phase 1[1]	V
mains VL2N	Voltage grid phase 2[1]	V
mains VL3N	Voltage grid phase 3[1]	V
genFreq	Frequency generator	dHz
genVL12	Voltage generator between phases 12	V
genVL23	Voltage generator between phases 23	V
genVL13	Voltage generator between phases 31	V
genVL1N	Voltage generator phase 1	V
genVL2N	Voltage generator phase 2	V
genVL3N	Voltage generator phase 3	V
ph1Amp	Current phase 1	A
ph2Amp	Current phase 2	A
ph3Amp	Current phase 3	A
pFC1	Power factor phase 1	%
pFC2	Power factor phase 2	%
pFC3	Power factor phase 3	%
pFT1	Power factor type phase 1	0: C 1: L
pFT2	Power factor type phase 2	0: C 1: L
pFT3	Power factor type phase 3	0: C 1: L
realPow	Active power	kW
appPow	Apparent power	kVA

ID. Object (OID)	Description	Units
reactivePow	Reactive power	kVAr
pFCTotal	Power factor	
pFTTotal	Power factor type	0: L 1: C
thdV1	THD voltage phase 1	%
thdV2	THD voltage phase 2	%
thdV3	THD voltage phase 3	%
thdI1	THD current phase 1	%
thdI2	THD current phase 2	%
thdI3	THD current phase 3	%
engineState	Bitmap engine status (8 7 6 5 4 3 2 1) The active value indicates: 1: Stable engine and closed generator contactor 2: Engine stopping with cooling 3: Permission to activate GC 4: Stable engine 5: Engine starting 6: Engine running 7: Engine STOPPING 8: Engine stop	
speed	Speed	rpm
fuelLevel	Fuel level	%
alternatorVolt	Battery charging alternator voltage	dV
batteryVolt	Battery voltage	dV
waterTemp	Cooling temperature2	d°C/d°F
oilPress	Oil pressure3	dBar/dPsi
oilTemp	Oil temperature	d°C/d°F
defLevel	Level DEF	%
internalFuelVol	Internal fuel tank volume	L
externalFuelVol	Fuel oil volume external tank	L
dtcNumber	DTC number	
an1value	Conversion input AN1	uds
an2value	Conversion input AN2	uds
an3value	Conversion input AN3	uds

ID. Object (OID)	Description	Units
an4value	Conversion input AN4	uds
totalInstantPower	Total generator energy meter	kWh
powerPerDay	Daily accumulated generator energy	kWh
powerPerMonth	Accumulated monthly generator energy	MWh
powerPerYear	Annual accumulated generator energy	MWh
totalRunningTime	Total engine hour meter	seconds
unsuccessfulStarts	Failed engine starts counter	
successfulStarts	Counter for correct engine starts	
totalMainsPower	Total grid energy meter	kWh
mainsPowerPerDay	Daily accumulated energy grid	kWh
mainsPowerPerMonth	Accumulated monthly grid energy	MWh
mainsPowerPerYear	Annual accumulated grid energy	MWh
mantCounter1	Counter maintenance 1 decremental	seconds
mantCounter2	Counter maintenance 2 decremental	seconds
mantCounter3	Maintenance counter 3 decremental	seconds
mantCounter4	Counter maintenance 4 decremental	seconds
rentCounter	Decremental rent counter	seconds

ID. Object (OID)	Description	Units
status01T32	Bitmap status of the generator: Listing from least significant bit to most significant bit: · Active alarm · On-going generator · Generator STOP · AUTO mode · MAN mode · Test mode · Blocking mode · Transfer pump · DEF pump · Generator contactor · Grid contactor · External accreditation · Counter mtto 1 · Counter mtto 2 · Counter mtto 3 · Counter mtto 4 · Rental meter · Grid lamp · Amber lamp · Malfunction lamp · Protect lamp · Forced regeneration · Safety regeneration · Inhibited regeneration · Dark mode · Lock screen mode · Configuration mode locked · Connection with operator · Connection to HG · Programmed anti-theft · Anti-theft detected · Valid Dismuntel configuration	
status33T64	Controller status bitmap Listing from the least significant bit to the most significant bit: · Valid Himoinsa configuration	

ID. Object (OID)	Description	Units
alarmBitMap001T032	Alarm bitmap controller: Listing from the least significant bit to the most significant bit: · Voltage controller · ID · Communication ATS · IOT Communication · Without GPS · Generator position · Impact · Switching auto mode · High water temperature · Oil pressure · Emergency STOP · Battery alternator · Start failure · Water level · Fuel reserve · J1939 · Water in fuel · DEF bomb warning · DEF pump · Filling DEF pump · Internal tank theft · External tank theft · Fuel pre-filter clogged · Fuel filter clogged · Auxiliary battery · Reset of the engine start · ECU malfunction (malfunction lamp) · ECU protection (protection lamp) · ECU (yellow lamp) · ECU (grid lamp) · Rental meter · Mtto counter	

ID. Object (OID)	Description	Units
alarmBitMap033T064	Alarm bitmap controller: Listing from the least significant bit to the most significant bit: · Sensor AN1 not connected · Sensor AN2 not connected · AN3 sensor not connected · Sensor AN4 not connected · Battery voltage · High battery voltage · Low voltage of start battery · Overspeed · Underspeed · Unexpected STOP · Failure STOP · Moderate water temperature sensor · Severe water temperature sensor · Oil pressure sensor moderate · Severe oil pressure sensor · Fuel level sensor · Low engine temperature · Maximum severe voltage · Maximum voltage moderate · Severe minimum voltage · Voltage moderate minimum voltage · Voltage asymmetry · Phase sequence voltage · Group drop · Severe maximum current · Maximum current moderate · IDMT current · Short circuit current · Current asymmetry · Severe maximum power · Maximum power moderate · Minimum power	

ID. Object (OID)	Description	Units
alarmBitMap065T096	Alarm bitmap controller: Listing from the least significant bit to the most significant bit: · Reverse power · Maximum frequency severe · Maximum frequency moderate · Minimum frequency severe · Minimum frequency moderate · Generator contactor · Free alarm 01 · Free alarm 02 · Free alarm 03 · Free alarm 04 · Free alarm 05 · Free alarm 06 · Free alarm 07 · Free alarm 08 · Free alarm 09 · Free alarm 10 · Free alarm 11 · Free alarm 12 · Free alarm 13 · Free alarm 14 · Free alarm 15 · Free alarm 16 · Free alarm 17 · Free alarm 18 · Free alarm 19 · Free alarm 20 · Free alarm 21 · Free alarm 22 · Free alarm 23 · Free alarm 24 · Free alarm 25 · Free alarm 26	

ID. Object (OID)	Description	Units
alarmBitMap097T128	Alarm bitmap controller: Listing from the least significant bit to the most significant bit: · Programmable alarm 01 · Programmable alarm 02 · Programmable alarm 03 · Programmable alarm 04 · Programmable alarm 05 · Programmable alarm 06 · Programmable alarm 07 · Programmable alarm 08 · Programmable alarm 09 · Programmable alarm 10 · Programmable alarm 11 · Programmable alarm 12 · Programmable alarm 13 · Programmable alarm 14 · Programmable alarm 15 · Programmable alarm 16 · Programmable alarm 17 · Programmable alarm 18 · Programmable alarm 19 · Programmable alarm 20 · Programmable alarm 21 · Programmable alarm 22 · Programmable alarm 23 · Programmable alarm 24 · Programmable alarm 25 · Programmable alarm 26 · Programmable alarm 27 · Programmable alarm 28 · Programmable alarm 29 · Programmable alarm 30 · Programmable alarm 31 · Programmable alarm 32	

ID. Object (OID)	Description	Units
alarmBitMap128T160	Alarm bitmap controller: Listing from the least significant bit to the most significant bit: · Programmable alarm 33 · Programmable alarm 34 · Programmable alarm 35 · Programmable alarm 36 · Programmable alarm 37 · Programmable alarm 38 · Programmable alarm 39 · Programmable alarm 40 · Programmable alarm 41 · Programmable alarm 42 · Programmable alarm 43 · Programmable alarm 44 · Programmable alarm 45 · Programmable alarm 46 · Programmable alarm 47 · Programmable alarm 48 · Programmable alarm 49 · Programmable alarm 50 · Programmable alarm 51 · Programmable alarm 52 · Programmable alarm 53 · Programmable alarm 54 · Programmable alarm 55 · Programmable alarm 56 · Programmable alarm 57 · Programmable alarm 58 · Programmable alarm 59 · Programmable alarm 60 · Programmable alarm 61 · Programmable alarm 62 · Programmable alarm 63 · Programmable alarm 64	
driversDemandEnginePercentTorque	Driver demanded engine STOP (J1939)	%
actualEnginePercentTorque	Current engine STOP (J1939)	%
engineSpeed	Engine speed (J1939)	RPM
totalEngineHours	Total engine hours (J1939)	-
totalEngineRevolution	Total engine revolutions (J1939)	-
tripFuel	En-route fuel (J1939)	L
totalFuel	Total fuel consumed (J1939)	L
engineCoolant	Engine coolant temperature (J1939)	ºC
fuelTemperature	Fuel temperature (J1939)	ºC
oilTemperature	Engine oil temperature (J1939)	ºC
turboOilTemperature	Turbo oil temperature (J1939)	ºC

ID. Object (OID)	Description	Units
intercoolerTemperature	Engine heat exchanger temperature (J1939)	ºC
fuelDeliveryPressure	Fuel supply pressure (J1939)	KPa
extendedCrankcaseBlowByPressure	Exhaust gas pressure to crankcase (J1939)	KPa
engineOilLevel	Engine oil level (J1939)	%
engineOilPressure	Engine oil pressure (J1939)	KPa
crankcasePressure	Crankcase pressure (J1939)	KPa
coolantPressure	Coolant pressure (J1939)	KPa
coolantLevel	Coolant level (J1939)	%
fuelRate	Fuel flow (J1939)	L/h
particulateTrapInletPressure	Particulate filter input pressure (J1939)	KPa
boostPressure	Boost pressure (J1939)	KPa
intakeManifoldTemperature	Intake manifold temperature (J1939)	ºC
airInletPressure	Air input pressure (J1939)	KPa
airFilterDifferentialPressure	Air filter differential pressure (J1939)	KPa
exhaustGasTemperature	Exhaust gas temperature (J1939)	ºC
coolantFilterDifferentialPressure	Coolant filter differential pressure (J1939)	KPa
batteryPotentialSwitched	Net battery current (J1939)	A
pgn01	Variable associated to PGN 01 configured	-
pgn02	Variable associated to PGN 02 configured	-
pgn03	Variable associated to PGN 03 configured	-
pgn04	Variable associated to PGN 04 configured	-
pgn05	Variable associated to PGN 05 configured	-
pgn06	Variable associated to PGN 06 configured	-
pgn07	Variable associated to PGN 07 configured	
pgn08	Variable associated to PGN 08 configured	-
pgn09	Variable associated to PGN 09 configured	-
pgn10	Variable associated to PGN 10 configured	-
pgn11	Variable associated to PGN 11 configured	-
pgn12	Variable associated to PGN 12 configured	-
pgn13	Variable associated to PGN 13 configured	-
pgn14	Variable associated to PGN 14 configured	-
pgn15	Variable associated to PGN 15 configured	-
pgn16	Variable associated to PGN 16 configured	-
switchPanelCount	No. of ATS controllers associated to controller	-

Switching measures Table

ID. Object (OID)	Description	Units
mainsFreqConm	Frequency grid[1]	dHz
mainsVL12Conm	Voltage grid between phases 12[1]	V
mainsVL23Conm	Voltage grid between phases 23[1]	V
mainsVL13Conm	Voltage grid between phases 31[1]	V
mains VL1NConm	Voltage grid phase 1[1]	V
mains VL2NConm	Voltage grid phase 2[1]	V
mains VL3NConm	Voltage grid phase 3[1]	V
genFreqConm	Frequency generator	dHz
genVL12Conm	Voltage generator between phases 12	V
genVL23Conm	Voltage generator between phases 23	V
genVL13Conm	Voltage generator between phases 31	V
genVL1NConm	Voltage generator phase 1	V
genVL2NConm	Voltage generator phase 2	V
genVL3NConm	Voltage generator phase 3	V
ph1AmpConm	Current phase 1	A
ph2AmpConm	Current phase 2	A
ph3AmpConm	Current phase 3	A
flagsCurrentConm	Current bitmap	
pFCTotalConm	Power factor	
pFC1Conm	Power factor phase 1	%

ID. Object (OID)	Description	Units
pFC2Conm	Power factor phase 2	%
pFC3Conm	Power factor phase 3	%
realPow	Active power	kW
appPow	Apparent power	kVA
reactPowConm	Reactive power	kVAr
mainsControlType	Type of controller	
statusConm	Bitmap generator status: Listing from least significant bit to most significant bit: · Active alarm · AUTO mode · MAN mode · Test mode · Blocking mode · Generator contactor · Grid contactor · Dark mode · Lock screen mode · Configuration mode locked · Valid Dismuntel configuration · Valid Himoinsa configuration	

ID. Object (OID)	Description	Units
alarmBitMap001T032Conm	Alarms bitmap controller switching: Listing from the least significant bit to the most significant bit: · Voltage controller · ID · Communication ATS · IOT Communication · Without GPS · Generator position · Impact · Switching auto mode · Voltage asymmetry · Maximum severe voltage · Maximum voltage moderate · Severe minimum voltage · Voltage moderate minimum voltage · Maximum frequency severe · Maximum frequency moderate · Minimum frequency severe · Minimum frequency moderate · Voltage sequence · Generator drop · Emergency STOP · Generator STOP failure · Free 01 · Free 02 · Free 03 · Free 04 · Free 05 · Free 06 · Free 07 · Free 08 · Free 09 · Free 10	
alarmBitMap033T064Conm	Alarms bitmap controller switching: Listing from the least significant bit to the most significant bit: · Programmable 01 · Programmable 02 · Programmable 03 · Programmable 04 · Programmable 05 · Programmable 06 · Programmable 07 · Programmable 08 · Maximum grid voltage · Minimum grid voltage · Maximum grid frequency · Minimum grid frequency · Grid sequence · Grid down · Grid contactor error · Generator contactor error · Synchronisation error	

Generator parameters Table

ID. Object (OID)	Description	Range
timeBetweenStarts	Time between starts	3”...15”
delayEngineStartAfterMainsDrop	START delay time in case of grid failure	0”...7200”
preHeatingTimeBeforeEngineStart	Warm-up time before the engine start	0”...180”
startupTime	Start-up time	1”...30”
loadActivationTime	Charge activation time	1”...300”
nominalConditionTime	Nominal condition time	2”...15”
dplusActivationTime	D+ activation time	1”...10”
delayStopAfterExtStopInputOffTime	Stop delay time for external STOP START	1”...60000”
coolingTime	Cooling time	2”...1800”
eJP1ActivationDelayTime	Activation delay time EJP1	1”...1800”
engineStopTime	Engine STOP time	1”...30”
mainsActivationDelay	Grid return delay	2”...60000”
alarmActivationTime	Alarm activation time	0: Indefinite 1: 1”...1800”
inputI01Filter	Filtering time input 01	0...50 ds
inputI02Filter	Filtering time input 02	0...50 ds
inputI03Filter	Filtering time input 03	0...50 ds
inputI04Filter	Filtering time input 04	0...50 ds
inputI05Filter	Filtering time input 05	0...50 ds
inputI06Filter	Filtering time input 06	0...50 ds
inputI07Filter	Filtering time input 07	0...50 ds
inputI08Filter	Filtering time input 08	0...50 ds
inputI09Filter	Filtering time input 09	0...50 ds
inputI10Filter	Input filtering time 10	0...50 ds
inputI11Filter	Filtering time input 11	0...50 ds
inputI12Filter	Filtering time input 12	0...50 ds
inputAn1Filter	Filtering time input AN1	0...50 ds
inputAn2Filter	Filtering time input AN2	0...50 ds
inputAn3Filter	Filtering time input AN3	0...50 ds
inputAn4Filter	Filtering time input AN4	0...50 ds
inputPEMFilter	PEM input filtering time	0...50 ds
InputMANFilter	MAN input filtering time	0...50 ds
dummyLoadFilteringTime	Dummy load filter time	1”...3000”
demandLoadFilteringTime	Start filter time demand load	1”...3000”
cgPulseTime	Pulse time CG	0”...100”
gasEngineIgnitionStartDelayTime	Delay time gas ignition START	0”...100”
gasEngineEvDelayTime	Time delay gas EV	0”...30”
gasEngineIgnitionStopDelayTime	Delay time gas ignition Stop	0”...100”
smokeReductionDuringEngineStartTime	Smoke control time	0”...30”
idmtTime	Time IDMT	0”...3600”
gensetContactorDelayTime	Delay time CG	0”...30”
mainsContactorDelayTime	Delay time CR	0”...30”
stopFailureDetectionTime	STOP failure detection time	
gensetPhaseNumber	Electrical configuration of alternator generator	0 - 6
mainsPhaseNumber	Electrical configuration grid	0 - 6
gensetNominalPower	Power rating generator	0 – 65535
startsCount	Number of starts	0 – 65535
startingVoltageGensetSignal	Voltage of the start in generator	30 – 100
startingVoltageAlternator	Voltage of alternator start	6 – 23
startingSpeed	Engine detection speed when started	300 - 1000
engineFlywheelTeeth	Engine flywheel teeth	0 - 300
primaryVoltTransformerConfig	Voltage primary transformer configuration	0 - 5000
secondaryVoltTransformerConfig	Voltage secondary transformer configuration	0 - 5000
phaseShiftVoltTransformerConfig	Voltage offset voltage transformer configuration	0 - 360
primaryCurrentTransformerConfig	Primary current transformer configuration	0 - 5000
secondaryCurrentTransformerConfig	Secondary current transformer configuration	0 - 5000
phaseShiftCurrentTransformerConfig	Phase shift current transformer configuration	0 - 360

ID. Object (OID)	Description	Range
preheatTempThreshold	Preheating cut-off temperature	0 – 125 ºC
transferPumpMinLevel	Minimum fuel level transfer pump	5 % - 90 %
transferPumpMaxLevel	Maximum fuel level transfer pump	10 % - 10 %
minPreheatingTemp	Minimum heating temperature	5 – 30 ºC
maxPreheatingTemp	Maximum heating temperature	10 – 40 ºC
dummyLoadActivationPower	Dummy load activation power	0 - 1000
dummyLoadDeactivationPower	Power deactivation dummy load	0 - 1000
loadDemandActivationPower	Power activation load demand	0 - 1000
loadDemandDeactivationPower	Power deactivation load demand	0 - 1000
defPumpMaxLevel	Maximum DEF level	0% - 100%
defPumpMinLevel	Minimum level DEF	0% - 100 %
defPumpIncreaseLevel	Threshold filled DEF	0% - 100 %
maxGensetVoltageModerate	Maximum moderate generator voltage	0 - 65535
maxGensetVoltageSevere	Maximum severe generator voltage	0 - 65535
minGensetVoltageModerate	Minimum voltage of the moderate generator	0 - 65535
minGensetVoltageSevere	Minimum voltage of severe generator	0 - 65535
maxGensetAsymetryValue	Maximum voltage generator asymmetry	0 - 65535
maxGensetFrequencyModerate	Maximum frequency of moderate generator	0 - 65535
maxGensetFrequencySevere	Maximum frequency of severe generator	0 - 65535
minGensetFrequencyModerate	Moderate generator minimum frequency	0 - 65535
minGensetFrequencySevere	Minimal severe generator frequency	0 - 65535
maxGensetCurrentModerate	Maximum moderate generator current	0 - 65535
maxGensetCurrentSevere	Maximum severe generator current	0 - 65535
shortCircuitAlarmThreshold	Maximum short circuit current	0 - 65535
currentAsymmAlarmThreshold	Current asymmetry threshold	0 % - 100 %
maxReversePowerAlarmThreshold	Maximum reverse power	0 - 20
idmtCurveIntensityAlarmThreshold	Intensity TMDI curve	101 % - 200 %
lowPowerAlarmThreshold	Low power threshold	0 – 100

