



TE809-A

Instructions Manual

Project: v2.3.0

PREFACE

Thanking you for preference, **TECNOELETTRA SRL** hopes that the use of this equipment could be a reason of satisfaction. This manual is designed to put you in a position to intervene on the equipment and different performs of installation and connection. In order to ensure efficient operation and durability, it is recommended the strict observance of the rules laid down here. Thanks in advance for the suggestions that we will be given to possible further improvements of the equipment. For any question always consult the **TECNOELETTRA** Technical Department.

TECNOELETTRA S.r.l.

Note:

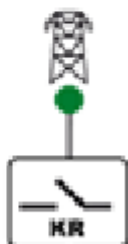
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OELETTRA

TE809A
AMF Controller



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1- GENERAL REQUIREMENTS AND INSTALLATION

1- 1 General notes



WARNING!

- Carefully read the manual before the installation or use.
- This equipment is to be installed by qualified personnel, complying to current standards, to avoid damages or safety hazards.
- Before any maintenance operation on the device, remove all the voltages from measuring and supply inputs and short-circuit the CT input terminals.
- Products illustrated herein are subject to alteration and changes without prior notice.
- Technical data and descriptions in the documentation are accurate, to the best of our knowledge, but no liabilities for errors, omissions or contingencies arising there from are accepted.
- A circuit breaker must be included in the electrical installation of the building. It must be installed close by the equipment and within easy reach of the operator. It must be marked as the disconnecting device of the equipment: IEC /EN 61010-1 § 6.12.2.1.
- Clean the instrument with a soft dry cloth; do not use abrasives, liquid detergents or solvents.

1- 2 Product Label and Rating plate

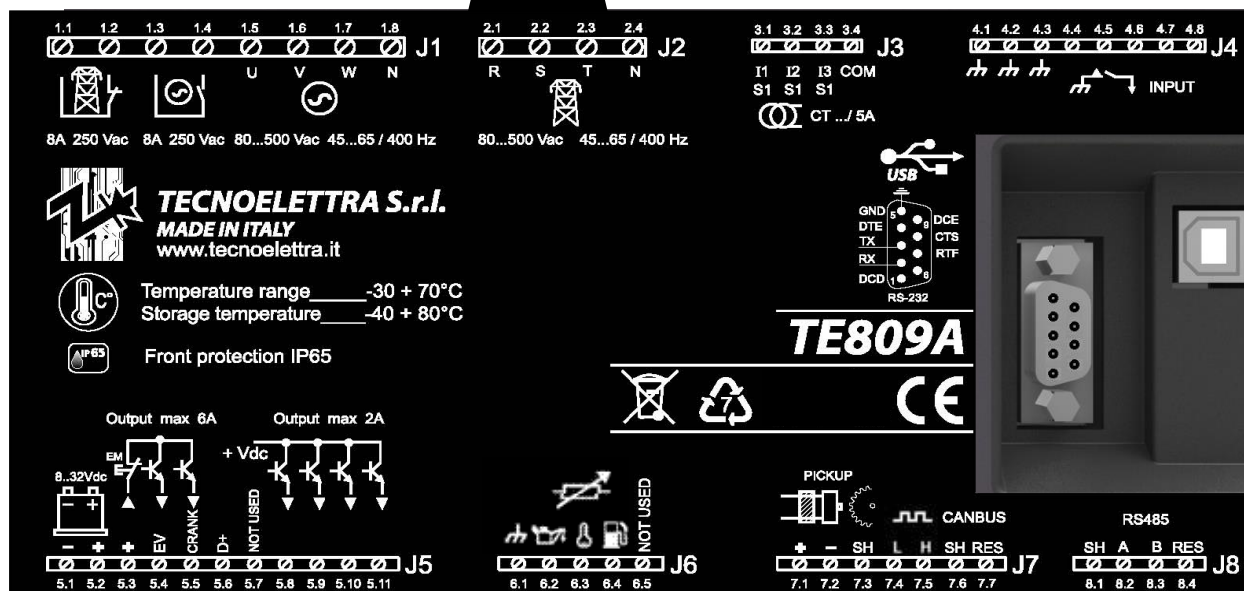
General identifications of each unit are traced on the plate below and placed on the controller.

245 mm

Cut-off dimensions:
220 x 160 mm

182 mm

40 mm



NOTE!



Inform the manufacturer the general identification data reported on the label, before asking for technical specifications or information about the equipment.

1- 3 TE809 2.3.0 New features

List of new features inside TE809A 2.3.0 and differences with TE809A 2.2.0:

GENERIC FEATURES

1. Improved voltage and current calibration
2. Cobo fuel curve inserted by default as "Custom" curve
3. Murphy fuel curve inserted by default as "Custom" curve

List of new features inside TE809A 2.2.0 and differences with TE809A 2.0.0:

GENERIC FEATURES

1. Canbus TSC1 speed request support for IVECO Nef/Cursor and VOLVO EMS2
2. New setup M2.2 to program alternate ratings
3. Setup M8.6 becomes "Alternate In" to program the logic of alternate alarms and functions
4. Setup Expansion becomes M8.7
5. Id for mains wrong sequence changed to 1212
6. Id for slave TE809 in dual mode configuration changed to 2
7. New parameter to set the controller in Auto mode at start-up
8. Engine control page 3 added with load percentage and fuel consumption
9. Rated power factor parameter added
10. New alarm and pre alarm on load % with hysteresis
11. Fuel consumption calculated from load percentage with 5 steps interpolation
12. Start/stop procedure for GAS engines
13. Night mode to disable faulty mains start during day or night

IO OPTIONS

14. Support for new expansion board TE810EXP, now the programmable inputs and outputs are 10 each.
15. New Rpm increase and decrease options available to change TSC1 speed request via canbus
16. New Alternative ratings inputs to change standard configuration ratings to other 3.
17. New User alarm #4 added.

REMOTE CONTROL

18. Now alarms are programmable via Modbus RTU protocol
19. Initial work hours and reset events log and number of start attempts can be locked and unlocked by TE Monitor

1- 4 Hardware ratings

GENERAL CHARACTERISTICS	
Rated voltage Vdc	12Vdc (24Vdc)
Allowed Vdc	from 6Vdc to 33Vdc
Immunity to cranking voltage dropouts	0V for 150 ms
Rated voltage Vac	400 Vac
Allowed Vac	Up to 500 Vac
Allowed frequency	Up to 75 Hz
Max consumption with backlight	250 mA
Temperature range	-30 °C + 70 °C (circuit) -20 °C + 70 °C (display) -30 °C + 70 °C (storage)
DISPLAY	128x64 px ; 66x33mm
INTERNAL CLOCK	
Calendar	Calendar supplied by internal 3V lithium battery, type CR1225, even when the controller is OFF
DIGITAL INPUTS	
N°	5
SPEED INPUT – PICKUP / W	
Voltage range	From 1 to 36 V
Frequency range	Up to 8 kHz
STATIC OUTPUTS	
N°	6 (2x6A ; 4x2A)
ANALOG INPUTS	
N°	3
Input type	Resistance to ground measurements
SERIAL COMMUNICATION INTERFACE	
Interface type	Serial RS -232, modbus RTU protocol
Cable length	< 3 m
Baud rate	Up to 115200 bps
Interface type	Serial RS485, modbus RTU protocol
Baud rate	Up to 115200 bps
Can Bus	1 Canbus interface
USB PORT	
Cable length	< 3 m
Type	USB device for connection to PC only for configuration and project upgrade thorough TE Suite programs
RELAY OUTPUTS	
N° outputs	2
Type of contacts	1x N.O. genset contactor - 1x N.C. mains contactor
Contact max load	8 A / 250 VAC
LOAD CURRENT INPUTS	
N°	3
Measure range	Up to 5A
Accuracy	< 1% F.S. + 1 digit
VOLTAGE INPUTS	
N°	8
Input type	Resistive coupling
Rated voltage	230 Vac (L-N) - 400 Vac (L-L)
Measure range	TRMS from 0 to 300 Vac (L-N) - from 0 to 500 Vac (L-L)
Accuracy	< 1% F.S. + 1 digit
ACTIVE POWER MEASURE	
Measure type	Instant power integration
HARDWARE	
N°Keys	15
N°LED	10

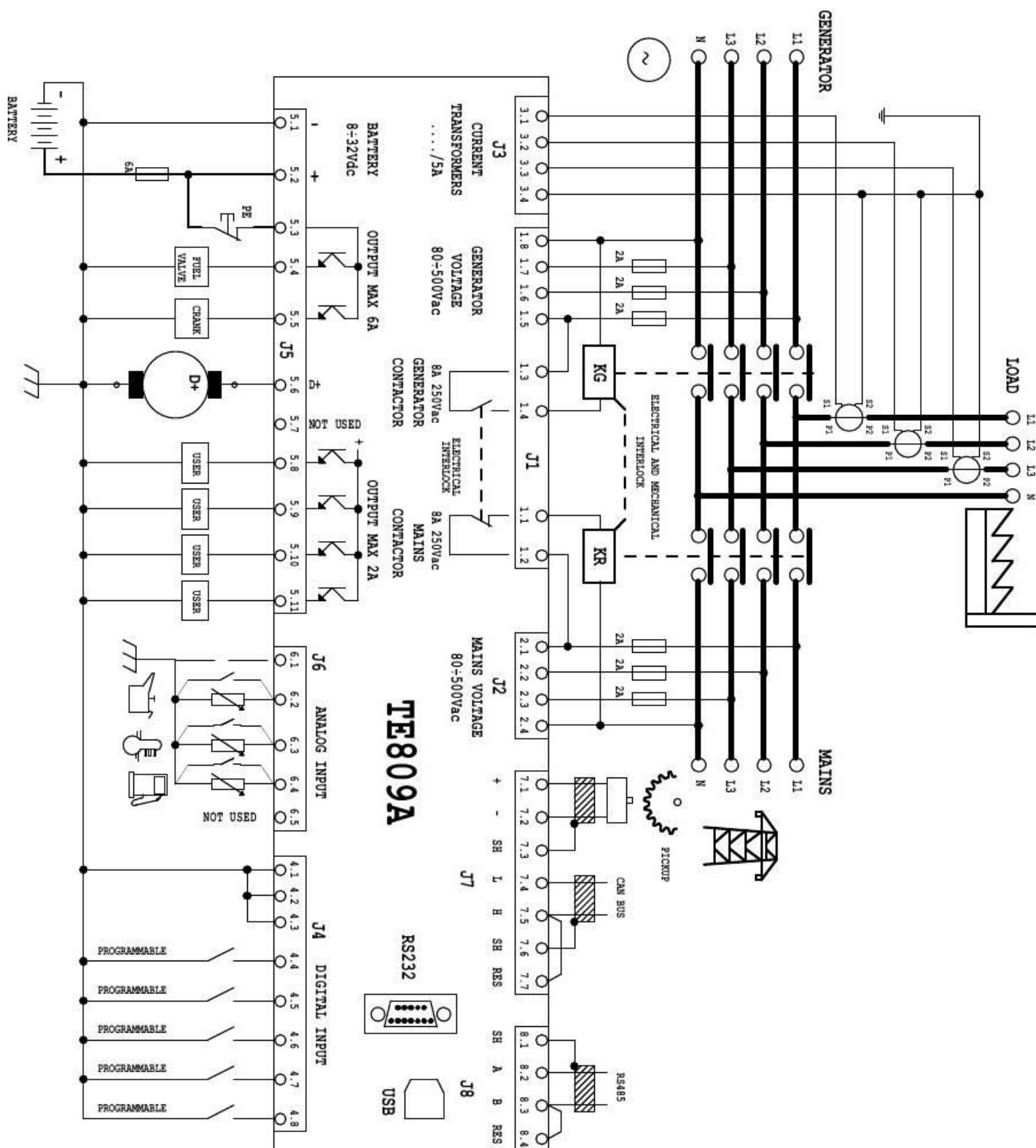
DIRECTIVES COMPLIANCE
2014/30/EU (EMC compatibility)
2014/35/EU (Low voltage)
2011/65/EU (RoHS II)
STANDARD REFERENCES
EN55011
EN55016-2-1
EN55016-2-3
EN60068-2-1
EN60068-2-2
EN60068-2-27
EN60068-2-30
EN60068-2-6
EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-6-2
EN61000-6-4

1- 5 Electrical Installations

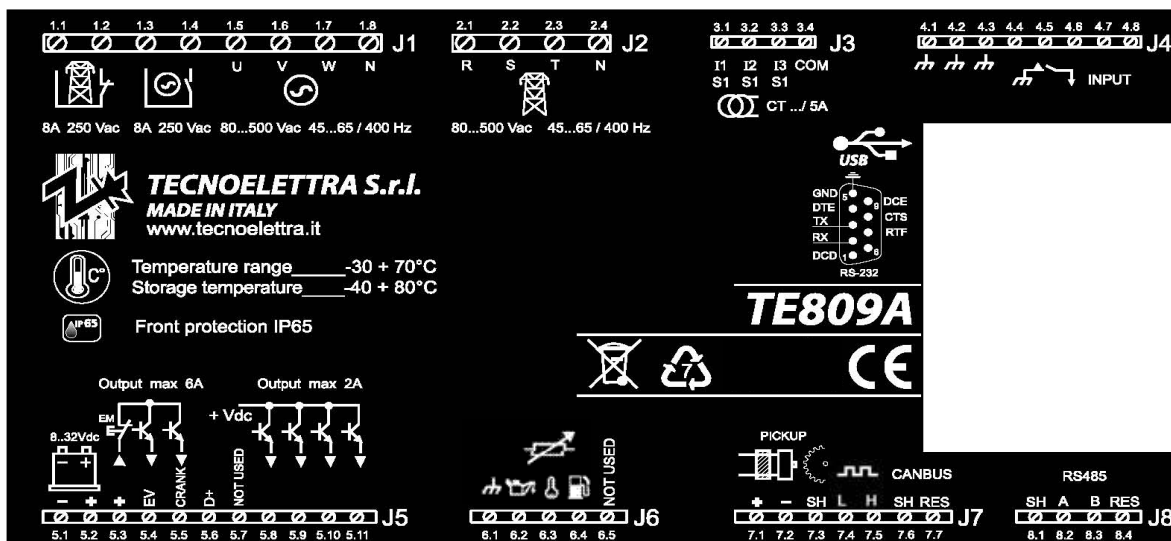
1- 5.1 Drawing



Warning! before inserting the plugs make sure that the connections strictly comply with the wiring diagram below. For more information about programmable inputs/outputs, see par. 2-10.



1- 5.2 Connections



J1 – Genset AC voltage and contactors

- 1.1 - Mains contactor output (NC)
- 1.2 - Mains contactor output (NC)
- 1.3 - Genset contactor output (NO)
- 1.4 - Genset contactor output (NO)
- 1.5 - Genset voltage phase 1
- 1.6 - Genset voltage phase 2
- 1.7 - Genset voltage phase 3
- 1.8 - Neutral

J2 – Mains AC voltage

- 2.1 - Mains voltage phase 1
- 2.2 - Mains voltage phase 2
- 2.3 - Mains voltage phase 3
- 2.4 - Neutral

J3 – Genset AC current

- 3.1 - Genset current I1
- 3.2 - Genset current I2
- 3.3 - Genset current I3
- 3.4 - CT common

J4 – Digital inputs

- 4.1 - Gnd
- 4.2 - Gnd
- 4.3 - Gnd
- 4.4 – Programmable digital input (default – Low oil pressure alarm)
- 4.5 – Programmable digital input (default – High temperature alarm)
- 4.6 – Programmable digital input (default – Low fuel level)
- 4.7 – Programmable digital input (default – Remote start)
- 4.8 – Programmable digital input (default - Low coolant level)

J5 – Supply and Outputs

- 5.1 - Battery negative
- 5.2 - Battery positive
- 5.3 - Common positive for fuel valve and start output (Default - Emergency stop alarm input)
- 5.4 - Fuel valve output
- 5.5 - Start engine output
- 5.6 - Battery charger alternator output (D+)
- 5.7 - Not used
- 5.8 - Programmable output (default – Global alarm #1)
- 5.9 – Programmable output (default – Glow plugs)
- 5.10 – Programmable output (default – Siren)
- 5.11 – Programmable output (default – Electro solenoid)

J6 – Digital / Analog inputs

- 6.1 - Gnd
- 6.2 - Oil pressure digital / analog (programmable, default – Oil pressure analog)
- 6.3 – High engine temperature digital / analog (programmable, default – Engine temperature analog)
- 6.4 – Fuel level percentage digital / analog (programmable, default – Fuel level percentage analog)
- 6.5 – Not used

J7 – Rpm and Canbus

- 7.1 - Pickup input positive
- 7.2 - Pickup input negative
- 7.3 - Pickup shield
- 7.4 - Canbus Low
- 7.5 - Canbus High
- 7.6 – Canbus shield
- 7.7 - Canbus termination resistor (bridge with J7.5)

J8 - RS485 port

- 1- Shield
- 2- A
- 3- B
- 4- Termination resistor

RS232 - Communication ports

RS232 - connection of a remote device or PC with Modbus RTU protocol for programming and monitoring

USB - Communication ports

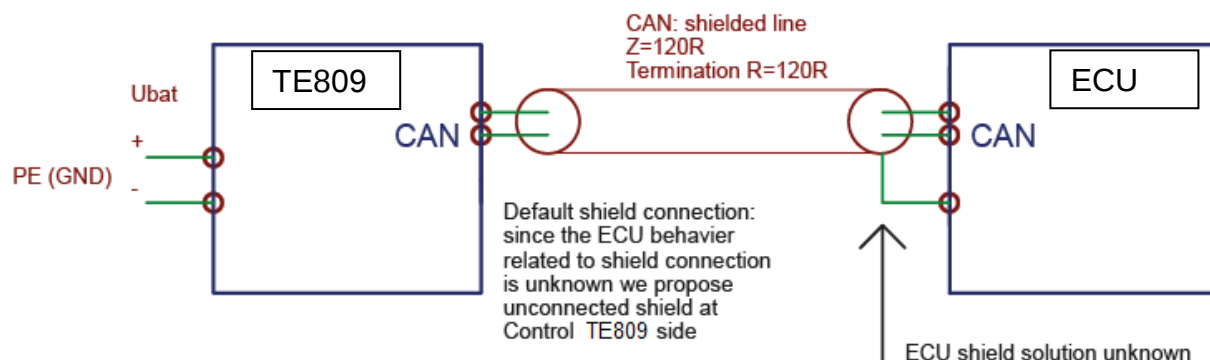
USB - connection of a PC for project upgrading or programming

1- 5.2.1 CAN bus wiring for improved shielding

CAN bus connection between Control and ECU must be shielded. To avoid PE potential differences cross current there are two possibilities:

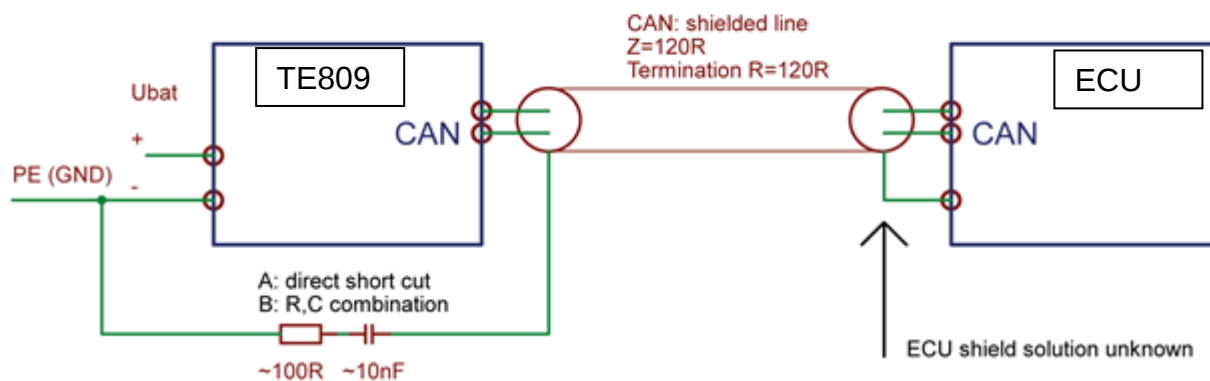
1. Since the ECU behavior related to shield connection is unknown we propose unconnected shield at TE809 side

Default shield connection



2. Improved shield connection

Improved shield connection



1- 6 Operation modes

Automatic mode

The engine automatically starts in case of mains failure (or out of limits) and stops in the presence of the same, with automatic management of KG and KR. During the starting phase it is possible to stop the engine with the STOP button. At the end of this phase the button is disabled. Use the RESET button to stop the engine. Push the AUT button to select this functioning mode.

Manual mode

The engine can be started and stopped manually by pressing start and stop key buttons; load switching on mains and generator is managed using buttons KG and KR. Push the MAN button to select this functioning mode.

Test mode

Manual test: Press the TEST button: the engine starts immediately to test the genset for a programmable time. If activated during AUT mode, in absence of mains during the test, the TE809 switches the load to the generator. The engine is stopped after the time at parameter M4.3-C. If activated during MAN mode, the load switching can be controlled only by KG and KR buttons, even if the mains is faulty. The test is stopped after time at parameter M4.3-C, only if KG is open, otherwise the generator must be stopped through STOP button. Disabling the test (or after the test time), the controller returns to the previous operation mode. Push the TEST button to select this functioning mode.

Automatic test: If you programmed an automatic test (see par 2-6.3), it will run only if you are in automatic mode.

Reset mode

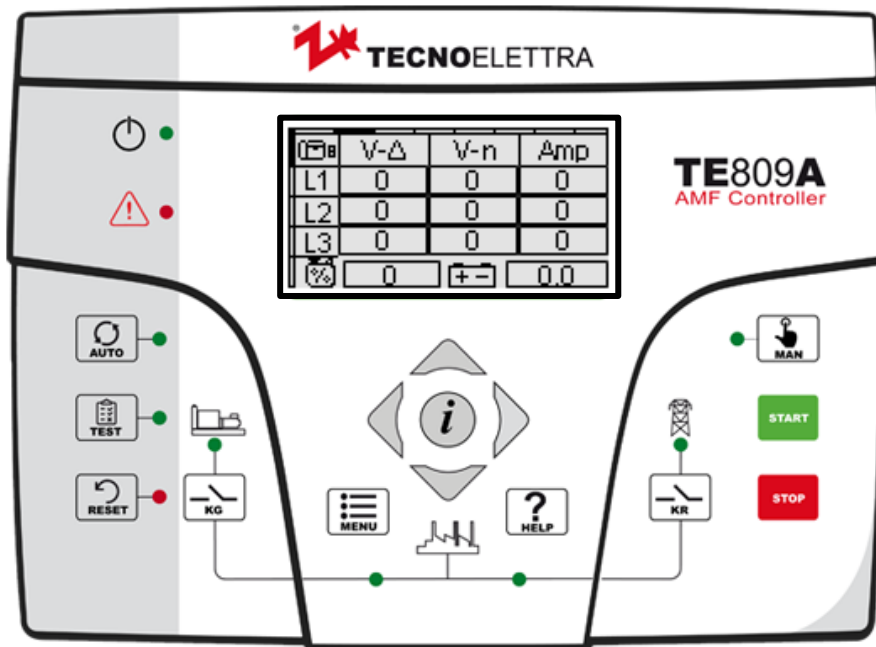
The engine cannot work. If the mains is available it is connected to the load. If you select Reset mode, the alarms are reset and the engine stops immediately if it is working. If the cause of the alarm remains, the alarm will probably appear again. Push the RESET button to select this functioning mode.

