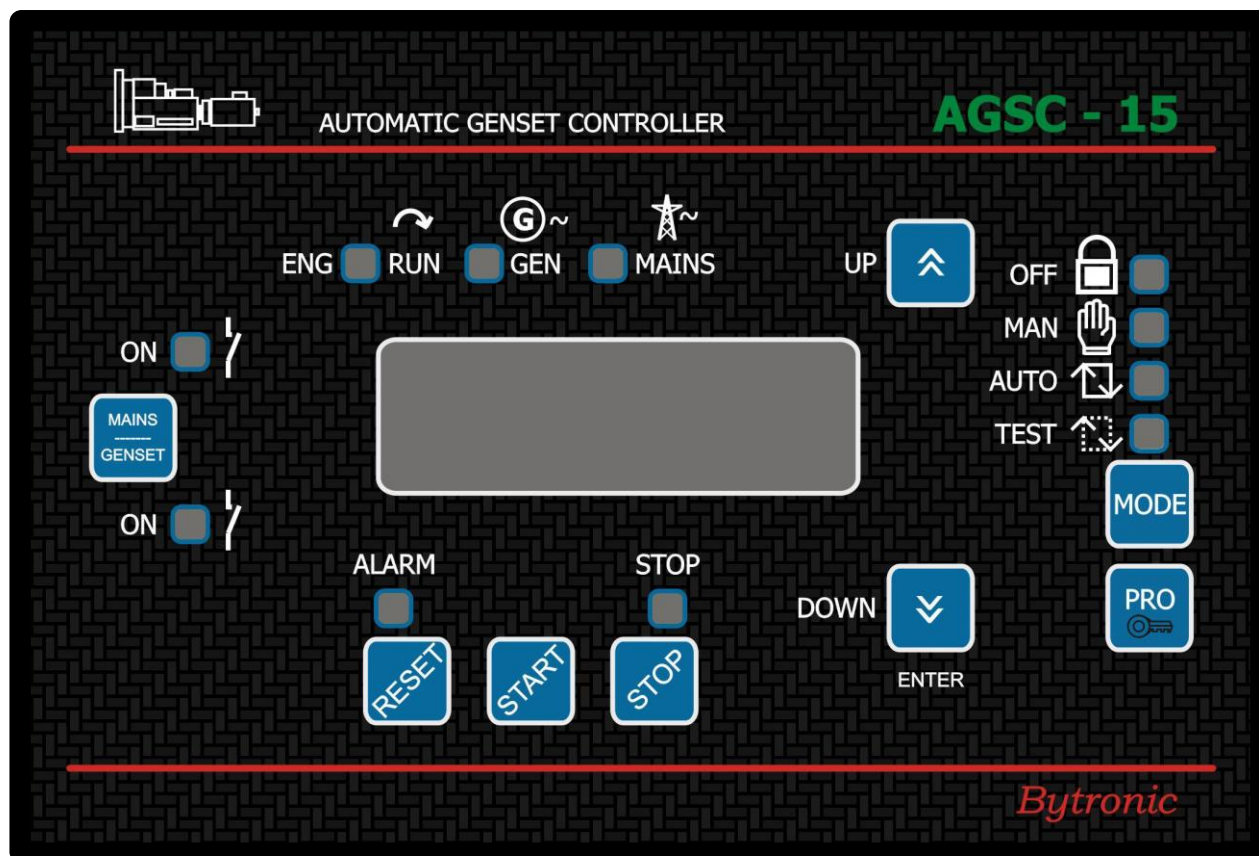


AGSC-15



AUTOMATIC COMMAND AND CONTROL GENERATOR

This document is the exclusive property of:

Bytronic S.r.l. - Via Como 55-21050 Cairate (VA) - ITALY.

It may not be copied, modified or distributed in any way, even partially, by any means without the expressed consent of the Owner.

The information and technical data in this document is subject to copyright and intended solely and exclusively to persons and / or companies to which expressly granted with restrictions of use.

Bytronic reserves the right to change specification without prior notice, at any time, depending on the evolution of materials, technologies and production requirements.

Bytronic is not responsible for any consequences resulting from the use of legal or illegal content of this document, whether due to inaccuracies, errors, misinterpretations or otherwise.

No responsibility can be attributed to Bytronic Srl about any damage to property or persons arising from any use of the equipment described. Its suitability, scope and type of installation should be evaluated by the user, which is obliged to comply with all applicable safety standards and take all appropriate solutions to avoid any damage arising from the use of the equipment, assuming full responsibility.