ID. Object (OID)	Description	Range
maxPowerAlarmThresholdModerate	Percentage of maximum power moderate	0 - 120
maxPowerAlarmThresholdSevere	Percentage of maximum power severe	0 - 120
maxPickupSpeedAlarmThreshold	Maximum engine speed	0 - 50000
minPickupSpeedAlarmThreshold	Minimum engine speed	0 - 50000
minBatteryVoltage	Minimum battery voltage	8 - 23
fuelReserveLevel	Fuel reserve level	0 % - 30 %
lowOilPressureModerate	Moderate low oil pressure	5 - 30
lowOilPressureSevere	Severe low oil pressure	5 - 30
highWaterTemperatureThresholdModerate	High temperature moderate	80 - 105 ºC
highWaterTemperatureThresholdSevere	Severe high temperature	80 - 105 ºC
lowEngineTemperature	Low engine temperature per sensor	0 - 40 ºC
minBatteryAuxVoltage	Minimum voltage auxiliary battery	0 - 23
defLevelThresholdModerate	Moderate DEF level	0 % - 100 %
defLevelThresholdSevere	Severe DEF level	0 % - 100 %
maxBatteryVoltage	Maximum battery voltage	8 - 40
startMinBatteryVoltage	Minimum battery voltage at START	8 - 23
maxMainsVoltage	Maximum grid voltage	0 - 65535
minMainsVoltage	Minimum voltage of the grid	0 - 65535
maxMainsFrequency	Maximum grid frequency	0 - 65535
minMainsFrequency	Minimum grid frequency	0 - 65535
gensetId	Generator identifier	0 - 14
polarityI01	Polarity digital input 01	0 - 1
polarityI02	Polarity digital input 02	0 - 1
polarityI03	Polarity digital input 03	0 - 1
polarityI04	Polarity digital input 04	0 - 1
polarityI05	Polarity digital input 05	0 - 1
polarityI06	Polarity digital input 06	0 - 1
polarityI07	Polarity digital input 07	0 - 1
polarityI08	Digital input polarity 08	0 - 1

ID. Object (OID)	Description	Range
polarityI09	Polarity digital input 09	0 - 1
polarityI10	Digital input polarity 10	0 - 1
polarityI11	Digital input polarity 11	0 - 1
polarityI12	Polarity digital input 12	0 - 1
polarityAN1	Polarity of analog input 01	0 - 1
polarityAN2	Polarity of analog input 02	0 - 1
polarityAN3	Polarity of analog input 03	0 - 1
polarityAN4	Polarity of analog input 04	0 - 1
polarityPEM	Polarity of the input emergency STOP	0 - 1
inputI01	Digital input function 01	See Table of Input functionalities
inputI02	Digital input function 02	
inputI03	Digital input function 03	
inputI04	Digital input function 04	
inputI05	Digital input function 05	
inputI06	Digital input function 06	
inputI07	Digital input function 07	
inputI08	Digital input function 08	
inputI09	Digital input function 09	
inputI10	Digital input function 10	
inputI11	Digital input function 11	
inputI12	Digital input function 12	
inputAn1	Analog input 01 function	
inputAn2	Analog input 02 function	
inputAn3	Analog input 03 function	
inputAn4	Analog input 04 function	

ID. Object (OID)	Description	Range
outputP1	Function output 01	See Table of Output functionalities
outputP2	Function output 02	
outputP3	Function output 03	
outputP4	Function output 04	
outputP5	Function output 05	
outputP6	Function output 06	
outputP7	Function output 07	
outputP8	Function output 08	
outputP9	Function output 09	
outputP10	Function output 10	
outputP11	Output function 11	
outputP12	Function output 12	
outputC1	Function output C1	
outputC2	Function output C2	
outputC3	Function output C3	
outputC4	Function output C4	
engineConfig	Engine configuration	0 - 1
conditionVoltage	AC voltage as engine status condition	0 - 1
conditionAlternator	Alternator battery charging as engine status condition	0 - 1
conditionPickup	Engine speed as a condition engine state	0 - 1
conditionLowOilPressure	Low oil pressure as engine status condition	0 - 1
intensityTransformerPosition	TC position	0 - 1
controllerType	Type of controller	0 - 2
forcedRunMode	Forced running management mode	0 - 2
gear3000RPM	Engine speed/frequency ratio AC 3000 rpm/50 Hz	0 - 1
tempUnits	Temperature units	0 - 1
pressureUnits	Pressure units	0 - 1
analogInputCfg1	Configuration of analog input 1	0 - 3
analogInputCfg2	Analog input 2 configuration	0 - 3

ID. Object (OID)	Description	Range
analogInputCfg3	Analog input 3 configuration	0 - 3
analogInputCfg4	Analog input 4 configuration	0 - 3
analogInputSensor1	Engine sensor associated with analog input 1	0 - 7
analogInputSensor2	Engine sensor associated with analog input 2	0 - 7
analogInputSensor3	Engine sensor associated with analog input 3	0 - 7
analogInputSensor4	Engine sensor associated with analog input 4	0 - 7
analogInputSensorCfgExt1	Engine sensor associated with external analog input 1	0 - 7
analogInputSensorCfgExt2	Engine sensor associated with external analog input 2	0 - 7
analogInputSensorCfgExt3	Engine sensor associated with external analog input 3	0 - 7
analogInputSensorCfgExt4	Engine sensor associated to external analog input 4	0 - 7
analogInputSensorCfgExt5	Engine sensor associated with external analog input 5	0 - 7
analogInputSensorCfgExt6	Engine sensor associated with external analog input 6	0 - 7
analogInputSensorCfgExt7	Engine sensor associated with external analog input 7	0 - 7
analogInputSensorCfgExt8	Engine sensor associated with external analog input 8	0 - 7
analogInputSensorCfgExt9	Engine sensor associated with external analog input 9	0 - 7
analogInputSensorCfgExt10	Engine sensor associated with external analog input 10	0 - 7
analogInputSensorCfgExt11	Engine sensor associated with external analog input 11	0 - 7
analogInputSensorCfgExt12	Engine sensor associated with external analog input 12	0 - 7
analogInputSensorCfgExt13	Engine sensor associated with external analog input 13	0 - 7
analogInputSensorCfgExt14	Engine sensor associated with external analog input 14	0 - 7
analogInputSensorCfgExt15	Engine sensor associated with external analog input 15	0 - 7
analogInputSensorCfgExt16	Engine sensor associated with external analog input 16	0 - 7
transferPumpMode	Fuel oil transfer pump mode	0 - 3
startMode	Controller default mode	0 - 3
dynamoMode	Maintained excitation of alternator charges battery	0 - 1

ID. Object (OID)	Description	Range
phaseSequenceDirection	Sense sequence of phases	0 - 1
ledAux01	Functionality associated with led 1	See Table of LED functionalities
ledAux02	Functionality associated with led 1	
ledAux03	Functionality associated with led 1	
ledAux04	Functionality associated with led 1	
fastExternalStart	AUTO mode generator immediate start configuration	0 - 1
alarmOutputOffAutoStart	Alarm inhibition at generator start in AUTO mode	0 - 1
reserveGensetEnable	Enabling generator in reserve	0 - 1
alarmOutputOffByButton	Deactivation of alarm output via button	0 - 1

ATS parameters Table

ID. Object (OID)	Description	Range
gensetPhaseNumberConm	Electrical configuration of alternator generator	0: Three-phase without neutral 1: Three-phase 2: Two-phase 3: Single-phase 4: Delta 5: Delta without neutral 6: Two-phase selector
mainsPhaseNumberConm	Electrical configuration of the grid	
gensetNominalPowerConm	Power rating generator	-
startingVoltageGensetSignalConm	Voltage value for start	-
maxGensetVoltageModerateConm	Maximum moderate generator voltage	
maxGensetVoltageSevereConm	Maximum severe generator voltage	-
minGensetVoltageModerateConm	Minimum voltage of the moderate generator	
minGensetVoltageSevereConm	Minimum voltage of severe generator	-
maxGensetAsymetryValueConm	Maximum value of generator asymmetry	-
maxGensetFrequencyModerateConm	Maximum frequency of moderate generator	

ID. Object (OID)	Description	Range
maxGensetFrequencySevereConm	Maximum frequency of severe generator	-
minGensetFrequencyModerateConm	Moderate generator minimum frequency	
minGensetFrequencySevereConm	Minimal severe generator frequency	-
maxMainsVoltageConm	Maximum grid voltage	-
minMainsVoltageConm	Minimum voltage of the grid	-
maxMainsFrequencyConm	Maximum grid frequency	-
minMainsFrequencyConm	Minimum grid frequency	-
maxGensetCurrentConm	Maximum generator current	-

14.1 TRAPS TABLE

If an alarm occurs in the controller, both generator and ATS, the IOT sends an asynchronous TRAP message to the IP configured in the OID manageAddress by the SNMP SET command or in the SNMP tab in the configuration from Genset WorkBench.

The contents of the trap are 3 variables:

- Timeticks.
- OID.
- Text string with alarm information.

The text string has the following structure: “XX – YY – ZZ”

XX: Alarm index generator

ID	Alarm
1	Controller voltage controller
2	Controller Id
3	Controller Com commutation
4	Controller Com Iot
5	Gps-Free controller
6	Position controller
7	Impact controller
8	AUTO mode controller
9	Water temperature controller
10	Engine oil pressure
11	Engine emergency stop
12	Engine alternator batteries
13	Engine failure START
14	Engine water level
15	Engine fuel reserve
16	Engine J1939
17	Engine water in fuel
18	Engine alarm engine DEF moderate
19	Engine alarm engine DEF severe
20	Engine DEF pump
21	Engine internal tank fuel theft
22	Engine external fuel tank fuel theft
23	Engine CloggedFfPrefilter
24	Engine CloggedFfFilter
25	Auxiliary battery engine
26	Engine reset START
27	Engine Ecu malfunction lamp
28	Engine protection lamp
29	Engine yellow lamp
30	Grid lamp engine
31	Engine rental counter
32	Engine counter maintenance
33	Engine SensorAn1 not connected
34	Engine SensorAn2 not connected
35	Engine SensorAn3 not connected
36	Engine SensorAn4 not connected
37	Engine battery voltage
38	Engine high voltage battery

ID	Alarm
39	Engine low voltage battery START
40	Engine overspeed
41	Engine underspeed
42	Engine STOP unexpected stop
43	Engine failure STOP
44	Engine water temperature sensor moderate
45	Engine water temperature sensor severe
46	Engine oil pressure sensor moderate
47	Engine oil pressure sensor severe
48	Engine fuel level sensor
49	Engine low temperature engine
50	Severe voltage max generator
51	Generator voltage max moderate
52	Generator voltage min severe
53	Generator voltage min moderate
54	Voltage generator aismetery
55	Generator voltage phase sequence
56	Generator falling group
57	Max severe current generator
58	Generator current max moderate
59	IDMT current generator
60	Alarm genset generator short circuit current
61	Current generator asymmetry
62	Severe max power generator
63	Generator max power moderate
64	Generator min power
65	Reverse power generator
66	Severe max frequency generator
67	Generator frequency max moderate
68	Generator frequency min severe
69	Generator frequency min moderate

ID	Alarm
70	Generator contactor group
71	Free01
72	Free02
73	Free03
74	Free04
75	Free05
76	Free06
77	Free07
78	Free08
79	Free09
80	Free10
81	Free11
82	Free12
83	Free13
84	Free14
85	Free15
86	Free16
87	Free17
88	Free18
89	Free19
90	Free20
91	Free21
92	Free22
93	Free23
94	Free24
95	Free25
96	Free26
97	Programmable01
98	Programmable02
99	Programmable03
100	Programmable04

ID	Alarm
101	Programmable05
102	Programmable06
103	Programmable07
104	Programmable08
105	Programmable09
106	Programmable10
107	Programmable11
108	Programmable12
109	Programmable13
110	Programmable14
111	Programmable15
112	Programmable16
113	Programmable17
114	Programmable18
115	Programmable19
116	Programmable20
117	Programmable21
118	Programmable22
119	Programmable23
120	Programmable24
121	Programmable25
122	Programmable26
123	Programmable27
124	Programmable28
125	Programmable29
126	Programmable30
127	Programmable31
128	Programmable32
129	Programmable33
130	Programmable34
131	Programmable35

ID	Alarm
132	Programmable36
133	Programmable37
134	Programmable38
135	Programmable39
136	Programmable40
137	Programmable41
138	Programmable42
139	Programmable43
140	Programmable44
141	Programmable45
142	Programmable46
143	Programmable47
144	Programmable48
145	Programmable49
146	Programmable50
147	Programmable51
148	Programmable52
149	Programmable53
150	Programmable54
151	Programmable55
152	Programmable56
153	Programmable57
154	Programmable58
155	Programmable59
156	Programmable60
157	Programmable61
158	Programmable62
159	Programmable63
160	Programmable64

XX: Index of ATS alarms

ID	Alarm
1	Controller voltage controller
2	Controller Id
3	Controller Com commutation
4	Controller Com Iot
5	Gps-Free controller
6	Position controller
7	Impact controller
8	Auto mode controller
9	Asymmetry in generator voltage
10	Severe voltage max generator
11	Generator voltage max moderate
12	Generator voltage min severe
13	Generator voltage min moderate
14	Severe max frequency generator
15	Generator frequency max moderate
16	Generator frequency min severe
17	Generator frequency min moderate
18	Voltage sequence
19	Generator falling group
20	Emergency STOP
21	Generator STOP failure
22	Free01
23	Free02
24	Free03
25	Free04
26	Free05
27	Free06
28	Free07
29	Free08
30	Free09
31	Free10
32	Programmable01
33	Programmable02
34	Programmable03
35	Programmable04
36	Programmable05
37	Programmable06
38	Programmable07
39	Programmable08
40	Maximum grid voltage
41	Minimum voltage of the grid
42	Maximum grid frequency
43	Minimum grid frequency
44	Grid sequence
45	Grid down
46	Grid contactor error
47	Generator contactor error
48	Synchronisation error

YY: Controller type

- 1. Generator
- 2. Grid/Switching ATS

ZZ: CAN identifier of the controller

15. ANNEX IV: CONTROLLER SCREENS

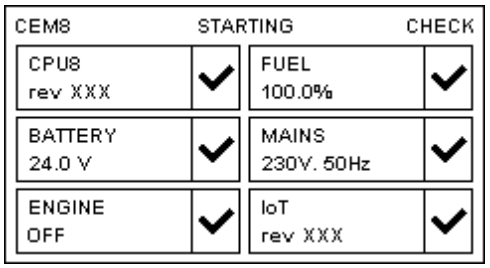
15.1 SYSTEM INITIALIZATION SCREEN

When powering up the controller with the ignition key, the initialization screen is displayed, showing some basic parameters before accessing the navigation of the switchboard. The parameters that will be displayed are, in order:

1. **Control device connection:** In the first step of initialization, a check is made to see if a control device (CPU8) is connected to the CAN bus. If no control device is connected, the checklist will remain blocked at this step until one is connected, i.e. it is not possible to access the navigation of the control unit if CEA8/CEM8 and CPU8 are not connected by CAN. When the connection is complete, the firmware version of the CPU8 will be displayed and the checklist will continue.

   In the case of connecting a control device with a CAN identifier different to that of the user interface, it will allow to pass through this check, but the CPU8 version will not be displayed, and the “Identifier” alarm will be triggered. The device list must be accessed and the ID configured before any configuration is conducted.

2. **Battery voltage:** Displays the battery voltage of the controller.
3. **Engine status:** Displays the engine status.
4. **Fuel:** Displays the fuel level percentage.
5. **Mains:** Displays the V1N mains voltage and its frequency.
6. **IoT connection:** The IoT device connection is checked, displaying a check and its firmware version if it is detected during the initialisation process. If the presence of IoT is not detected, the initialisation is not stopped, and navigation can continue.
7. **Manufacturer’s screen:** Last of all, the manufacturer’s screen is displayed. The screen will display the Himoinsa logo and the firmware version and year by default. This screen is customizable. To do this, you must import an image of the corresponding size (240 x 128px), in black and white and .bmp format, from GW (Interface/Image).



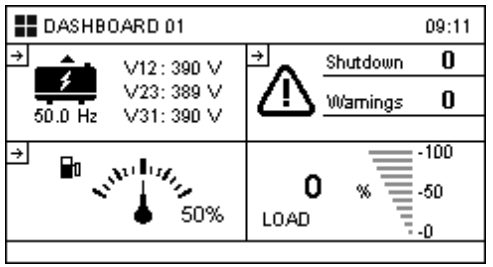
15.2 MAIN MENU (HOME)

The Main Menu can be accessed from any page of the navigation by pressing the Home button. From here you can access the rest of the navigation screens by scrolling left or right with the cursor keys ◄ ► and pressing OK.

1. DASHBOARD
2. USERS
3. SETTINGS
4. CONFIGURATIONS (Only with authorisation key)
5. TIMERSET
6. FUNCTIONS
7. PLC
8. COMMUNICATIONS
9. IoT
10. REGENERATION (Only if the configured engine allows it)
11. LOCK / UNLOCK (CEA only)
12. TEST (CEA only)
13. INPUTS / OUTPUTS
14. MAINS (CEA only)
15. GENERATOR
16. ENGINE
17. STATUS
18. ALARMS

15.3 DASHBOARD

The DASHBOARD is the initial screen of the controller, which allows easy and direct display of certain variables of interest divided into “Widgets”. It has a maximum of 8 screens with 4 Widgets each, while the Widgets can display from 1 to 4 measurements each.



You can scroll through the widgets and between Dashboard screens with the directional pad and access those widgets with direct access (⊡) with the OK button. Holding the OK button for 5 seconds will set the selected widget to the first position on the main Dashboard screen (DASHBOARD 01, top left corner).

The list of available Widgets is shown in the Widgets Table.

1. Voltage Phase/Phase (Generator). Displays Phase/Phase voltages and Frequency if the alternator configuration is Three Phase (with or without neutral). If the configuration is Two Phase it shows both Phase/Phase and Phase/Neutral voltages and frequency, and if it is Single Phase it shows Phase/Neutral voltage and frequency.

2. Voltage Phase/Neutral (Generator). Displays the Phase/Neutral voltages and frequency if the alternator configuration is three phase with neutral.