Alarms

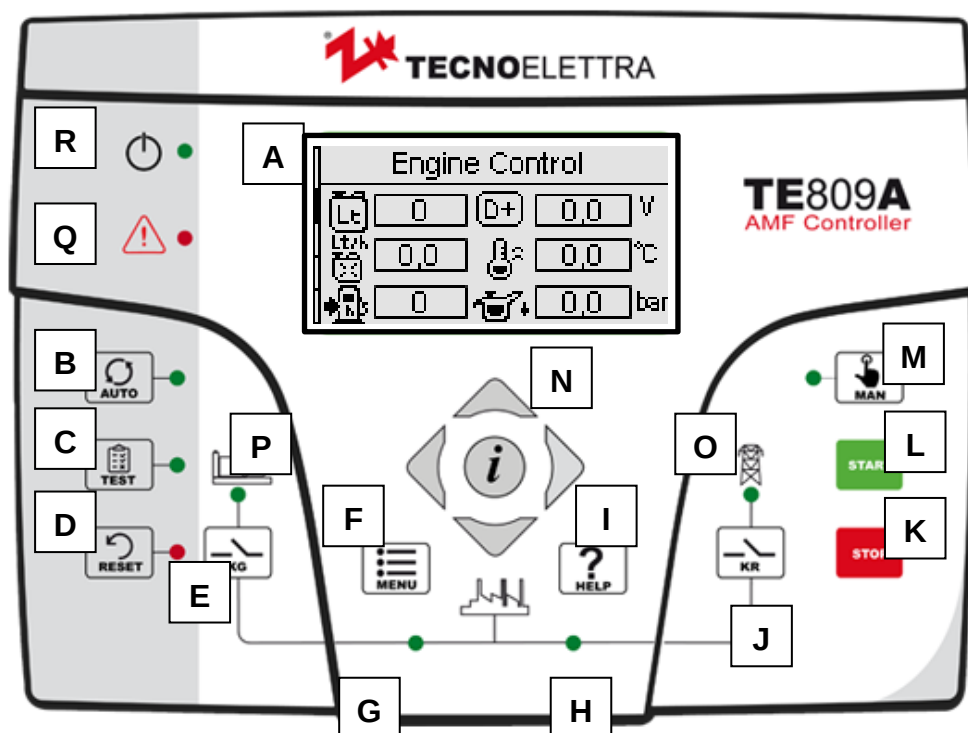
In case of alarm, the display shows its description. If more different alarms are detected, they appear individually in sequence. For each alarm it is available a message that can help to identify the source of the problem. The alarm reset can be made by pressing the RESET button; by this, the alarm is deleted and the TE809 goes in Reset mode, preventing accidental generator starting attempts. If the alarm, after reset, still remains on the display, the cause of the alarm is not removed.

First installation

The TE809 can be powered either be 12 or 24Vdc with automatic detection. You must set or verify menu parameters about ALTERNATOR (CT ratio, type of connection, rated voltage and frequency) and the Starting Menu inside "Engine setup", according to the type of engine used.



1- 7 Equipment Overview

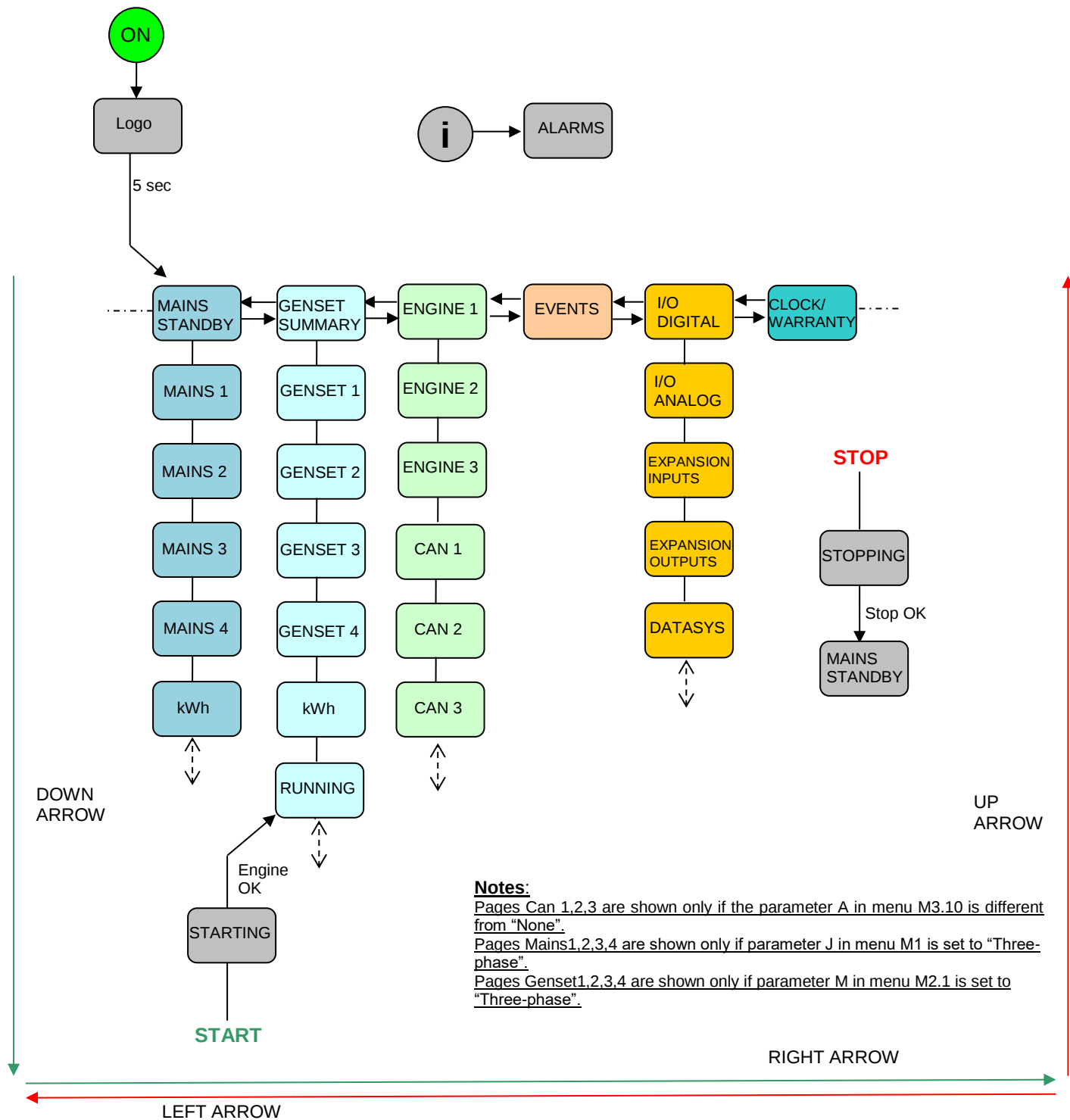


POS.	NAME	DESCRIPTION
A	Display	Back light display shows all functions, measures and alarms about the generator and the mains. Automatically the backlight turns off, and it turns on again when you press a button.
B	AUT	Button to select the automatic mode.
C	TEST	Button to select the test mode.
D	RESET	To activate reset/OFF mode. In this operative mode the engine is stopped without cooling and the alarms are deleted. If the cause of the alarm persists, the alarm will appear again.
E	KG	Key control for generator contactor. Active only in manual mode if the generator is running and is within the programmed voltage and frequency limits.
F	Menu	To enter the programming menu. Inside the menus, it's used as a button "back" or "esc".
G	KG state led	Led that indicates if KG is closed (led on) or open (led off).
H	KR state led	Led that indicates if KR is closed (led on) or open (led off).
I	Help	It permits you to better understanding of the parameters and symbols in the actual page.
J	KR	Key control for mains contactor. Active only in manual mode if the mains is within the programmed voltage and frequency limits.
K	STOP	To stop the generator immediately. Active only in manual mode.
L	START	To start the generator. Active only in manual mode.
M	MAN	Button to select the manual mode.
N	Navigation drive	Navigation drive composed by four arrows to scroll through the pages (left and right arrows) and increase or decrease the parameters inside the menus. It contains also a special button "i", to select an element on the screen or edit a parameter and confirm the new value. See paragraph 1-8.1 for more information about the navigation through the display pages, and paragraph 2-2 for more information about the navigation through the menus.
O	Mains state led	It shows if the mains status: - led OFF if mains not detected - led blinking if mains detected outside limits - led ON if mains is within limits after delay
P	Generator state led	It shows the status of the generator: - led OFF if genset is not detected - led blinking if genset is running but not within limits - led ON if genset is within limits after delay
Q	General alarm led	It blinks if a stopping alarm is present. It remains ON if an alarm enabled as global alarm 1 is present.
R	Battery state led	It turns on when the board is supplied.

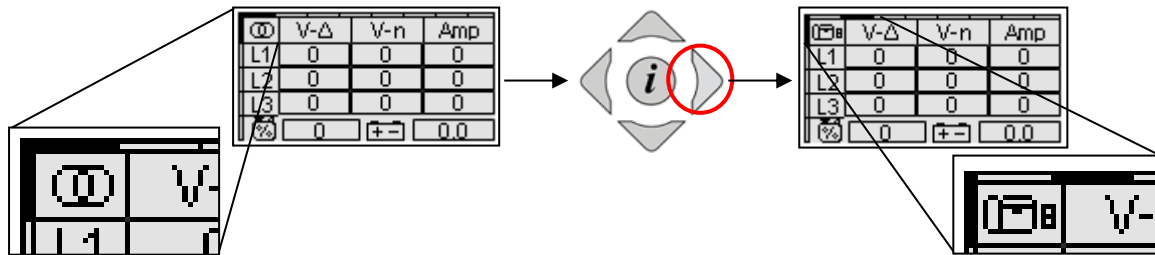
1- 8 Display pages

1- 8.1 Navigation diagram

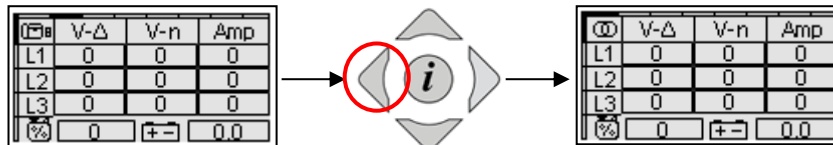
When you turn on the board, you will see the logo page. Then you will be in the mains stand-by page. When you start the generator, you will go in the starting page, that will disappear when the start is completed, and redirects you to the running page. When you stop the engine, you will see a stopping page, then you will return automatically to the page you were in when you pressed the stop button. With the left and right arrows, you can move through the different sections, and with the up and down arrows you can scroll the pages of the selected section. Pressing the “i” button from navigation pages, you can go to the status and alarm page. Here you can see the organization diagram of the display pages. Pressing the HELP button, you can see more indication about the measures if available.



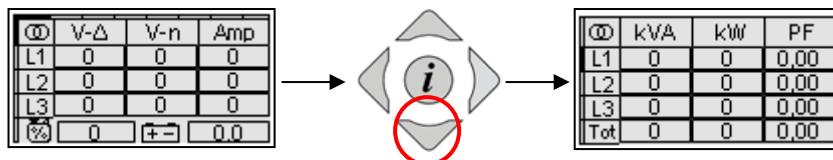
1- 8.2 Navigation cursors and first activation



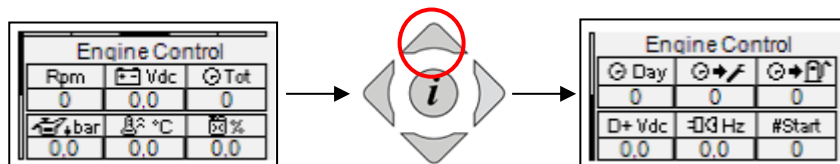
- The cursors on the upper side and left side of the display indicate the position of the page inside the navigation diagram: the left and right arrows move the page along with horizontal cursor.



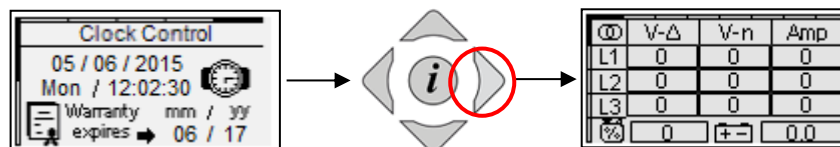
- The left arrow button allows to return back to the previous section: in this case from the generator pages to the mains pages.



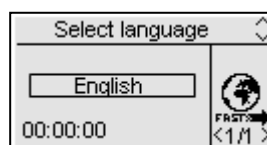
- If the vertical cursor is available on display it's possible to use up and down arrow buttons to see more pages for the section: in this case from the mains measure #1 to mains measure #2.



- With up arrow button you can return to the previous page of the section, in this case from engine control #2 to engine control #1. Inside the first page of the section there is also the horizontal cursor which means that the left and right arrow buttons will let you move to the next section.



- From the last section (clock/warranty in this case) with the right arrow you return to the first section (mains).



- When the controller is activated for the first time, the language selection screen will appear. If a language different from "DEFAULT" is selected, this screen will not appear anymore at the next startup.

1- 8.3 Display pages - Mains

1- 8.3.1 Mains stand-by

When you turn on the board, you will see the logo page. After five seconds you will be in this page, that is the stand-by page with engine OFF:

A	B	C
Mains Control		
Ⓢ V-Δ	Amp	Σ kW
0	0	0
Σ kVA	PF	FHz
0	0.00	0.0
D	E	F

- A) Mains Vac voltage L1-L2 (or L1-N if the system is single-phase)
- B) Mains L1 current
- C) Total kW on mains
- D) Total kVA on mains
- E) Total power factor
- F) Mains frequency

1- 8.3.2 Mains 1

(shown only in case of 3-phase system)

A	B	C
Ⓢ V-Δ	V _{L-n}	Amp
L1	0	0
L2	0	0
L3	0	0
Tot	---	0

- A) Mains Vac voltages L1-L2-L3
- B) Mains line voltages L1-L2-L3
- C) Mains currents L1-L2-L3 and total

1- 8.3.3 Mains 2

(shown only in case of 3-phase system)

A	B	C
Ⓢ	kVA	kW
L1	0	0
L2	0	0
L3	0	0
Tot	0	0

- A) Mains apparent power L1-L2-L3 and total
- B) Mains active power L1-L2-L3 and total
- C) Mains reactive power L1-L2-L3 and total

1- 8.3.4 Mains 3

(shown only in case of 3-phase system)

A	B	C
Ⓢ	kVA	PF
L1	0	0.00
L2	0	0.00
L3	0	0.00
Tot	0	0.00

- A) Mains apparent power L1-L2-L3 and total
- B) Mains active power L1-L2-L3 and total
- C) Power factor L1-L2-L3 and total

1- 8.3.5 Mains 4

(shown only in case of 3-phase system)

A	B	C
Ⓢ	kVA	kVAR
L1	0	0.0
L2	0	0.0
L3	0	0.0
Tot	0	0.0

- A) Mains apparent power L1-L2-L3 and total
- B) Mains reactive power L1-L2-L3 and total
- C) Power factor L1-L2-L3 and total

1- 8.3.6 Mains control kWh

A
Mains Control
kWh 0
€tot 0
€MWh 0
B
C

- A) Total active energy supplied by mains
- B) Total mains energy cost
- C) Cost of each mains MWh

1- 8.4 Display pages - Genset

1- 8.4.1 Genset summary

A	B	C
Genset Control		
Ⓢ V-Δ	Amp	Σ kW
0	0	0
Σ kVA	PF	FHz
0	0.00	0.0
D	E	F

- A) Genset Vac voltage L1-L2 (or L1-N if the system is single-phase)
- B) Genset L1 current
- C) Total kW on genset
- D) Total kVA on genset
- E) Total power factor
- F) Genset frequency

1- 8.4.2 Genset 1

(shown only in case of 3-phase system)

A	B	C
Ⓢ V-Δ	V _{L-n}	Amp
L1	0	0
L2	0	0
L3	0	0
Tot	---	0

- A) Generator Vac voltages L1-L2-L3
- B) Generator line voltages L1-L2-L3
- C) Generator currents L1-L2-L3 and total

1- 8.4.3 Genset 2

(shown only in case of 3-phase system)

	A	B	C
GE	kVA	kW	kVAR
L1	0	0	0,0
L2	0	0	0,0
L3	0	0	0,0
Tot	0	0	0,0

- A) Generator apparent power L1-L2-L3 and total
- B) Generator active power L1-L2-L3 and total
- C) Generator reactive power L1-L2-L3 and total

1- 8.4.4 Genset 3

(shown only in case of 3-phase system)

	A	B	C
GE	kVA	kW	PF
L1	0	0	0,00
L2	0	0	0,00
L3	0	0	0,00
Tot	0	0	0,00

- A) Generator apparent power L1-L2-L3 and total
- B) Generator active power L1-L2-L3 and total
- C) Generator power factor L1-L2-L3 and total

1- 8.4.5 Genset 4

(shown only in case of 3-phase system)

	A	B	C
GE	kVA	kVAR	PF
L1	0	0,0	0,00
L2	0	0,0	0,00
L3	0	0,0	0,00
Tot	0	0,0	0,00

- A) Generator apparent power L1-L2-L3 and total
- B) Generator reactive power L1-L2-L3 and total
- C) Generator power factor L1-L2-L3 and total

1- 8.4.6 Genset control kWh

GensetControl		A
kWh	0	B
€tot	0	C
€MWh	0	

- A) Total active energy supplied by generator (upgraded every work hour with KG closed)
- B) Total generator energy cost
- C) Cost of each generator MWh

1- 8.4.7 Running page diesel

After the engine has started, you will see directly this Running page, if the system is set for diesel engine:

A	B	C	D
GE running ...			
V-Δ	Amp	Σ kW	Σ kVA
0	0	0	0
Oil pressure	Engine temperature	Fuel level percentage	F(Hz)
0,0	0,0	0,0	0,0
E	F	G	H

- A) Generator Vac voltage L1
- B) Generator current L1
- C) Total kW
- D) Total kVA
- E) Oil pressure
- F) Engine temperature
- G) Fuel level percentage
- H) Generator frequency

1- 8.4.8 Running page gasoline

If the system is set for gasoline engine, the running page is:

A	B	C
GE running ...		
V-Δ	Amp	F(Hz)
0	0	0,0
Σ kW	Σ kVA	Oil pressure
0	0	0,0
D	E	F

- A) Generator Vac voltage L1
- B) Generator current L1
- C) Generator frequency
- D) Total kW
- E) Total kVA
- F) Fuel level percentage

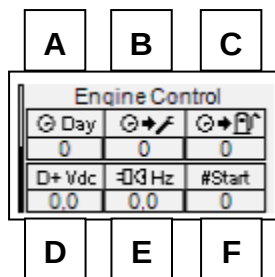
1- 8.5 Display pages - Engine

1- 8.5.1 Engine 1

A	B	C
Engine Control		
Rpm	Vdc	⊙ Tot
0	0,0	0
Oil pressure	Engine temperature	Fuel level percentage
0,0	0,0	0,0
D	E	F

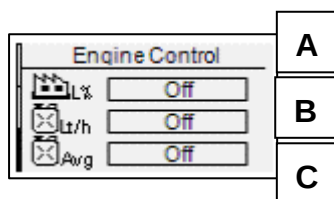
- A) Rpm value
- B) Engine battery voltage
- C) Work hours
- D) Oil pressure analog (Off if 6.2 input is not analog)
- E) Engine temperature (Off if 6.3 input is not analog)
- F) Fuel level percentage (Off if 6.4 input is not analog)

1- 8.5.2 Engine 2



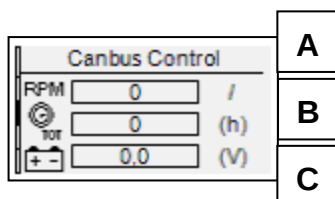
- A) Daily work hours
- B) Work hours to the next service
- C) Autonomy hours
- D) D+ voltage (Vdc)
- E) Pickup frequency (Hz)
- F) Total start attempts

1- 8.5.3 Engine 3



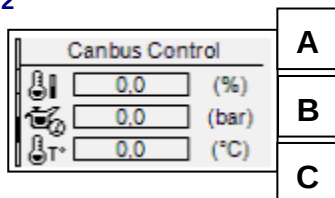
- A) Load percentage (calculated on rated voltage and current)
- B) Instantaneous fuel consumption (calculated on load percentage)
- C) Average fuel consumption (calculated over 24 work hours period)

1- 8.5.4 Canbus 1



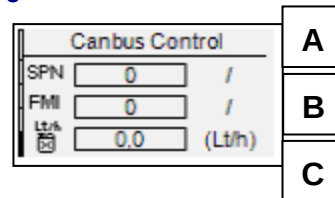
- A) RPM indicator from Canbus
- B) Total work hours from Canbus
- C) Battery voltage from Canbus - If engine ECU is not supplied, this value is 0,0.

1- 8.5.5 Canbus 2



- A) Coolant level percentage from Canbus
- B) Oil pressure from Canbus
- C) Engine temperature from Canbus

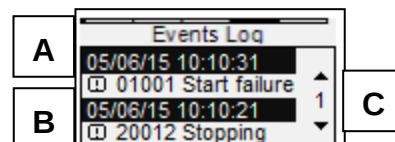
1- 8.5.6 Canbus 3



- A) SPN - Parameter code to identify ECU failure
- B) FMI - Failure mode indicator to perform a preliminary diagnosis of ECU failure
- C) Instant fuel consumption (Lt/h)

1- 8.6 Display pages - Events log

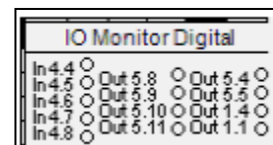
The events log page shows you the last alarms with the date and time.



- A) First event inside selected page: each event records alarm ID, alarm name, date and hour.
- B) Second event inside selected page.
- C) Press the UP or DOWN button to select the up or down arrow, then press "I". This way you can scroll the events (up to 250).

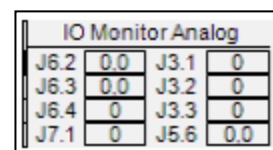
1- 8.7 Display pages - System

1- 8.7.1 I/O digital



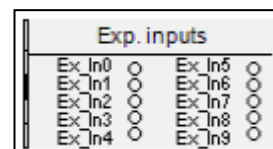
In this page you can see the state of all the 5 digital inputs (from J4.4 to J4.8) and outputs KG (J1.4), KR (J1.1), plus 6 programmable outputs (from J5.8 to J5.11, J5.4 and J5.5).

1- 8.7.2 I/O analog



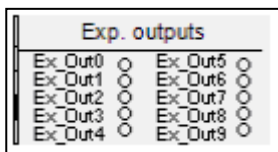
In this page you can see the state of 8 analog inputs (mains voltages excluded).

1- 8.7.3 Expansion inputs



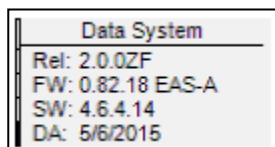
Here you can see the state of the 10 digital inputs of the expansion board (only with expansion enabled).

1- 8.7.4 Expansion outputs



Here you can see the state of the 10 digital outputs of the expansion board (only with expansion enabled).

1- 8.7.5 Data info



This page contains the information about the release file:

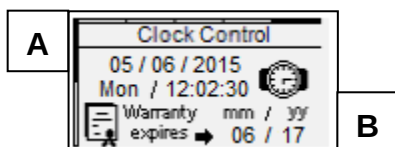
REL: Project release version

FW: Firmware release version

SW: TE Utilities release version

DA: Release date

1- 8.8 Clock and warranty



- A) Clock: date and time
- B) Warranty expiry date detected automatically by the controller after 2 hours with mains voltage and frequency within limits

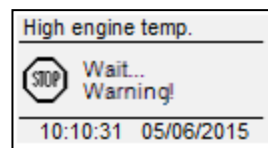
1- 8.9 Display pages - Start and stop

1- 8.9.1 Stopping page

When the engine is stopping, you will see this page that indicates that the engine is stopping.

If the cooling procedure is active, you will see the text "cooling", otherwise you will see the text "stopping".

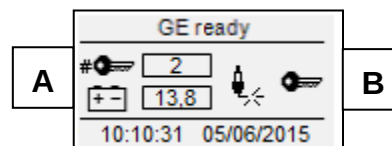
If you see the "warning" indication, it means that the stop is commanded by an alarm. Ready means the end of stop phase.



1- 8.9.2 Starting page

When you start the generator you will see this page with number of start attempts and battery voltage that disappears after the starting, and redirects you to the Running page.

The upper part of this screen shows the actual phase of the engine (preheating, starting, etc...)



- A) Attempt number indicator and battery voltage
- B) Start phase indicator: glow plug means preheat phase while key means cranking phase

1- 9 Optional accessories

1- 9.1 Serial cable code 95-050

This cable is used to connect your TE809 with a PC for the remote control. It's a db9 female - db9 female null modem cable.



1- 9.2 GSM modem code 1571806B

This GSM/GPRS modem is used for GSM or GPRS communication. For GSM communication, you need to connect it to the TE809. For the GPRS data transferring it's necessary to connect one modem to the PC and one to the TE809. In both cases, the connection must be done with a normal male-female 9 poles serial cable (code 51C3).



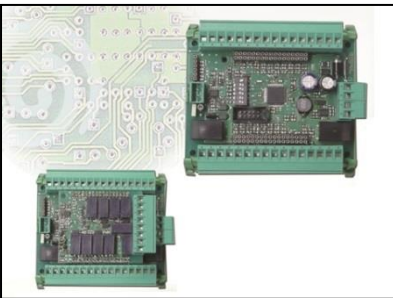
1- 9.3 TCP/IP converter Aport code 1571806G

It's possible to connect the TE809 with a TCP/IP converter (to one serial port) to permit the remote monitoring of the controller for example with our TE Monitor.



1- 9.4 Expansion boards TE6010

It's possible to connect one or more expansion boards to the TE809 to the RS232 or RS485 port. For more informations see paragraph 2- 10.7.