SUMMARY

1	REFERENCES AGSC-15	1.4
2	OVERVIEW AND GENERAL AGSC-15	2.1
2.1	AVAILABLE VERSIONS	2.1
2.2	KEY FEATURES AND OPTIONS	2.1
2.3	OPTIONS AND ACCESSORIES AVAILABLE SEPARATELY	2.2
2.3.1	<i>Boards and Modules</i>	2.2
2.3.2	<i>Wiring</i>	2.2
2.3.3	<i>Software</i>	2.2
3	REAR PANEL (CONNECTIONS)	3.1
3.1	DESCRIPTION OF THE CONNECTIONS	3.2
3.2	SELECTION OF THE OPERATING VOLTAGE	3.3
4	MAP OF THE FRONT PANEL AGSC-15	4.1
4.1	OPERATION OF THE KEYS	4.2
4.2	VIEWS: BEHAVIOR OF LEDS	4.4
4.3	VIEWS DISPLAY - GENERAL	4.6
4.3.1	<i>Display "MENU SHORT" - Mode TRI-PHASE</i>	4.7
4.3.2	<i>Display pages added to the "MENU EXPAND" - Mode TRI-PHASE</i>	4.8
4.3.3	<i>Display "MENU SHORT" - Mode MONO-PHASE</i>	4.16
4.3.4	<i>Display pages added to the "MENU EXPAND" - Mode PHASE</i>	4.17
4.3.5	<i>Special notes to display</i>	4.24
4.3.5.1	Electrical measurement values in 'over range'	4.24
4.3.5.2	Representation of Power Factors (PF)	4.24
5	PLANTS	5.1
5.1	GETTING STARTED	5.1
5.2	ON DIAGNOSTICS	5.2
5.3	OPERATING PARAMETERS FROM KEYBOARD	5.2
5.3.1	<i>Password</i>	5.2
5.3.2	<i>Procedure</i>	5.3
5.4	SELECTIVE ADJUSTMENTS FROM KEYBOARD	5.4
5.5	SETTINGS PARAMETERS REMOTELY	5.4
6	OPERATING PARAMETERS	6.1
6.1	SUMMARY TABLE OF PROGRAMMABLE PARAMETERS AGSC-15	6.1
6.2	PROGRAMMABLE PARAMETERS - DETAILS	6.2
6.3	FIXED PARAMETERS AGSC-15	6.10
7	ADJUSTING THE TACHOMETER	7.1
7.1	METHOD "STANDARD"	7.1
7.2	METHOD "EASY" TEACH-IN	7.1
8	DESCRIPTION OF OPERATION	8.1
8.1	VIEW	8.1
8.2	OPERATING STATUS "LOCKED" (OFF)	8.2
8.3	OPERATING STATUS "MANUAL" (MAN)	8.3
8.3.1	<i>Commands as 'Manual'</i>	8.3
8.3.1.1	STOP button	8.3
8.3.1.2	START button	8.4
8.3.1.3	Button Load Transfer	8.5
8.4	STATE "AUTOMATIC" (AUTO)	8.6
8.4.1	<i>Terms of Start / Stop mode 'Automatic'</i>	8.7
8.5	OPERATING STATUS "TEST" (TEST)	8.10
8.6	CONTROL OF THE MOTOR	8.11
8.6.1	<i>Common parameters when starting (manual and automatic)</i>	8.11