3. Energy (Generator). Shows the average energy of the generator in the last day, month and year in Kwh, Mwh and Mwh respectively.

4. Phase/Phase Voltage (Grid). Displays the Phase/Phase voltages and Frequency if the grid configuration is Three Phase (with or without neutral). If the configuration is Two-phase it shows both the Phase/Phase and Phase/Neutral voltages and the Frequency, and if it is Single-phase it shows the Phase/Neutral voltage and the Frequency. In case of having an CEM device with several CEC devices connected, the grid shown in this Widget will always be that of the CEC with Id 0.

5. Voltage Phase/Neutral (Grid). Displays the Phase/Neutral Voltages and Frequency if the grid configuration is Three Phase with Neutral. In case of having an CEM device with several CEC devices connected, the grid shown in this Widget will always be the one of the CEC with Id 0.

6. Energy (Grid). Shows the average energy of the grid in the last day, month and year in Kwh, Mwh and Mwh respectively. In case of having a CEM device with several CEC devices connected, the grid shown in this Widget will always be that of the CEC with Id 0.

7. Current. Displays the actual current in each phase. This will be provided by the grid or the generator depending on which contactor is closed at the moment.

8. Power. Displays the Active, Reactive and Apparent power consumed at the moment. In addition, it shows the Power Factor value in (%).

9. Power Factor. Displays the total power factor and the power factor of the phases separately.

10. Load. Displays the power load of the generator with respect to its nominal value.

11. Speed. Displays the current engine speed in rpm.

12. Sensors. Displays both water temperature and oil pressure and temperature.

13. Fuel Level. Displays the current fuel level. In addition, the fuel icon blinks if the transfer pump is active.

14. DEF Level. Displays the current DEF level. In addition, the DEF icon blinks if the DEF pump is active.

15. Regeneration. Displays the regeneration status if the configured engine allows it.

16. Electricity. Displays Battery Voltage, Alternator Voltage and Auxiliary Battery measurements.

17. Engine Run Counter. Shows how long the engine has been running.

18. Start Counter. Displays the number of successful and failed starts.

19. Maintenance Widgets. Displays the current time of the selected maintenance timer. If the timer has exceeded the remaining time it displays the exceeded time while blinking.

20. PGN Widgets. Displays the value of the selected PGN.

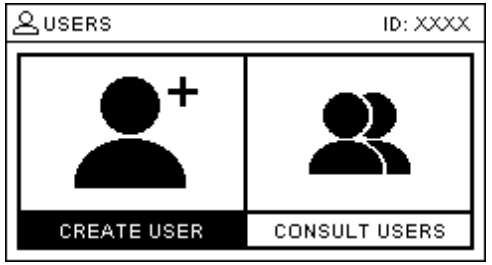
21. Alarm/Warning Widget. Displays the number of unnotified alarms and alerts from the controller.

22. Generator Status Widget. Displays whether the generator is running, stopped, started, out of range...

15.4 USERS

The USERS page manages everything related to the controller's access users and passwords. To access this screen it is necessary to log in with a user of any level.

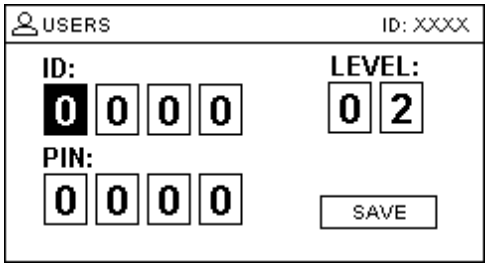
From the main USERS screen you can access the "CREATE USER" and "CONSULT USER" options.



On all user management screens, the ID of the currently logged-in user is displayed in the upper left corner.

15.4.1 CREATE USER

Once the user creation screen is accessed, the ID, PIN and access level of the new user can be modified. To scroll through the different digits press ◄ ► and press ▲▼ to increase or decrease the selected number. To move to the next setting (ID, PIN, LEVEL), press OK.

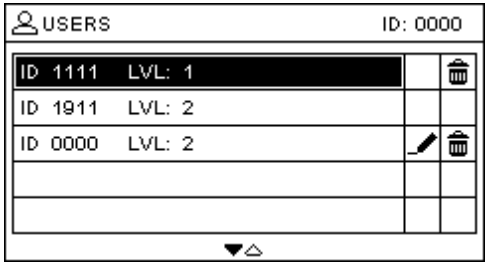


It is important to keep in mind that a user can only create users from level 1 to a level lower than his own, they can never create users of a level equal to or higher than his own. For example, a level 3 user can only create users of level 1 or 2, never level 3. For the same reason, a level 1 user cannot create any user, being forbidden the access to this screen.

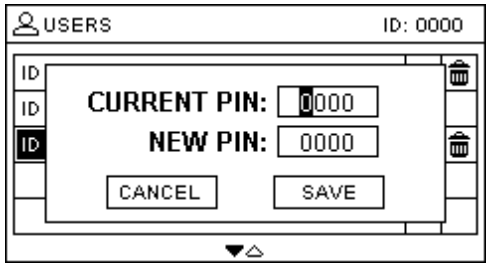
Once the ID, PIN and access level is as desired, press SAVE to create the new user.

15.4.2 CONSULT USER

From this screen you can consult all those users with the same level or lower than the level of the logged in user. For example, if the user created in the previous section (ID: 0000, PIN: 0000, Level: 2) logs in and enters the CONSULT USER screen, you could see a list similar to the following:



As can be seen in the image, from this list you can edit the PIN of the current user by accessing the icon with the buttons ▼ (to go to user 0000) and ► (to access the icon). Once selected, press OK to open the editing window:



To change between digits press ◄ ► and press ▲▼ to increase or decrease their value. Press OK to move to the next section (current PIN, new PIN, buttons). Once the cursor is on a button, press ◄ ► to switch between them and OK to activate them.

To successfully edit the PIN, It must have the following features:

- The current PIN matches the password saved at the time of editing.
- The new PIN cannot be the same as the current PIN.

Finally, users can be deleted by clicking on the icon (only for users of a lower level than the logged in user or the logged in user). It is important to bear in mind that once a user is deleted, this action cannot be undone, if you are going to delete the same user who is logged in, make sure that you have an alternative method to log in.

NOTE

Deleting all available users will reset the default users.

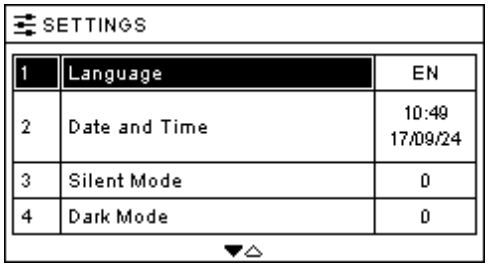
15.5 SETTINGS

The SETTINGS page allows you to configure the interface and restore the default or factory settings.

Navigation between the different options is done with the cursor keys ▲▼.

The configuration options on this page are:

- **Language (User Level).** Allows you to configure the navigation language.
- **Date and Time (User Level).** Configures the date and time of the controller.
- **Silent Mode (User Level).** Mutes the buzzer.
- **Dark Mode (User Level).** Turns off the backlight of the display.
- **Contrast (User Level).** Adjusts the contrast of the display between 0 and 10.
- **Save Backup (Maintenance Level).** Saves the current configuration of the controller as backup configuration.
- **Save Factory Settings (Maintenance Level).** Restores the controller parameter values to those saved in the backup.
- **Default Reset (Maintenance Level).** Resets the controller to its fixed default values.



By pressing OK on one of the configuration options, the parameter is edited (the value will start to blink), allowing it to be edited with the up and down cursors. Once the desired value has been selected, press OK to save it or BACK to cancel editing.

In case you want to reset or save configuration parameters, pressing OK will display a pop-up window asking for confirmation.

Editing the Date and Time takes you to a single screen for this purpose.

15.5.1 DATE AND TIME CONFIGURATION

The DATE AND TIME editing screen is divided into three parts: time, date and save button. The cursor starts at the time setting, where you can choose Hour / Minute with the cursors ◄ ► and change its value with the cursors ▲▼. To access the next part, the date, the OK button must be pressed. The operation for the configuration of the date is the same as for the time. To finish the configuration, press OK to access the SAVE button on the screen.

15.6 CONFIGURATION

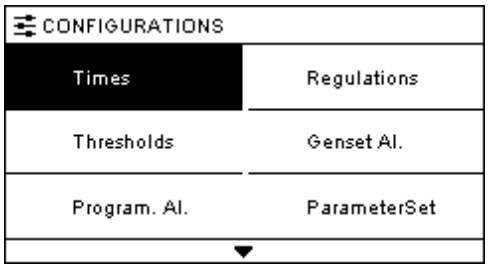
The CONFIGURATION page allows you to modify the controller parameter tables.

The parameters of up to 13 tables can be modified from the interface:

1. Times Table.
2. Regulations Table.
3. Thresholds Table.
4. Group alarms Table.
5. Programmable alarms Tables.
6. Parameter set Table.
7. J1939 Table.
8. Fuel Table.
9. Interface Table.
10. Heater Table.
11. MODBUS Table.
12. Widgets Table.
13. IoT Table.

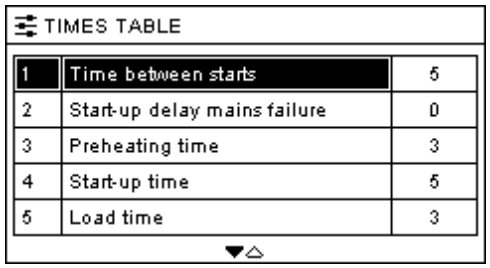
To enter each menu, use the cursor keys to select ◄ ► ▲▼ and press OK.

The main Configuration screen is restricted to at least a User Level password.



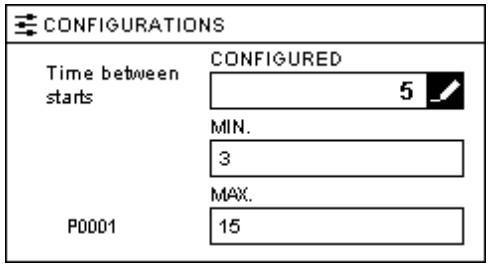
Once in the menu of the parameter table you wish to consult, use the cursor keys ▲▼ to scroll through the table.

The table is divided into three columns, in order: parameter number, parameter name, current value. To modify the value assigned to the selected parameter, press the OK button (see ANNEX I: PARAMETER TABLE).



15.6.1 VISUALISATION OF THE PARAMETER

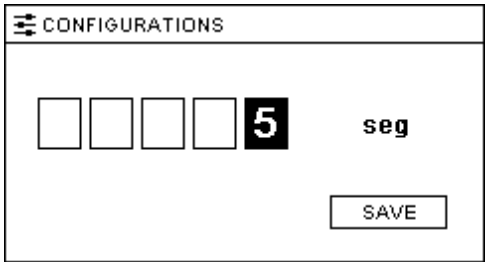
Pressing OK on a parameter takes you to the Parameter Display screen, where you can see the parameter name on the left, the parameter number at the bottom left, its configured value and its configurable maximum and minimum value.



Pressing OK on the edit button (default cursor position) takes you to the parameter configuration screen.

15.6.2 CONFIGURATION OF THE PARAMETER

This screen shows the unit of the parameter (if it has one) and its value divided in 5 boxes. Use the cursor buttons ◄ ► to move to the digit you want to modify and ▲▼ to increase or decrease its value. Once you have obtained the value you wish to set in the parameter, press OK to move the cursor to the SAVE button and press OK again.

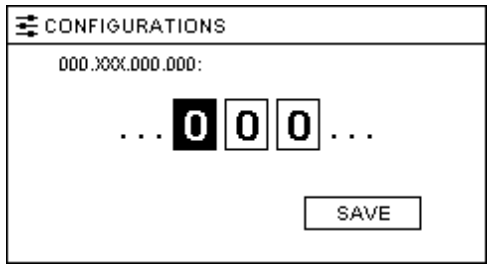


15.6.3 IP CONFIGURATION

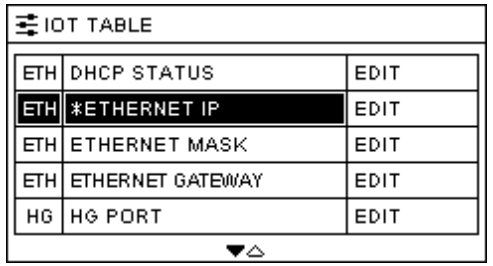
If you want to modify an IP, you can see how the parameter editing screen is different from the others. In this case, only 3 digits of the IP will be displayed, which will correspond to the 3 digits marked with X at the top left.

To move between digits use the cursor keys ◄ ► and to increase or decrease their value ▲▼. Once the rightmost digit is reached, the right cursor can be pressed again to move to the next three digits and so on. The same action can be performed, but in the opposite direction, to access the leftmost digits.

Once the desired IP has been obtained, press OK to access the Save button.

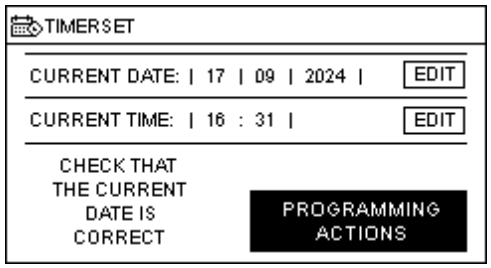


Making any change to a parameter in the IoT table shall mark that parameter with an "*" in front of the parameter name and prompt to reboot the IoT device when exiting the table menu.



15.7 TIMERSET

The TIMERSET page allows the user to schedule single or repeating scheduled actions.



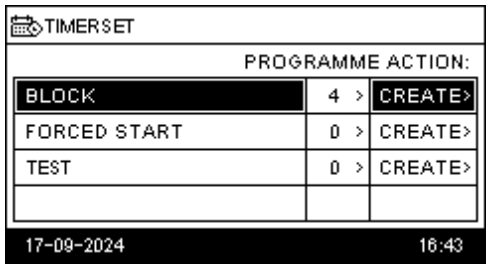
When accessing the “PROGRAM ACTIONS” menu via OK button, you can consult the number of programmed actions of each type and access the menu for creating each action.

15.7.1 CREATION OF NEW EVENTS

To access the CREATION OF NEW EVENTS, click on the “create” button of the desired type of action. This access is restricted to a Maintenance Level.

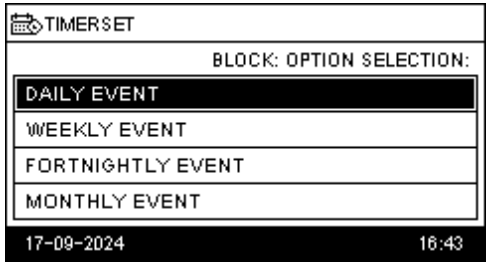
The actions that can be scheduled by timetable are (in order of priority):

- **Blocking:** Prevents the generator from starting and inhibits contactor activation.
- **Forced Start:** Starts the generator and activates the contactor.
- **Test:** Starts the generator without contactor activation.



Events can be programmed to repeat on a daily, weekly, fortnightly and monthly basis. To enter each menu, select it with ◄ ► ▲▼ and press the OK button.

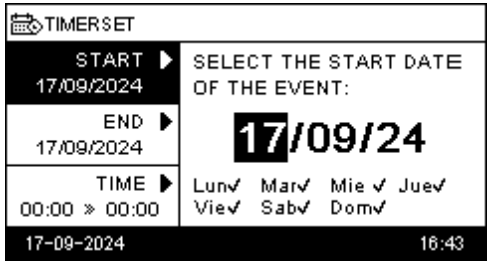
- **Single Event:** The scheduled action only happens on the start day.
- **Daily Event:** The scheduled action happens daily or every scheduled day of the week (e.g. every Monday and Tuesday) from the start day to the end day.
- **Weekly Event:** The scheduled action happens from the start date, every 7 days until the end date (e.g. Day 2, Day 9, ...).
- **Fortnightly Event:** The scheduled action happens from the start date, every 14 days until the end date (e.g. Day 5, Day 19, ...).
- **Monthly Event:** The scheduled action happens from the start date, every month until the end date (e.g. 4th of each month).



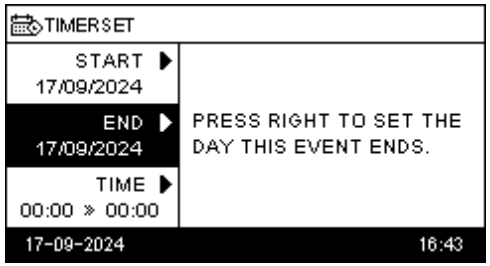
Once the repeat mode is selected, the start and end date (the event will be repeated with the set repetition if it is between the two specified dates), and the start and end times (times of day between which the scheduled action takes place) will be specified. The start time must always be before the end time; otherwise, the end time belongs to the day after the start time. Once the current date exceeds the end date, the event will be automaticaly deleted.

To select the start date, press the button ► with the cursor in the START section of the sidebar:

Once the date has been edited, to move between day, month and year, use the buttons ◄ ► and to edit it, use the buttons ▲▼. In the case of creating a daily event, pressing OK once the start date has been edited, accesses the selection of the days of the week on which the event will occur. To select the days of the week, move the cursor with the keys ◄ ► ▲▼ and select the day with the OK button. The programmed action will occur on those days with a ✓ (by default all days of the week). In the case of not selecting any day of the week, it will be considered a single event, the programmed action will only happen on the starting day.

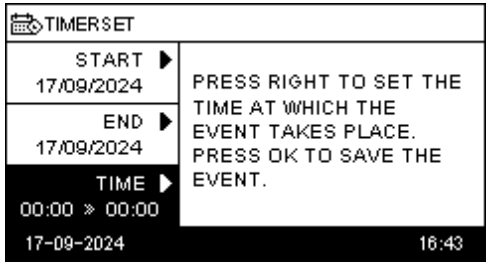


To select the end date, press the button ► with the cursor positioned in the END section of the sidebar:



Once you have accessed date editing, to move between day, month and year you must use the ◄ ► buttons and to edit it you must use the ▲▼ buttons. To exit the editing process, press BACK or OK.

Finally, to edit the time slot in which the action takes place, press the button ► with the cursor located in the TIME section of the sidebar:

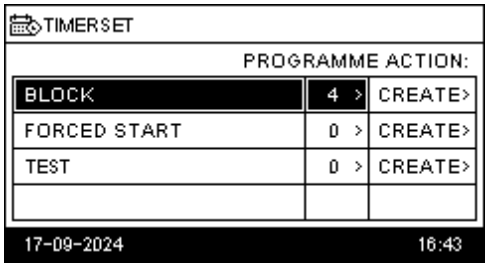


To edit the START TIME, use the ▲▼ keys to edit the value and the ◄ ► keys to move between hours and minutes. To switch to the end time, press OK.

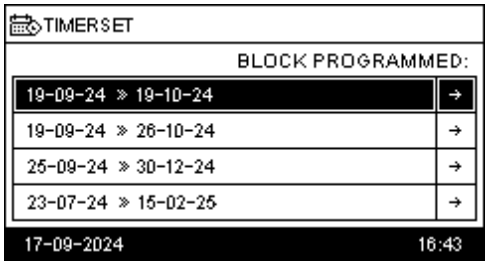
Once all the parameters have been edited, click OK on the TIME section of the sidebar to save the event.