TE6010 base: base board for the connection of I/O
TE6010B: 8 digital inputs expansion
TE6010C: 5 relay outputs
TE6010M: 8 digital outputs expansion

1- 9.5 Expansion boards TE810-EXP

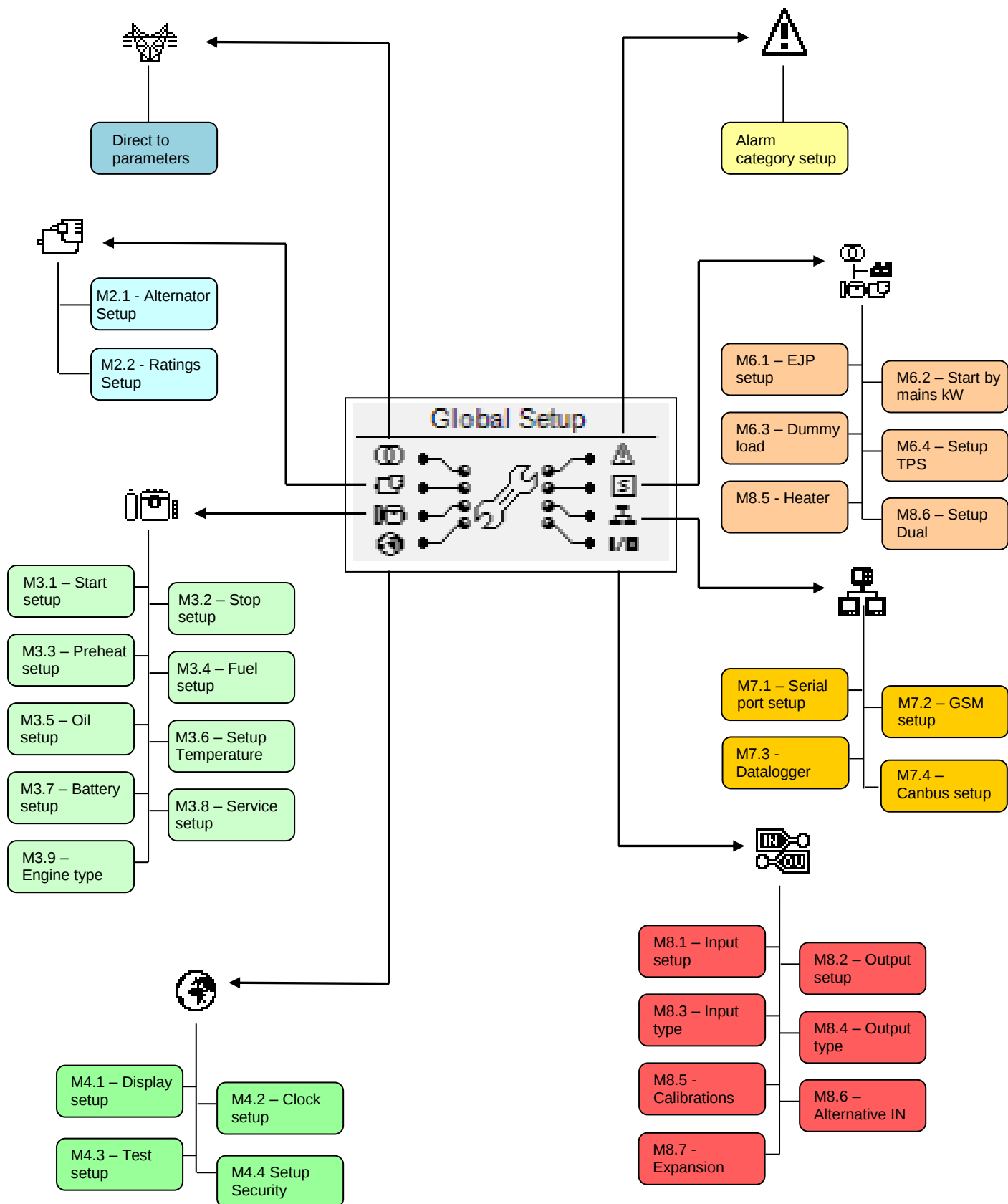
It's possible to connect one expansion board TE810-EXP to the TE809 to the RS485 port. For more information see paragraph 2- 10.8.



10 digital inputs
10 digital outputs

2- PROGRAMMATION MENUS

2- 1 Navigation chart - Global Setup



2- 2 Navigation instructions

Entering global setup, pressing the MENU button, you have to insert the correct password to access to the programming menu. Press the DOWN arrow to highlight the square with the password, and press "i" to confirm. Modify the password with the LEFT and RIGHT arrows, then confirm with "i". The password, by default, is 1. If you enter the wrong password, you will see the indication "wrong code" and you will not be able to enter inside the menu. To change the password, see the Security setup, M.4.4.

If the password is correct, press the DOWN arrow to select the icon (A) and confirm with "i" to enter in the programming menus.

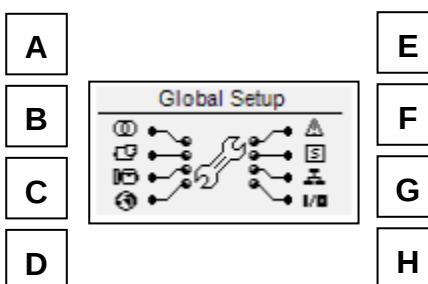
The correct password is, by default, 1

Note: the password that you insert will remain in memory until you turn-off the controller.



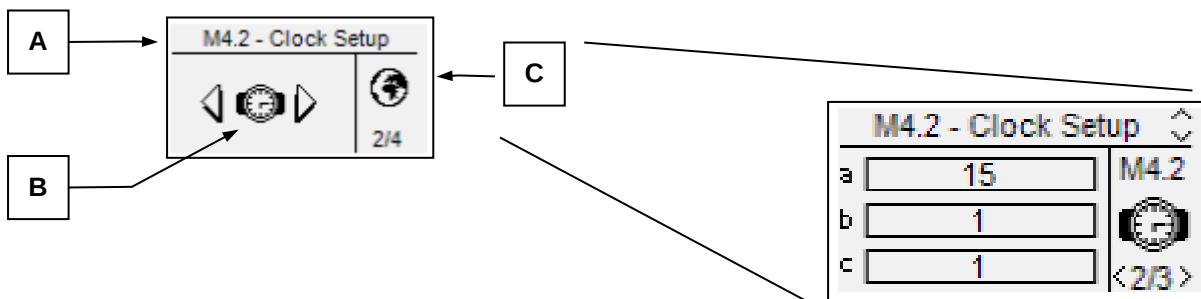
From the main page you can choose 8 different menus:

- A) Mains setup
- B) Alternator setup
- C) Engine setup
- D) General setup
- E) Alarms setup
- F) Special functions
- G) Connectivity
- H) I/O setup



If the HELP symbol is present, it means that there is at least one alarm active. Pressing the HELP button, you directly go to the active alarms page. With the arrows you can select the menu. Once selected the desired menu, press the "i" button to confirm and enter or press "menu" to return to the previous screen. Then you will see a screen for the choice of the submenu (except for Alternator, Mains and Alarms, in which you will see directly the programming parameters). This screen is composed by 3 parts:

- A) The name of the submenu
- B) The icon of the submenu
- C) The page and the icon of the menu that contains the submenu



Press "i" to confirm and enter, or press the left or right arrows to see the next submenu, or press "menu" to return to the previous screen. In the submenus, the parameters are divided in different pages; choose the page with the left and right arrows, and choose the parameter with the up and down arrows. Then press "i" to confirm and modify the parameter. Then press "i" to confirm or "menu" to annul.

2- 3 M1 - Mains setup

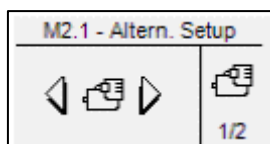
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Mains rated V	Allows you to set the rated voltage of the mains.	0-600 [Vac]	400
b	Mains high V	You can set the high threshold voltage; if the voltage measured is higher than this value (% of the rated voltage), the mains is considered faulty and TE809 starts the generator (in automatic mode).	100-200 [%]	115
c	Mains low V	You can set the low threshold voltage; if the voltage measured is lower than this value (% of the rated voltage), the mains is considered faulty and TE809 starts the generator (in automatic mode).	0-100 [%]	85
d	Mains rated F	Allows you to set the rated frequency.	50-60 [Hz]	50
e	Mains high F	You can set the high frequency threshold; if the frequency measured is higher than this value (% of the rated frequency), the mains is considered faulty and TE809 starts the generator (in automatic mode).	100-200 [%]	110
f	Mains low F	You can set the low frequency threshold; if the frequency measured is lower than this value (% of the rated frequency), the mains is considered faulty and TE809 starts the generator (in automatic mode).	0-100 [%]	90
g	KR delay	You can set a delay time for the closure of the mains contactor. This time starts from when the TE809 opens the generator contactor (software interlock function).	0-100 [s]	1
h	Mains OK	It is the delay time after which, if the mains returns within the limits set (see parameters B, C, E, F), it's considered stable and the mains contactor is closed, then begins the stop phase of the generator (in automatic mode).	0-600 [s]	10
i	Faulty mains	It is the delay time after which the mains is considered faulty, compared with the limits specified in parameters B, C, E, F. This parameter is used to filter any temporary instability of the mains. Increase this parameter to avoid fast start/stop procedures due to mains flickering.	0-600 [s]	5
j	Phase sequence	Choose the sequence of the phases: R-S-T or T-S-R, or OFF	OFF-RST-TSR	RST
k	V Asymmetry	If the difference between the lower and the higher phase voltages is greater than this parameter, the asymmetry alarm (if enabled) is shown.	0-100 [%]	10
l	KR protection	Parameter to enable the protection on mains failure. If On, the alarms about the mains immediately open the mains contactor. If Off, the mains contactor is opened only when the generator is ready.	On-Off	On
m	System type	You can set the type of system of the mains: three-phase, single-phase or two-phase with neutral.	Three-phase Single-phase Two-phase+n	Three-phase
n	Cost for MWh	Set the cost for every Mega Watt per hour supplied by mains	1-999999	100
o	Start by KR	If On, if parameter "KR protection" is set to ON, every condition which activates KR protection (phase inversion, feedback KR, asymmetry alarm, ecc...) also triggers an engine start with changeover on generator until the mains returns ok.	On-Off	On

2- 4 M2 - Genset setup

The Genset setup is composed by 2 submenus:

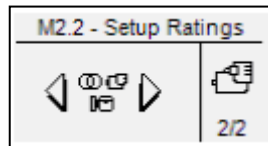
- A) Alternator setup: Submenu that contains all the parameters about the alternator
- B) Ratings setup: Submenu for the settings of the alternate ratings of the system

2- 4.1 M2.1 - Alternator setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	GE rated V	Rated voltage of the generator.	0-600 [VAC]	400
b	GE high V	You can set the high threshold voltage; if the voltage measured is higher than this value (% of the rated voltage), the generator is considered faulty and TE809 shows the "high GE voltage" alarm.	100-200 [%]	115
c	GE low V	You can set the low threshold voltage; if the voltage measured is lower than this value (% of the rated voltage), the generator is considered faulty and TE809 shows the "low GE voltage" alarm.	0-100 [%]	85
d	GE rated F	Rated frequency of the generator.	40-70 [Hz]	50
e	GE high F	You can set the high threshold frequency; if the frequency measured is higher than this value (% of the rated frequency), the generator is considered faulty and TE809 shows the "high GE frequency alarm".	100-200 [%]	110
f	GE low F	You can set the low threshold frequency; if the frequency measured is lower than this value (% of the rated frequency), the generator is considered faulty and TE809 shows the "low GE frequency alarm".	0-100 [%]	90
g	Rated current	You set the nominal operating current of the generator.	0-9999 [A]	100
h	I _{max} overload	You set the maximum overload admitted on the generator. If exceeded, an alarm message is shown.	0-1000 [%]	200
i	I _{max} short circuit	You set the value that permits to consider a short circuit on the generator. If exceeded, related alarm message is shown.	0-1000 [%]	300
j	Max load power	Set the maximum load percentage allowed on the generator	10,0 – 1000,0 [%]	130
k	Load power pre alarm	Set the load percentage on the generator which activates pre alarm	10,0 – 1000,0 [%]	110
l	Hysteresis delay	Set the delay time to deactivate load percentage pre alarm when the load is below 95% of the pre alarm threshold	0-255 [s]	5
m	Single CT	If On, line 2 and line 3 load currents are the same value of line 1. In this case it is possible to calculate all 3-phase load measurements (kW, kVA, kVAR, PF) using a single current transformer. This feature is intended to be used only with balanced three-phase loads.	On-Off	Off
n	Cost for MWh	Set the cost for every Mega Watt per hour supplied by generator	1-999999	100
o	Rated PF	It sets the rated power factor of the system: the value is multiplied by 100 so if rated power factor is 0,8, then just program 80.	0-100	80
p	KG delay	You can set a delay time for closing the generator contactor. This time starts from when the TE809 opens the mains contactor (software interlock function).	0-100 [s]	1
q	GE Ok delay	It is the delay time over which if the voltage and frequency are within limits (parameters B, C, E, F), the generator is considered stable and its contactor is closed.	0-65535 [s]	5
r	CT ratio	It sets the ratio of Current Transformers to read the current value (example: CT 100/5A, you must set it at 20, because 100: 5 = 20).	0-10000	20
s	System type	You can set the type of system of the generator: three-phase, single-phase or two-phase with neutral.	Three-phase Single-phase Two-phase+n	Three-phase
t	Set kWh	Here you can set the initial value of the kWh.	0-10E+8 [kWh]	0
u	Phase sequence	Choose the sequence of the phases: R-S-T or T-S-R, or OFF	OFF-RST-TSR	RST
v	Asymmetry	If the difference between the lower and the higher phase voltages is greater than this value, the asymmetry alarm (if enabled) is shown.	0-100 [%]	10
w	GE Filter	Insert a 5-levels software filter on eventual disturbs on generator voltage and frequency. It can be set from 0 (no filtering) to 5 (high filtering), to avoid accidental opening of the generator contactor.	0-5	1
x	Neutral	Set if the system is with (On) or without (Off) neutral	On-Off	On

2- 4.2 M2.2 - Ratings setup



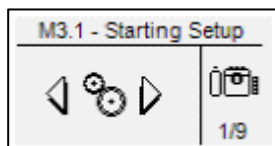
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a1	Alternative 1: VG	Set the alternative rated generator voltage	1-500 [Vac]	230
a2	Alternative 1: FG	Set the alternative rated generator frequency	1-65 [Hz]	50
b1	Alternative 1: VM	Set the alternative rated mains voltage	1-500 [Vac]	230
b2	Alternative 1: FM	Set the alternative rated mains frequency	1-65 [Hz]	50
c	Alternative 1: RPM	Set the alternative rated engine speed	1-65535 [Rpm]	1500
d1	Alternative 2: VG	Set the alternative rated generator voltage	1-500 [Vac]	230
d2	Alternative 2: FG	Set the alternative rated generator frequency	1-65 [Hz]	60
e1	Alternative 2: VM	Set the alternative rated mains voltage	1-500 [Vac]	230
e2	Alternative 2: FM	Set the alternative rated mains frequency	1-65 [Hz]	60
f	Alternative 2: RPM	Set the alternative rated engine speed	1-65535 [Rpm]	1800
g1	Alternative 3: VG	Set the alternative rated generator voltage	1-500 [Vac]	380
g2	Alternative 3: FG	Set the alternative rated generator frequency	1-65 [Hz]	60
h1	Alternative 3: VM	Set the alternative rated mains voltage	1-500 [Vac]	380
h2	Alternative 3: FM	Set the alternative rated mains frequency	1-65 [Hz]	60
i	Alternative 3: RPM	Set the alternative rated engine speed	1-65535 [Rpm]	1800

2- 5 M3 - Engine setup

The engine setup is composed by 9 submenus:

- A) Start setup: Submenu that contains all the parameters about the starting, like thresholds and times
- B) Stop setup: Submenu for the settings of the stop procedure, like modalities, times and setting of the cooling
- C) Preheat setup: Submenu for the settings of the preheating procedure, the modalities, times and types
- D) Fuel setup: Submenu with all the parameters about the fuel control and management of the wastes
- E) Oil setup: Submenu with all the parameters about the oil pressure, with the choice of the instrument and the thresholds
- F) Temperature setup: Submenu with all the parameters about the temperature, with the choice of instrument and thresholds
- G) Battery setup: Submenu where you can set the parameters about the battery, like the thresholds and time to battery service
- H) Service: Submenu that allows the setting of the parameters and hours about the services and warranty
- I) Engine type: dedicated setup for the choke function on gasoline engines and gas valve on gas engine

2- 5.1 M3.1 - Starting setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Digital pressure signal *	Permits to detect engine running status by the digital oil pressure sensor. It works only if connected to input J4.8.	On/Off	Off
b	D+ threshold *	Permits to set the voltage of D+ of a battery charger alternator, over which the engine is considered started. Set to Off to disable the D+ threshold.	0-9999 [V]	Off
c	W Threshold signal / pickup *	You set the frequency value measured on a permanent by a pickup or a "W" tachimetric sensor, over which the engine is considered started. <u>Note: The pickup input range is 1-36V. So it's not recommended to connect a Saprisa device, that normally has higher voltages.</u>	0-9999 [Hz]	Off
d	GE volt. ON *	You set the voltage (% of the nominal voltage, see alternator menu) value measured of the power alternator, over which the engine is considered started.	0-100 [%]	20
e	GE freq. ON *	You set the frequency (% of the nominal frequency, see alternator menu) value measured of the power alternator, over which the engine is considered started.	0-100 [%]	20
f	Oil pressure *	Threshold on analog oil pressure input to detect engine running.	Off-10 [bar]	Off
g	Attempts number	You set the number of start attempts; when expired, the "starting failure" alarm is activated.	1-10	5
h	Attempt time	It is the maximum duration time of each starting attempt. When the engine is detected running, the crank output is de-activated.	1-30 [s]	5
i	Delay attempts	It is the time between a failed starting attempt and the next one.	1-10 [s]	5
j	RPM constant	This value multiplied with the frequency value of the engine gives you the RPM value.	0.0-100.0	30.0
k	ON alarm delay	It is the time delay from the engine running detection to the enable of the alarms; this time allows the generator to reach the nominal operating conditions.	0-1000 [s]	8
l	Siren time	It is the duration time of the acoustic advisor in case of alarm, if a programmable output is set for "Siren".	0-1000 [s]	20
m	Dec. delay	Time during which the output programmed for decelerator remains active at the starting of the generator after the detection of engine running. At the stopping, that output is active during the whole cooling phase and the stopping phase. It's also the time after the detection of engine running after which the output programmed for accelerator is activated.	Off-99 [s]	Off
n	High RPM	You set the maximum value over which the alarm for high engine rpm appears.	0-200 [%]	120
o	Low RPM	You set the minimum value beyond which the alarm for low engine rpm appears.	0-100 [%]	80
p	RPM nominal	It is the nominal speed of the engine, used also as reference to set the limits on points N and O.	0-10000	1500

*** Warning!** If a general machine switch is present, to avoid any damage to the cranking motor, we strongly recommend:

- to activate also one engine threshold (D+, or W, or oil pressure), not only the alternator frequency and voltage, if the voltage signals (wires 1.5, 1.6, 1.7 and 1.8) are between the the switch and the load

Or

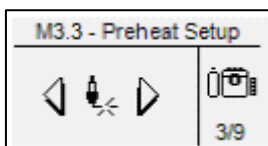
- to connect the voltage signals (wires 1.5, 1.6, 1.7 and 1.8) between the alternator and an eventual general machine switch, not between the switch and the load

2- 5.2 M3.2 - Stop setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Stop time	You set the maximum time of the stop phase, after which the engine must be completely stopped. It also coincides with the maximum time of supplying power to the stop electromagnet, to avoid problems due to permanent power supply.	0-99 [s]	8
b	Cooling time	It sets the cooling time after which the engine is stopped: after the generator contactor opening, the engine continues to run for the set time, to cool down without load. <u>It works only in automatic mode.</u> In manual mode, the cooling can be made opening the generator contactor KG and, after the desired time, stopping the engine with the "stop" button.	0-255 [s]	30

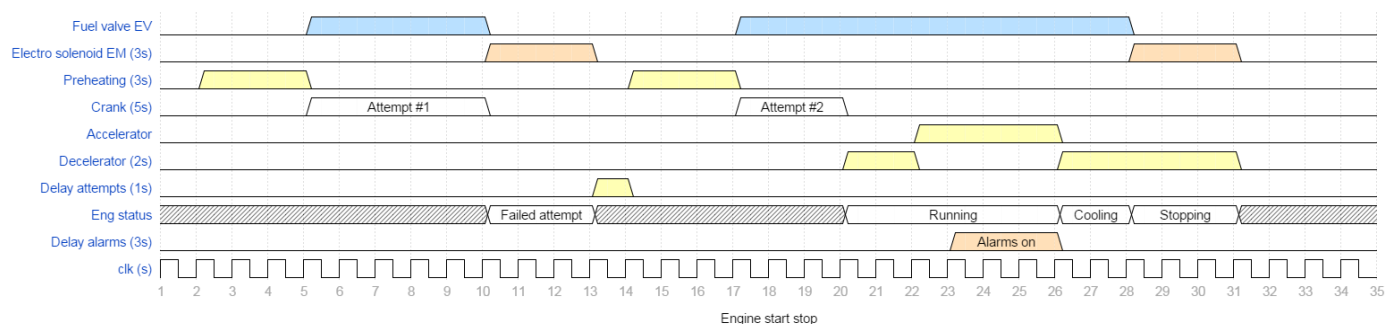
2- 5.3 M3.3 - Preheat setup



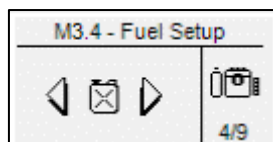
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Preheat time	You set the glow plugs time before starting.	0-99 [s]	5
b	Preheat with EV	If ON, during preheating is also supplied the fuel electrovalve output. If OFF, during the preheating the fuel electrovalve output is not supplied.	On-Off	Off
c	Skip preheat	You can set the value of the engine temperature above which the preheat procedure is skipped, because the engine is already considered "warm".	-999 a 999 [°C]	70
d	Preheat type	You can select the type of procedure: Before start: the glow plugs output is active only before each starting attempt. During start: the glow plugs output is active before and during each starting attempt. During attempts: the glow plugs output is active before starting, during the starting and also during the pause between attempts.	- Before start - During start - During attempts	Before start

2- 5.3.1 Diesel engine start/stop chart

The chart below describes the logical activation of EV, EM, preheating, start, accelerator, decelerator outputs during starting procedure of diesel engine in auto mode. The first attempt is not successful, after the delay time between attempts, a second successful starting procedure is performed. After 6s with engine running the engine is stopped for example by remote stop activation.