8.6.2	Parameters related to the goodwill automatic	8.11
8.6.3	Automatic start cycle	8.11
8.6.4	Stop and Cycle Automatic shutdown	8.12
8.6.5	Safety timer.....	8.12
8.6.6	With the engine running	8.13
8.7	MANAGEMENT AUTOMATIC TRANSFER OF THE LOAD	8.14
8.8	ALARMS AND FAILURES	8.16
8.8.1	Features Alarms	8.16
8.8.2	Features of Failures.....	8.17
8.8.3	Summary of the differences in behavior between ALARMS and FAULTS	8.17
8.8.4	Summary Table of Alarms and Failures	8.18
8.8.5	List FAILURES available	8.19
8.8.6	List ALARMS available	8.23
8.9	SERIAL COMMUNICATIONS	8.1
8.9.1	Overview & Specifications Connection	8.1
8.9.2	Communication parameters	8.1
8.9.3	Communication Protocols	8.2
8.9.4	Custom ASCII protocol - Reading and changing operating parameters	8.2
8.9.4.1	Generality	8.2
8.9.4.2	Preparation	8.2
8.9.4.3	Command Format ASCII Custom	8.3
8.9.4.4	Creating a 'Recipe' basis with the read command	8.4
8.9.4.5	Selective editing of parameters so 'Recipe'	8.7
8.9.4.6	Manual changes of parameters so ASCII Custom.....	8.8
8.9.5	MODBUS - JBUS way MODBUS RTU and ASCII.....	8.9
8.9.5.1	Generality	8.9
8.9.5.2	Basic structure of the registers	8.9
8.9.5.3	Reading MODBUS registers in binary (RTU).....	8.10
8.9.5.4	Reading logs in ASCII mode MODBUS	8.11
8.9.5.5	Writing records in binary (RTU)	8.12
8.9.5.6	Writing records in ASCII mode	8.13
8.9.5.7	List of registers available - Legend	8.14
8.9.5.8	List of registers available - WO BASIC, 1-255	8.15
8.9.5.9	List of registers available - RW BASIC, 256-511.....	8.15
8.9.5.10	List of registers available - RO BASIC, 512-767 - Electric	8.17
8.9.5.11	List of registers available - RO BASIC, 768 - 1023 - Group	8.19
8.9.5.12	Troubleshooting Modbus	8.20
9	TECHNICAL SPECIFICATIONS	9.1

1 REFERENCES AGSC-15

This manual refers to the device AGSC-15, has been updated to the following:

- File name: **AGSC-15_01_EN.docx**
- Revision: **01**
- Date: **14/04/2015**

The update status of the device AGSC-15 is the following:

- Firmware **07/10/2014 01:01:02 the**
- Supported languages: **Italian English**
- Hardware Support: **BY10200A**

2 OVERVIEW AND GENERAL AGSC-15

It is an electronic mono-card for the full manual and automatic control of a three-phase or single-phase generator (programmable), with a diesel engine and diesel plant at 12V or 24V.

And totally designed, built and tested in Italy.

It measures 185x125x67mm and is suitable for front panel mounting.

2.1 Available versions

Model unit	Description
AGSC-15_V01	<u>Standard version.</u> No analog sensors engine.

2.2 Key Features and Options

Features and Options	AGSC-15 V01	
Monitoring and measuring voltages of	•	
31 electrical measurements for the generator (V-I-F-W-Pf-Energy ...)	•	
4 measures monitoring electronic board	•	
66 programmable parameters	•	
2 time elapsed service	•	
Hour counters Group	•	
Hour meter total power adapter	•	
Counter number motor starts	•	
4 operating modes: OFF - MAN - AUT and TEST	•	
Weekly test in AUT mode (activated / disabled)	•	
Electrical protective excludable individually	•	
Direct motor start relay 30A	•	
Stop relay with changeover contact 8A	•	
Negative output command glow plugs	•	
Commands for switching (TLG and TLR) with 2 relays 8A, outputs NO and NC	•	
Outputs excitation alternator 12 and 24V	•	
Double control alternator (internal and external)	•	
Engine running on remote signaling contact NO relay signal	•	
Failure of remote signaling contact NO relay signal	•	
Tachometer W and pickup	•	
Engine oil pressure switch input	•	
Input motor thermostat	•	
Contact input for fuel reserves	•	
Input emergency stop command	•	
2 input lines for damage available	•	
Line input for external network presence or way SCR (programmable)	•	
Line input for automatic start inhibition group	•	
Line input for key inhibition selector and programming	•	
Backlit alphanumeric display 16 aratteri x 2 Lines	•	
2 Display Modes (Short menu and extended menu)	•	
8 Control keys	•	
11 Led signaling and control on the front panel	•	
RS485 isolated high speed	•	
3 communication protocols (Modbus RTU - Modbus ASCII mode and 'Recipe')	•	
Bootloader for firmware update	•	

2.3 Options and accessories available separately

2.3.1 **Boards and Modules**

	Code	Type	Description
	CNV-M-BY4750	Module RS232 / RS485 USB	Form conversion from RS232 / RS485 to USB, to connect the AGSC-15 to a personal computer. The cable with the USB plug along approximately 180cm is integrated with the drive and there is no need to buy it separately. The connecting cables RS232 or RS485 are not included.