15.7.2 CONSULTING, EDITING OR DELETING SAVED EVENTS

In the PROGRAM ACTION screen, the number of programmed actions of each type is displayed by the number to the right of the name of the action.



By pressing the OK button on this number, you can consult the list of programmed actions of a specific type and their start and end dates.

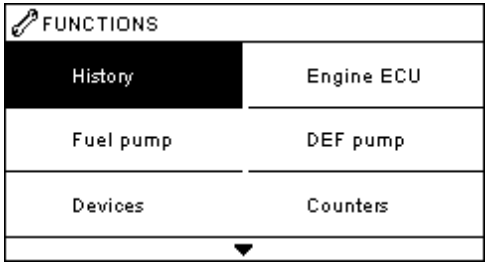


To access the details of each programmed event, simply press OK on the Event, displaying a table with the most relevant details. Press ▲▼ to navigate between the pages of the table. At the bottom of this table there are the options to edit or delete the selected event (restricted with Maintenance Level).

15.8 FUNCTIONS

The FUNCTIONS screen allows access to some tools to consult data or to modify and configure the controller. Within FUNCTIONS you will find:

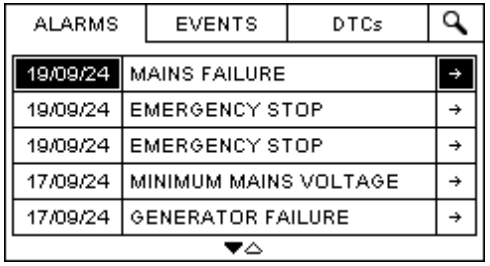
- **History:** Allows to consult the Alarms, Events and DTCs that have occurred, by date.
- **Engine ECU (Maintenance Level):** Allows querying of internal engine errors if the engine has ECU and J1939 communication.
- **Fuel pump:** Allows you to check the fuel level and the status of the transfer pump, if there is one. It also allows activation of the pump if it is in mixed or manual mode (if the user level is high enough).
- **DEF pump:** Allows to consult the DEF level and the status of the DEF pump if there is one. It also allows you to activate the DEF pump if you are in manual mode (if the user level is high enough).
- **Devices:** Allows you to consult the list of devices connected to the same CAN Bus of the controller and edit their ID (if the user level is high enough).
- **Counters:** Allows you to view the status of the Maintenance and Rental counters (and edit them if the user level is high enough).
- **GEOFENCE (Maintenance Level):** Displays the status of the Perimeter Thief Alarm and allows it to be configured.

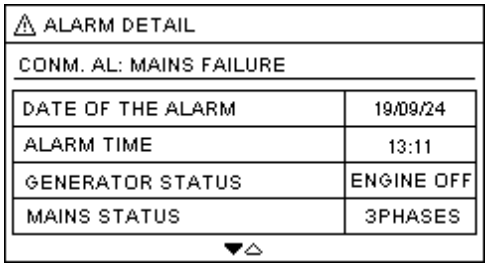


15.8.1 HISTORY

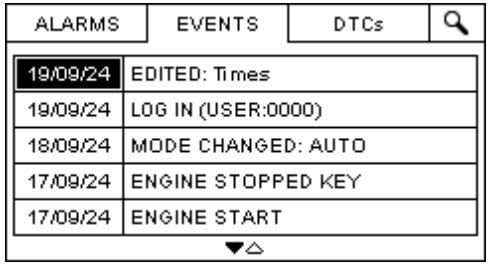
The HISTORY section is divided into 4 TABS: Alarms, Events, DTCs and Search by date, allowing the user to move between them with the ◄ ►.

ALARMS: Displays the log of alarms that have occurred up to a maximum of 1000 alarms and their date. It also allows access to the details of the first 100 alarms by pressing OK on one of them.

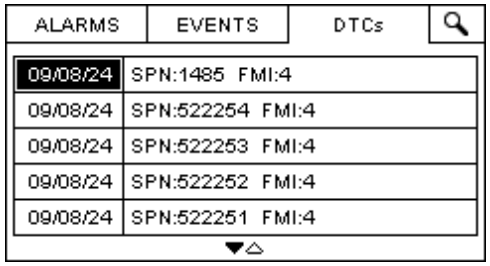




EVENTS: Displays the log of the last 1000 events that have occurred and their date.

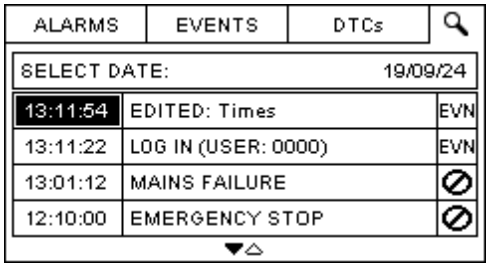


DTCs: Displays the log of the last 1000 DTCs that have been received and their date.



Search by date: Displays a log of ALARMS, EVENTS and DTCs that have occurred on a specific date.

To edit the search date, press the arrow ▲ when you are in the last record, in the first position of the table. Once you have accessed date editing, you can switch between day, month and year with the ◄ ► arrows, changing its value with ▲▼. Once the desired date has been selected, press OK to apply the changes or press BACK to return to the previously set date.



In this screen the icon on the right indicates whether it is an EVENT, ALARM, DTC...

- ⊘ : Indicates a Shutdown, an alarm that stops the engine.
- ⚠ : Indicates a Warning, an alarm that does not stop the engine.
- EVN : Indicates an EVENT.
- DTC : Indicates a DTC.

15.8.2 ENGINE ECU

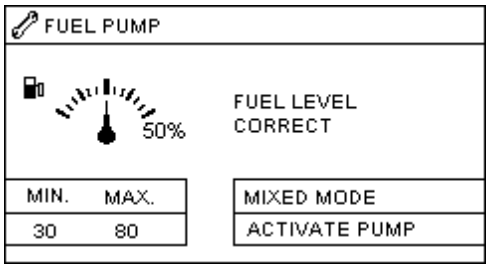
Within the ENGINE ECU screen, the list of DTCs (DM2) stored in the ECU can be viewed (if the engine has a J1939 communication interface). To access this you must have a Maintenance Level access.

To move through the list, press the ▲▼ keys, and access the details with the OK button.

15.8.3 FUEL PUMP

The FUEL PUMP section allows easy access to basic information about the transfer pump: fuel level, pump mode, minimum and maximum levels to start the pump in auto and mixed mode, button to activate/deactivate the pump in manual and mixed mode, pump status.

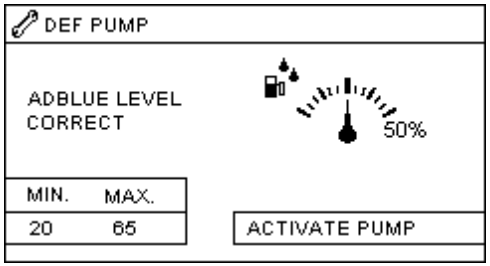
To access the pump on/off button, press the ►, ▼ or OK button. A Maintenance Level access is required to operate this button.



15.8.4 DEF PUMP

The DEF PUMP section allows easy access to basic DEF pump information: DEF level minimum and maximum levels to start the pump in auto mode, button to activate/deactivate the pump in manual mode, pump status.

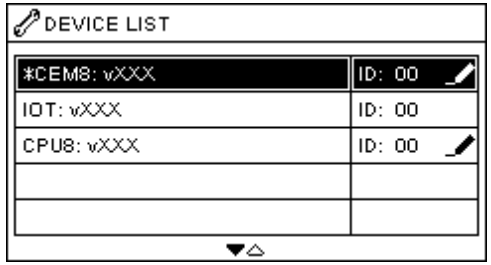
To access the pump on/off button, press the ►, ▼ or OK button. A Maintenance Level access is required to operate this button.



15.8.5 DEVICES

The DEVICES screen generates a list of all devices connected to the same CAN bus, their respective firmware versions and their CAN ID. The **CE8** device itself on which the screen is displayed will be shown with a "*" in front of its name.

By pressing OK you can access the editing of the ID of each device (Maintenance Level).



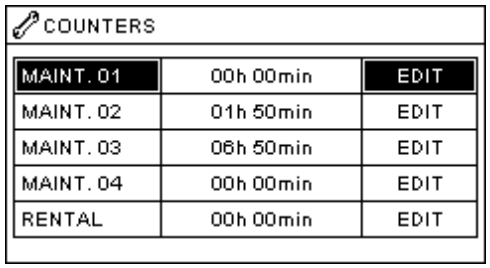
It is important to note that the IoT ID cannot be edited independently. This ID is directly linked to the ID of the corresponding display module. Editing the ID of a display module will change the ID of its assigned IoT at the same time.

NOTE

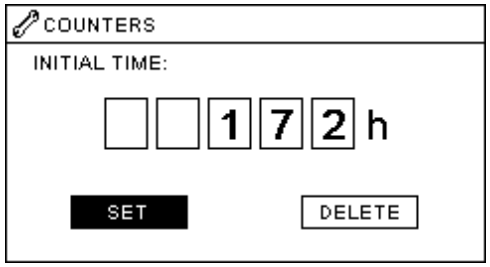
Important, changing the ID of a device will result in an automatic reboot of the device.

15.8.6 COUNTERS

The COUNTERS screen shows the value of the 4 Maintenance counters and the rental counter. The counter value will appear negative and blinking if the counter has expired (the value will then be that of the time that has elapsed since it expired).



Pressing OK on a counter will give access to editing it (if you have Administrator Level or higher), allowing you to change the initial time of the counter (maximum 65535 h) by pressing SET, or to delete the counter by pressing DELETE. To move between the digits of the initial time of the counter, press the buttons ◄ ► and to raise or lower this digit, press ▲▼.Once the desired time has been entered, press OK to access the "Set" button (saves the time in the counter) or "Delete" (deletes the counter).



15.8.7 GEOFENCE

The GEOFENCE screen displays the most influential parameters for the perimeter anti-theft system (GEOFENCE) to function correctly. To access this screen it is necessary to have a Maintenance Level.

The display shows information about the GEOFENCE status (On/Off), the stored reference position for the anti-theft device, the GPS status and the number of satellites that are available to obtain the position.

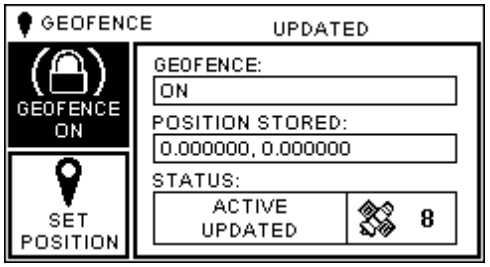
The navigation of this screen consists of 2 buttons: “Turn GEOFENCE On/Off” and “Set Position”.

- **GEOFENCE On/Off**: Pressing the OK button on this button changes the status of the GEOFENCE from ON to OFF and vice versa. Pressing this option automatically restarts the IOT device, which usually takes no more than 10 seconds. Repeatedly pressing the button too often may therefore result in the status change not being performed correctly.

  Important: This button does not perform any action if there is already an input programmed as “Geofence Enable” (Feature 33).

- **Set Position:** This button allows the current position of the generator to be set as the reference position for the anti-theft device. In the same way as the previous one, this change of status performs a reset of the IOT device.
- In this case the button still maintains its function, even if there is an input configured as “Geofence Programming” (Feature 34).

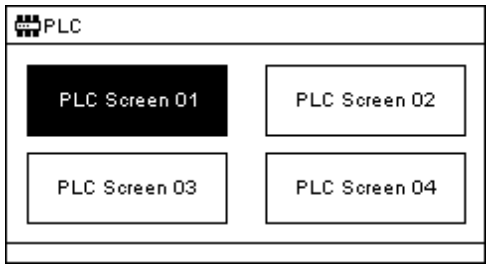
  Important: For the current position to be set as a reference location, the GPS must be active and up-to-date.



15.9 PLC

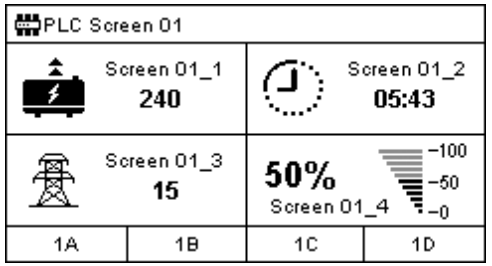
The PLC screen is divided into four separate screens with 4 customisable widgets for each.

To access each of the screens you must move with the buttons ◄ ► ▲▼ and press OK to enter.



15.9.1 PLC SCREENS

These screens are each divided into 4 widgets and 4 customisable buttons:



Pressing the ◄ ► buttons moves the cursor between the lower buttons (1A, 1B, 1C and 1D). The text of these buttons can be customised from Genset WorkBench.

In addition to the 16 buttons on the displays (4 buttons x 4 displays), the multifunction button on the front panel of the CEM8 can be programmed as a PLC input (Interface Table, parameter 4). In doing so, the multifunction button will do the same action as the 16 buttons mentioned above and will be managed from the PLC programming. In addition, when the multifunction button is programmed with this functionality, the LED corresponding to this button will also be managed from the PLC operation.

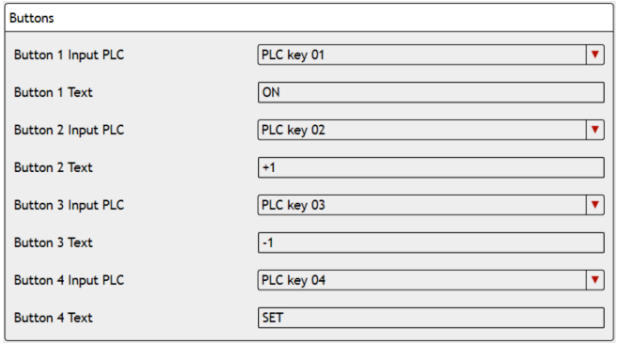
Beyond this, the operation of the PLC depends exclusively on the program that the user has developed.

NOTE

If there is any failure in the PLC execution, the icon will be displayed in all those screens where it is possible.

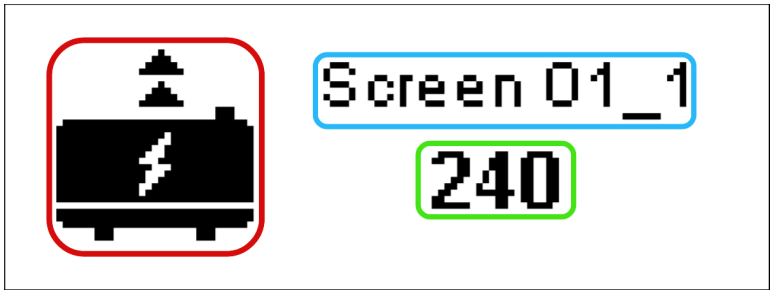
15.9.2 CUSTOMISATION OF BUTTON TEXTS

To customise the text of the buttons, you must access the section PLC Control Screen in Genset WorkBench. Once there, modify the text of the desired button and click on write parameters:



15.9.3 CUSTOMISATION OF WIDGETS

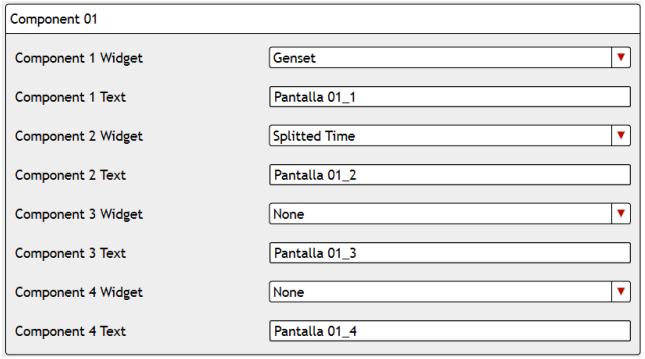
To customise widgets, you first need to understand what parts they are made up of. Below there is an image of a typical widget with its parts marked with different colours:



As you can see, the widget has a **customisable image**, a **customisable text** and the value of the **assigned variable**.

The customisable text has a maximum of 13 characters and to modify it you only have to access the same Genset WorkBench tab where the buttons are customised (PLC/Screen0X) and look for the Component section. Once in this point, edit the text in the “Text” box of the component you wish to edit, being 1 the upper left widget, 2 the upper right widget, 3 the lower left widget and 4 the lower right widget.

From this same point, the image of the widget in question is edited. To do this, select the desired option from the drop-down menu in the “Widget” box:



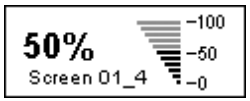
It should be noted that, although most widgets maintain the same distribution, there are some that have different distributions or ways of representing the variable. The possible widgets are listed below and an example of each is shown:

1. Generator: Displays the data next to a generator image.

2. Grid: Displays the data next to a grid image.

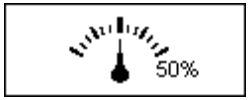
3. Lightning: Displays the data next to an image of a lightning bolt.

4. Percentage Bars: This widget has a different structure to the usual one. It shows the data as a percentage by painting bars to mark the percentage between 0 and 100.



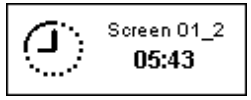
5. Engine: Displays the data next to an image of an engine.

6. Speedometer percentage: This widget has a different structure than usual. It displays the data as a percentage by moving a needle on a speedometer-style indicator. Custom text is not shown in this widget.



7. Time: Displays the data nexto to an image of a clock.

8. Split time: Displays the data next to an image of a clock. In this widget the data is divided by 60, showing the result on the left side of the colon and the rest on the right side. In this way, if the variable shown is in seconds, it will be automatically calculated to be divided into minutes and seconds. If it is minutes, it will be divided into hours and minutes.



9. Maintenance: Displays the data next to an image of some tools.

10. Alarm: Displays the data next to an alarm image.

Finally, the variable is always placed in the same place in the widget. The value is assigned to the variable directly from the PLC programming. For more information see the **LogicLab** manual.

15.10 COMMUNICATIONS

The COMMUNICATIONS screen allows the user to view the most important data for MODBUS RTU, MODBUS TCP and SNMP communications.

To navigate between the different types of communication, press the ▲▼ arrows and to access the display of the data, press the OK button.

It is important to note that this page does not allow to edit any parameters, it only allows to view them. To edit parameters, consult the CONFIGURATION page.

15.11 IOT

The IOT screen has very similar characteristics to the COMMUNICATIONS screen. This screen allows the display of the IOT device data, ETHERNET, MODEM, GPS, HG, anti-theft and low power parameters.

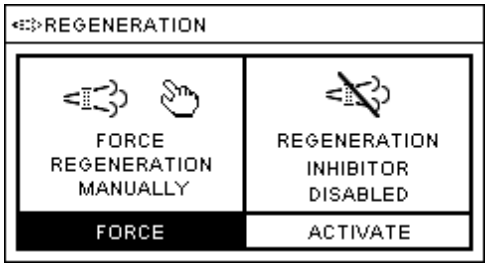
In the same way, to navigate through the IOT screen, press the ▲▼ buttons and access the details of each section by pressing OK.