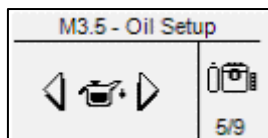
2- 5.4 M3.4 - Fuel setup



The fuel setup contains all the parameters (shown in the table) about the fuel management. See Appendix A for the table of the most common sensors.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Analog tool type	You select the type of transmitter used.	Vdo-Veglia -Datcon-Custom	Vdo
b	Low fuel level	Value beyond which the display shows a warning message that normally does not stop the generator.	0-100 [%]	20
c	Lack of fuel	Value beyond which the display shows an alarm message that normally shuts down the generator.	0-100 [%]	10
d	Refueling enable	This parameter allows you to activate (On) or deactivate (Off) one of the programmable outputs designed to control a pump for the automatic refilling of fuel. <u>This automatic fuel refilling works only if the TE809 is in AUT mode.</u>	On-Off	Off
e	Start refuel	It sets the fuel level below which the automatic fuel refilling starts.	0-100 [%]	30
f	Start delay	It 's a time delay on the refilling starting detection to avoid false signals due to possible movements of fuel sensor in the tank.	0-59 [s]	10
g	Stop refuel	It sets the fuel level that, when reached, stops the automatic refilling.	0-100 [%]	100
h	Stop timer	You set a time limit after which the filling pump output is stopped, although the stop level was not reached. In this case an alarm (refueling timeout) will be displayed and the refueling function is stopped.	0-99 [min]	5
i	Refueling mode	You set the type of management for refueling pump: - Auto mode means that refueling pump will be activated with analog percentage level only in auto mode - Auto+Man means that refueling pump will be activated with analog percentage level in both manual and auto mode - Digital inputs means that refueling pump will be activated only with start pump input and stopped only with stop pump input (or full fuel tank input)	Auto mode - Auto+Man - Digital inptus	Auto
j	Refueling with engine On	If On, the refueling pump will be activated only with engine running.	Off-On	Off
k	Tank capacity	You set the capacity of the tank. Necessary for the fuel management.	0-20000 [L]	100
l1	Automatic	If On, the consumption at 10% load is calculated as 2/3 of consumption at 25% load. If Off, the correct value may be programmed inside "l2" parameter.	Off-On	Off
l2	Cons. 10% load	You can set the hourly consumption of the engine declared by the manufacturer with 10% load. It is necessary for fuel management.	0.0 - 999,0 [L/h]	1.0
m1	Automatic	If On, the consumption at 25% load is calculated as 2/3 of consumption at 50% load. If Off, the correct value may be programmed inside "m2" parameter.	Off-On	Off
m2	Cons. 25% load	You can set the hourly consumption of the engine declared by the manufacturer with 25% load. It is necessary for fuel management.	0.0 – 999.0 [L/h]	3.0
n	Cons. 50% load	You can set the hourly consumption of the engine declared by the manufacturer with 50% load. It is necessary for fuel management.	0.0 – 999.0 [L/h]	5.0
o	Cons. 75% load	You can set the hourly consumption of the engine declared by the manufacturer with 75% load. It is necessary for fuel management.	0.0 – 999.0 [L/h]	8.0
p	Cons. 100% load	You can set the hourly consumption of the engine declared by the manufacturer with 100% load. It is necessary for fuel management.	0.0 – 999.0 [L/h]	12.0
q	Offset fuel	Adjust for the fuel level measure.	-10 – +10 [%]	0
r	Min. autonomy	If the autonomy level is under this value, the autonomy alarm appears.	0-1000 [h]	5

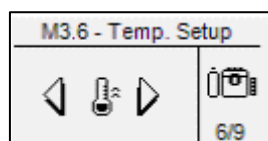
2- 5.5 M3.5 - Oil pressure setup



The oil setup contains all the parameters (shown in the table) about the lubricant system management. See Appendix B for the table of the most common sensors.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Analog tool type	You select the type of transmitter used.	Vdo-Veglia – Datcon-Custom	Vdo
b	Oil pres. prealarm	Value beyond which the display shows a warning message that normally doesn't stop the generator.	1-400 [bar]	3.0
c	Low oil pres.	Value beyond which the display shows an alarm message that normally stops the generator.	1-400 [bar]	2.0

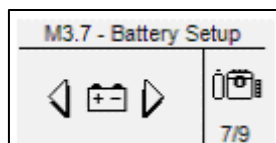
2- 5.6 M3.6 - Temperature setup



The oil setup contains all the parameters (shown in the table) about the coolant system management. See Appendix C for the table of the most common sensors.

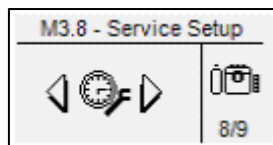
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Analog tool type	You select the type of transmitter used.	Vdo-Veglia – Datcon-Custom	Vdo
b	Temp. prealarm	Value over which the display shows a warning message that normally does not stop the generator.	40-999 [°C]	90
c	High temp.	Value over which the display shows an alarm message that normally stops the generator.	40-999 [°C]	100

2- 5.7 M3.7 - Battery setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	High Vdc	It sets the percentage of maximum battery voltage over rated value; if the battery value measured is higher than this value, the "High battery alarm" is shown.	100-200 [%]	130
b	Low Vdc	It sets the percentage of minimum battery voltage over rated value; if the battery value measured is lower than this value, the "Low battery alarm" is shown.	0-100 [%]	80
c	Rated Vdc	This parameters is programmed automatically by the controller at system startup.	12-24	-
d	Battery efficiency	You set the maximum voltage dropout during cranking to measure battery efficiency. If the battery voltage is detected lower than this value, an alarm will occur after engine start.	1-255 [V*10]	70

2- 5.8 M3.8 - Service setup



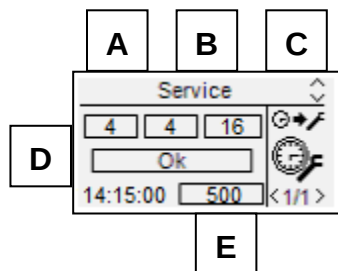
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Enable service	If Off, all service management will be disabled, inside navigation pages "hours to service" indicator will be 0. Service alarm will not be activated. If On, service management will be activated using parameters inside this menu. Inside navigation pages, "hours to service" indicator will show the hours to the next service calculated from running work hours. Service alarm will be activated when running hours will reach the service hours or by date if service type is "hours+date".	Off-On	Off
b	Service type	If Work hours, the service alarm will be activated only by running hours. If Hours + date, the service alarm will be also activated by programmed date limit.	Work hours - Hours+Date	Work hours
c	Next service	Confirm this option to upgrade service limits to the programmed ones.	-	Ok
d	Next service (h)	Set the hours for the next services. Every time a service upgrade is performed, this value will be the hours to the next one.	0-65535 [h]	250
e	Year	If Service type is "hours+date", this value will be stored during service upgrade procedure to give service alarm by date	1 - 99	15
f	Month	If Service type is "hours+date", this value will be stored during service upgrade procedure to give service alarm by date	1 - 12	1
g	Initial work hours	It is the starting value of generator working hours. Normally you can change this value when the controller is mounted on a generator that has already worked.	0-2000 [h]	0
h	Restore hours	By drive, you can confirm it to reset the working hours to the "initial work hours" value at point G.	-	Ok
i	Reset start #	It permits to reset the number of the engine start counter	-	Ok

IMPORTANT: Page 3 with parameters "g", "h" and "i" can be enabled or disabled by "Security user" option inside TE monitor.

2- 5.8.1 - Fast Service upgrade (special "button" menu)

To upgrade service hours and date without entering system setup, follow this procedure:

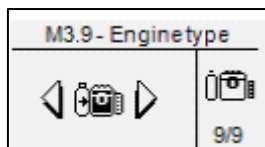
- 1) If service alarm is active on display press RESET to activate OFF mode.
- 2) In OFF mode keep pressed START button for 10 seconds.
- 3) Fast service upgrade page will appear.



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Next service (h)	Set the hours for the next services. Every time a service upgrade is performed, this value will be the hours to the next one. Same parameter as M3.8 - D.	0-65535 [h]	250
b	Month	If Service type is "hours+date", this value will be stored during service upgrade procedure to give service alarm by date	1 - 12	1
c	Year	If Service type is "hours+date", this value will be stored during service upgrade procedure to give service alarm by date	1 - 99	15
d	Next service	Confirm this option to upgrade service limits to the programmed ones.	-	Ok
e	Hours to next service	Shows the hours for the next service after upgrade	-	-

After service upgrade, press MENU to esc to the normal pages.

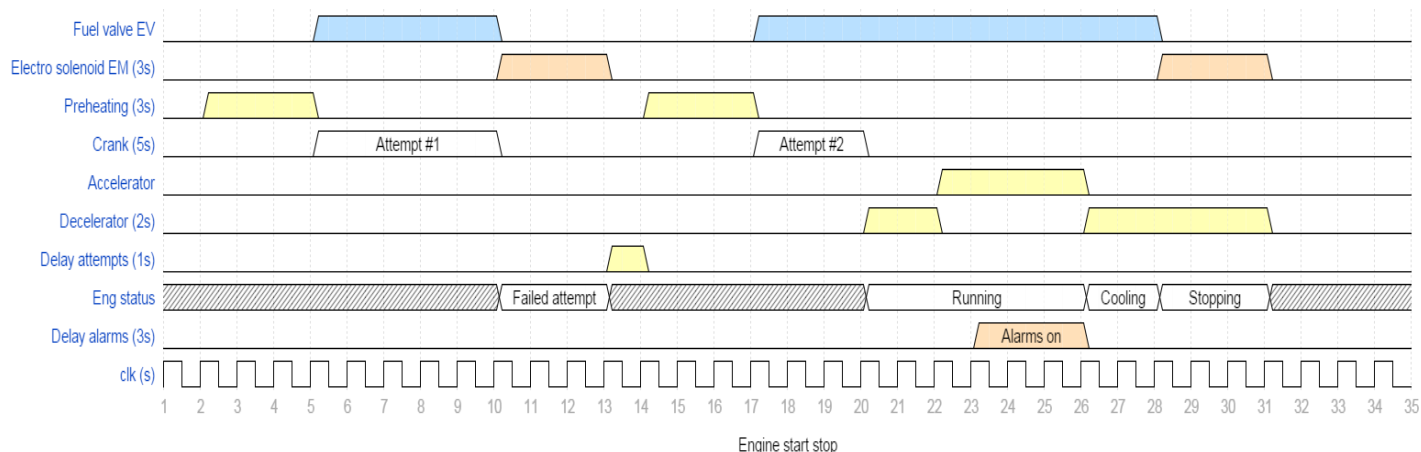
2- 5.9 M3.9 - Engine type



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Engine type	Set the type of fuel and technology used by the engine: - If programmed as "Diesel" the start logic procedure is the one described at 2-5.9.1 paragraph. Outputs EV, Start, Glow plugs, EM are used. - If programmed as "Petrol" the start logic is the one described at 2-5.9.2 paragraph. Outputs EV, Start, Glow plugs, EM, Choke-Priming are used. - If programmed as "Gas" the start logic is the one described at 2-5.9.3 paragraph. Outputs EV, Start, Glow plugs, EM, Choke-Priming, Gas valve are used.	Diesel – Petrol - Gas	Diesel
b	Choke time	It is the maximum time during which the Choke output is activated during the starting.	0-255 [s]	3
c	Threshold	Voltage threshold that must be reached at the starting to deactivate automatically the choke output.	Off-500 [V]	100
d	Temp. Inhibit	When a starting procedure is commanded, if the temperature is higher than this value, the choke output is not activated.	Off-255 [°C]	Off
e	Gasoline pages	If On, the display pages are set properly for gasoline system. If Off, the display pages remain the standard ones.	On-Off	On
f	Choke type	Choose the logic of activation of the choke output: Continuous: the choke output can be commanded during every starting attempt, in accordance with parameters B-C-D. Alternate: the choke output can be commanded only during the odd starting attempts, in accordance with parameters B-C-D.	Continuous - Alternate	Continuous
g	Gas valve delay	Set the delay time between start output activation and GV, EV and priming activation. This timer defines the "Purge" phase for gas engines.	0-255 [s]	3
h	Fuel valve delay	Set the delay time between gas valve de-activation and fuel valve de-activation during stop phase.	0-255 [s]	3
i	Priming delay	Set the activation time of priming output during first attempt of starting procedure	0-255 [s]	3

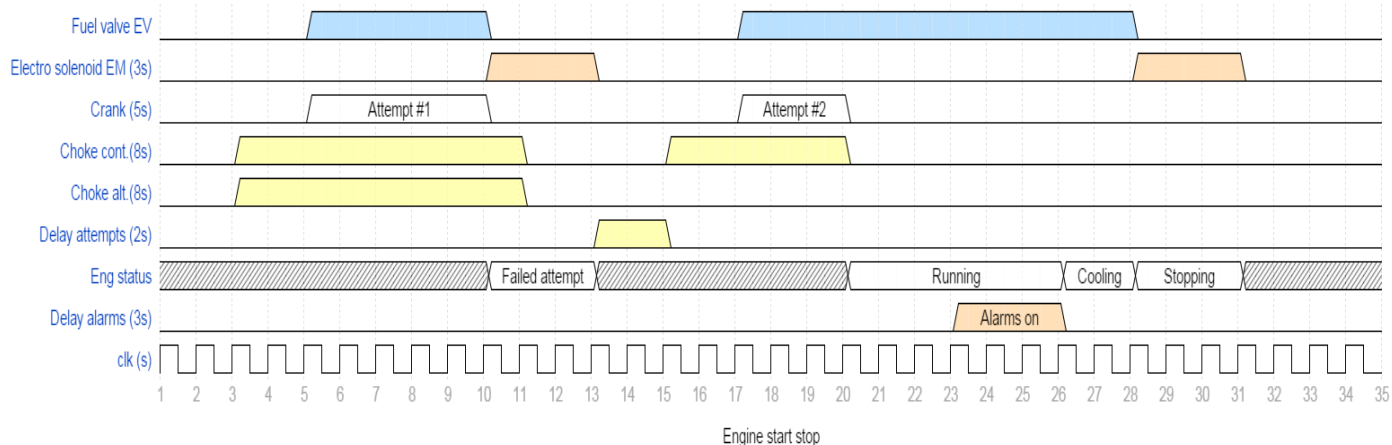
2- 5.9.1 Diesel engine start/stop chart

The chart below describes the logical activation of EV, EM, preheating, start, accelerator, decelerator outputs during starting procedure of diesel engine. The first attempt is not successful, after the delay time between attempts, a second successful starting procedure is performed. After 6s with engine running the engine is stopped for example by remote stop activation.



2- 5.9.2 Petrol/Gasoline engine start/stop chart

The chart below describes the logical activation of EV, EM, choke, start outputs during starting procedure of gasoline engine. The first attempt is not successful, after the delay time between attempts, a second successful starting procedure is performed. During the second attempt with choke in alternate mode, the choke output is not activated. After 6s with engine running the engine is stopped for example by remote stop activation.

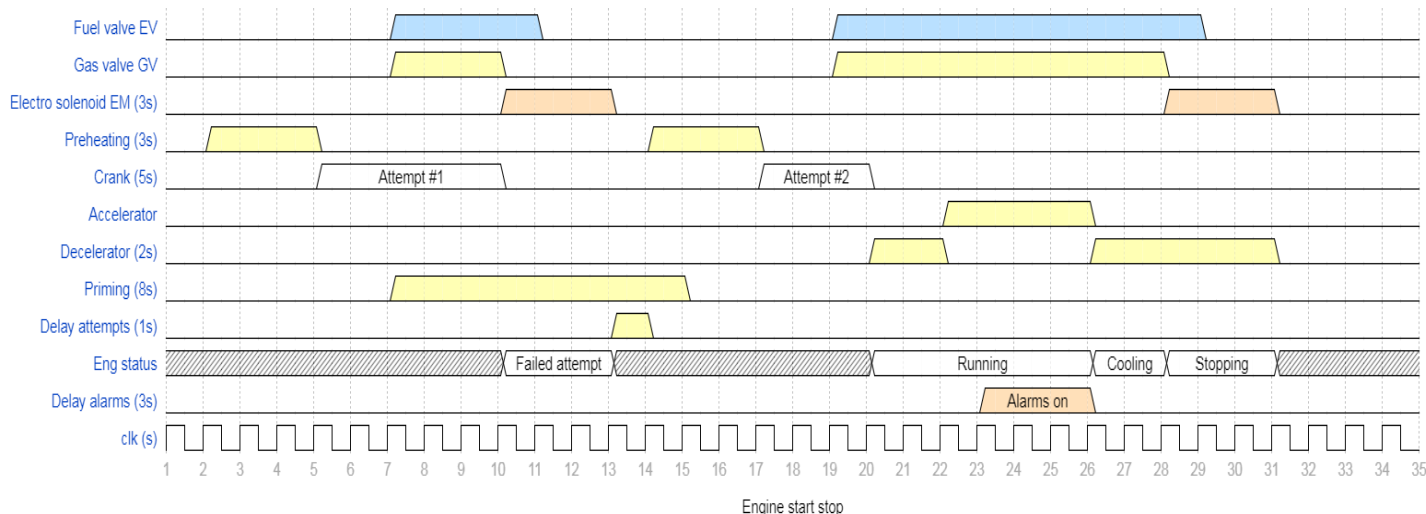


Note: the temperature and the voltage threshold have not been considered. If the temperature is higher than parameter D, the choke output is not activated. If parameter C is reached during the starting, the choke output is automatically de-activated.

Note: Remember to set one output for the choke function (see menu M8.2). This output is activated 2 seconds before the cranking output, and remains active until the value at parameter C is reached, or until the time at parameter B has passed. If the engine is not provided with a temperature sensor, our advice is to install a thermal circuit breaker in series with the control of the choke magnet. It's also necessary to set a weekly test with minimum length of 5 minutes. For this function, see menu M4.3.

2- 5.9.3 Gas engine start/stop chart

The chart below describes the logical activation of EV, EM, Gas valve, Priming, start outputs during starting procedure of gas engine in auto mode. The first attempt is not successful, after the delay time between attempts, a second successful starting procedure is performed.



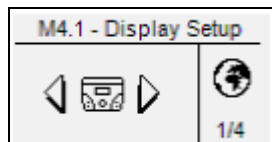
Note: Remember to set two outputs for the gas engine function (see menu M8.2). The first one is the "Gas valve" output which is activated at the same time of EV but during stop is switched off before EV. The second one is "Choke-Priming" output which is activated at the same time of EV and GV but only for a programmable time and only during first start attempt.

2- 6 M4 - General setup

The general setup is composed by 4 submenus:

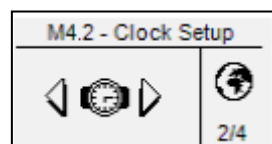
- A) Display setup: Submenu that contains all the parameters settings of the screen: language, contrast, etc
- B) Clock setup: Submenu with the general settings about the clock: date, time and day of the week
- C) Test setup: Submenu with the settings of the test operation mode, like the length and day of the programmable tests
- D) Security setup: Submenu to set the passwords for different levels that lock and unlock the various menus

2- 6.1 M4.1 - Display setup



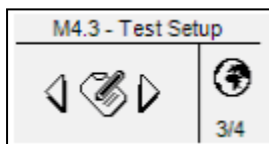
POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Language	You select the language. On board are available the following languages: English, Italian and French. Another language can be inserted by request in the "custom" position. The controller at the turn-on will ask the settings of the language only if the "default" option is selected.	IT – EN – FR – Custom – Default	Default (EN)
b	Contrast	To set the display contrast preferred for the TE809.	0-15	10
c	Show warranty	If On the automatic controller warranty time will be shown on display, otherwise it will remain hidden.	Off - On	On
d	Show IO	If On the IO monitor pages will be shown on display, otherwise they will remain hidden.	Off - On	On
e	Auto Start at turn on	If On, the controller at the turn on is set to Auto mode	Off - On	Off

2- 6.2 M4.2 - Clock setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
-	Reset clock	Used to confirm the adjusted date/clock, it updates the current time with the values set in parameters C,D,E,F,G and H. To do it, you must select the area using the drive arrows and then confirm by the "i" drive button.	-	-
-	Current setting	It shows current date and clock set.	-	-
a	Year	To set the year	0-99	12
b	Month	To set the month	0-12	1
c	Day	To set the day	0-31	1
d	Day of the week	To set the day of the week from Sunday to Saturday	Sun - Sat	Sun
e	Hours	To set the current hour	0-23	12
f	Minutes	To set the current minute	0-59	0

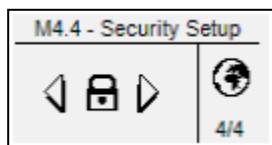
2- 6.3 M4.3 - Test setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Start hour	You set the hour of test 1 starting.	0-23	9
b	Start min.	You set the minute of test 1 starting.	0-59	30
c	Test length	You set the length time for the test 1. If Off, test 1 is disabled.	Off -255 [min]	5
d	Start hour	You set the hour of test 2 starting.	0-23	10
e	Start min.	You set the minute of test 2 starting.	0-59	30
f	Test length	You set the length time for the test 2. If Off, test 2 is disabled.	Off -255 [min]	Off
g	Test with load	If you set it to ON, during the test, the switching between Mains and Genset should be done.	On-Off	Off
h	No remote stop	If ON, during the test the remote stop signal is not considered. If OFF, if the remote stop signal is active during the test, the engine is stopped and the test finishes automatically.	On-Off	Off

POS.	NAME	DESCRIPTION
-	Sunday	If the tick is present, it enables the daily test on Sunday. If the tick is removed, on this day the test is not executed.
-	Monday	If the tick is present, it enables the daily test on Monday. If the tick is removed, on this day the test is not executed.
-	Tuesday	If the tick is present, it enables the daily test on Tuesday. If the tick is removed, on this day the test is not executed.
-	Wednesday	If the tick is present, it enables the daily test on Wednesday. If the tick is removed, on this day the test is not executed.
-	Thursday	If the tick is present, it enables the daily test on Thursday. If the tick is removed, on this day the test is not executed.
-	Friday	If the tick is present, it enables the daily test on Friday. If the tick is removed, on this day the test is not executed.
-	Saturday	If the tick is present, it enables the daily test on Saturday. If the tick is removed, on this day the test is not executed.

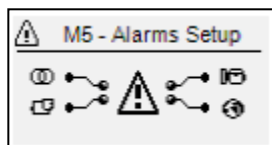
2- 6.4 M4.4 - Security setup



The security setup menu permits to enter the access codes the permit to lock/unlock the programming menus. By default, the access codes are set correctly, so you can access to all the menus. You have the possibility to protect the programming menus entering wrong codes: this way the menus correspondent to the wrong code inserted are locked. When you want to unlock the menus, simply enter in this menu and set the codes to the correct values. The 6 codes are shown in the table.

POS.	NAME	DESCRIPTION	CODE
a	Global code	This is the password to access to the programming menus. It's possible to change it, from 000 to 999.	1
b	Clear events log	Confirm to erase events log register. Unlockable via TE Monitor activating the "Security user" parameter	-
c	State password	Password to lock/unlock all the alarms except the mains, generator and engine ones.	70
d	Mains password	Enter the password that locks/unlocks the mains setup and the relative alarms. If you enter the code correctly to 60, the mains menu is completely unlocked. If you enter a wrong code, the menu is locked until the correct code will be inserted.	60
e	Genset password	Enter the password that locks/unlocks the alternator setup and the relative alarms. If you enter the code correctly to 50, the alternator setup is completely unlocked. If you enter a wrong code, the menu is locked.	50
f	Engine password	Enter the password that locks/unlocks the engine setup and the relative alarms. If you enter the code correctly to 40, the engine setup is completely unlocked. If you enter a wrong code, the menu is locked.	40
g	Special password	Enter the password that locks/unlocks the special functions setup. If you enter the code correctly to 30, the special functions setup is completely unlocked. If you enter a wrong code, the menu is locked.	30
h	Connectivity password	Enter the password that locks/unlocks the connectivity setup. If you enter the code correctly to 20, the connectivity setup is completely unlocked. If you enter a wrong code, the menu is locked.	20
i	I/O password	Enter the password that locks/unlocks the I/O setup. If you enter the code correctly to 10, the I/O setup is completely unlocked. If you enter a wrong code, the menu is locked.	10

2- 7 M5 - Alarms list

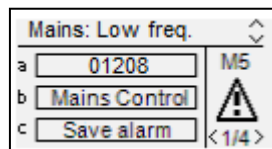


The alarms setup is composed by 4 different alarm groups:

- a) Mains control
- b) Genset control
- c) Engine control
- d) Status control

Select the category with the down and up arrows, then press "i" to confirm and enter.

You will see a general screen for the setup of the alarms, composed by 4 pages. In the first page, select and confirm the parameter "a" to choose the code of the alarm. In the upper part of the screen you will see the name of the corresponding alarm. Then modify the parameters from "d" to "l" as you prefer. Return then to the first page and confirm the parameter "c" to save the modifications.