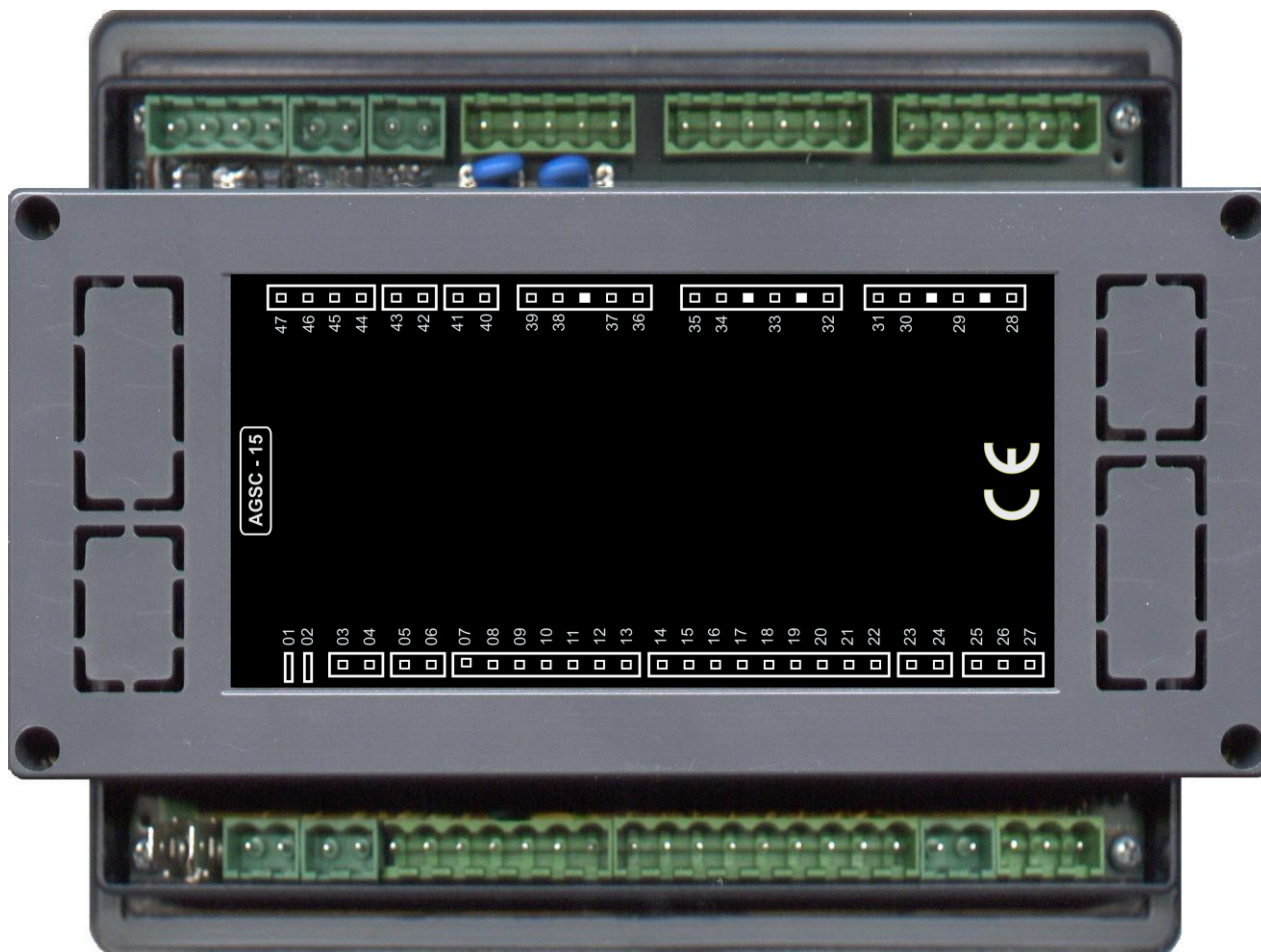
2.3.2 **Wiring**

	Code	Type	Description
	CV- BY4750-485.500	Connection cable	RS485 connection cable between CNV-M-BY4750 and AGSC-15. Length: 0.5m

2.3.3 **Software**

	Code	Type	Description
	SW-BOOT_18F	Firmware Bootloader	Software for the firmware update