It is important to note that this page does not allow you to edit any parameters, it only allows you to view them. To edit parameters, consult the CONFIGURATION page.

15.12 REGENERATION

To access the REGENERATION screen it is necessary to have an access level of Maintenance or higher.

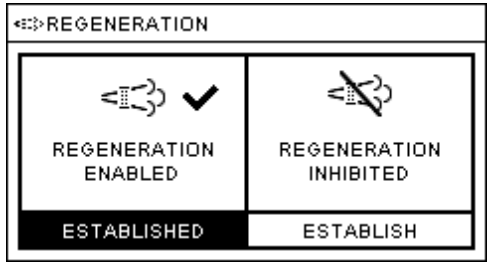
The REGENERATION screen allows the forced regeneration of the particulate filter to be activated or inhibited. To choose between these two options move the cursor with ◄ ► and press OK to enter.



15.12.1 INHIBITION OF REGENERATION

The screen for inhibiting regeneration has a very similar structure to the previous one. In the same way, to move between the options “Regeneration Enabled” / “Regeneration Inhibited” the ◄ ► keys must be used and each option can be selected with the OK button.

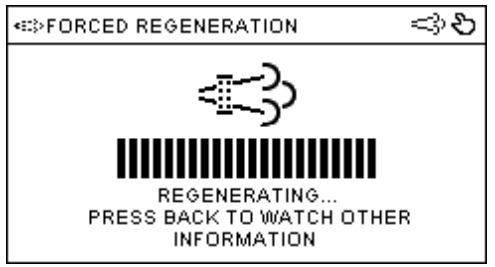
The “Check” icon indicates which option is currently selected (in the following image regeneration is enabled).



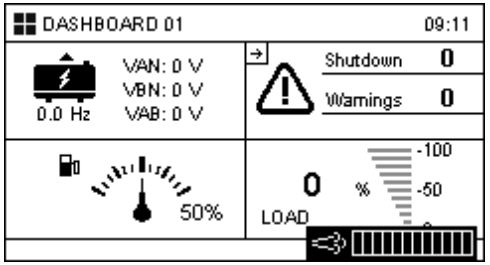
15.12.2 FORCE REGENERATION

The screens to force the regeneration of the particulate filter are organised in a single navigation thread, so that you only have to go by pressing the OK button, checking the steps described to perform the regeneration. Some screens will not allow you to proceed to the next step until the steps are completed correctly.

At the end of the regeneration thread, a progress bar is accessed showing the status of the regeneration. At this point the regeneration has started and other screens can be accessed by pressing the BACK or HOME button. The thread can be exited at any time by pressing the same buttons.



Similarly, a bar indicating the status of the regeneration will be displayed on all screens (as long as it does not cover relevant information).

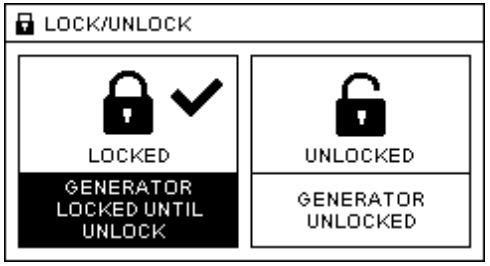


15.13 LOCK/UNLOCK (CEA only)

LOCK/UNLOCK allows to enable or disable the controller's lock mode. User Level or higher is required to access this screen.

To activate or deactivate the lock mode, the ◄ ► keys must be used to move between the options, and the OK button can be pressed to activate the selected function. The current status of the controller is marked with a "check" in the corresponding option.

If the controller is not set to automatic mode, it shall not be allowed to activate the lock mode.

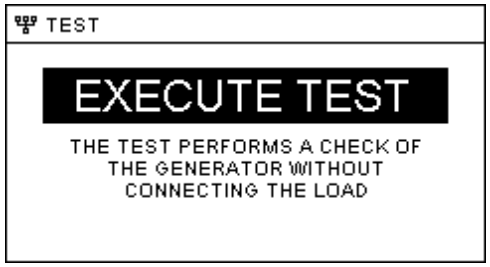


15.14 TEST (CEA only)

With the TEST page you can activate or deactivate the generator test. To access this screen a User Level or higher is required.

This screen consists of a single button that shows if the test can be executed, or if it is already active and can be stopped. To access this button, just press the OK button and, by pressing the same button again, its function will be activated.

If the controller is not set to automatic mode, the button to activate the test cannot be accessed.

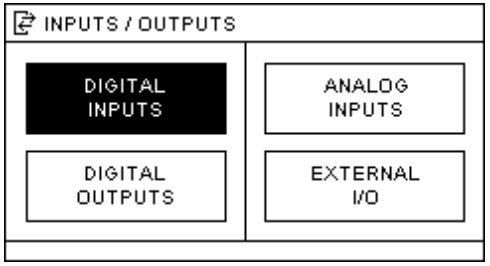


15.15 INPUTS / OUTPUTS

The INPUTS / OUTPUTS screens allow you to easily view and understand the status of inputs and outputs, their configuration, whether they are assigned and whether they are active.

This menu is divided into 4 main screens:

- Digital Inputs.
- Digital outputs.
- Analog inputs.
- External Inputs and Outputs.



To scroll through the available options, use the keys ◄ ►▲▼ and to access each one, press the OK button.

15.15.1 DIGITAL INPUTS

The DIGITAL INPUTS menu lists the inputs with their respective functionality, if any. In addition, it is shown on the right side of the list whether these inputs are active or not.

To scroll through the list, press the ▲▼ buttons.

15.15.2 DIGITAL OUTPUTS

The DIGITAL OUTPUTS menu lists the outputs with their respective functionality, if any. In addition, it is shown on the right side of the list whether these outputs are active or not.

To scroll through the list, press the ▲▼ buttons.

15.15.3 ANALOG INPUTS

When accessing the ANALOG INPUTS menu, all the analog inputs are listed, the 4 analog inputs of the controller itself and the 16 possible external analog inputs.

The “VAL” column shows the actual value measured by the sensor and the “Ud” column shows the units depending on whether it is a resistive, voltage or current sensor.

To scroll through this list, press the ▲▼ buttons.

15.15.4 EXTERNAL I / O

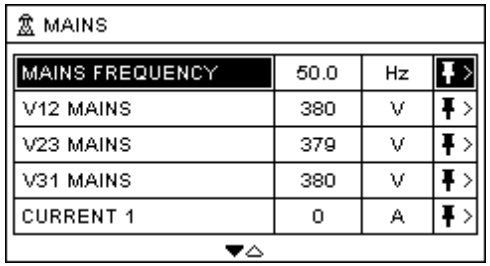
The EXTERNAL I/O menu displays the external digital inputs and external digital outputs divided into two tabs. The first tab displayed is the EXTERNAL INPUTS tab while the EXTERNAL OUTPUTS tab can be accessed by pressing the ► button. Once in this tab, to return to the inputs, just press the ◄ button.

Each tab shows the inputs or outputs with their respective functionalities and their status respectively.

15.16 MAINS (CEA and CEM + CEC only)

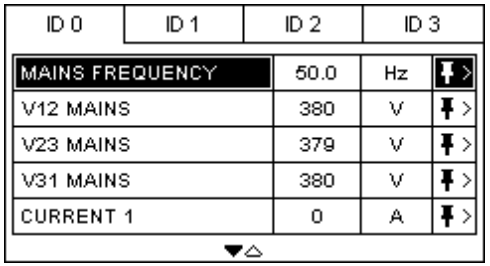
On the mains page there is a table with the most important measurements of the grid, such as Voltages, currents, powers...

To scroll through the list, press the ▲▼ buttons. The measures that have a black pin on the right can be set as a widget on the Dashboard. By pressing OK, this widget will be set to the first position on the second screen of the dashboard (if you have at least User Level).



Those measures whose pins are greyed out cannot be set in the Dashboard as they do not have a widget assigned to them.

In the case of having an EMF configuration with multiple CECs, the screen is divided into tabs (one per connected CEC) showing the ID configured on each CEC.



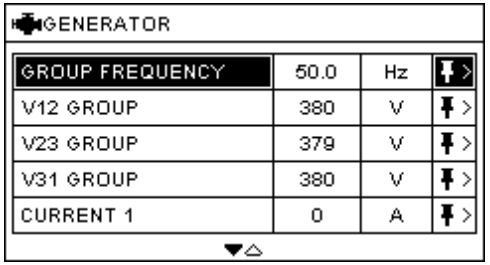
You can scroll through the tabs to view the measurements for each CEC by pressing the ◄ ► buttons.

15.17 GENERATOR

The GENERATOR page shows a table with the most important measurements of the generator set, such as voltages, currents, power...

The generator screen can be accessed from the main navigation of the control panel or via the multifunction button if it has been configured with the functionality 6 “Shortcut (Generator)”.

To scroll through the list, press the ▲▼ buttons. The measures that have a black pin on the right can be set as a widget on the Dashboard. By pressing OK, this widget will be set to the first position on the second screen of the dashboard (if you have at least User Level).



Those measures whose pins are greyed out cannot be set in the Dashboard as they do not have a widget assigned to them.

15.18 ENGINE

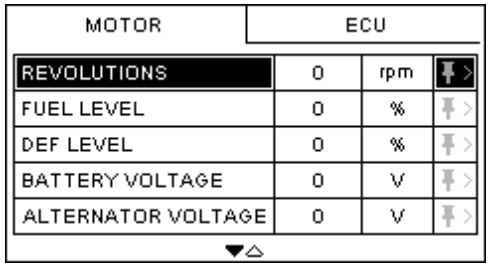
The ENGINE page may or may not be split into two tabs depending on whether the configured engine has an ECU and J1939 communication. If it does, the page will be divided into 2 tabs (ENGINE and ECU), otherwise, the display will only show the ENGINE listing.

The engine screen can be accessed from the main navigation of the control unit or via the multifunction button if this has been configured with functionality 6 “Shortcut (Engine)”.

15.18.1 ENGINE TAB

The ENGINE TAB displays the most important engine variables such as speed, fuel level, alternator voltage, oil pressure...

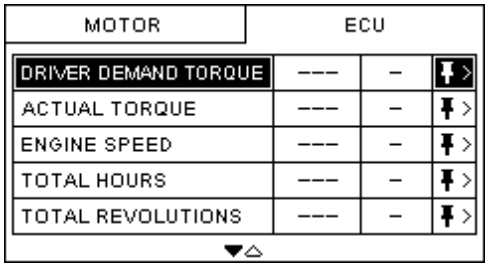
To scroll through the list, press the ▲▼ buttons. The measures that have a black pin on the right can be set as a widget on the Dashboard. By pressing OK, this widget will be set to the first position on the second screen of the dashboard (if you have at least User Level).



15.18.2 TAB ECU

The ECU tab displays the fixed ECU variables followed by a series of 16 customisable variables (PGN). These variables must be configured in the corresponding parameter table (J1939).

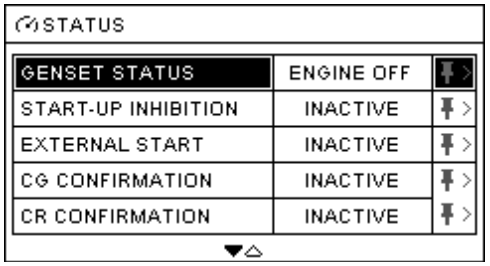
To scroll through the list, press the ▲▼ buttons. The measures that have a black pin on the right can be set as a widget on the Dashboard. By pressing OK, this widget will be set in the first position of the second screen of the Dashboard (if you have at least User Level).



15.19 STATUS

The STATUS page allows you to view the most important variables of the general status of the controller, such as the status of the engine, the external start "input", the confirmation of the contactors...

You can scroll through this list with the ▲▼ buttons. The states in the list that have a black pin on the right side can be set as a widget on the Dashboard. By pressing OK, this widget will be set to the first position on the second screen of the dashboard (if you have at least User Level).



Those measures whose pins are greyed out cannot be set in the Dashboard as they do not have a widget assigned to them.

15.20 ALARMS

The ALARMS page allows you to view active and reported alarms and DTCs.

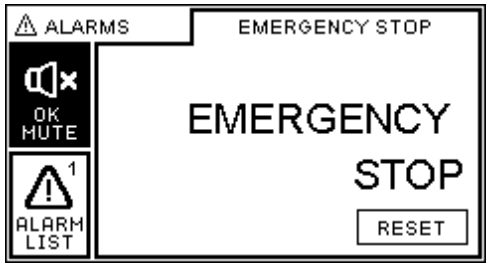
This page is divided into two screens: the main screen and the list.

15.20.1 MAIN SCREEN

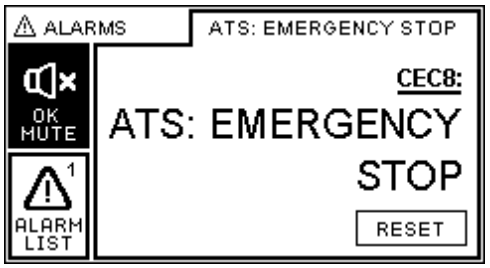
This screen is automatically displayed when an alarm occurs or can be accessed from HOME. It shows the last alarm or DTC that has occurred or, in the case of selecting an alarm from the list, it will show this alarm.

This screen can also be accessed directly by pressing the multifunctional button on the front panel if it has been configured with the functionality 4 "Shortcut (Alarms)".

If an alarm is received, the display will flash and an alarm sound will be produced (if the controller is not in mute mode). Press the OK MUTE button at the top left to silence the alarm and, once this step is done, you can move the cursor to the RESET button with the ► button, to notify the alarm (if it is no longer active), or move the cursor to the ALARM LIST button to consult the list of active/unreported alarms and DTCs.



In case of a CEM8 + CEC8 configuration in integrated mode, alarms from connected CEC8s shall also be displayed. Alarms from CEC8s shall be displayed with a header "CEC8:" just above the alarm name.



NOTE

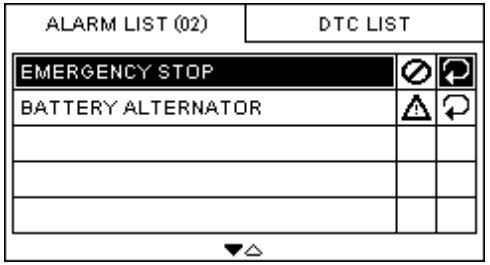
Alarms from the CEC8 controller cannot be reported from the CEM8 controller.

15.20.2 ALARM LIST

This screen is divided into two tabs: ALARMS LIST and DTCs LIST. In each of the tabs the alarms and unreported DTCs are displayed respectively.

You can move from the alarm tab to the DTCs tab with the ► button and in the opposite direction with the ◄ button.

To scroll through the list, use the ▲▼ keys while pressing OK will take you to the main screen of the selected alarm and you can notify it by pressing the RESET button. Another way of notifying an alarm is directly from the list, accessing with the cursor to the icon and pressing OK.



15.21 REGENERATION STATUS

While navigating through the different pages of the controller, certain pictograms may be displayed at the top of the screen. These are responsible for informing about the status of the particulate filter regeneration, if you have an engine with particulate filter regeneration.

Table Icons YANMAR regeneration functionality

Description	Icon	Value
Diesel Particulate Filter Lamp SPN: 3697		OFF
		ON
		ON (flashing)
Amber Warning Lamp (REOP3)		Amber warning lamp active
Filter Active Regeneration Status NORMAL-SPN 3700 FORCED-SPN 4175 INHIBITED-SPN 3703		Dormant regeneration
		Active regeneration
		Inhibition of active regeneration
		Forced regeneration
Exhaust System High Temperature SPN: 3698		High temperature (flashing)
NOx Control Diagnostic System (only STAGE V)		Diagnosis NCD (NOx)
Safety Mode By Interlock		Active safety conditions for forced regeneration request

Table IVECO regeneration functionality icons

Description	Icon	Value
EGR/DPF operator inducement severity Sytem tampering lamps		Not available
		First level
SCR inducement Lamps DEF Quality Lamps DEF Level Lamps		Second level/Last level. **Blink**
Soot level (Diesel particulate filter status) SPN 3701		LOW HOLLIN LEVEL: Regeneration not required
		HOLLIN MEDIUM LEVEL: Regeneration required, moderate level
		HOLLIN HIGH LEVEL: Regeneration required, high level
		HOLLIN CRITICAL LEVEL: Regeneration required, critical level. **Blink**
Thermal treatment SPN 3697 SPN 3700 (Forced) SPN 3712 (Inhibition)		DPF Active forced regeneration
		DPF Active regeneration inhibition
		DPF Automatic idle regeneration
		DPF Active automatic regeneration
Exhaust system high temperature (HEST) SPN: 3698		High catalyst temperature
HC burn off		Engine speed not reduced
		Reduced engine speed. First level of HC accumulation
		Reduced engine speed. Second level or higher of HC accumulation. **Blinking**

Table Icons SCANIA regeneration functionality

Description	Icon	Value
Diesel Exhaust Fluid Level SPN 5245		No urea fluid level warnings
		Moderate warning of urea fluid refilling
		Severe warning of urea fluid refill/empty urea tank. **Flashing**
Soot level (Diesel particulate filter status) SPN 3701		LOW HOLLIN LEVEL: Regeneration not required
		AVERAGE HOLLIN LEVEL: Regeneration required
		HOLLIN HIGH LEVEL: Regeneration required, moderate level
		HOLLIN CRITICAL LEVEL: Regeneration required, high level. **Blink**
Thermal Treatment SPN 3697 SPN 3700 (Forced)		Active forced regeneration
		Inhibition of active regeneration
		Dormant regeneration
		Automatic regeneration
Exhaust system high temperature (HEST) SPN: 3698		High catalyst temperature
Emission-ODB inducement failure		Emissions failure: dosing error, urea quality, monitoring failure, or NOx sensor failure

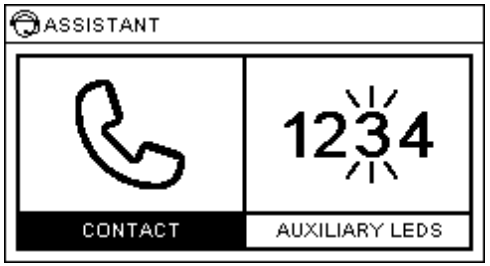
NOTE

In addition to the regeneration icons, the PLC program failure icon can also be displayed.

15.22 ASSISTANT

The ASSISTANT can be easily accessed by pressing the button from any screen.

When accessing the main menu of the assistant, you can select between CONTACT and AUXILIARY LEDs:



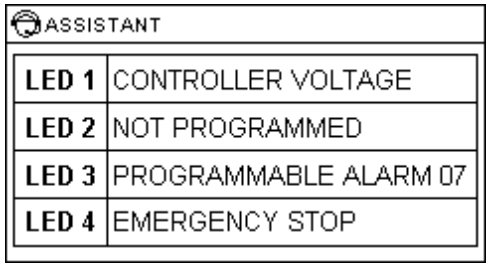
15.22.1 CONTACT

When clicking on CONTACT, the screen of the manufacturer that has been imported will be displayed. If no screen has been imported, the HIMOINSA manufacturer screen will be displayed by default.

You can include the data (telephone, mail, ...) in the imported image to facilitate the contact from this screen.