For every alarm, you can program all the following parameters:

POS.	NAME	DESCRIPTION	RANGE
a	Alarm code	Select this parameter to choose the alarm that you want to set. All the parameters in the next pages refer to the alarm selected in this parameter. In the upper part of the screen you will see also the name correspondent to the code that you are selecting.	-
b	Category of the alarm	Name of the category selected from the first screen of the alarm setup. Note: It's not possible to modify it directly in this page!	-
c	Save alarm	Parameter that has to be confirmed with the "i" button to save all the parameters from d to l in the configuration of the alarm selected at parameter a.	-
d	Activation	It permits to choose when the alarm condition must be verified and make the alarm appear: Always (always enabled), Run (active only with engine running) or Disabled (disabled).	Always - Run-Disabled
e	Delay	Before the activation of the alarm, the cause must remain present for this time.	0-255 [s]
f	Retentive	Choose if the alarm must be retentive (ON: the alarm indication remains on display until you press the reset button, even if the cause has disappeared) or not (OFF: the alarm indications disappears when the cause disappears).	Off-On
g	Action	Select the action in consequence of the activation of the alarm: Warning (only indication), Stop (the alarm stops the engine immediately) or Cooling (the alarms stops the engine with cooling).	Warning - Stop - Cooling
h	Siren	Set if the activation of the alarms must also activate the output programmed for Siren. It can be set to ON (the output set for "siren" is activated when the alarm is present) or OFF.	Off-On
i	Remote	Set if the activation of the alarm must also send an SMS message if Remote APP option is enabled and one or more of programmed GMS numbers are correctly saved (see menu M7). It can be set to ON (if a modem is connected, the board sends a SMS when the alarm appears) or OFF. Enable also the single alarm flag inside modbus map.	Off-On
j	Global 1	Set if the activation of the alarms must also activate the output programmed for Global alarm 1. It can be set to ON (the output is activated when the alarm is present) or OFF.	Off-On
k	Global 2	Set if the activation of the alarms must also activate the output programmed for Global alarm 2. It can be set to ON (the output is activated when the alarm is present) or OFF.	Off-On
l	Global 3	Set if the activation of the alarms must also activate the output programmed for Global alarm 3. It can be set to ON (the output is activated when the alarm is present) or OFF.	Off-On

2- 7.1 M5 - Alarms default parameters

N.	Category	Alarm code	Alarm name	Activation			Delay	Retentive	Action			Siren	REMOTE	Global 1	Global 2	Global 3
				Always	Disabled	Run			Cooling	Stop	Warning					
1	Mains	1208	Mains: low freq.		☒		2				☒		☒			
2	Mains	1209	Mains: high freq.		☒		2				☒		☒			
3	Mains	1212	Mains: phase seq.	☒			0				☒	☒	☒	☒		
4	Mains	1213	Mains: V asymmetry	☒			1				☒	☒	☒	☒		
5	Mains	20025	Faulty mains	☒			2				☒		☒			
6	Mains	20034	KR feedback	☒			5				☒	☒	☒	☒		
7	Mains	20060	Mains: low voltage		☒		5				☒		☒			
8	Mains	20061	Mains: high voltage	☒			5				☒		☒			
9	Genset	1201	GE: low freq.			☒	5	☒		☒		☒	☒	☒		
10	Genset	1202	GE: high freq.			☒	5	☒		☒		☒	☒	☒		
11	Genset	1205	GE: phase seq.	☒			0	☒		☒		☒	☒	☒		
12	Genset	1206	GE: short circuit			☒	2	☒		☒		☒	☒	☒		
13	Genset	1207	GE: I max overload			☒	5	☒	☒			☒	☒	☒		
14	Genset	1214	GE: V asymmetry			☒	1	☒			☒	☒	☒	☒		
15	Genset	20007	Ground protection	☒			2	☒		☒		☒	☒	☒		
16	Genset	20032	Emergency stop	☒			0	☒		☒		☒	☒	☒		
17	Genset	20033	KG feedback	☒			5	☒			☒	☒	☒	☒		
18	Genset	20036	User alarm 1	☒			3	☒			☒	☒	☒	☒		
19	Genset	20037	User alarm 2	☒			3	☒			☒	☒	☒	☒		
20	Genset	20038	User alarm 3	☒			3	☒			☒	☒	☒	☒		
21	Genset	20062	GE: low voltage			☒	5	☒		☒		☒	☒	☒		
22	Genset	20063	GE: high voltage			☒	5	☒		☒		☒	☒	☒		
23	Genset	20066	Dual mode on	☒			0				☒		☒			
24	Genset	20069	User alarm 4	☒			3	☒			☒	☒	☒	☒		
25	Genset	20070	High kW pre alarm			☒	0				☒	☒	☒	☒		
26	Genset	20071	High load kW			☒	0	☒	☒			☒	☒	☒		
27	Engine	01001	Start failure	☒			0	☒		☒		☒	☒	☒		
28	Engine	01003	Mechanical fault			☒	10	☒		☒		☒	☒	☒		
29	Engine	01101	Temp. pre alarm		☒		2				☒	☒	☒	☒		
30	Engine	01102	High engine temp. A		☒		2	☒	☒			☒	☒	☒		
31	Engine	01104	Fuel pre alarm		☒		30				☒	☒	☒	☒		
32	Engine	01105	Low fuel level A		☒		30				☒	☒	☒	☒		
33	Engine	01107	Oil press. pre alarm		☒		2	☒			☒	☒	☒	☒		
34	Engine	01108	Low oil pressure A		☒		2	☒		☒		☒	☒	☒		
35	Engine	01112	High RPM			☒	2	☒		☒		☒	☒	☒		
36	Engine	01113	Low RPM		☒		5	☒			☒	☒	☒	☒		
37	Engine	20005	Low oil level	☒			2	☒			☒	☒	☒	☒		
38	Engine	20006	Low coolant level	☒			2	☒			☒	☒	☒	☒		
39	Engine	20015	Stop engine failure		☒		0	☒		☒		☒	☒	☒		
40	Engine	20019	Service	☒			3	☒			☒	☒	☒	☒		
41	Engine	20020	Refueling timeout	☒			0	☒			☒	☒	☒	☒		
42	Engine	20024	Faulty D+		☒		5				☒	☒	☒	☒		
43	Engine	20028	High GE temp. D			☒	2	☒	☒			☒	☒	☒		
44	Engine	20029	Low fuel level D	☒			5				☒	☒	☒	☒		
45	Engine	20030	Low oil pres. D			☒	2	☒		☒		☒	☒	☒		
46	Engine	20039	Autonomy low		☒		10				☒	☒	☒	☒		
47	Engine	20042	Clogged filter	☒			5	☒			☒	☒	☒	☒		
48	Engine	20043	Tank full	☒			5				☒	☒	☒	☒		
49	Engine	20051	No oil sensor		☒		60				☒	☒	☒	☒		
50	Engine	20057	Low battery voltage	☒			15				☒	☒	☒	☒		
51	Engine	20058	High battery voltage	☒			15				☒	☒	☒	☒		
52	Engine	20064	Water in fuel	☒			3	☒		☒		☒	☒	☒		
53	Engine	20065	High coolant temperature	☒			3	☒		☒		☒	☒	☒		
54	Engine	20068	Battery efficiency	☒			0	☒			☒	☒	☒	☒		
55	General	20008	Test active	☒			0				☒		☒			
56	General	20012	Stopping...	☒			0				☒		☒			
57	General	20013	Start phase	☒			0				☒		☒			
58	General	20021	Remote start	☒			1				☒		☒			
59	General	20022	Remote stop	☒			1		☒			☒	☒	☒		
60	General	20026	EJP	☒			0				☒		☒			
61	General	20027	Failed test	☒			0	☒			☒	☒	☒	☒		
62	General	20045	GE running...	☒			0				☒		☒			
63	General	20046	GE ready...	☒			0				☒		☒			
64	General	20055	Refueling	☒			0				☒		☒			
65	General	20059	TPS mode on	☒			0				☒		☒			
66	General	20067	Master com error	☒			15				☒	☒				

2- 7.2 M5 - Alarms description

N.	Code	Alarm name	Alarm description	Menu / Parameter
1	1208	Mains: low freq.	Indicates that the mains frequency is under the programmed threshold	M1-f
2	1209	Mains: high freq.	Indicates that the mains frequency is over the programmed threshold	M1-e
3	1212	Mains: phase seq.	Indicates a wrong phase sequence of the mains	M1-j
4	1213	Mains: V asymmetry	Indicates that the difference between the higher and the lower mains voltages is too high	M1-k
5	20025	Faulty mains	Indicates that the mains is out of limits	M1-b/c/e/f
6	20034	KR feedback	If KR contactor output status is not equal to input status	M8
7	20060	Mains: low voltage	Indicates that the mains voltage is under the programmed threshold	M1-c
8	20061	Mains: high voltage	Indicates that the mains voltage is over the programmed threshold	M1-b
9	1201	GE: low freq.	Frequency values are under the programmed limits	M2.1-f
10	1202	GE: high freq.	Frequency values are over the programmed limits	M2.1-e
11	1205	GE: phase seq.	Indicates wrong generator voltages sequence	M2.1-o
12	1206	GE: short circuit	Indicates an instantaneous current higher than the programmed limits for short circuit	M2.1-i
13	1207	GE: I _{max} overload	Indicates an instantaneous current higher than the programmed limits for overload	M2.1-h
14	1214	GE: V asymmetry	Indicates that the difference between the higher and the lower genset voltages is too high	M2.1-p
15	20007	Ground protection	Ground protection digital input alarm	M8
16	20032	Emergency stop	It indicates that the input programmed as "emergency button" is active	M8
17	20033	KG feedback	If KG contactor output status is not equal to input status	M8
18	20036	User alarm 1	Alarm that is present when the digital input programmed as user alarm 1 is active	M8
19	20037	User alarm 2	Alarm that is present when the digital input programmed as user alarm 2 is active	M8
20	20038	User alarm 3	Alarm that is present when the digital input programmed as user alarm 3 is active	M8
21	20062	GE: low voltage	Voltage values are under the programmed limits	M2.1-c
22	20063	GE: high voltage	Voltage values are over the programmed limits	M2.1-b
23	20066	Dual mode on	Alarm active during stop by dual standby mode, during this standby the mains detection led is activated even if mains is not present.	M6.6
24	20069	User alarm 4	Alarm that is present when the digital input programmed as user alarm 4 is active	M8
25	20070	High kW pre alarm	Indicates an instantaneous load power on generator higher than the programmed limits for kW pre alarm.	M2.1-k
26	20071	High load kW	Indicates an instantaneous load power on generator higher than the programmed limits for kW alarm.	M2.1-j
27	01001	Start failure	Indicates that the engine is not detected running after the start attempts in automatic mode	M3.1
28	01003	Mechanical fault	Indicates that all engine running detection signals are lost without a command from the controller to stop the engine	M3.1
29	01101	Temp. pre alarm	Indicates analog engine temperature higher than programmed pre-alarm threshold	M3.6-b
30	01102	High engine temp. A	Indicates analog engine temperature higher than programmed alarm threshold	M3.6-c
31	01104	Fuel pre alarm	Indicates analog fuel level lower than programmed pre-alarm threshold	M3.4-b
32	01105	Low fuel level A	Indicates analog fuel level lower than programmed alarm threshold	M3.4-c
33	01107	Oil press. pre alarm	Indicates analog oil pressure lower than programmed pre alarm threshold	M3.5-b
34	01108	Low oil pressure A	Indicates analog oil pressure lower than programmed alarm threshold	M3.5-c
35	01112	High RPM	Indicates an engine speed value higher than programmed value	M3.1-n
36	01113	Low RPM	Indicates an engine speed value lower than programmed value	M3.1-o
37	20005	Low oil level	Oil level digital input alarm	M8
38	20006	Low coolant level	Coolant level digital input alarm	M8
39	20015	Stop engine failure	Indicates that the engine is still detected running after a stop phase	M3.2
40	20019	Service	Indicates that service timer has expired	M3.8
41	20020	Refueling timeout	Indicates that the engine is still detected running after a stop phase	M3.2
42	20024	Faulty D+	Indicates an alternator D+ voltage under 4Vdc with engine running	-
43	20028	High GE temp. D	High temperature digital input alarm	M8
44	20029	Low fuel level D	Low fuel level digital input alarm	M8
45	20030	Low oil pres. D	Low oil pressure digital input alarm	M8
46	20039	Autonomy low	If autonomy hours calculated with load percentage, fuel consumption and fuel level are lower than the programmed value, the alarm will be shown	M3.4
47	20042	Clogged filter	"Clogged air filter" digital input alarm	M8
48	20043	Tank full	"Fuel tank full" digital input alarm	M8
49	20051	No oil sensor	Indicates that the oil pressure digital sensor is open with engine not running	-
50	20057	Low battery voltage	Indicates a battery voltage higher than programmed value	M3.7-a
51	20058	High battery voltage	Indicates a battery voltage lower than programmed value	M3.7-b
52	20064	Water in fuel	Water in fuel alarm by digital input	M8
53	20065	High coolant temperature	High coolant temperature alarm by digital input	M8
54	20068	Battery efficiency	Indicates high battery voltage dropout during cranking phase	M3.7

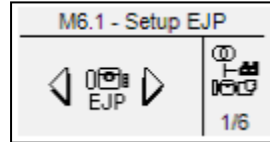
N.	Alarm code	Alarm name	Alarm description	Menu / Parameter
55	20008	Test active	Signalization active during test procedure	M4.3
56	20012	Stopping...	Indicates an active stop procedure	-
57	20013	Start phase	Indicates an active start procedure	-
58	20021	Remote start	Indicates remote start function from digital input	M8
59	20022	Remote stop	Indicates remote stop function from digital input	M8
60	20026	EJP	Indicates that the the remote start input (if programmed as EJP) is active	M6.1
61	20027	Failed test	Indicates an unsuccessful test: in manual if mode the engine has not started after the attempts number; in automatic mode if a stopping alarm occurs during test procedure	M4.3
62	20045	GE running...	Indication that is active when the generator is detected running	-
63	20046	GE ready...	Indication that the generator is not running and without blocking alarms	-
64	20055	Refueling	Indicates refueling conditions active, if refueling pump output is programmed, the connected output is activated.	M3.4
65	20059	TPS mode on	Indicates acitvation of TPS timed programmable start/stop mode.	M6.4
66	20067	Master com error	Indicates RS485 master-slave communication error if dual standby mode is enabled.	M6.6

2- 8 M6 - Special functions

The TE809 permits 6 special functions active only in automatic mode: EJP, Start by mains kW, Dummy load, TPS, Heater, Dual standby. The relative parameters can be set in this menu. Here you can also set the type of use of all the programmable inputs and outputs. The submenus are the following:

- A) EJP - only auto mode
- B) Start by mains kW (peak shaving) - only auto mode
- C) Dummy Load - only auto mode
- D) TPS (timer programmable start stop) - only auto mode
- E) Heater - only auto mode
- F) Dual standby - only auto mode

2- 8.1 M6.1 - Setup EJP



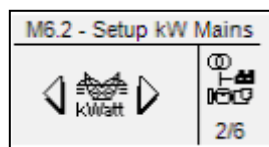
Start the generator by a remote signal on one of the programmable inputs previously programmed as remote start (see par. 2-10). When that input is closed to negative, after a delay time, the generator starts. Then:

- a) If EJP 2 ENABLE is OFF: when the KG DELAY time has elapsed, TE809 switches the changeover switch on generator side, even if the mains is detected.
- b) If EJP 2 ENABLE is ON: after the generator has started, you have to wait that the second programmable input (that you have to set to CHANGEOVER, see par. 2-10) is closed to negative, then after the KG delay time, TE809 switches the changeover switch on generator side, even if the mains is detected.

“No KR with EJP” option permits to inhibit, in case of generator alarm, the changeover switch on mains side.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	EJP enable	If ON the function is enabled, if OFF the function is disabled.	On/Off	Off
b	Start delay	It is the delay time that elapses when you close to negative the terminal programmed as remote start before the generator starting.	0-999 [s]	5
c	KG delay	It is the delay time that elapses after the starting of the generator (if parameter d is OFF) or after the closure to negative of the input programmed as changeover (if parameter d is ON) before the switching of the changeover switch.	0-999 [s]	5
d	EJP2 input	If ON, it enables the changeover switch control by the changeover input terminal closed to negative; when closed and after the delay time at point c, the load switches to generator. If OFF, the changeover input is not necessary to control the changeover switch: changeover switch is automatically closed on generator side when the engine is started by the remote start input and after the delay time at point c.	On/Off	On
e	No KR with EJP	If ON, when EJP mode is active (remote start input active), the mains contactor opens and it's not possible to close it also if the generator is stopped by an alarm.	On/Off	Off
f	Off delay	It is the delay time during which the EJP signal must be disabled to permit the stopping of the generator and the switching on the mains.	0-999 [s]	5

2- 8.2 M6.2 - Start by mains kW



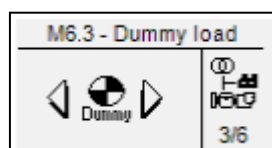
Function that allows the generator's automatic start and stop, according to the maximum and minimum thresholds programmable on mains consumption.

If the load consumption from the mains supplies exceeds the START THRESHOLD for a period of time longer then the TIME FOR START, TE809 starts the generator and switch the load for the generator. When the value of load's consumption is less than the STOP THRESHOLD at least for the TIME FOR STOP time, the load is commutated to the mains (if available) and the generator is stopped. If the mains is missing, the load remains on generator until the mains voltage is detected.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	kW mains Enable	If ON the function is enabled, if OFF it is disabled.	On / Off	Off
b	Start power	Load supplied by the mains: if the power consumption exceeds this value (at least for the "time for start" at point c), the generator starts and the power switching moves on the generator.	0-255 [%]	80
c	Time for start	It is the delay time for which the load consumption must remain over the threshold value on the mains (point b); after this time the generator starts.	0-255 [s]	5
d	Stop power	Load is supplied by the generator: if the power consumption returns to be less than this threshold value set (at least for the "time for stop at point e), the load switches to the Mains and the generator is stopped.	0-255 [%]	30
e	Time for stop	It's the delay time for which the load consumption must remain below the threshold value; after this time the load returns to the Mains and the generator is stopped.	0-255 [s]	5

Note: power percentage thresholds are referred to the rated kW value, that is calculated from the rated voltage, the rated current, the rated power factor (0,8) and the type of the system selected.

2- 8.3 M6.3 - Dummy load

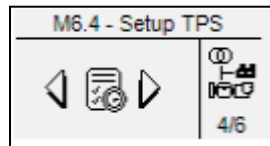


Function that allows to activate one of the programmable outputs, according to the maximum and minimum thresholds programmable on load consumption. If the load consumption is lower than the DUMMY ON for a period of time longer then the ON DELAY, the board activates all the outputs that you programmed for Dummy load function (see par. 2-10 for the programming of the outputs). When the value of load consumption is higher than the DUMMY OFF at least for the OFF DELAY time, the outputs are de-activated. To activate this function, you have to set at least one of the programmable outputs for "dummy load" (see par. 2-10), then you have to set the following parameters.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Dummy enable	If ON the function is enabled, if OFF the function is disabled.	On / Off	Off
b	Dummy On	Load supplied by generator: if the power consumption is lower than this value (at least for the "On delay" at point c), the outputs programmed as "dummy load" are activated.	0-255 [%]	30
c	On delay	It is the delay time for which the load consumption must remain under the threshold value on the generator (point b); after this time the outputs are activated.	0-255 [s]	5
d	Dummy Off	Load is supplied by the generator: if the power consumption exceeds the threshold value set (at least for the "Off delay" at point e), the outputs programmed as "dummy load" are deactivated.	0-255 [%]	80
e	Off delay	It is the delay time for which the load consumption must remain over the threshold value on the generator (point d); after this time the outputs are deactivated.	0-255 [s]	5

Note: power percentage thresholds are referred to the rated kW value, that is calculated from the rated voltage, the rated current, the rated power factor (0,8) and the type of the system selected.

2- 8.4 M6.4 - Setup TPS



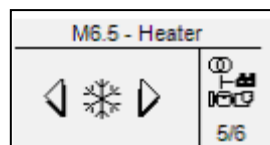
This function similar to automatic test is used to program up to two working intervals which activate the generator at chosen clock time and stop it at a chosen clock time. It's also possible to program if the working time is with or without load, with or without remote stop and which are the days allowed to work. Outside of TPS time intervals, it's possible to defines if the generator will start with faulty mains only during day or night.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a 1-2	TPS1 start (h) TPS1 start (m)	TPS1 start hour and minute.	0-23 / 0-59	8:30
b 1-2	TPS1 stop (h) TPS1 stop (m)	TPS1 stop hour and minute.	0-23 / 0-59	12:30
c	TPS1 enable	If Off, the working period 1 is disabled.	On / Off	Off
d	TPS2 start (h) TPS2 start (m)	TPS2 start hour and minute.	0-23 / 0-59	14:30
e	TPS2 stop (h) TPS2 stop (m)	TPS2 stop hour and minute.	0-23 / 0-59	18:30
f	TPS2 enable	If Off, the working period 2 is disabled.	On / Off	Off
g	TPS with load	If On, the TPS mode will be with load on generator side, id Off the load will remain on mains side and the changeover will happen only in case of mains failure during TPS.	On / Off	Off
h	No remote stop	If On, the TPS mode will override remote stop activation to start the generator.	On / Off	Off

POS.	NAME	DESCRIPTION
-	Sunday	If the tick is present, it enables the TPS on Sunday. If the tick is removed, on this day the TPS is not executed.
-	Monday	If the tick is present, it enables the TPS on Monday. If the tick is removed, on this day the TPS is not executed.
-	Tuesday	If the tick is present, it enables the TPS on Tuesday. If the tick is removed, on this day the TPS is not executed.
-	Wednesday	If the tick is present, it enables the TPS on Wednesday. If the tick is removed, on this day the TPS is not executed.
-	Thursday	If the tick is present, it enables the TPS on Thursday. If the tick is removed, on this day the TPS is not executed.
-	Friday	If the tick is present, it enables the TPS on Friday. If the tick is removed, on this day the TPS is not executed.
-	Saturday	If the tick is present, it enables the TPS on Saturday. If the tick is removed, on this day the TPS is not executed.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
m 1-2	Dawn time (h) Dawn time (m)	Set the clock to begin daytime.	0-23 / 0-59	7:00
n 1-2	Dusk time (h) Dusk time (m)	Set the clock to end daytime and begin night time.	0-23 / 0-59	19:00
o	Night mode	If Off, the night mode is disabled. If nighttime stop is selected, the generator will not start by faulty mains during the night. If daytime stop is selected, the generator will not start by faulty mains during the day.	Off – Nighttime stop – Daytime stop	Off

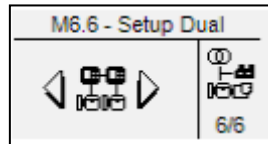
2- 8.5 M6.5 - Heater



This function is used to configure heater output inside M8.2 setup. The output is used to activate an heater device by the measured environmental temperature values. Please note: to use properly this function we suggest to use a PT100 sensor to measure engine temperature. This type of sensor can give low temperature values below zero and not only the high temperature working ones.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Heater enable	If On, enable heater output activation.	On / Off	Off
b	On temperature (°C)	Set the temperature threshold to activate heater output.	-50 + 50 [°C]	0
c	Off temperature (°C)	Set the temperature threshold to deactivate heater output.	0 - 50 [°C]	30
d	Max time (m)	Set the maximum time with heater output active, if Off, there is no maximum activation time.	Off - 255 [m]	Off

2- 8.6 M6.6 - Setup Dual



This function is used to activate dual mode mutual standby between two TE809A 2.1.0. The communication channel is by RS485 connection between the first one (Modbus master protocol) and the second (Modbus slave protocol ID=2 with the same serial speed as master controller).

If Dual mode is enabled on master controller, and the slave is not connected or the serial port speed is not correct, an alarm will appear on the master device.

When both controllers are in auto mode, the dual mutual standby is activated by working hours difference between generator master and slave. If the working hours difference is lower than the programmed value, the master generator will start. After some working hours, the slave generator will be started and when it will be ready to close KG, the master generator will open KG and begin cooling and stop procedure.

When mains returns back, the dual standby will keep stopped the generator with more working hours at the next faulty mains start.

If a shutdown alarm occurs on the running generator, the other one will be started to take the load, in this case the dual standby cycle is interrupted until alarm generator is restored. The cycle can be interrupted also by one or more of these conditions:

1. Master not in auto mode
2. Slave not in auto mode
3. Master disabled (M6.6 - a = Off)
4. Slave disabled (M6.6 - a = Off)

By programmable inputs setup M8.1, is possible to assign "Priority" function to one of the inputs. When priority input is activated, the correspondent generator will be the one in charge even if running hours are greater than the other generator. If both master and slave priority input is activated, the master generator will be the one in charge.

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Dual enable	If On, enable the dual standby between master and slave controller on RS485. Use serial setup M7.1 to define which controller is master and which one slave. The serial speed must be the same on both controllers, the ID for the slave controller must be 1.	On / Off	Off
b	Dual work (h)	Set maximum working hours difference between master and slave controller, when the currently running generator reaches the hours, the other one is started.	1-100 [h]	10
c	Dual delay (s)	Set the delay time between the dual stop conditions and the beginning of stop procedure.	1 - 255 [s]	10

APPLICATION EXAMPLE:

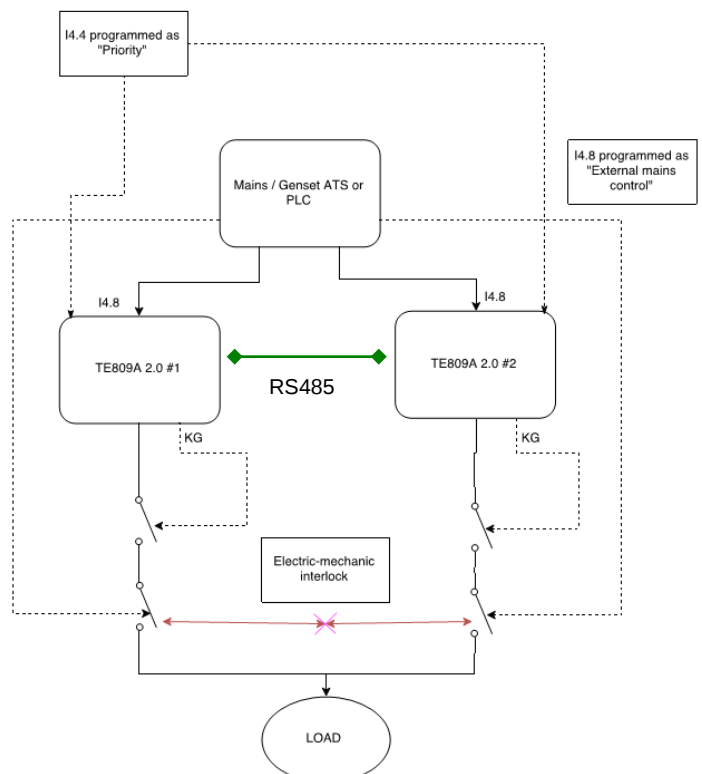
Connect two controllers via RS485 in master-slave mode (ID slave must be **2**).