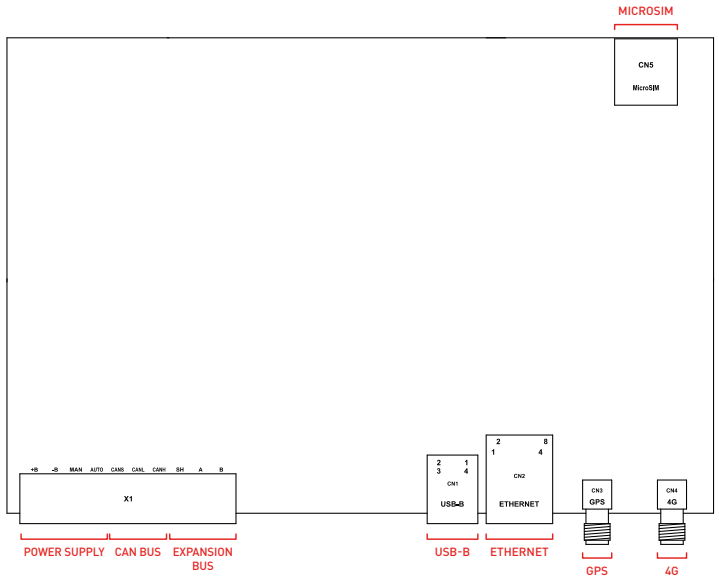
15.22.2 AUXILIARY LEDS

The AUXILIARY LEDS screen shows a table with the configuration of each of the 4 auxiliary LEDs on the front panel of the interface.

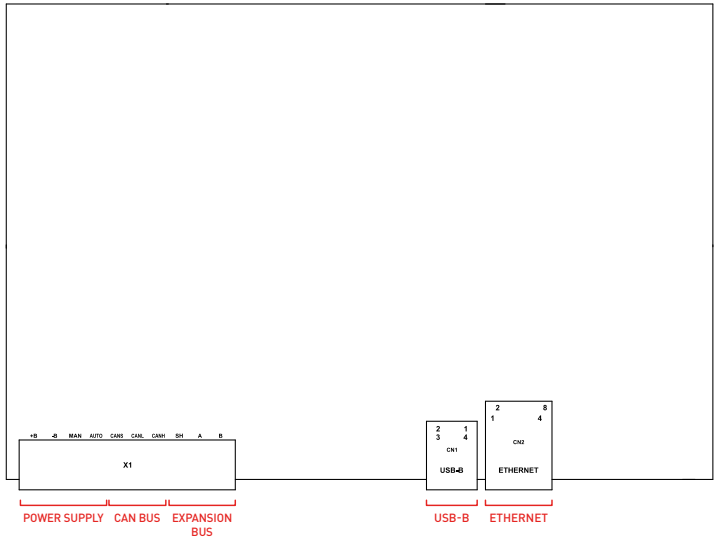


16. ANNEX V: DIMENSIONS, WIRING AND MECHANICAL PARTS

16.1 CE8 INTERFACE

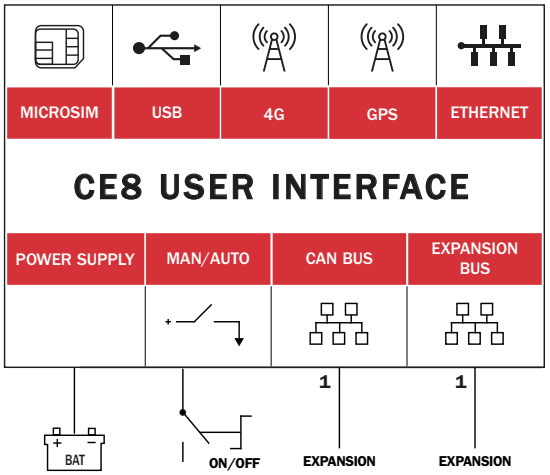


CE8 interface

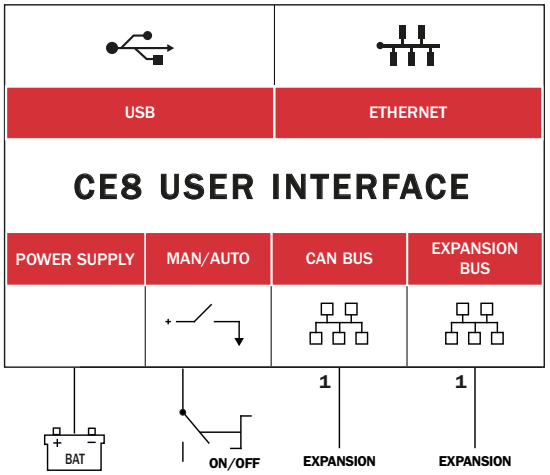


CE8 interface without modem

16.1.1 INSTALLATION AND WIRING



CE8 user interface connection



CE8 user interface connection without modem

16.1.2 INPUTS AND OUTPUTS

Signal	Description	Type	Characteristics
POWER SUPPLY			
+B	Positive power supply	Power supply	Power supply voltage of the module
-B	Power supply negative	Power supply	Power supply voltage of the module
MAN	Manual	Input	PNP digital start-up input
AUTO	Automatic	Input	PNP digital start-up input
CAN BUS			
CANS	CAN1 bus display	CAN bus	CAN Communication
CANL	CAN1 bus signal L	CAN bus	CAN Communication
CANH	CAN1 bus H-signal	CAN bus	CAN Communication
RS485 BUS			
SH	RS485 bus display	RS485 bus	RS485 communication
A	RS485 bus signal A	RS485 bus	RS485 communication
B	RS485 bus signal B	RS485 bus	RS485 communication
USB			
USB	USB-B port	USB	USB device 2.0 port
ETHERNET			
ETHERNET	Ethernet port	Ethernet	100BaseTX Ethernet port
GPS			
GPS	GPS antenna	Antenna	SMA connector GPS antenna
4G			
4G	4G antenna	Antenna	4G antenna SMA connector
MICRO SIM			
MicroSIM	MicroSIM card	MicroSIM	Push-push socket for MicroSIM card

It is recommended to use 1 mm^2 cross-section cable for power supply to the module.

The equipment must be isolated or disconnected before making the voltage input connection for the generator, as there is a risk of danger.

For the connections it is recommended to use 1 mm^2 cross-section cable.

The module should be mounted on the front of an electrical panel with limited tool access, which is used outdoors, if possible in the centre for easy wiring.

No special ventilation requirements are needed due to the low power consumption of the module.

16.1.3 ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
POWER SUPPLY (terminals +B, –B)						
+B	Power supply voltage of the module		8	12/24	36	VDC
I_{+B}	Power supply current	+B = 12V			1250	mA
I_{+B}	Power supply current	+B = 24V			625	mA
P_{+B}	Power consumed				15	W
$+B_{RES}$	Power supply module resolution measurement			0,1		V
PNP DIGITAL INPUTS (terminals MAN, AUTO)						
V_{IN}	Voltage input		0		36	V
V_{IL}	Input voltage at low level				1	V
V_{IH}	Voltage input at high level		8			V
I_{IL}	Input current at low level	V_{IN} = 0 V		100	125	uA
I_{IH}	Input current at high level	V_{IN} = 12 V		1	1,25	mA
CAN BUS (terminals CANS, CANL, CANH)						
DR_{CAN}	Transmission speed			50		Kbps
L_{CAN}	Bus length				200	m
N_{CAN}	Number of nodes				8	nodes

• Electrically isolated CAN bus.
• Recommended cables:
  • Belden 3105A - 1 pair 22AWG shielded multi-conductor cable.
  • Belden 9481 - 1 pair 24AWG shielded multicore cable.						

RS485 BUS (terminals SH, A, B)						
DR_{RS485}	Transmission speed			9600		Kbps
L_{RS485}	Bus length				200	m
N_{RS485}	Number of nodes					nodes

• Electrically isolated RS485 bus.
• Recommended cables:
  • Belden 3105A - 1 pair 22AWG shielded multi-conductor cable.
  • Belden 9481 - 1 pair 24AWG shielded multicore cable.						

NPN DIGITAL INPUTS (terminals IN1, IN2, IN3, IN4)						
V_{IN}	Voltage input		0		36	V
V_{IL}	Input Voltage at low level				1	V
V_{IH}	Voltage input at high level		8			V
I_{IL}	Input current at low level	V_{IN} = 0 V			12	mA
I_{IH}	Input current at high level	V_{IN} = +B		100	125	uA

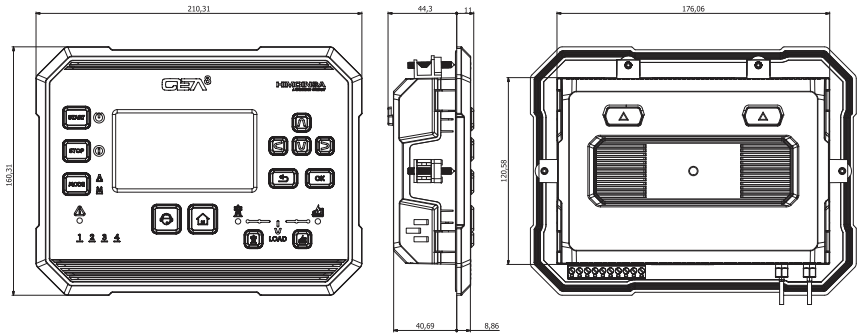
Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
PNP DIGITAL OUTPUTS (terminals OUT1, OUT2, OUT3, OUT4)						
V_{OUT}	Voltage output	I_{OUT} = 0		+B		V
I_{OUT}	Output current $I_{01} + I_{02} + I_{03} + I_{04}$				1	A
$I_{OUT, TOTAL}$	Output current $I_{01} + I_{02} + I_{03} + I_{04}$				4	A
ENVIRONMENTAL CONDITIONS AND ENCLOSURE PROTECTION						
T^a	Operating temperature		-20		+70	ºC
H_R	Relative humidity	Without condensation			80	%
	IP degree of protection			65		

NOTE

IP 65 on the front of the control panel when installed with the supplied sealing gasket.

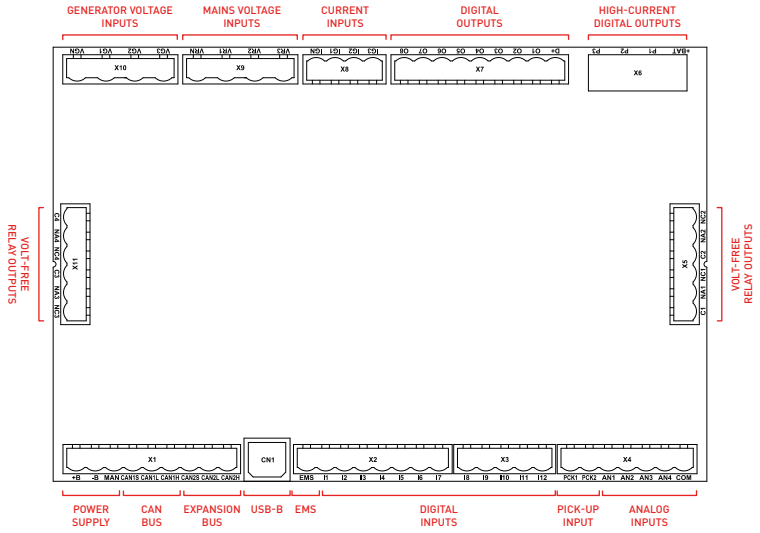
All voltage measurements are referenced to terminal -B except where expressly stated.

16.1.4 DIMENSIONS

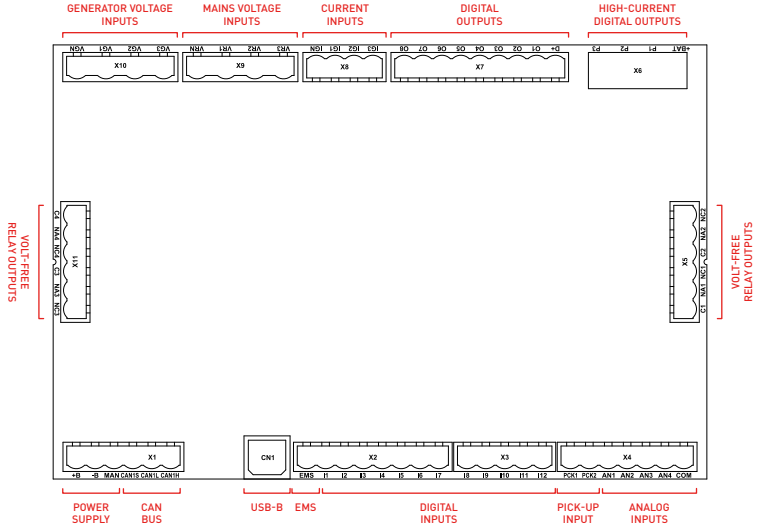


CE8 interface dimensions

16.2 CPU8 CONTROLLER

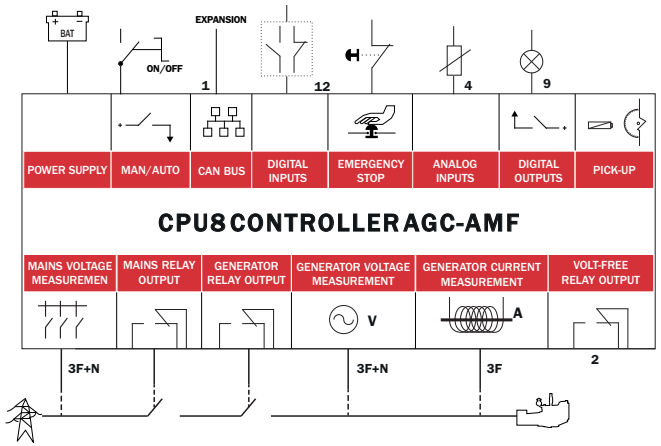


CPU8J controller

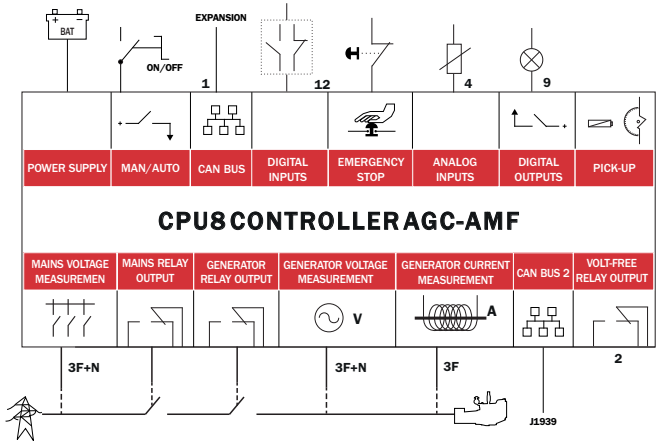


CPU8 controller

16.2.1 INSTALLATION AND WIRING



Connection of CPU8 controller



Connection of CPU8J controller

16.2.2 INPUTS AND OUTPUTS

Signal	Description	Type	Characteristics
POWER SUPPLY			
+B	Positive power supply	Power supply	Power supply voltage of the module
-B	Power supply negative	Power supply	Power supply voltage of the module
MAN	Manual	Input	PNP digital start-up input
CAN1 BUS			
CAN1S	CAN1 bus display	CAN bus	CAN Communication
CAN1L	CAN1 bus signal L	CAN bus	CAN Communication
CAN1H	CAN1 bus H-signal	CAN bus	CAN Communication
CAN2 BUS (J1939)			
CAN2S	CAN2 bus display	CAN bus	CAN communication (only CPU8J)
CAN2L	CAN2 bus signal L	CAN bus	CAN communication (only CPU8J)
CAN2H	CAN2 bus signal S	CAN bus	CAN communication (only CPU8J)
USB			
USB	USB-B port	USB	USB device 2.0 port
DIGITAL INPUT FOR STOP			
EMP	Stop input	Input	NPN digital input
NPN DIGITAL INPUTS			
I1	Input 1	Input	NPN digital input
I2	Input 2	Input	NPN digital input
I3	Input 3	Input	NPN digital input
I4	Input 4	Input	NPN digital input
I5	Input 5	Input	NPN digital input
I6	Input 6	Input	NPN digital input
I7	Input 7	Input	NPN digital input
I8	Input 8	Input	NPN digital input
I9	Input 9	Input	NPN digital input
I10	Input 10	Input	NPN digital input
I11	Input 11	Input	NPN digital input
I12	Input 12	Input	NPN digital input
MAGNETIC PICK-UP INPUT			
PCK1	Pick-up 1	Analog input	Magnetic pick-up input
PCK2	Pick-up 2	Analog input	Magnetic pick-up input

Signal	Description	Type	Characteristics
ANALOG INPUTS			
AN1	Input AN1	Analog input	Resistive sensor analog input / voltage / current
AN2	Input AN2	Analog input	Resistive sensor analog input / voltage / current
AN3	Input AN3	Analog input	Resistive sensor analog input / voltage / current
AN4	Input AN4	Analog input	Resistive sensor analog input / voltage / current
COM	Common analog inputs	Common	Common analog sensors
HIGH CURRENT DIGITAL OUTPUTS			
+BAT	Positive power supply	Power supply	Voltage power supply digital outputs
P1	Output 1	Output	PNP digital output
P2	Output 2	Output	PNP digital output
P3	Output 3	Output	PNP digital output
ALTERNATOR EXCITATION INPUT / OUTPUT			
D+	D+ signal	Input / output	Battery charging alternator excitation
DIGITAL OUTPUTS			
O1	Output 1	Output	NPN digital output
O2	Output 2	Output	NPN digital output
O3	Output 3	Output	NPN digital output
O4	Output 4	Output	NPN digital output
O5	Output 5	Output	NPN digital output
O6	Output 6	Output	NPN digital output
O7	Output 7	Output	NPN digital output
O8	Output 8	Output	NPN digital output
THREE-PHASE CURRENT INPUT			
IGN	Neutral current	Input	Analog current measurement input
IG1	Intensity phase R	Input	Analog current measurement input
IG2	Intensity phase S	Input	Analog current measurement input
IG3	Intensity phase	Input	Analog current measurement input
THREE-PHASE GRID VOLTAGE INPUT			
VRN	Neutral	Input	Voltage measurement analog input
VR1	Voltage phase R	Input	Voltage measurement analog input
VR2	Voltage phase S	Input	Voltage measurement analog input
VR3	Voltage phase T	Input	Voltage measurement analog input

Signal	Description	Type	Characteristics
THREE-PHASE GENERATOR VOLTAGE INPUT			
VGN	Neutral	Input	Voltage measurement analog input
VG1	Voltage phase R	Input	Voltage measurement analog input
VG2	Voltage phase S	Input	Voltage measurement analog input
VG3	Voltage phase T	Input	Voltage measurement analog input
VOLTAGE-FREE RELAY OUTPUT			
C1	C contactor	Output	Voltage free relay output
NA1	NO contactor	Output	Voltage free relay output
NC1	NC contactor	Output	Voltage free relay output
C2	C contactor	Output	Voltage free relay output
NA2	NO contactor	Output	Voltage free relay output
NC2	NC contactor	Output	Voltage free relay output
C3	C contactor	Output	Voltage free relay output
NA3	NO contactor	Output	Voltage free relay output
NC3	NC contactor	Output	Voltage free relay output
C4	C contactor	Output	Voltage free relay output
NA4	NO contactor	Output	Voltage free relay output
NC4	NC contactor	Output	Voltage-free relay output

16.2.3 ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
POWER SUPPLY (terminals +B, –B, +BAT)						
+B	Power supply voltage of the module		8	12/24	36	VDC
+BAT	Power supply voltage outputs		8	12/24	36	VDC
I_{+B}	Power supply current	+B = 12 V			833	mA
I_{+B}	Power supply current	+B = 24 V			417	mA
P_{+B}	Power consumed				10	W
$+B_{RES}$	Power supply module resolution measurement			0,1		V
$+BAT_{RES}$	Power supply power supply output resolution			0,1		V

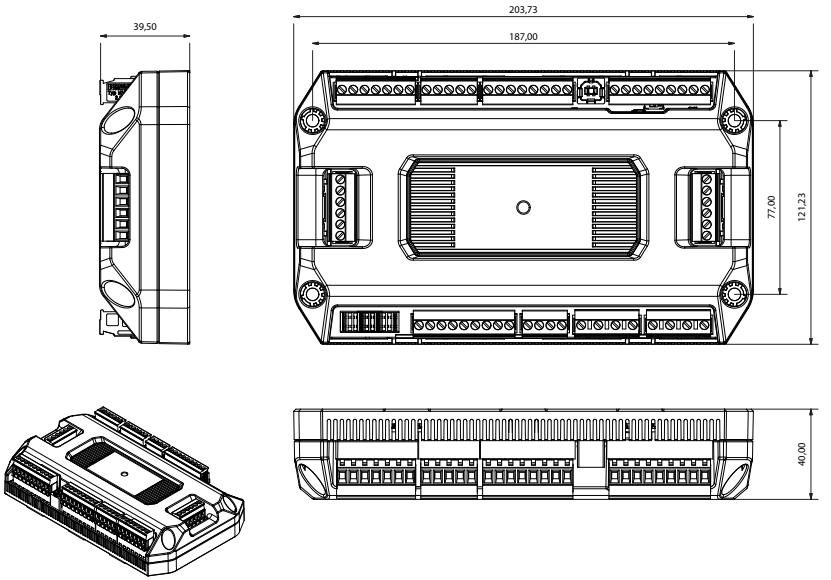
Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
PNP digital input (MAN terminal)						
V_{IN}	Voltage input		0		36	V
V_{IL}	Input voltage at low level				1	V
V_{IH}	Voltage input at high level		8			V
I_{IL}	Input current at low level	V_{IN} = 0 V		100	125	uA
I_{IH}	Input current at high level	V_{IN} = 12 V		1	1,25	mA
CAN1 BUS (terminals CAN1S, CAN1L, CAN1H)						
DR_{CAN1}	Transmission speed			50		Kbps
L_{CAN1}	Bus length				200	m
N_{CAN1}	Number of nodes				8	nodes
• Electrically isolated CAN1 bus. • Recommended cables: • Belden 3105A - 1 pair 22AWG shielded multi-conductor cable. • Belden 9481 - 1 pair 24AWG shielded multicore cable.						
CAN2 BUS (terminals CAN2S, CAN2L, CAN2H)						
DR_{CAN2}	Transmission speed			250		Kbps
L_{CAN2}	Bus length				200	m
N_{CAN2}	Number of nodes				8	nodes
• Electrically isolated CAN2 bus. • Recommended cables: • Belden 3105A - 1 pair 22AWG shielded multi-conductor cable. • Belden 9481 - 1 pair 24AWG shielded multicore cable.						
NPN DIGITAL INPUTS (terminals I1, I2, I3, I4, I5, I6, I7, I8, I9, I10, I11, I12)						
V_{IN}	Voltage input		0		36	V
V_{IL}	Input voltage at low level				1	V
V_{IH}	Voltage input at high level		8			V
I_{IL}	Input current at low level	V_{IN} = 0 V		2,5	3,75	mA
I_{IH}	Input current at high level	V_{IN} = 12V		100	125	uA
PICK-UP ANALOG INPUT (terminals PCK1, PCK2)						
$V_{PICK-UP}$	Voltage input		0,5		70	VAC
$F_{PICK-UP}$	Input frequency		10		10000	Hz
$F_{PICK-UP, RES}$	Measured frequency resolution			1		Hz
$R_{PICK-UP}$	Input resistance			48		KΩ

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
ANALOG INPUTS (terminals AN1, AN2, AN3, AN4, COM)						
V_{AN}	Voltage input		0		12,5	V
$V_{AN, RES}$	Voltage measurement resolution			0,01		V
I_{AN}	Input current		0		25	mA
$I_{AN, RES}$	Measured current resolution			0,020		mA
R_{AN}	Input resistance		0		10	KΩ
$R_{AN, RES}$	Resolution resistance measurement			10		Ω
V_{COM}	Common mode voltage		-2		2	V
PNP HIGH CURRENT DIGITAL OUTPUTS (terminals P1, P2, P3)						
V_{OUT}	Voltage output	I_{OUT} = 0		+BAT		V
I_{OUT}	Output current I_{P1}, I_{P2}, I_{P3}	T ≤ 1s			40	A
I_{OUT}	Output currentI_{P1}, I_{P2}, I_{P3}	1s ≤ T ≤ 10s			20	A
I_{OUT}	Output current I_{P1}, I_{P2}, I_{P3}	T ≥ 10s			10	A
$I_{OUT, TOTAL}$	Total current $I_{P1} + I_{P2} + I_{P3}$	T ≤ 1s			40	A
$I_{OUT, TOTAL}$	Total current $I_{P1} + I_{P2} + I_{P3}$	1s ≤ T ≤ 10s			30	A
$I_{OUT, TOTAL}$	Total current $I_{P1} + I_{P2} + I_{P3}$	T ≥ 10s			20	A
Note: T is the time during which the output remains active.						
ANALOG INPUT / OUTPUT (terminal D+)						
$V_{D+, IN}$	Input voltage D+		0		36	V
$V_{D+, OUT}$	Output Voltage D+	I_{OUT} = 0		+BAT		V
$V_{D+, RES}$	Voltage measurement resolution D+			0,1		V
$I_{D+, OUT}$	Output current D+	+BAT = 12 V		210		mA
$I_{D+, OUT}$	Output current D+	+BAT = 24 V		105		mA
$I_{D+, OUT}$	Output power D+	+BAT = 12/24 V		2,5		W
PNP DIGITAL OUTPUTS (terminals 01, 02, 03, 04, 05, 06, 07, 08)						
V_{OUT}	Voltage output	I_{OUT} = 0		+BAT		V
I_{OUT}	Output current I_{01}, I_{02}, … , I_{07}, I_{08}				2	A
$I_{OUT1, TOTAL}$	Total current $I_{01} + I_{02} + I_{03} + I_{04}$				4	A
$I_{OUT2, TOTAL}$	Total current $I_{05} + I_{06} + I_{07} + I_{08}$				4	A
$I_{OUT3, TOTAL}$	Total current $I_{01} + I_{02} + I_{03} + I_{04} + I_{05} + I_{06} + I_{07} + I_{08}$				8	A

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
ANALOG INPUTS FOR VOLTAGE MEASUREMENT (terminals VGN, VG1, VG2, VG3 and terminals VRN, VR1, VR2, VR3)						
$V_{IN,\ FF}$	Phase-to-phase input voltage	V_{VZx} - V_{VZy}	100	480	576	VAC
$V_{IN,\ FN}$	Input voltage phase to neutral	V_{VZx} - V_{VZN}	58	277	333	VAC
F_{IN}	Frequency		3,5	50/60	75	Hz
$V_{IN,\ RES}$	Voltage measurement resolution			1		VAC
$F_{IN,\ RES}$	Measured frequency resolution			0,1		Hz
$R_{IN,\ VZx-VZN}$	Input resistance phase neutral			450		KΩ
$R_{IN,\ VZx-B}$	Input resistance phase a -B			4		MΩ
Note: x, y = {1, 2, 3}; x ≠ y; Z = {G, R}						
ANALOG INPUTS FOR CURRENT MEASUREMENT (terminals IGN, IG1, IG2, IG3)						
$I_{IN,\ IGx}$	Input current		0	5	5,75	AAC
F_{IN}	Frequency		3,5	50/60	75	Hz
$I_{IN,\ RES}$	Measured current resolution			0,025		AAC
$R_{IN,\ IGx}$	Input resistance			0,01		Ω
VOLTAGE-FREE RELAY OUTPUTS (terminals C1, NA1, NC1, C2, NA2, NC2, C3, NA3, NC3, C4, NA4, NC4)						
V_{RELAY}	Voltage of the contact				250	VAC
I_{RELAY}	Contact current	cos ϕ = 1			8	A

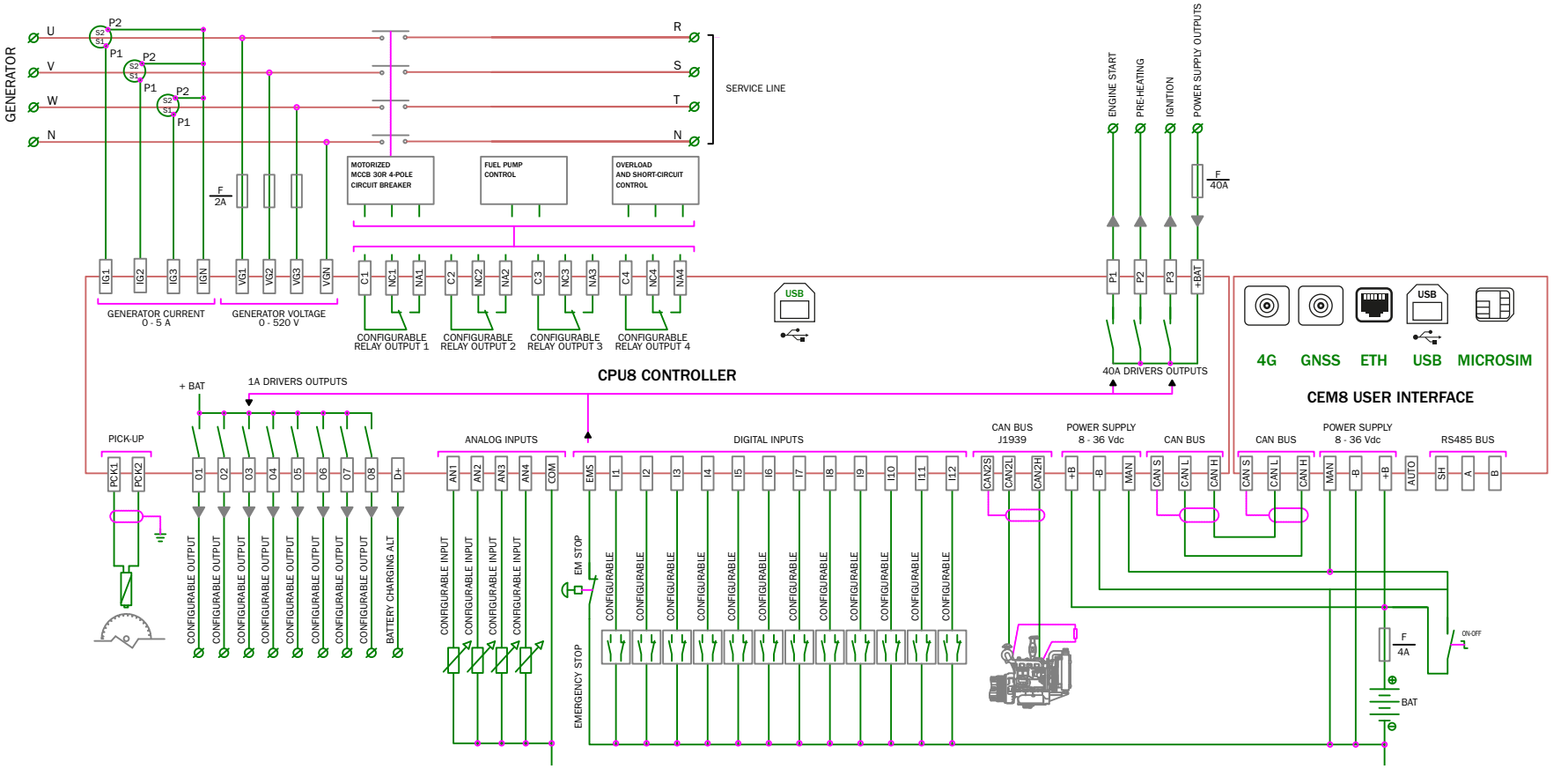
All voltage measurements are referenced to terminal -B except where expressly stated.