If mains is not used, it's possible to program one digital input as "external mains control". By this it's possible to use this input as remote start by external ATS or PLC.

It's possible to program an additional digital input as "Priority" to switch the genset priority by external contact.

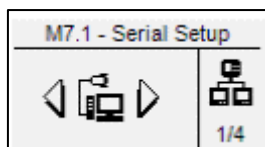
Contactors can be managed by TE809 or external ATS/ PLC.

In normal conditions (both in auto mode, no stop alarms, etc....), when the work hour difference between two gensets is greater than M6.6 - b parameter, the priority changes to the generator with less work hours.



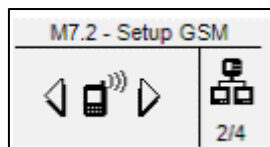
2- 9 M7 - Connectivity

2- 9.1 M7.1 - Serial port setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Unit ID	It's the address of the board for RS485 communication.	0-255	1
b	RS485 protocol	Protocol types available: None: Serial port disabled. Modbus Master: used for the connection with TE6010 expansion and TE809 Slave module for Dual standby mode. Modbus slave: used for remote monitoring via serial cable or Dual standby connection with a master Modbus device. GSM modem: used to connect a GSM modem.	None Modbus Master Modbus Slave Gsm modem	Modbus Slave
c	RS485 baud-rate	Communication speed in bit per second: for modem connections, it is recommended speed of 9600.	9600-115200 [bps]	115200
d	RS232 protocol	Protocol types available: None: Serial port disabled. Modbus Master: used for the connection with TE6010 expansion and TE809 Slave module for Dual standby mode. Modbus slave: used for remote monitoring via serial cable or Dual standby connection with a master Modbus device. GSM modem: used to connect GSM modem.	None Modbus Master Modbus Slave Gsm modem	Modbus Slave
e	RS232 baud-rate	Communication speed in bit per second for RS232 port.	9600-115200 [bps]	115200
f	Activate USB	Confirm to activate USB port to communicate with PC. The communication channel disables as protection CAN port and current measures on J3, use it without machine running for programmation only.	Off-On	Off
g	232 parity	Set the parity for 232 serial port: 1 = Even 2 = Odd 3 = Mark 4 = Space	None - 4	None
h	485 parity	Set the parity for 485 serial port: 1 = Even 2 = Odd 3 = Mark 4 = Space	None - 4	None

2- 9.2 M7.2 - GSM Setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Modem status	Status of the modem: initial (initializing phase), wait (waiting), ready (stand-by phase), send (sending a message), send wait (waiting the response).	-	-
b	APP enable	It enables the automatic status messages and alarm via SMS for SMS app or standard mobile.	On-Off	Off
c	SMS filter (s)	Set the minimum time between two different SMS events to avoid to send many messages in short period of time.	1-255 [s]	3
d 1-2	Generator Ok - Engine running	If enabled, the activation of this condition will trigger a SMS info message	On-Off	Off-On
e 1-2	Engine stopping - Stopping ok	If enabled, the activation of this condition will trigger a SMS info message	On-Off	Off-On
f 1-2	KG active - KR active	If enabled, the activation of this condition will trigger a SMS info message	On-Off	On-On
g 1-2	Auto mode - Test mode	If enabled, the activation of this condition will trigger a SMS info message	On-Off	On-Off
h 1-2	Off mode - Man mode	If enabled, the activation of this condition will trigger a SMS info message	On-Off	On-On
l 1-2	EJP on - Mains return	If enabled, the activation of this condition will trigger a SMS info message	On-Off	Off-Off
j	Remote stop	If enabled, the activation of this condition will trigger a SMS info message	On-Off	On
k 1-2-3	Pw char 1-2-3	Set the 6 characters password code for SMS commands: if password is different from 0-0-0-0-0-0, every SMS command received without the correct password code will be discarded. The syntax to send the correct SMS with password is: <i>PWD=[XXXXXX] [Command]</i> For example if password is 1-0-2-A-z-X, the SMS command to start the engine must be composed this way: <i>PWD=102AzX START</i>	[0-9] or [A-Z] or [a-z]	0 - 0 - 0
l 1-2-3	Pw char 4-5-6	Set the other 3 characters for the password	[0-9] or [A-Z] or [a-z]	0 - 0 - 0
m	Call Numbers	It shows the mobile phone numbers set in position 1	-	-
n	Call Numbers	It shows the mobile phone numbers set in position 2	-	-
o	Call Numbers	It shows the mobile phone numbers set in position 3	-	-
p	Call Numbers	It shows the mobile phone numbers set in position 4	-	-
q	Call Numbers	It shows the mobile phone numbers set in position 5	-	-

2- 9.2.1 - System info SMS message

SMS sent by remote device will be received by mobile device with the following format:

```

EAS=Gen.Name-----
O=AUTO,P=000
M237,237,232,49.9
G000,000,000,00.0
A003.0,000.0,000.0
B=14.1V,h=00000
T=99%,U=00
MC=ON,Z=00
E0000,A000
#41001,Start failure

```

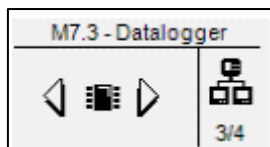
SMS SECTION	FORMAT DESCRIPTION	# DATA CHARACTERS	DATA DESCRIPTION
EAS	[Message type]	3	Message header for TE809A 2.0.0
=-----	=[Generator name]	16	Name of the generator
O=AUTO	O=[Program]	4	Operative mode active ("OFF "- "MAN "- "AUTO"- "TEST")
,P=000	,P=[Active power kW]	3	Total active power
M237	M[Mains voltage line 1]	3	Mains L1-n voltage
,237	,[Mains voltage line 2]	3	Mains L2-n voltage
,232	,[Mains voltage line 3]	3	Mains L3-n voltage
,49.9	,[Mains frequency]	4	Mains frequency
G=000	G=[Genset voltage line 1]	3	Generator L1-n voltage
,000	,[Genset voltage line 2]	3	Generator L2-n voltage
,000	,[Genset voltage line 3]	3	Generator L3-n voltage
,00.0	,[Genset frequency]	4	Generator frequency
A003.0	A[Load current line 1]	4	Load current L1
,000,0	,[Load current line 2]	4	Load current L2
,000.0	,[Load current line 3]	4	Load current L3
B=14.1	B=[Battery voltage]	4	Battery voltage
V,h=00000	V,h=[Work hours]	5	Total work hours
T=99%	T=[Fuel level]	2	Fuel level percentage
%,U=00	%,U=[Oil pressure]	2	Oil pressure
MC=ON	[Contactor status]	5	Contactors status: - MC=ON means mains contactor ON - GC=ON means generator contactor ON - C=OFF means both contactors OFF
,Z=00	,Z=[Engine temperature]	5	Engine temperature
E0	E[Input I4.4 status]	1	Status of input I4.4
0	[Input I4.5 status]	1	Status of input I4.5
0	[Input I4.6 status]	1	Status of input I4.6
0	[Input I4.7 status]	1	Status of input I4.7
,A0	,A[output O5.8 status]	1	Status of output 5.8
0	[output O5.9 status]	1	Status of output 5.9
0	[output O5.10 status]	1	Status of output 5.10
#41001	#[message ID]	5	Message ID without alarms: 00250 = Power on 00201 = Generator ready 00202 = Engine running 00203 = Engine stopping 00204 = Engine stop successful 00205 = KG on 00206 = KR on 00207 = Auto mode 00208 = Test mode 00209 = Off mode 00210 = Man mode 00211 = Ejp on 00212 = Mains return 00219 = Remote stop 00222 = System info Message ID with alarms, the first digit is the alarm gravity: 1 = Global alarm #1 On 2 = Global alarm #2 On 3 = Global alarm #3 On 4 = Shutdown alarm The other four digits are the alarm code, if the alarm code is greater than 20000, than the SMS code will be: $[SMS_alarm_code]=[Alarm_ID]-17000$ For example "Emergency stop" alarm code 20032 which is a shutdown alarm will be reported with the following code: $[Emergency_stop_alarm_code] = (4*10^5)+(20032-17000) = 43032$ Othwise "autonomy low" alarm which is not a shutdown alarm but is a global alarm #1 will be advised with this code: $[Autonomy_low_alarm_code] = (1*10^5)+(20039-17000) = 13039$ "Engine temperature pre alarm" is not a shutdown alarm but is a global alarm #1 with code lesser than 20000, will be advised with this code: $[temperature_pre_alarm_code] = (1*10^5)+(1101) = 11101$
,Start failure	,[message text]	16	Message text

2- 9.2.2 - SMS commands list

This is the list of commands which could be sent to mobile device:

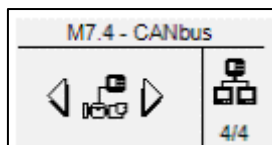
COMMAND NAME	TEXT SENT (case sensitive)	DESCRIPTION
MANUAL MODE	MAN	Activate manual mode on remote device
AUTO MODE	AUT	Activate auto mode on remote device
OFF MODE	OFF	Activate Off mode on remote device
RESET ALARMS	RESET	Alarms reset on remote device
MAINS CONTACTOR	MAINS	Changeover switch on mains side in manual mode
GENSET CONTACTOR	GEN	Changeover switch on generator side in manual mode
START ENGINE	START	Start generator command in manual mode (if man mode is not selected, the controller will activate manual mode before start)
STOP ENGINE	STOP	Stop generator command in manual mode (if man mode is not selected, the controller will activate manual mode before start)
TEST MODE	TEST	Activate test mode
CUSTOM PARAMETER	SET:[ID_parameter] [Value_parameter] Both values are numeric between 0-999, for instance if i want to set parameter 300 to 10, the text sent will be: SET:300 10	Set an enabled parameter of remote device
SET GSM NUMBER	SET[Position_number]:[Cellphone_number] Position_number value is numeric between 1-6, cellphone_number is a telephone number which allows the remote device to know where SMS need to be sent. For instance to set number 339 333 9000 in position #3 of remote device, the sent text will be: SET3:3393339000	Set the telephone number which will be used by remote device to send SMS. Usually this number is the one of the receiver device where the app is installed.
SERVICE	SERV	Command to remove service alarm and upgrade service hours on remote device.
SYSTEM INFO	INFO	Command to request info to the remote device.

2- 9.3 M7.3 - Datalogger



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS																																																
a	Enable datalog	Enable automatic datalog	False-True	False																																																
b		Set the sampling time for datalog, change this value with datalog disabled. Then enable datalog with the new value. The datalog memory size is 1588 samples, when the memory is full, no more samples are taken and an erase memory must be performed before start sampling again, below a table of sampling intervals with time by hours and days before fulfilling the memory size: <table><tr><th>Sample time (s)</th><th>Hours to full memory</th><th>Days to full memory</th><th>Samples per day</th></tr><tr><td>10</td><td>4,41</td><td>0,18</td><td>8640,00</td></tr><tr><td>60</td><td>26,47</td><td>1,10</td><td>1440,00</td></tr><tr><td>300</td><td>132,33</td><td>5,51</td><td>288,00</td></tr><tr><td>600</td><td>264,67</td><td>11,03</td><td>144,00</td></tr><tr><td>1800</td><td>794,00</td><td>33,08</td><td>48,00</td></tr><tr><td>3600</td><td>1588,00</td><td>66,17</td><td>24,00</td></tr><tr><td>7200</td><td>3176,00</td><td>132,33</td><td>12,00</td></tr><tr><td>12400</td><td>5469,78</td><td>227,91</td><td>6,97</td></tr><tr><td>14400</td><td>6352,00</td><td>264,67</td><td>6,00</td></tr><tr><td>18000</td><td>7940,00</td><td>330,83</td><td>4,80</td></tr><tr><td>21600</td><td>9528,00</td><td>397,00</td><td>4,00</td></tr></table> List of logged variables: • Generator voltage L1-n (V) • Generator voltage L2-n (V) • Generator voltage L3-n (V) • Generator frequency (Hz) • Mains voltage L1-n (V) • Mains voltage L2-n (V) • Mains voltage L3-n (V) • Mains frequency (Hz) • Load current L1 (A) • Load current L2 (A) • Load current L3 (A) • Total active power (kW) • Total apparent power (kVA) • Total reactive power (kVAR) • Total power factor (PF) • Fuel level percentage (%) • Battery voltage (Vdc) • Engine speed (Rpm) • Oil pressure (Bar) • Engine temperature (°C) • Work hours (h) • Shutdown alarm • Global alarm • Last alarm ID	Sample time (s)	Hours to full memory	Days to full memory	Samples per day	10	4,41	0,18	8640,00	60	26,47	1,10	1440,00	300	132,33	5,51	288,00	600	264,67	11,03	144,00	1800	794,00	33,08	48,00	3600	1588,00	66,17	24,00	7200	3176,00	132,33	12,00	12400	5469,78	227,91	6,97	14400	6352,00	264,67	6,00	18000	7940,00	330,83	4,80	21600	9528,00	397,00	4,00	[5-65535]	12400
	Sample time (s)	Hours to full memory	Days to full memory	Samples per day																																																
10	4,41	0,18	8640,00																																																	
60	26,47	1,10	1440,00																																																	
300	132,33	5,51	288,00																																																	
600	264,67	11,03	144,00																																																	
1800	794,00	33,08	48,00																																																	
3600	1588,00	66,17	24,00																																																	
7200	3176,00	132,33	12,00																																																	
12400	5469,78	227,91	6,97																																																	
14400	6352,00	264,67	6,00																																																	
18000	7940,00	330,83	4,80																																																	
21600	9528,00	397,00	4,00																																																	
c	Memory status	If Ok the memory is not full, if Full, you can select it to erase memory.	Ok	-																																																

2- 9.4 M7.4 - Canbus setup



POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Canbus Protocol	Set the communication protocol of for engine canbus communication. Protocols available are: - J1939 - SCANIA EMS - SCANIA EMS6 (Start/Stop) - SCANIA EMS8 (Start/Stop) - VOLVO EMS - VOLVO EMS2 (Start/Stop) - VOLVO EDC4 - PERKINS ECM - JOHN DEERE JDEC - DEUTZ EMR1 - IVECO NEF / CURSOR - CUMMINS CM850 - MTU ECU7 (Start/Stop) - MTU ECU8 (Start/Stop) - DEUTZ EMR2 (Start/Stop) - JCB TIER2 - None If set to "None", the display pages about the CanBus are not shown. Protocols marked with "Start/Stop" allow to activate and shout down the engine directly from CANBUS communication. To start engine properly through CANBUS communication M3.1B needs to be programmed as "OFF" if no D+ signal is connected to TE809.	None-TE80x	None
b	CAN baud-rate	Communication speed in bits per second for Canbus port	100 to 1000 [kbps]	250
c	ECU delay	This is the time during which the ECU output (if one output is programmed for ECU) remains active after the turn-on of the controller or after the stopping of the generator. Set to Off to leave the output always active. The output activates also at the starting of the generator and remains active during the functioning, regardless of the programming of this parameter.	Off to 59 [min]	5
d	Rpm request	If On, the controller will send rpm speed request to ECU via TSC1 command if engine is IVECO or VOLVO EMS2. The speed request sent will be equal to parameter M3.1-p "Nominal RPM" during start phase, then the speed request can be regulated via "RPM +" and "RPM -" digital inputs. The maximum value for speed request is equal to the high rpm limit (parameter M3.1-n), and the minimum value is equal to the low rpm limit (parameter M3.1-o). During cooling phase the rpm request returns automatically to the starting rated rpm if the actual value is greater.	Off - On	Off
e1	Inc. Step	Set the speed variation for each increase step	50-255 [rpm]	50
e2	Dec. Step	Set the speed variation for each decrease step	50-255 [rpm]	50
f	Interval	Set the delay time for speed variation request when Rpm + or Rpm - digital inputs are active. If the input is detected closed for this time, the corresponding speed request is sent. Note: RPM - is priority: if the inputs "RPM +" and "RPM -" are accidentally activated at the same time, the "RPM -" request is sent.	1-255 [s]	3

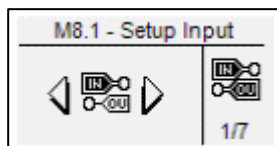
2- 10 M8 - IO setup

The IO setup is composed by 6 submenus:

- A) Input setup: Submenu that contains all the parameters about the input functions available.
- B) Output setup: Submenu that contains all the parameters about the output functions available.
- C) Input type: Submenu to set input types, you can select between disabled, normally open, normally closed or analog if the input allows it.
- D) Output type: Submenu to set output types, you can select between disabled, normally open or normally closed
- E) Measures: Submenu to adjust voltage and current measures with a programmable offset.
- F) Expansion: Submenu to configure expansion outputs

Important: if a digital input function is associated to an analog / digital input (for example: I6.4 fuel level) the input type must be programmed as "Digital" inside Input type menu. In this case the function associated with analog measure will be unavailable.

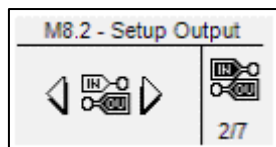
2- 10.1 M8.1 - Input setup



The I/O menu permits to select the type of use of the programmable digital inputs. The inputs I4.4, I4.5, I4.6, I4.7, I4.8, I6.2 (digital / analog oil pressure), I6.3 (digital / analog water temperature), I6.4 (digital / analog fuel level), and the digital inputs from the expansion boards (EXIN0 – EXIN9), can be programmed as:

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Low oil pressure	Low oil pressure alarm from digital contact	None - I4.4 - I4.5 - I4.6 - I4.7 - I4.8 - I6.2 - I6.3 - I6.4 - ExIn_0 ~ ExIn_9	I4.4
b	High engine temperature	High engine temperature from digital contact	Same as parameter A	I4.5
c	Low fuel level	Low fuel level from digital contact	Same as parameter A	I4.6
d	Ex mains control	If digital input is active, the mains is considered ok even if missing or outside programmed limits.	Same as parameter A	None
e	Remote start	Start the generator in auto mode with mains detected within limits.	Same as parameter A	I4.7
f	Remote stop	Stop the generator in auto mode even if there are some condition which would start the engine as faulty mains or remote start. It's possible to disable remote stop during normal test or TPS test.	Same as parameter A	None
g	Low coolant level	Low coolant level alarm from digital contact	Same as parameter A	I4.8
h	Clogged filter alarm	Clogged filter alarm from digital contact	Same as parameter A	None
i	Ground protection	Ground protection alarm from digital contact	Same as parameter A	None
j	Alternate alarm 1	Activate the alarm selected for alternate alarm 1 (menu M8.6)	Same as parameter A	None
k	Alternate alarm 2	Activate the alarm selected for alternate alarm 2 (menu M8.6)	Same as parameter A	None
l	Alternate alarm 3	Activate the alarm selected for alternate alarm 3 (menu M8.6)	Same as parameter A	None
m	Alternate alarm 4	Activate the alarm selected for alternate alarm 4 (menu M8.6)	Same as parameter A	None
n	Alternate alarm 5	Activate the alarm selected for alternate alarm 5 (menu M8.6)	Same as parameter A	None
o	Alternate alarm 6	Activate the alarm selected for alternate alarm 6 (menu M8.6)	Same as parameter A	None
p	Alternate function 1	Activate the function selected for alternate function 1 (menu M8.6)	Same as parameter A	None
q	Alternate function 2	Activate the function selected for alternate function 2 (menu M8.6)	Same as parameter A	None
r	Alternate function 3	Activate the function selected for alternate function 3 (menu M8.6)	Same as parameter A	None
s	Alternate function 4	Activate the function selected for alternate function 4 (menu M8.6)	Same as parameter A	None
t	Alternate function 5	Activate the function selected for alternate function 5 (menu M8.6)	Same as parameter A	None
u	Alternate function 6	Activate the function selected for alternate function 6 (menu M8.6)	Same as parameter A	None

2- 10.2 M8.2 - Output setup



The Output setup permits to select the type of use of the programmable outputs.

The outputs O5.8, O5.9, O5.10, O5.11, O5.5 crank and O5.4 EV can be programmed as:

- Start: the output is used to command the start.
- Fuel valve (EV): the output is used to command the stop with EV.
- Electro solenoid (EM): the output is used to command the stop with EM.
- Glow plugs: the output is used to command the preheating function, with the modality that you can set in the preheat setup.
- Siren: the output is used to command a siren activated when an alarm with siren enabled appears.
- Global alarm 1: the output is used to command an indication when an alarm set as general alarm 1 appears. The output remains active until you reset or the alarm disappears.
- Engine running: the output is activated when the generator is running.
- Test active: the output is used to signal that the test is active.
- Refueling pump: the output is used to command the start and stop of a refueling pump. The parameters about the refilling functions can be set in the fuel menu.
- Dummy load: the output is used for the dummy load function. To have more information about this function, see menu 2-8.3.
- Off mode: indicates that the controller is in reset mode
- Auto mode: indicates that the controller is in automatic mode
- Man mode: indicates that the controller is in manual mode
- Global alarm 2: the output is used to command an indication when an alarm set as general alarm 2 appears. The output remains active until you reset or the alarm disappears.
- Global alarm 3: the output is used to command an indication when an alarm set as general alarm 3 appears. The output remains active until you reset or the alarm disappears.
- KG ON: indicates that the generator contactor is closed
- KR ON: indicates that the mains contactor is closed
- Alarm A: the output is active when the alarm assigned to A position by M8.2 - g parameter is active
- Alarm B: the output is active when the alarm assigned to B position by M8.2 - h parameter is active
- Alarm C: the output is active when the alarm assigned to C position by M8.2 - i parameter is active
- Choke-Priming: output activated for the starting of gasoline engines, with time and limits settable in the choke setup. The same output is used for the gas engines as "Priming" output.
- ECU: output that is active during the functioning of the generator, and for a programmable time after the stopping of the generator and the turn-on of the controller. See paragraph 2-5.10 for more information.
- Decelerator: the output is activated for a programmable time (M3.1 – parameter P) after the detection of engine running. This output is also active during all the cooling phase and the stop phase.
- Accelerator: the output is activated after a programmable time at the starting (M3.1 – parameter P), and it is de-activated at the beginning of the cooling/stop phase.
- Heater: the output is activated by Heater feature programmed in M6.5.
- Gas valve: the output is activated during start procedure for the gas engines.
- Oil alarm: indicates that one alarm about the oil pressure is active
- Fuel alarm: indicates that one alarm about the fuel level is active
- Temperature alarm: indicates that one alarm about the engine temperature is active

POS.	NAME	RANGE OF VALUES	DEFAULT SETTINGS
a	O5.8	Start – EV – EM – Glow plugs – Siren – Global alarm 1 – Engine running – Test active – Refueling pump – Dummy load – Reset mode – Auto mode – Man mode – Global alarm 2 – Global alarm 3 – KG ON – KR ON - Alarm A - Alarm B - Alarm C – Choke/Priming - ECU - Decelerator - Accelerator - Heater – Gas valve - Oil alarm - Fuel alarm - Temperature alarm	Global alarm 1
b	O5.9	Same as parameter A	Glow plugs
c	O5.10	Same as parameter A	Siren
d	O5.11	Same as parameter A	Electro solenoid (EM)
e	O5.5 Start	Same as parameter A	Start
f	O5.4 EV	Same as parameter A	EV
g	Alarm A	[Off - 64] - see single alarm ID list below	Off
h	Alarm B	[Off - 64] - see single alarm ID list below	Off
i	Alarm C	[Off - 64] - see single alarm ID list below	Off

Single alarms ID list:

Use the list below in conjunction with M8.2G, M8.2H and M8.2 I parameters to assign a specific alarm to an output.

Configuration example:

- M8.2 - b programmed to "ALARM A"
- M8.2 - c programmed to "ALARM B"
- M8.2 - d programmed to "ALARM C"
- M8.2 - g programmed to 8
- M8.2 - h programmed to 4
- M8.2 - i programmed to 3

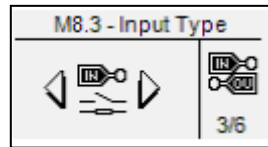
With this configuration output O5.9 will be activated with "Mains phase seq." alarm, output

O5.10 will be activated with "Mains: high voltage" and output 5.11 will be activated with

"Mains: low voltage" alarm.

1	Mains: low freq.
2	Mains: high freq.
3	Mains: low voltage
4	Mains: high voltage
5	Mains: v asymmetry
6	Faulty mains
7	KR feedback
8	Mains phase seq.
9	Ge: low freq.
10	Ge: high freq.
11	Ge: low voltage
12	Ge: high voltage
13	Ge: phase seq.
14	Ge: short circuit
15	Ge: I _{max}
16	Ge: v asymmetry
17	Ground protection
18	Emergency stop
19	KG feedback
20	User alarm1
21	User alarm2
22	User alarm3
23	Start failure
24	Mechanical fault
25	Temp. pre alarm
26	High eng. Temp.
27	Fuel pre alarm
28	Low fuel level
29	Oil pressure prealarm
30	Low oil pressure
31	Low oil level
32	Low coolant level
33	Stop engine failure
34	Service
35	Refueling timeout
36	Faulty D+
37	High GE temp. D
38	Low fuel level D
39	Low oil pressure D
40	Autonomy low
41	Clogged filter
42	Tank full
43	No oil sensor
44	Low battery voltage
45	High battery voltage
46	Test fail
47	Low RPM
48	High RPM
49	Water in fuel
50	High coolant temp
51	Master comm error
52	Battery Efficiency
53	User alarm4
54	High kW pre alarm
55	High load kW
56-57	Free

2- 10.3 M8.3 - Input type



The input type setup permits to select the type of programmable inputs.

The inputs I4.4, I4.5, I4.6, I4.7, I4.8 can be programmed as:

- Disabled: the input is not active
- Digital NO: the input is digital type normally open
- Digital NC: the input is digital type normally closed

The inputs I6.2, can be programmed as:

- Disabled: the input is not active
- Pressure: the input is programmed for analog oil pressure
- Level: the input is programmed for secondary analog fuel level percentage (only custom application)
- Temperature: the input is programmed for analog external temperature (only custom application)
- Digital NO: the input is digital type normally open
- Digital NC: the input is digital type normally closed

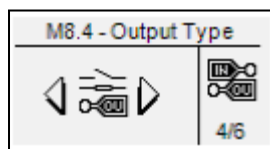
The inputs I6.3, I6.4 can be programmed as:

- Disabled: the input is not active
- Analog: the input is analog for a specific measure programmed by tool configuration
- Digital NO: the input is digital type normally open
- Digital NC: the input is digital type normally closed

The parameter "Analog source" permits to choose if the oil pressure, engine temperature and battery voltage sources are directly from TE809 or via Canbus; the alarms are the same for both analog sources.

POS.	NAME	RANGE OF VALUES	DEFAULT SETTINGS
a	I4.4	Disabled – Digital NO – Digital NC	Digital NO
b	I4.5	Disabled – Digital NO – Digital NC	Digital NO
c	I4.6	Disabled – Digital NO – Digital NC	Digital NO
d	I4.7	Disabled – Digital NO – Digital NC	Digital NO
e	I4.8	Disabled – Digital NO – Digital NC	Digital NO
f	I6.2-Oil	Disabled – Pressure - Level - Temperature – Digital NO – Digital NC	Pressure
g	I6.3-Temperature	Disabled – Analog – Digital NO – Digital NC	Analog
h	I6.4-Fuel	Disabled – Analog – Digital NO – Digital NC	Analog
i	Analog source	Board-Can	Board
j	RPM source	Frequency – Pickup – Canbus If programmed as "Frequency", the engine speed is calculated from alternator frequency multiplied by rpm constant parameter (M3.1j) which by default is 30. If M3.1j is programmed as 1, it becomes 30 when "Frequency" option is selected. If programmed as "Pickup", the engine speed is calculated from pickup frequency input (J7.1) multiplied by rpm constant parameter (M3.1j). To find the correct rpm correction factor, use AutoSet RPM parameter (M8.3k). If programmed as "Canbus", the engine speed is calculated from Canbus frequency multiplied by rpm constant parameter (M3.1j) which will be automatically fixed at 1.	Frequency
k	AutoSet RPM (only if M8.3J = pickup)	Detect Start the generator and speed up to match rated speed 1500 rpm. If the frequency detected by pickup is greater than 10Hz, you can press "Detect" button to find the correct conversion factor for your pickup sensor.	-
l	Engine speed (only if M8.3J = pickup)	It shows the actual value of engine speed.	-

2- 10.4 M8.4 - Output type



The output type setup permits to select the type of programmable outputs.

The outputs O5.8, O5.9, O5.10, O5.11 can be programmed as:

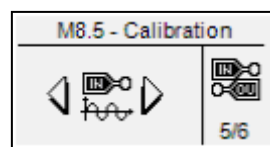
- Disabled: the output is not active
- Digital NO: the output is digital type normally open
- Digital NC: the output is digital type normally closed

The output O5.5 Start and O5.4 Ev can be programmed as:

- Disabled: the output is not active
- Digital NO: the output is digital type normally open

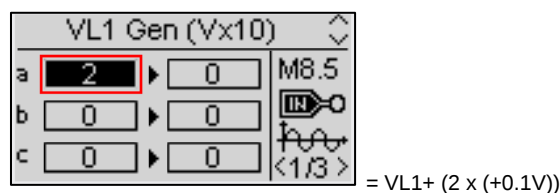
POS.	NAME	RANGE OF VALUES	DEFAULT SETTINGS
a	O5.8	Disabled – Digital NO – Digital NC	Digital NO
b	O5.9	Disabled – Digital NO – Digital NC	Digital NO
c	O5.10	Disabled – Digital NO – Digital NC	Digital NO
d	O5.11	Disabled – Digital NO – Digital NC	Digital NO
e	O5.4 Ev	Disabled – Digital NO	Digital NO
f	O5.5 Start	Disabled – Digital NO	Digital NO

2- 10.5 M8.5 - Calibration



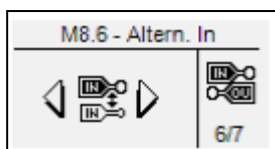
The measures setup allows to adjust the measured values for genset and mains voltages and load currents. For each **voltage** measure it's possible to set a calibration offset with steps of 0.1 V. For each **current** measure the offset is a percentage of the CT ratio, in steps of 0,1 %.

e.g.:



POS.	NAME	RANGE OF VALUES	DEFAULT SETTINGS
a	VL1 Gen	-100 +100 (V/10)	0
b	VL2 Gen	-100 +100 (V/10)	0
c	VL3 Gen	-100 +100 (V/10)	0
d	VL1 Mains	-100 +100 (V/10)	0
e	VL2 Mains	-100 +100 (V/10)	0
f	VL3 Mains	-100 +100 (V/10)	0
g	IL1	50.0 – 150.0 (%)	100
h	IL2	50.0 – 150.0 (%)	100
i	IL3	50.0 – 150.0 (%)	100

2- 10.6 M8.6 - Alternate IN



The Alternate IN menu allows to select the alarm or function of correspondent alternative input:

POS.	NAME	DESCRIPTION	RANGE OF VALUES	DEFAULT SETTINGS
a	Alternate alarm 1	Activate the alarm selected for alternate alarm 1 (see "Alternate alarms table")	User alarm 1 - User alarm 2 - User alarm 3 - User alarm 4 - low oil level - full tank - high coolant temperature - water in fuel - feedback KG - feedback KR	User alarm #1
b	Alternate alarm 2	Activate the alarm selected for alternate alarm 2 (see "Alternate alarms table")	Same as parameter A	User alarm #2
c	Alternate alarm 3	Activate the alarm selected for alternate alarm 3 (see "Alternate alarms table")	Same as parameter A	User alarm #3
d	Alternate alarm 4	Activate the alarm selected for alternate alarm 4 (see "Alternate alarms table")	Same as parameter A	User alarm #4
e	Alternate alarm 5	Activate the alarm selected for alternate alarm 5 (see "Alternate alarms table")	Same as parameter A	Low oil level
f	Alternate alarm 6	Activate the alarm selected for alternate alarm 6 (see "Alternate alarms table")	Same as parameter A	Tank full
g	Alternate function 1	Activate the function selected for alternate function 1 (see "Alternate Functions table")	Changeover – Auto mode - Refueling On - Refueling Off - Priority - Alternative set 1 - Alternative set 2 - Alternative set 3 - Rpm increase - Rpm decrease	Changeover
h	Alternate function 2	Activate the function selected for alternate function 2 (see "Alternate Functions table")	Same as parameter G	Auto mode
i	Alternate function 3	Activate the function selected for alternate function 3 (see "Alternate Functions table")	Same as parameter G	Refueling On
j	Alternate function 4	Activate the function selected for alternate function 4 (see "Alternate Functions table")	Same as parameter G	Refueling Off
k	Alternate function 5	Activate the function selected for alternate function 5 (see "Alternate Functions table")	Same as parameter G	Priority
l	Alternate function 6	Activate the function selected for alternate function 6 (see "Alternate Functions table")	Same as parameter G	Alternate Set 1

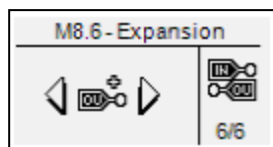
2- 10.6.1 M8.6.1 - Alternate Alarms Table

POS.	NAME	DESCRIPTION
0	User alarm #1	Programmable alarm from digital input, with string changeable by PC software TE Monitor.
1	User alarm #2	Programmable alarm from digital input, with string changeable by PC software TE Monitor.
2	User alarm #3	Programmable alarm from digital input, with string changeable by PC software TE Monitor.
3	User alarm #4	Programmable alarm from digital input, with string changeable by PC software TE Monitor.
4	Low oil level	Low oil level alarm from digital contact.
5	Fuel tank full	Fuel tank full alarm from digital contact. If refueling pump output is On, is deactivated.
6	High coolant temperature	High coolant temperature alarm from digital contact.
7	Water in fuel	Water in fuel alarm from digital contact.
8	Feedback KG	Feedback generator contactor. Is activated if KG output is On but feedback is not and vice versa.
9	Feedback KR	Feedback mains contactor. Is activated if KR output is On but feedback is not and vice versa. Please note: This alarm is considered to start the generator in auto mode with "Start by KR" parameters programmed to On. In this case this alarm should be programmed as retentive to avoid start and stop loops.

2- 10.6.2 M8.6.2 - Alternate Functions Table

POS.	NAME	DESCRIPTION
0	Changeover	Changeover command from digital contact: works in auto mode with remote start, EJP, automatic test. If it's activated with generator measures within limits, the load is switched to genset.
1	Auto mode	Activates automatic mode if not already selected.
2	Refueling On	If refueling mode selected is "Digital inputs", when this input is active, the refueling output is activated.
3	Refueling Off	If refueling mode selected is "Digital inputs", when this input is active, the refueling output is deactivated. This input has priority over Refueling On input.
4	Priority	If activated, during dual standby mode, the generator becomes the active one even if is not its turn by working hours difference.
5	Alternative set 1	When the assigned digital input is activated, the generator and mains ratings are switched to the ones programmed for alternative set 1 inside the menu M2.2 - a /b /c. If the input is removed, the ratings return to the standard ones programmed inside M1.1, M2.1 and M3.1 menus. Alternative set 1 input is priority over Alternative set 2 and Alternative set 3.
6	Alternative set 2	When the assigned digital input is activated, the generator and mains ratings are switched to the ones programmed for alternative set 2 inside the menu M2.2 - d /e /f. If the input is removed, the ratings return to the standard ones programmed inside M1.1, M2.1 and M3.1 menus. Alternative set 2 input is priority only Alternative set 3 but not over Alternative set 1.
7	Alternative set 3	When the assigned digital input is activated, the generator and mains ratings are switched to the ones programmed for alternative set 3 inside the menu M2.2 - g /h /i. If the input is removed, the ratings return to the standard ones programmed inside M1.1, M2.1 and M3.1 menus. Alternative set 3 input does not have priority over Alternative set 1 and 2.
8	Rpm increase	When the assigned input is activated, if canbus mode for the engine allows speed request by TSC1 command, the speed will be increased gradually until High rpm value (M3.1 - n).
9	Rpm decrease	When the assigned input is activated, if canbus mode for the engine allows speed request by TSC1 command, the speed will be decreased gradually until Low rpm value (M3.1 - o). Rpm decrease input is priority over Rpm Increase, so if both are activated, Rpm decrease will prevail.

2- 10.7 M8.7 - Expansion



The Expansion setup permits to select the type of use of the programmable outputs of an eventual TE6010 expansion board.

The outputs from ExOut_1 to ExOut_9 can be programmed as:

- None: no function associated to the output
- Siren: the output is used to command a siren that sounds when an alarm with siren enabled appears.
- Global alarm 1: the output is used to command an indication when an alarm set as general alarm 1 appears. The output remains active until you reset or the alarm disappears.
- Engine running: the output is activated when the generator is running.
- Test active: the output is used to signal that the test is active.
- Refueling pump: the output is used to command the start and stop of a refueling pump. The parameters about the refilling functions can be set in the fuel menu.
- Dummy load: the output is used for the dummy load function. To have more information about this function, see menu 2-8.3.
- Off mode: indicates that the controller is in reset mode
- Auto mode: indicates that the controller is in automatic mode
- Man mode: indicates that the controller is in manual mode
- Global alarm 2: the output is used to command an indication when an alarm set as general alarm 2 appears. The output remains active until you reset or the alarm disappears.
- Global alarm 3: the output is used to command an indication when an alarm set as general alarm 3 appears. The output remains active until you reset or the alarm disappears.
- KG ON: indicates that the generator contactor is closed
- KR ON: indicates that the mains contactor is closed
- Alarm A: the output is active when the alarm assigned to A position by M8.2 - g parameter is active
- Alarm B: the output is active when the alarm assigned to B position by M8.2 - h parameter is active
- Alarm C: the output is active when the alarm assigned to C position by M8.2 - i parameter is active
- GE ready: the output is activated when the generator is ready to take the load.
- Oil alarm: indicates that one alarm about the oil pressure is active
- Fuel alarm: indicates that one alarm about the engine temperature is active
- Temperature alarm: indicates that one alarm about the fuel level is active

All the parameters available in the Expansion setup are:

POS.	NAME	RANGE OF VALUES	DEFAULT SETTINGS
a	Enable EXP_A	On – Off (On permits to enable the communication with expansion board TE810-EXP. Note : You can use all the ten outputs from ExOut_0 to ExOut_9, and 10 digital inputs	Off
b	Enable EXP_B	On – Off (On permits to enable the communication with expansion board TE6010. Note : You can use the eight outputs from ExOut_0 to ExOut_7. If you are using an expansion board with five relay output, the five outputs are from ExOut_0 to ExOut_4.	Off
c	ExOut_0	None – Siren – Global alarm 1 – Engine running – Test active – Refueling pump – Dummy load – Reset mode – Auto mode – Man mode – Global alarm 2 – Global alarm 3 – KG ON – KR ON – Alarm A - Alarm B - Alarm C - GE ready - Oil alarm (cumulative) – Fuel alarm (cumulative) – Temperature alarm (cumulative)	None
d	ExOut_1	Same as parameter A	None
e	ExOut_2	Same as parameter A	None
f	ExOut_3	Same as parameter A	None
g	ExOut_4	Same as parameter A	None
h	ExOut_5	Same as parameter A	None
i	ExOut_6	Same as parameter A	None
j	ExOut_7	Same as parameter A	None
k	ExOut_8	Same as parameter A	None
l	ExOut_9	Same as parameter A	None

3- MODBUS RTU

Project: TE809A_b4.6.4.14_v2.2.0.te808
TE Utilities: 4.6.4.14

3- 1.1 General notes

The purpose of this document is to give the instructions to communicate with the TE809 with a Modbus Master device, through the Modbus RTU (zero-based) serial protocol.

The TE809 controller can be configured as a Modbus slave device, that can be queried by a Modbus master device. The Modbus communication anyway must be established and configured by skilled users following the Modbus protocol rules. For more documentation about the Modbus protocol, please refer to the following link:

<http://www.modbus.org/specs.php>

For first tests and trials it's possible to use the demo version of the Modbus Poll program, downloadable at the following link:

http://www.modbustools.com/modbus_poll.asp

The TE809 has 2 ports that can be used for the Modbus communication: 1 RS232 and 1 RS485.

3- 1.2 Configuration

The only thing to configure in the TE809 is the serial port. Go to Connectivity setup M7, then select Serial setup M7.1.

If you are using the RS485 port, check that parameter B is set to **Modbus Slave**. Then set parameter C to the desired speed of communication, and parameter A that is the address of the device. If you are using more than one device, be sure that all of them have a different address.

If you are using the RS232 port, check that parameter E is set to **Modbus Slave**. Then set parameter F to the desired speed of communication, and parameter A that is the address of the device.

3- 1.3 Modbus commands available

It's possible to send 2 different types of requests to the TE809. A reading requests to read single registers (Modbus function: 03) or a writing request to set a single register (Modbus function: 06). Every register is composed by 1 word (2 bytes).

The function 03-Read Holding Registers permits to read one or more registers from the TE809.

Example:

Request: Send to slave address 25 the request of reading register 69:

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	CRC HI	CRC LO
19	03	00	44	00	01	46	06
Slave address	Function	Address of the desired register		Number of registers required		CRC checksum	

Answer:

ADDR	FUNC	DATA byte count	DATA byte 69 HI	DATA byte 69 LO	CRC HI	CRC LO
19	03	02	02	2B	AF	7A
Slave address	Function	Number of bytes	Value of the required register		CRC checksum	

The function 06-Preset Single Register permits to set one register of the TE809 to a desired value.

Example:

Request: Send to slave address 35 the request of writing the value 928 into register 26:

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA Word HI	DATA Word LO	CRC HI	CRC LO
23	06	00	19	03	A0	5E	07
Slave address	Function	Address of the desired register		Value to set in the register		CRC checksum	

Answer (identical message retransmitted after editing the register):

ADDR	FUNC	DATA bit # HI	DATA bit # LO	DATA Word HI	DATA Word LO	CRC HI	CRC LO
23	06	00	19	03	A0	5E	07
Slave address	Function	Address of the desired register		Value to set in the register		CRC checksum	

3- 1.4 Modbus memory map

Var.Name	Var.Visual	Var.Type	ID	R/W	Scale
Active program (0 = man, 1 = auto, 2= off)	DT_NUMERIC	MW2812	40740	R	1
Fuel level percentage	DT_NUMERIC	MW2814	40741	R	10
Rpm	DT_NUMERIC	MW2816	40742	R	1
Oil pressure	DT_NUMERIC	MW2818	40743	R	10
Engine temperature	DT_NUMERIC	MW2820	40744	R	1
Mains Line voltage L1-L2	DT_NUMERIC	MW2822	40745	R	1
Mains Line voltage L2-L3	DT_NUMERIC	MW2824	40746	R	1
Mains Line voltage L3-L1	DT_NUMERIC	MW2826	40747	R	1
Mains phase voltage L1	DT_NUMERIC	MW2828	40748	R	1
Mains phase voltage L2	DT_NUMERIC	MW2830	40749	R	1
Mains phase voltage L3	DT_NUMERIC	MW2832	40750	R	1
Mains frequency	DT_NUMERIC	MW2834	40751	R	10
Mains kWh	DT_NUMERIC	MW2836	40752	R	1
Generator Line voltage L1-L2	DT_NUMERIC	MW2838	40753	R	1
Generator Line voltage L2-L3	DT_NUMERIC	MW2840	40754	R	1
Generator Line voltage L3-L1	DT_NUMERIC	MW2842	40755	R	1
Generator phase voltage L1	DT_NUMERIC	MW2844	40756	R	1
Generator phase voltage L2	DT_NUMERIC	MW2846	40757	R	1
Generator phase voltage L3	DT_NUMERIC	MW2848	40758	R	1
Generator frequency	DT_NUMERIC	MW2850	40759	R	10
Generator kWh	DT_NUMERIC	MW2852	40760	R	1
Engine D+ voltage	DT_NUMERIC	MW2854	40761	R	1
Engine Battery voltage	DT_NUMERIC	MW2856	40762	R	10
Start attempts	DT_NUMERIC	MW2858	40763	R	1
Work hours	DT_NUMERIC	MW2860	40764	R	1
Daily work hours	DT_NUMERIC	MW2862	40765	R	1
Service hours	DT_NUMERIC	MW2864	40766	R	1
Test mode on	DT_NUMERIC	MW2866	40767	R	1
IO status: Bit0= Input 4.4 Bit1= Input 4.5 Bit2= Input 4.6 Bit3= Input 4.7 Bit4= Input 4.8 Bit5= Input 6.2 Bit6= Input 6.3 Bit7= Input 6.4 Bit8= Output 5.8 Bit9= Output 5.9 Bit10= Output 5.10 Bit11= Output 5.11 Bit12= Output KR Bit13= Output KG Bit14= Output Start Bit15= Output EV	DT_NUMERIC	MW2868	40768	R	Bin
Load current L1	DT_NUMERIC	MW2870	40769	R	1
Load current L2	DT_NUMERIC	MW2872	40770	R	1
Load current L3	DT_NUMERIC	MW2874	40771	R	1
Total load current	DT_NUMERIC	MW2876	40772	R	1

Total active power	DT_NUMERIC	MW2878	40773	R	1
Total reactive power	DT_NUMERIC	MW2880	40774	R	1
Total apparent power	DT_NUMERIC	MW2882	40775	R	1
Fuel level liters	DT_NUMERIC	MW2884	40776	R	10
Autonomy hours	DT_NUMERIC	MW2886	40777	R	1
Instant consumption	DT_NUMERIC	MW2888	40778	R	10
Average consumption	DT_NUMERIC	MW2890	40779	R	10
Last refilling	DT_NUMERIC	MW2892	40780	R	10
Total power factor	DT_NUMERIC	MW2894	40781	R	100
Not used	DT_NUMERIC	MW2896	40782	R	1
Not used	DT_NUMERIC	MW2898	40783	R	1

Var.Name	Var.Visual	Var.Type	ID	R/W	Scale
Active power L1	DT_NUMERIC	MW3078	40832	R	1
Active power L2	DT_NUMERIC	MW3080	40833	R	1
Active power L3	DT_NUMERIC	MW3082	40834	R	1
Apparent power L1	DT_NUMERIC	MW3084	40835	R	1
Apparent power L2	DT_NUMERIC	MW3086	40836	R	1
Apparent power L3	DT_NUMERIC	MW3088	40837	R	1
Reactive power L1	DT_NUMERIC	MW3090	40838	R	10
Reactive power L2	DT_NUMERIC	MW3092	40839	R	10
Reactive power L3	DT_NUMERIC	MW3094	40840	R	10
Power factor L1	DT_NUMERIC	MW3096	40841	R	100
Power factor L2	DT_NUMERIC	MW3098	40842	R	100
Power factor L3	DT_NUMERIC	MW3100	40843	R	100
Opex 1	DT_NUMERIC	MW3102	40844	R	1
Opex 2	DT_NUMERIC	MW3104	40845	R	1
Opex 3	DT_NUMERIC	MW3106	40846	R	1
Opex 4	DT_NUMERIC	MW3108	40847	R	1
Opex 5	DT_NUMERIC	MW3110	40848	R	1
Opex 6	DT_NUMERIC	MW3112	40849	R	1
Rpm (canbus)	DT_NUMERIC	MW3114	40850	R	10
Work hours (canbus)	DT_NUMERIC	MW3116	40851	R	10
Battery voltage (canbus)	DT_NUMERIC	MW3118	40852	R	10
Coolant level (canbus)	DT_NUMERIC	MW3120	40853	R	10
Oil pressure (canbus)	DT_NUMERIC	MW3122	40854	R	10
Engine temperature (canbus)	DT_NUMERIC	MW3124	40855	R	10
Alarm SPN (canbus)	DT_NUMERIC	MW3126	40856	R	10
Alarm FMI (canbus)	DT_NUMERIC	MW3128	40857	R	10
Instant consumption (canbus)	DT_NUMERIC	MW3130	40858	R	10
Not used	DT_NUMERIC	MW3132	40859	R	Dec
Not used	DT_NUMERIC	MW3134	40860	R	Dec
Alarm package 1: Bit0= Mains: low freq. Bit1= Mains: high freq. Bit2= Mains: low voltage Bit3= Mains: high voltage Bit4= Mains: v asymmetry Bit5= Faulty mains Bit6= KR feedback Bit7= Mains phase seq. Bit8= Ge: low freq. Bit9= Ge: high freq. Bit10= Ge: low voltage Bit11= Ge: high voltage Bit12= Ge: phase seq. Bit13= Ge: short circuit Bit14= Ge: lmax Bit15= Ge: v asymmetry	DT_NUMERIC	MW3136	40861	R	Bin
Alarm package 2: Bit0= Ground protection Bit1= Emergency stop Bit2= KG feedback Bit3= User alarm1 Bit4= User alarm2 Bit5= User alarm3 Bit6= Start failure Bit7= Mechanical fault Bit8= Temp. pre alarm Bit9= High eng. Temp. Bit10= Fuel pre alarm Bit11= Low fuel level Bit12= Oil pressure prealarm Bit13= Low oil pressure Bit14= Low oil level Bit15= Low coolant level	DT_NUMERIC	MW3138	40862	R	Bin
Alarm package 3: Bit0= Stop engine failure Bit1= Service	DT_NUMERIC	MW3140	40863	R	Bin