16.2.4 DIMENSIONS

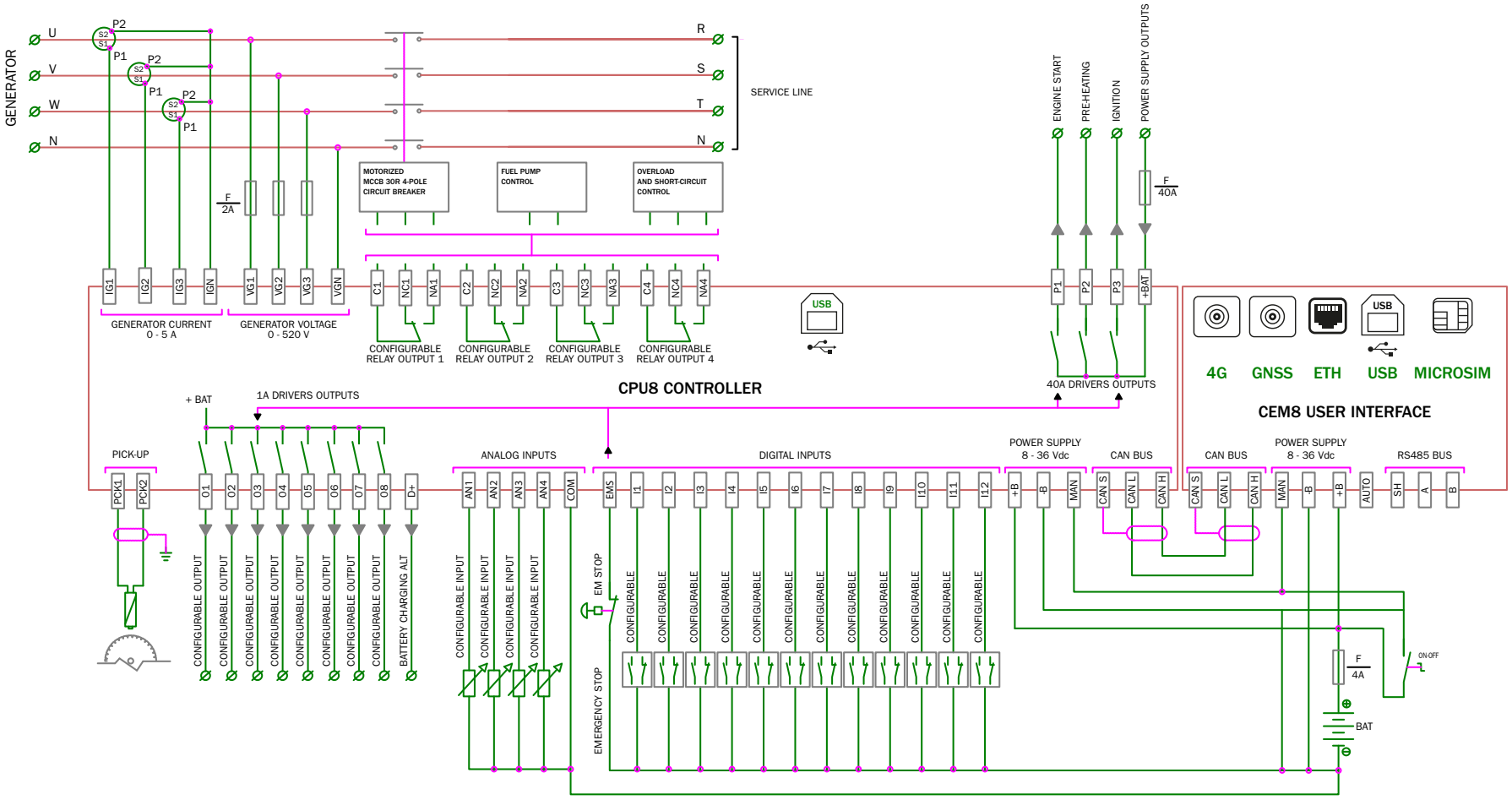


CPU8 controller dimensions

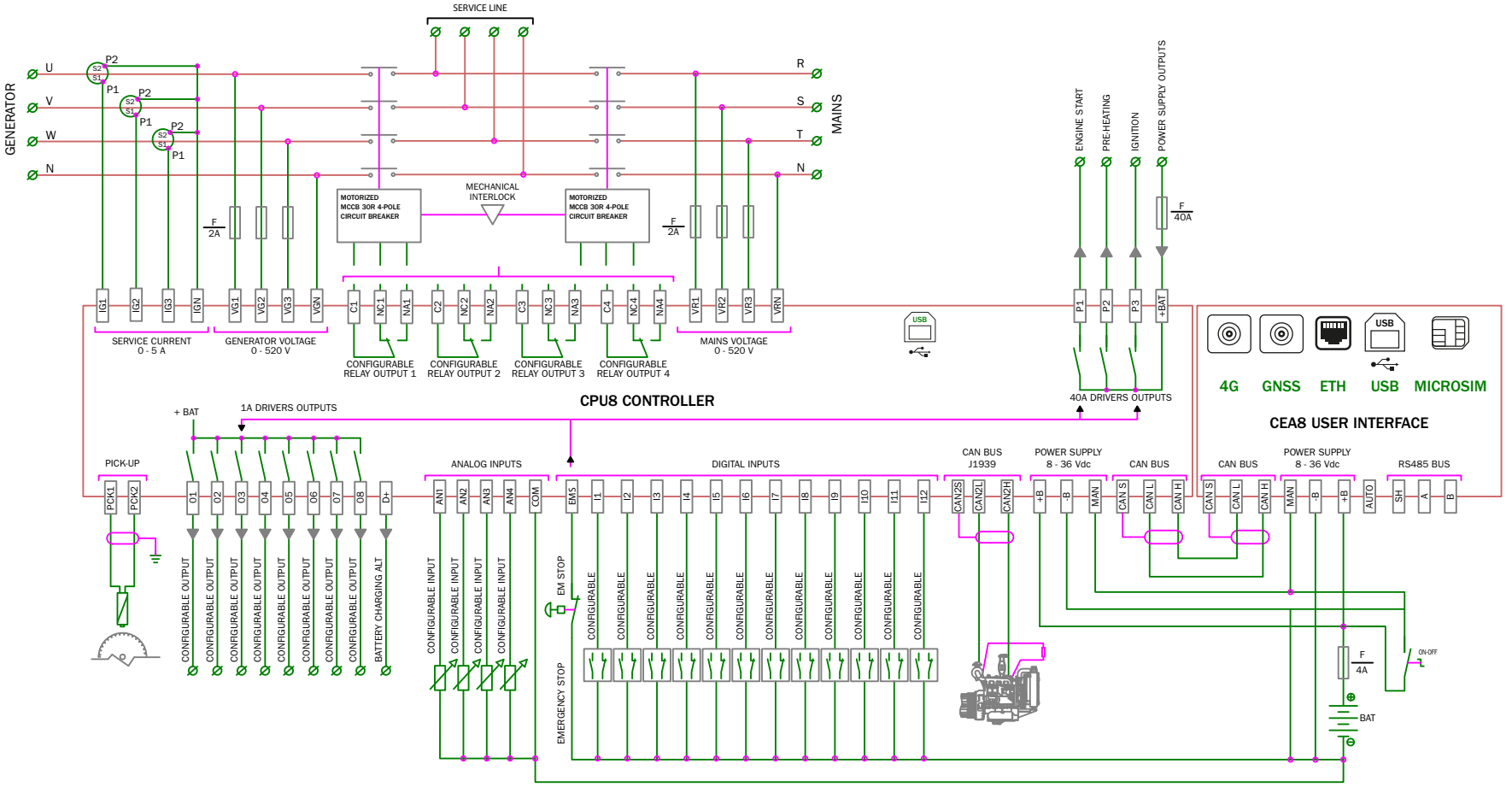
16.3 WIRING



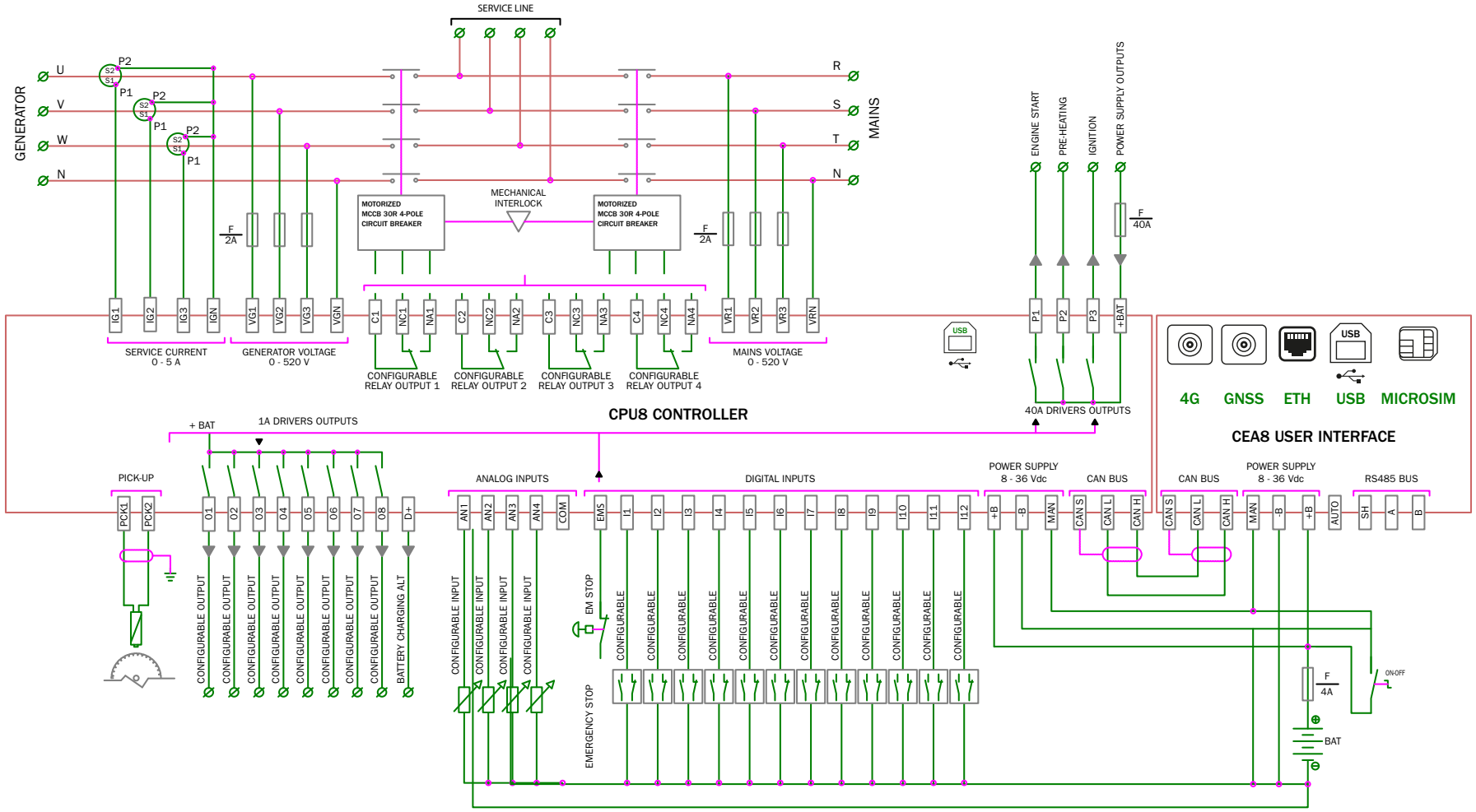
Wiring diagram CEM8+CPU8J controller (example AMG configuration)



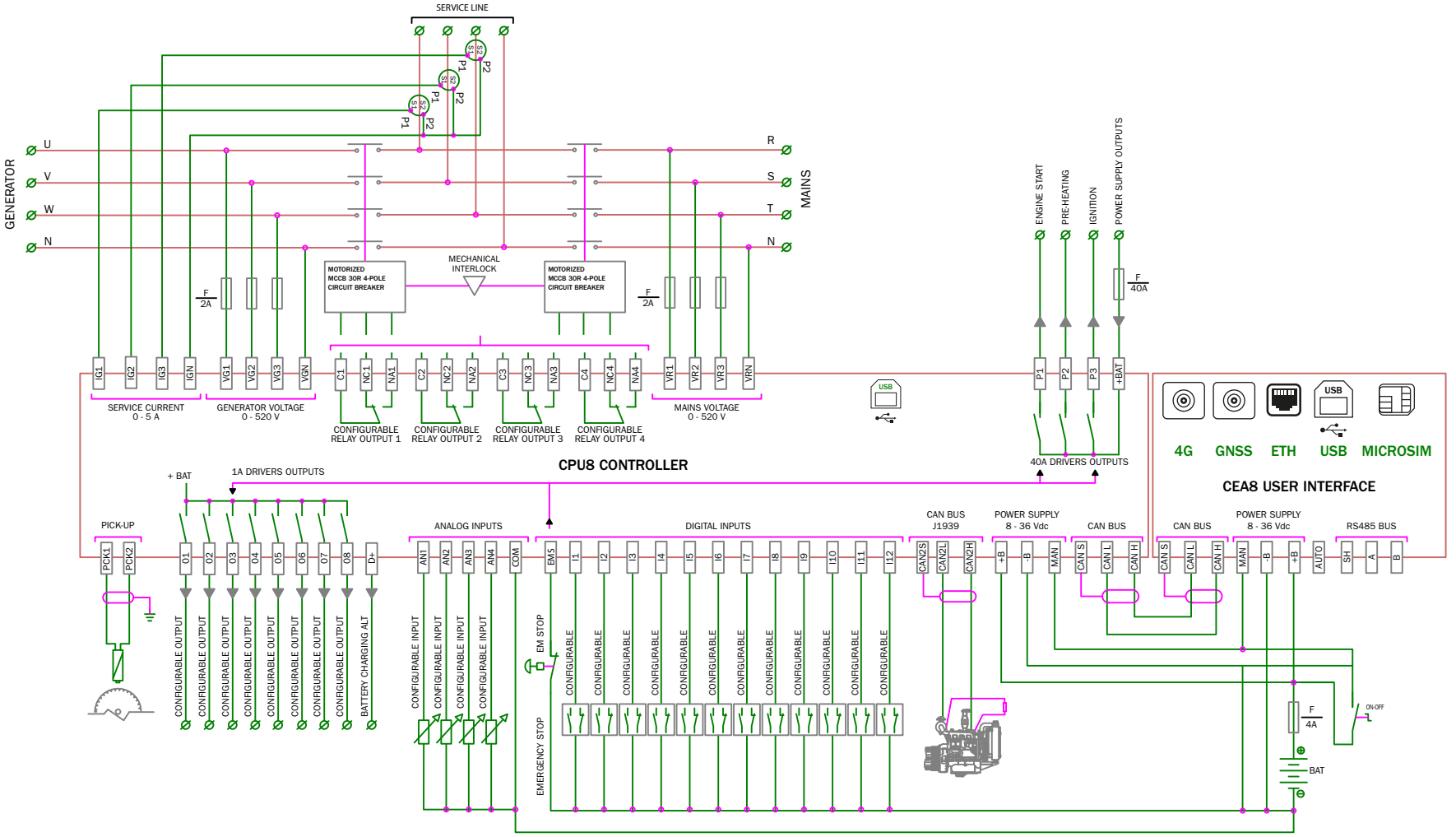
Wiring diagram CEM8+CPU8 controller (example AMG configuration)



CEA8+CPU8J controller wiring diagram (example AMF configuration with current measurement in generator line)



CEA8+CPU8 controller wiring diagram (example AMF configuration with current measurement in generator line)



CEA8+CPU8J controller wiring diagram (example AMF configuration with current measurement in usage line)

16.4 SIMBOLOGY

	Attention. Refer to the manufacturer's documentation.
	Risk of electric shock.
	Class II device. Equipment protected with double insulation or reinforced insulation.
	Equipment covered by Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). This equipment must be disposed of separately from normal waste, it is necessary to leave it at the collection and recycling point for electrical and electronic equipment.
	Direct current.

16.5 GENERALITIES, CHARACTERISTICS AND INSTALLATION OF THE EQUIPMENT

The documentation of the equipment is supplemented below:

1. General:

It is necessary to consult the documentation.

The equipment must be isolated or disconnected from hazardous voltage before accessing the equipment.

2. Characteristics:

The equipment has been designed to be safe in the following range of ambient conditions:

- The controllers must be mounted inside an electrical panel, which is used outdoors.
- Working temperature -20 ºC ~ +70 ºC.
- Maximum relative humidity of 80 % (non-condensing).
- Maximum altitude assigned above sea level is 2000 m.
- Pollution degree II.

3. Installation:

The equipment is included in the CAT III 600 V measurement category for measurements carried out in the building installation.

Disconnecting means must be incorporated into the fixed installation in accordance with the installation regulations. Such means must have contact separation on all poles to provide full disconnection under category III overvoltage conditions.

A switch or circuit breaker must be included in the installation as a means of disconnection. It must be located in the immediate vicinity of the equipment and must be easily accessible to the user. In addition, it must be marked as the disconnecting device for the equipment.

The means of disconnection shall be accessible to the user.

The surface of the equipment and the external face should be cleaned with a damp cloth.

The equipment is protected by double or reinforced insulation provided that the installation is carried out according to the instructions in the user manual.

The manufacturer is not responsible for any damage caused by not following the warnings and/or recommendations indicated in the manual, as the protection ensured by the equipment may be compromised.

For a correct protection of the equipment, the following elements must be installed in the electrical panel:

Nº	Fuse links	Amperios
F0	General power positives	40
F1	CEM7 digital automatic controllers	2
F2	Phase U	2
F3	Phase V	2
F4	Phase W	2
F5	Differential relay + Trip coil	2
F6	Battery charger	4
F7	Fuel transfer kit	10

The earth must be connected to the negative of the battery, to the chassis of the switchboard and to the chassis of the generator set.

17. ANNEX VI: COMUNICATIONS CAN

17.1 INTRODUCTION

The CAN bus is an industrial bus characterised by great robustness and reliability and guarantees correct communication between devices in the noisiest environments. Devices with CAN Controller can be integrated into an industrial automation and control system.

The most relevant features of a CAN bus communication control system are as follows:

- Up to 110 devices can be connected on a single CAN grid.
- Each grid can reach up to 1000 metres in length, easily extendable (up to 2000 metres) with the use of bridges or repeaters.
- CAN baud rate of 50 kbits/s (for 1000 metres of bus: 10 ms data update).
- Direct access to the CAN bus from a PC via USBCan.

The CAN bus can operate in environments with extreme noise and interference conditions, while error checking mechanisms ensure that noise-contaminated frames are detected.

The CAN bus is designed so that communication will continue even if the CAN bus is not used:

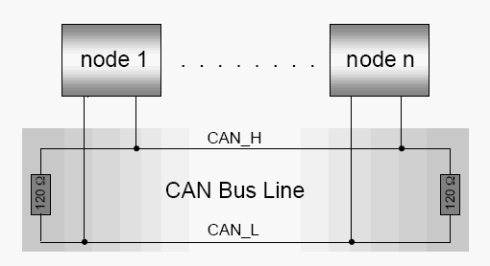
- Either of the two bus cables is broken.
- Any wires shorted to earth.
- Any cables shorted to power supply.

17.2 TOPOLOGY

The CAN grid uses a bus typology, where each node has an input and an output connection. The end nodes of the bus must have a 120 Ω terminator; this terminator is activated via a switch on each module (ON: terminator active, 1: terminator inactive). In any case, the impedance between the CANH and CANL lines must be approximately 60 Ω. For this purpose, a resistor of such a value must be set at each end of the grid that this impedance is guaranteed from any connected module.

NOTE

The existing impedance should be measured when all equipment is no longer in operation or has no physical access from the grid. For further information it is recommended to consult the ISO11898 specification and various application notes on this subject.



CAN bus topology

17.3 WIRING

The CAN grid requires wiring depending on the distance, transmission speed and number of nodes connected to the bus.

Cable characteristics according to length

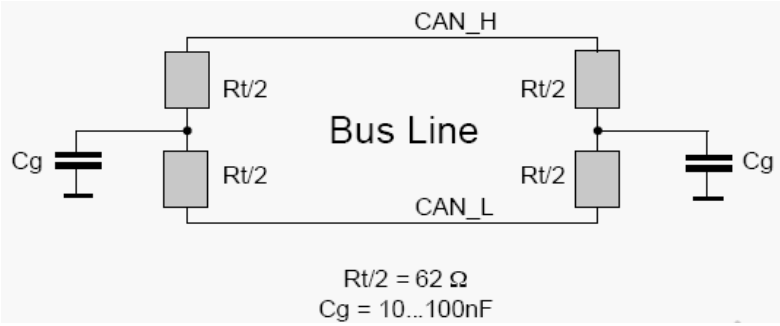
Bus length	Cable characteristics	
	Length to strength ratio	Section
0 m..40 m	70 mΩ/m	0,25 mm²..0,34 mm² AWG23, AWG22
40 m..300 m	<60 mΩ/m	0,34 mm²..0,6 mm² AWG22 , AWG20
300 m..600 m	<40 mΩ/m	0,4 mm²..0,6 mm² AWG20
600 m..1 Km	<26 mΩ/m	0,75 mm²..0,8 mm² AWG18

Cable characteristics as a function of the number of nodes

Bus length	Number of nodes		
	32	64	100
100 m	0,25 mm²	0,25 mm²	0,25 mm²
250 m	0,34 mm²	0,50 mm²	0,50 mm²
500 m	0,75 mm²	0,75 mm²	1,00 mm²
Cable resistance	<21 mΩ	<18,5 mΩ	<16 mΩ

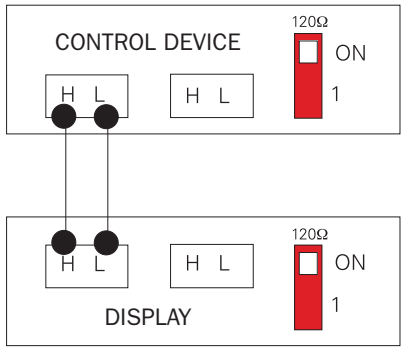
An unshielded twisted pair cable is required to connect the individual nodes of the grid. As an exception, an unscreened twisted pair cable can be used for the connection between the Controller and Display Module.

In very noisy environments with high electromagnetic interference (EMI), shielded braided cable can be used with the shield connected to the installation's earth. Another technique to improve immunity to electromagnetic interference is to replace the CAN terminator of the node with two 62 Ω resistors and install a decoupling capacitor between the CAN resistors and the battery negative.

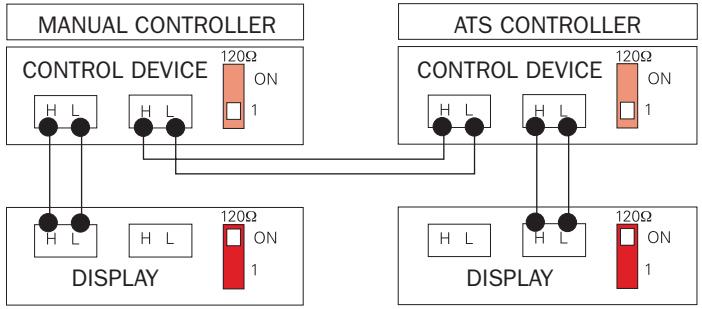


Electromagnetic noise protection technology: decoupling capacitor

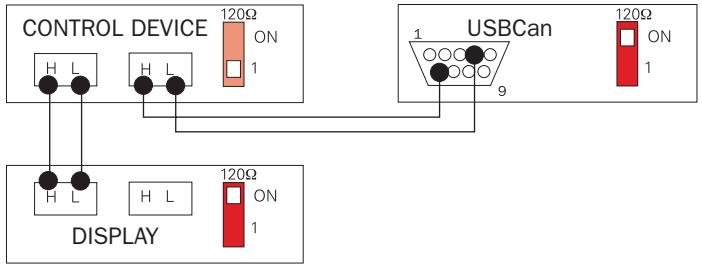
17.4 WIRING DIAGRAMS



Manual / automatic controller



Manual controller + ATS switching



Manual / automatic controller + option USBCan

18. ANNEX VII: COMMUNICATIONS FAILURE

The user interface of the **CE8** controller displays the communication error on the initialisation screen if it does not get the version of the measurement board. The possible causes of this status are:

- **The installation's CAN communication bus terminators are not active:** With the controller switched off, check that there is 60 Ω impedance between the installation's CANH and CANL lines.
- **Incorrect communications bus connection:** With the controller off, check continuity between the CANH terminals on the user interface and the control module; then check continuity between the CANL terminals on the user interface and the control module.
- **Control module power supply failure:** With the controller switched on, check that the Voltage between terminals +B and -B of the control module is higher than 8 V.
- **Controller module activation fault:** With the controller switched on, check the voltage between the MAN and -B terminals of the control module is higher than 8 V.

FACTORIES
SPAIN • FRANCE • INDIA • CHINA • USA • BRAZIL • ARGENTINA

SUBSIDIARIES
PORTUGAL | SINGAPORE | POLAND | UAE | PANAMA | GERMANY
ARGENTINA | UNITED KINGDOM | DOMINICAN REPUBLIC | SOUTH AFRICA | MOROCCO | AUSTRALIA

HEADQUARTERS
Ctra. Murcia - San Javier, km 23,6
30730 SAN JAVIER (Murcia) SPAIN
Tel. +34 968 19 11 28 | +34 902 19 11 28
Fax: +34 968 19 12 17 | Fax Exports: +34 968 33 43 03

www.himoinsa.com

HIMOINSA
A YANMAR COMPANY