Bit2= Refueling timeout Bit3= Faulty D+ Bit4= High GE temp. D Bit5= Low fuel level D Bit6= Low oil pressure D Bit7= Autonomy low Bit8= Clogged filter Bit9= Tank full Bit10= No oil sensor Bit11= Low battery voltage Bit12= High battery voltage Bit13= Test fail Bit14= Low RPM Bit15= High RPM					
Alarm package 4: Bit0= Water in fuel Bit1= High coolant temp Bit2= Master comm error Bit3= Battery Efficiency Bit4= Free Bit5= User alarm 4 Bit6= High kW pre alarm Bit7= High load kW Bit8= Free Bit9= Free Bit10= Free Bit11= Free Bit12= Free Bit13= Free Bit14= Free Bit15= Free	DT_NUMERIC	MW3142	40864	R	Bin
RTC clock minutes	DT_NUMERIC	MW3144	40865	R	1
RTC clock hours	DT_NUMERIC	MW3146	40866	R	1
RTC clock seconds	DT_NUMERIC	MW3148	40867	R	1
RTC clock day of the week	DT_NUMERIC	MW3150	40868	R	1
RTC clock day of the month	DT_NUMERIC	MW3152	40869	R	1
RTC clock month	DT_NUMERIC	MW3154	40870	R	1
RTC Clock year	DT_NUMERIC	MW3156	40871	R	1
Expansion board enable	DT_NUMERIC	MW3158	40872	R	Flag
Expansion board input status - High byte	DT_NUMERIC	MW3160	40873	R	Bin
Expansion board outputs - Low byte	DT_NUMERIC	MW3162	40874	R	Bin
Not used	DT_NUMERIC	MW3164	40875	R	1

Var.Name	Var.Visual	Var.Type	ID	R/W	Scale
Out special A	DT_NUMERIC	M4939.7	42044	R	Flag
Out special B	DT_NUMERIC	M4977.0	42045	R	Flag
Out special C	DT_NUMERIC	M4977.1	42046	R	Flag
Cumulative alarm mains	DT_NUMERIC	M4977.2	42047	R	Flag
Cumulative alarm generator	DT_NUMERIC	M4977.3	42048	R	Flag
Cumulative alarm pressure	DT_NUMERIC	M4977.4	42049	R	Flag
Cumulative alarm fuel	DT_NUMERIC	M4977.5	42050	R	Flag
Cumulative alarm battery	DT_NUMERIC	M4977.6	42051	R	Flag
Cumulative alarm temperature	DT_NUMERIC	M4977.7	42052	R	Flag
Mains: low freq.	DT_NUMERIC	M4990.0	42053	R	Flag
Mains: high freq	DT_NUMERIC	M4990.1	42054	R	Flag
Mains: low voltage	DT_NUMERIC	M4990.2	42055	R	Flag
Mains: high voltage	DT_NUMERIC	M4990.3	42056	R	Flag
Mains: v asymmetry	DT_NUMERIC	M4990.4	42057	R	Flag
Faulty mains	DT_NUMERIC	M4990.5	42058	R	Flag
KR feedback	DT_NUMERIC	M4990.6	42059	R	Flag
Mains phase seq.	DT_NUMERIC	M4990.7	42060	R	Flag
Ge: low freq.	DT_NUMERIC	M4991.0	42061	R	Flag
Ge: high freq.	DT_NUMERIC	M4991.1	42062	R	Flag
Ge: low voltage	DT_NUMERIC	M4991.2	42063	R	Flag
Ge: high voltage	DT_NUMERIC	M4991.3	42064	R	Flag
Ge: phase seq.	DT_NUMERIC	M4991.4	42065	R	Flag
Ge: short circuit	DT_NUMERIC	M4991.5	42066	R	Flag
Ge: lmax	DT_NUMERIC	M4991.6	42067	R	Flag
Ge: v asymmetry	DT_NUMERIC	M4991.7	42068	R	Flag
Ground protection	DT_NUMERIC	M4992.0	42069	R	Flag
Emergency stop	DT_NUMERIC	M4992.1	42070	R	Flag
KG feedback	DT_NUMERIC	M4992.2	42071	R	Flag
User alarm1	DT_NUMERIC	M4992.3	42072	R	Flag
User alarm2	DT_NUMERIC	M4992.4	42073	R	Flag
User alarm3	DT_NUMERIC	M4992.5	42074	R	Flag
Start failure	DT_NUMERIC	M4992.6	42075	R	Flag
Mechanical fault	DT_NUMERIC	M4992.7	42076	R	Flag
Temp. pre alarm	DT_NUMERIC	M4993.0	42077	R	Flag

High eng. Temp.	DT_NUMERIC	M4993.1	42078	R	Flag
Fuel pre alarm	DT_NUMERIC	M4993.2	42079	R	Flag
Low fuel level	DT_NUMERIC	M4993.3	42080	R	Flag
Oil pressure prealarm	DT_NUMERIC	M4993.4	42081	R	Flag
Low oil pressure	DT_NUMERIC	M4993.5	42082	R	Flag
Low oil level	DT_NUMERIC	M4993.6	42083	R	Flag
Low coolant level	DT_NUMERIC	M4993.7	42084	R	Flag
Stop engine failure	DT_NUMERIC	M4994.0	42085	R	Flag
Service	DT_NUMERIC	M4994.1	42086	R	Flag
Refueling timeout	DT_NUMERIC	M4994.2	42087	R	Flag
Faulty D+	DT_NUMERIC	M4994.3	42088	R	Flag
High GE temp. D	DT_NUMERIC	M4994.4	42089	R	Flag
Low fuel level D	DT_NUMERIC	M4994.5	42090	R	Flag
Low oil pressure D	DT_NUMERIC	M4994.6	42091	R	Flag
Autonomy low	DT_NUMERIC	M4994.7	42092	R	Flag
Clogged filter	DT_NUMERIC	M4995.0	42093	R	Flag
Tank full	DT_NUMERIC	M4995.1	42094	R	Flag
No oil sensor	DT_NUMERIC	M4995.2	42095	R	Flag
Low battery voltage	DT_NUMERIC	M4995.3	42096	R	Flag
High battery voltage	DT_NUMERIC	M4995.4	42097	R	Flag
Test fail	DT_NUMERIC	M4995.5	42098	R	Flag
Low RPM	DT_NUMERIC	M4995.6	42099	R	Flag
High RPM	DT_NUMERIC	M4995.7	42100	R	Flag
Water in fuel	DT_NUMERIC	M4996.0	42101	R	Flag
High coolant temp	DT_NUMERIC	M4996.1	42102	R	Flag
Master comm error	DT_NUMERIC	M4996.2	42103	R	Flag
Battery Efficiency	DT_NUMERIC	M4996.3	42104	R	Flag
High kW pre alarm	DT_NUMERIC	M4996.4	42105	R	Flag
High load kW	DT_NUMERIC	M4996.5	42106	R	Flag
Free	DT_NUMERIC	M4996.6	42107	R	Flag
Free	DT_NUMERIC	M4996.7	42108	R	Flag
Free	DT_NUMERIC	M4997.0	42109	R	Flag
Free	DT_NUMERIC	M4997.1	42110	R	Flag
Free	DT_NUMERIC	M4997.2	42111	R	Flag
Free	DT_NUMERIC	M4997.3	42112	R	Flag
Free	DT_NUMERIC	M4997.4	42113	R	Flag
Free	DT_NUMERIC	M4997.5	42114	R	Flag
Free	DT_NUMERIC	M4997.6	42115	R	Flag
Free	DT_NUMERIC	M4997.7	42116	R	Flag
Last alarm ID	DT_NUMERIC	MW5006	42181	R	Dec

Var.Name	Var.Visual	Var.Type	ID	R/W	Scale
Manual mode	DT_NUMERIC	M7619.5	40644	W	1
Auto mode	DT_NUMERIC	M7619.6	40649	W	1
Reset mode	DT_NUMERIC	M7619.7	40654	W	1
Start engine	DT_NUMERIC	M7622.0	40659	W	1
Stop engine	DT_NUMERIC	M7622.1	40664	W	1
Test mode	DT_NUMERIC	M7622.2	40669	W	1
KG contactor	DT_NUMERIC	M7622.3	40674	W	1
KR contactor	DT_NUMERIC	M7622.4	40679	W	1

M1.1 Mains Setup	Var.Visual	Var.Type	ID	R/W	Range
a) Mains rated voltage (V)	DT_NUMERIC	MW2220	40598	R/W	
b) Mains high voltage (%)	DT_NUMERIC	MB2224	40601	R/W	
c) Mains low voltage (%)	DT_NUMERIC	MB2223	40600	R/W	
d) Mains rated frequency (Hz)	DT_NUMERIC	MB2222	40599	R/W	
e) Mains high frequency (%)	DT_NUMERIC OFF	MB2226	40603	R/W	
f) Mains low frequency (%)	DT_NUMERIC OFF	MB2225	40602	R/W	
g) KR delay (s)	DT_NUMERIC OFF	MB2219	40596	R/W	
h) Mains ok (s)	DT_NUMERIC OFF	MW2232	40608	R/W	
i) Faulty mains (s)	DT_NUMERIC OFF	MW2234	40609	R/W	
j) Mains Phase sequence	DT_NUMERIC	MB516	40109	R/W	Off-RST-TSR
k) Mains Voltage asymmetry (%)	DT_NUMERIC	MB514	40111	R/W	
l) KR protection	DT_ONOFF	M3562.6	41019	R/W	Off-On
m) System type	DT_SYSTEM_TYPE	MB518	40616	R/W	3ph - 1ph - 2ph
n) Cost per MWh	DT_NUMERIC	MR6344	42951	R/W	
o) Start by KR	DT_ONOFF	M3562.7	41020	R/W	Off-On

M2.1 Genset Setup	Var.Visual	Var.Type	ID	R/W	Range
a) Gen rated voltage (V)	DT_REAL_1	MR2088	40470	R/W	
b) Gen high voltage (%)	DT_NUMERIC	MB2228	40605	R/W	
c) Gen low voltage (%)	DT_NUMERIC	MB2227	40604	R/W	
d) Gen rated frequency (Hz)	DT_REAL_1	MR2092	40471	R/W	
e) Gen high frequency (%)	DT_NUMERIC OFF	MB2230	40607	R/W	
f) Gen low frequency (%)	DT_NUMERIC OFF	MB2229	40606	R/W	
g) Rated current (A)	DT_NUMERIC	MW424	40612	R/W	

h) I _{max} overload (%)	DT_NUMERIC	MW2240	40614	R/W	
i) I _{max} shortcircuit (%)	DT_NUMERIC	MW2238	40613	R/W	
j) Max load power (%)	DT_REAL_1	MR7366	43513	R/W	
k) Load p pre alarm (%)	DT_REAL_1	MR7370	43514	R/W	
l) Hysteresis delay (s)	DT_NUMERIC	MB7339	43515	R/W	
m) Single CT	DT_ONOFF	M6352.7	42999	R/W	Off-On
n) Cost for MWh	DT_NUMERIC	MR6326	42943	R/W	
o) Rated power factor	DT_NUMERIC	MR7410	43526	R/W	
p) KG delay (s)	DT_NUMERIC_OFF	MB2218	40595	R/W	
q) Gen Ok delay (s)	DT_NUMERIC_OFF	MW2236	40610	R/W	
r) CT ratio	DT_NUMERIC	MW155	40597	R/W	
s) System type	DT_SYSTEM_TYPE	MB519	40617	R/W	3ph - 1ph - 2ph
t) Set kWh	DT_NUMERIC	MR2242	40633	R/W	
u) Gen phase sequence	DT_NUMERIC	MB517	40110	R/W	Off-RST-TSR
v) Gen voltage asymmetry	DT_NUMERIC	MB515	40112	R/W	
w) Gen filter (s)	DT_NUMERIC_OFF	MB2231	40611	R/W	
x) Neutral	DT_ONOFF	M853.5	40322	R/W	Off-On

M3.1 Starting setup	Var.Visual	Var.Type	ID	R/W	Range
a) Digital oil pressure	DT_ONOFF	M2055.5	40530	R/W	Off-On
b) D+ (V)	DT_NUMERIC_OFF	MR2096	40536	R/W	
c) W/pickup (Hz)	DT_NUMERIC_OFF	MR2100	40537	R/W	
d) Gen voltage on (%)	DT_NUMERIC_OFF	MB2081	40555	R/W	
e) Gen frequency on (%)	DT_NUMERIC_OFF	MB2086	40556	R/W	
f) Oil pressure (bar)	DT_NUMERIC_OFF	MR2112	40540	R/W	
g) Attempt number	DT_NUMERIC	MB2066	40521	R/W	
h) Attempt time (s)	DT_NUMERIC_OFF	MB2061	40522	R/W	
i) Delay attempts (s)	DT_NUMERIC_OFF	MB2062	40523	R/W	
j) Rpm constant	DT_REAL_1	MR3406	40943	R	
k) On alarm delay (s)	DT_NUMERIC_OFF	MD3364	40932	R/W	
l) Siren time (s)	DT_NUMERIC_OFF	MB6	40483	R/W	
m) Decelerator delay (s)	DT_NUMERIC_OFF	MB2064	40533	R/W	
n) High rpm (%)	DT_NUMERIC	MW3422	40946	R/W	
o) Low rpm (%)	DT_NUMERIC	MW3420	40945	R/W	
p) Rated rpm	DT_NUMERIC	MW3420	40945	R/W	

M3.2 Stop setup	Var.Visual	Var.Type	ID	R/W	Range
a) Stop time (s)	DT_NUMERIC	MB2117	40586	R/W	
b) Cooling time (s)	DT_NUMERIC	MW2118	40585	R/W	

M3.3 Preheat setup	Var.Visual	Var.Type	ID	R/W	Range
a) Preheat time (s)	DT_NUMERIC_OFF	MB2060	40527	R/W	
b) Preheat with EV	DT_ONOFF	M2055.3	40529	R/W	Off-On
c) Skip preheat (°C)	DT_NUMERIC	MR2068	40528	R/W	
d) Preheat type	DT_NUMERIC	MB2067	40526	R/W	Before start - During start - During attempts

M3.4 Fuel setup	Var.Visual	Var.Type	ID	R/W	Range
a) Analog tool type	DT_TOOLS	MB151	40472	R/W	Vdo - Veglia - Datcon - Custom
b) Low fuel level (%)	DT_NUMERIC	MB3396	40937	R/W	
c) Lack of fuel (%)	DT_NUMERIC	MB3397	40938	R/W	
d) Refueling enable	DT_ONOFF	M3553.7	41010	R/W	Off-On
e) Start refueling (%)	DT_NUMERIC	MW4654	41713	R/W	
f) Start delay (s)	DT_NUMERIC	MW4652	41712	R/W	
g) Stop refueling (%)	DT_NUMERIC	MW4656	41714	R/W	
h) Stop timer (m)	DT_NUMERIC	MW4650	41711	R/W	
i) Refueling mode	DT_NUMERIC	MB4658	41715	R/W	Auto - Man+Auto - Digital inputs
j) Refueling with engine on	DT_ONOFF	M4621.2	41716	R/W	Off-On
k) Tank capacity (Lt)	DT_NUMERIC	MW3424	40947	R/W	
l1) Automatic	DT_ONOFF	M7311.6	43537	R/W	
l2) Consumption @10% load (Lt/h)	DT_REAL_1	MR7414	43527	R/W	
m1) Automatic	DT_ONOFF	M7311.7	43538	R/W	
m2) Consumption @25% load (Lt/h)	DT_REAL_1	MR7418	43528	R/W	
n) Consumption @50% load (Lt/h)	DT_REAL_1	MR7422	43529	R/W	
o) Consumption @75% load (Lt/h)	DT_REAL_1	MR7426	43530	R/W	
p) Consumption @100% load (Lt/h)	DT_REAL_1	MR7430	43531	R/W	
q) Offset fuel (%)	DT_NUMERIC	MR3948	41345	R/W	
r) Min autonomy (h)	DT_NUMERIC	MR3788	41414	R/W	

M3.5 Oil setup	Var.Visual	Var.Type	ID	R/W	Range
a) Analog tool type	DT_TOOLS	MB152	40486	R/W	Vdo - Veglia - Datcon - Custom

b) Oil pressure prealarm (bar)	DT_REAL_1	MR3398	40939	R/W	
c) Low oil pressure (bar)	DT_REAL_1	MR3402	40940	R/W	

M3.6 Temperature setup	Var.Visual	Var.Type	ID	R/W	Range
a) Analog tool type	DT_TOOLS	MB150	40485	R/W	Vdo - Veglia - Datcon - Custom
b) Temp. Prealarm (°C)	DT_NUMERIC	MR3388	40935	R/W	
c) High temperature alarm (°C)	DT_NUMERIC	MR3392	40936	R/W	

M3.7 Battery setup	Var.Visual	Var.Type	ID	R/W	Range
a) High vdc (%)	DT_NUMERIC	MB4897	41957	R/W	
b) Low vdc (%)	DT_NUMERIC	MB4902	41958	R/W	
c) Rated vdc	DT_NUMERIC	MW4904	41962	R	
d) Battery efficiency (Vx10)	DT_NUMERIC	MB2040	40514	R/W	

M3.8 Service setup	Var.Visual	Var.Type	ID	R/W	Range
a) Enable service	DT_ONOFF	M5599.6	42515	R/W	
b) Service type	DT_NUMERIC	M5631.5	42496	R/W	Work hours - Hours+Date
c) Next service	\	\	\	\	
d) Next service (h)	DT_NUMERIC_OFF	MW5660	42499	R/W	
e) Year	DT_NUMERIC_OFF	MB5633	42497	R/W	
f) Month	DT_NUMERIC_OFF	MB5658	42498	R/W	
g) Initial work (h)	DT_NUMERIC	MR3646	41073	R/W	
h) Restore hours	\	\	\	\	
i) Reset start #	\	\	\	\	

M3.9 Engine Type	Var.Visual	Var.Type	ID	R/W	Range
a) Engine type	DT_ENGINEYPES	MB2015	40491	R/W	Diesel - Petrol - Gas
b) Choke time (s)	DT_NUMERIC	MB1977	40487	R/W	
c) Voltage threshold (V)	DT_NUMERIC_OFF	MW2016	40489	\	
d) Temp. Inhibit (°C)	DT_NUMERIC_OFF	MB2014	40488	R/W	
e) Gasoline pages	DT_ONOFF	M7587.4	43645	R/W	
f) Choke type	DT_NUMERIC	M1976.3	40490	R/W	Continuous - Alternate
g) Gas valve delay	DT_NUMERIC	MB2018	40492	R/W	
h) Fuel valve delay	DT_NUMERIC	MB2019	40493	R/W	
i) Priming delay	DT_NUMERIC	MB2020	40494	R/W	

M8.3 Input type	Var.Visual	Var.Type	ID	R/W	Range
a) I4.4	DT_DIO_TYPES	MB535	40085	R/W	Disabled - Digital NO - Digital NC
b) I4.5	DT_DIO_TYPES	MB536	40086	R/W	Disabled - Digital NO - Digital NC
c) I4.6	DT_DIO_TYPES	MB537	40087	R/W	Disabled - Digital NO - Digital NC
d) I4.7	DT_DIO_TYPES	MB538	40088	R/W	Disabled - Digital NO - Digital NC
e) I4.8	DT_DIO_TYPES	MB539	40089	R/W	Disabled - Digital NO - Digital NC
f) I6.2	DT_ANI_TYPES	MB546	40097	R/W	Disabled - Pressure - Level - Temp - Digital NO - Digital NC
g) I6.3	DT_ANI_TYPES	MB547	40098	R/W	Disabled - Analog - Digital NO - Digital NC
h) I6.4	DT_ANI_TYPES	MB548	40099	R/W	Disabled - Analog - Digital NO - Digital NC
i) Analog source	DT_NUMERIC	M835.2	40318	R/W	TE809 - Canbus
j) Rpm source	DT_NUMERIC	MB6353	42975	R/W	Frequency - Pickup - Canbus

Status	Var.Visual	Var.Type	ID	R/W	Range
Engine status (0 = off, 1 = run)	DT_NUMERIC	M1935.6	40563	R	
Mains status (0 = not ok, 1 = ok)	DT_ONOFF	M2216.4	40630	R	
Genset status (0 = not ok, 1 = ok)	DT_ONOFF	M2216.5	40631	R	
Shutdown alarm (0 =ok, 1 =alarm)	DT_NUMERIC	M39.1	40434	R	

APPENDIX

Appendix A: Fuel sensor curves

(Linear interpolation between values)

Fuel level value (%)	VDO-Ohm	VEGLIA-Ohm	DATCON-Ohm	Custom-Ohm (Cobo)
0	10	304	240	350
16	44	224	187	239
32	74	151	140	170
48	103	88	108	126
60	121	51	89	98
76	146	21	68	63
92	170	5	46	24
105	200	-1	-1	-1

Appendix B: Oil pressure sensor curves

(Linear interpolation between values)

Oil pressure value	VDO-ohm	VEGLIA-ohm	DATACON-ohm	Custom-Ohm (Murphy)
0	10	305	240	240
2	51	204	174	146
4	87	114	123	91
6	122	53	88	51
8	153	12	62	33
10	181	12	37	33
12	181	12	37	33
14	181	12	37	33

Appendix C: Temperature sensor curves

(Linear interpolation between values)

Engine temperature value	VDO-ohm	VEGLIA-ohm	DATACON-ohm	Custom-ohm
0	685	1050	650	0
40	325	1050	650	0
60	145	495	345	0
80	65	245	172	0
100	35	125	80	0
120	22	80	49	0
140	15	50	30	0
150	-1	-1	-1	0

Troubleshooting

PROBLEM	VERIFICATIONS AND POSSIBLE SOLUTIONS
Controller doesn't turn on	Check the battery and wiring to the unit. Check the DC supply and the DC fuse. The controller must be supplied with a voltage between 6V and 35V
Controller shuts down during cranking	Check DC supply voltage: probably the voltage drops below 6V for more than 150ms. Check the battery and the wirings: the battery could be depleted or under-sized, or the distance between the battery and the controller could be too high causing a voltage drop. Eventually increase the size of the cables
Controller always shows the Emergency Stop alarm	If no Emergency Stop Switch is fitted, ensure that a DC positive signal is connected to the Emergency Stop input J5.3. Check emergency stop switch is working correctly and verify the a DC positive signal is connected to the Emergency stop input J5.3
Low oil Pressure alarm	Check engine oil pressure. Check oil pressure switch/sensor and wiring. Check that the configurations are correct inside menu M3.5
High engine temperature alarm	Check engine temperature. Check temperature switch/sensor and wiring. Check that the configurations are correct inside menu M3.6
Pre-heat doesn't activate	Check the wiring to the engine heater plugs. Check the battery supply is present on the preheat output of module. Check menu M8.2 to verify which output is programmed for "Glow Plugs". Check preheat configuration is correct (menu M3.3)
Cranking motor doesn't activate	Check wiring to the cranking motore. Check the battery supply is present on the Crank output of module. Check that no alarm is present.
Cranking motor is activated for a short time, and the the engine doesn't run	Check the engine running thresholds inside menu M3.1. Check the connection of the D+. Eventually set the D+ threshold (parameter B) to Off
Start failure alarm is activated after configured number of attempts to start	Check wiring of fuel valve. Check the fuel. Check that battery supply is present on the Fuel and Cranking outputs (J5.4 and J5.5) of the module during the starting
Continuous starting of generator when in AUTO mode	Check that there is no signal present on the "Remote Start" input. Check the mains supply is available and within configured limits
Generator fails to start when the Remote Start signal is active	Check signal is on the "Remote Start" input. Check on menu M8.1 that the input is correctly configured to be used as "Remote Start". Check that the controller is in AUTO mode.
Engine runs but the generator doesn't take the load	Check connections to the switching device. In AUTO mode check that the led of KG is ON. Note that the controller doesn't take the load in manual mode without pressing the KG button
The controller doesn't read one or more phases of the generator	Check the fuses on the generator inputs (J1.5-1.6-1.7-1.8). Check the alternator output
The controller doesn't read one or more phases of the mains	Check the fuses on the mains inputs (J2.1-2.2-2.3-2.4)
The controller doesn't read the current	Check that the contactor relative to the read measures (mains or genset) is closed. Check the CTs. It's necessary that the S1 terminals are connected to the TE809 and the S2 terminals are connected to ground. The current must flow from P1 to P2 side of the CT. Check that P1 of the CT is at the side of the primary supply, and P2 is at the load side. Check that the voltages correspond to the current inputs: phase R (J1.5) must correspond to current I1 (J3.1); phase S (J1.6) must correspond to current I2 (J3.2); phase T (J1.7) must correspond to current I3 (J3.3)

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