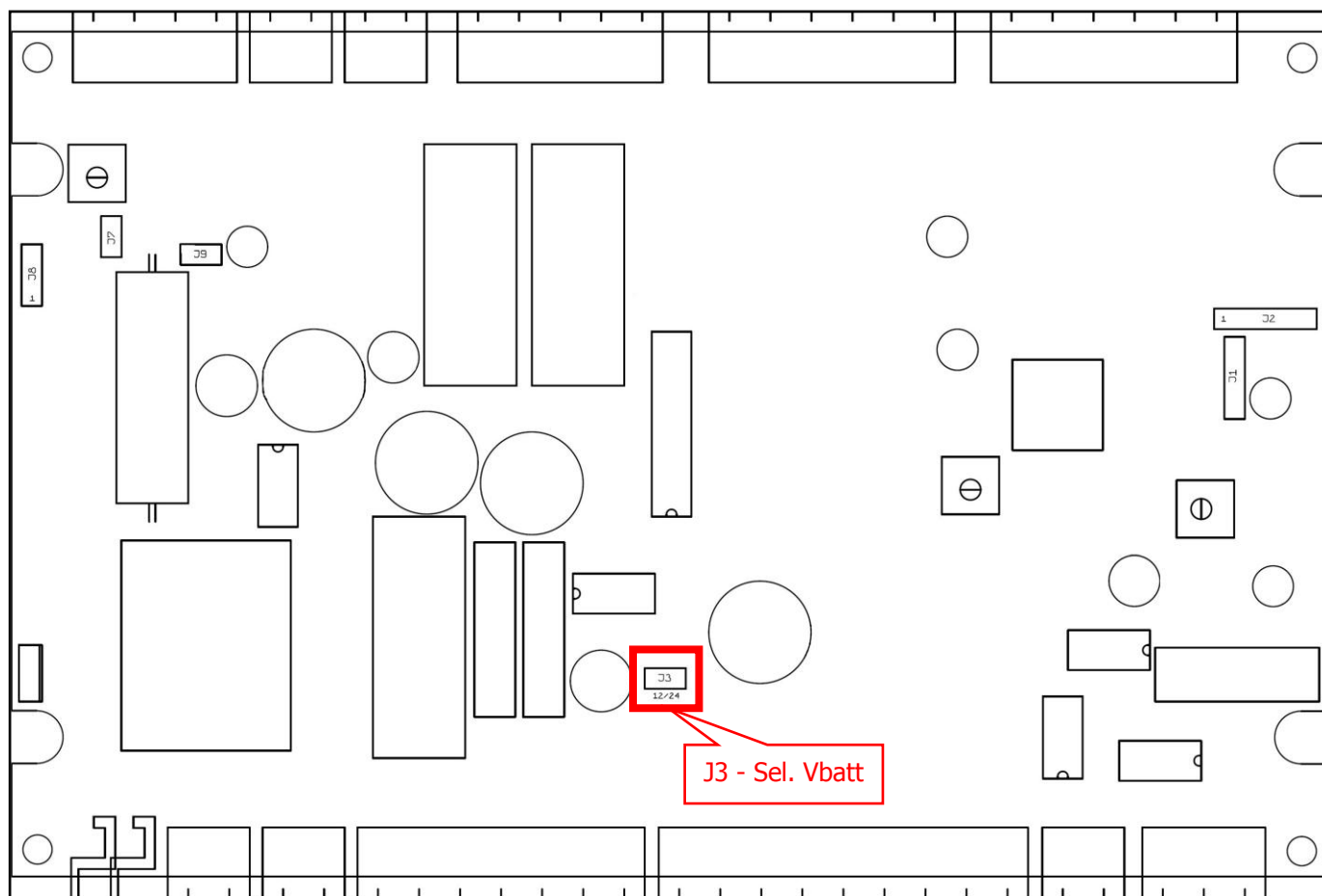
3 REAR PANEL (Connections)



3.1 Description of the connections

Terminal No.	Description	Notes
01	Positive Battery 30A for starter relay	The measurement of the battery voltage is made on this connection. The power excitation alternator is withdrawn from here.
02	30A positive command to start	
03	Output excitation current alternator charger 12V (D +)	Used when the battery is 12V V
04	Output excitation current alternator 24V charger (D +)	Used when the battery is 24V V
05	Battery positive (power tab)	The selection voltage 12 or 24V is made with the jumper J3, open = 24V, 12V = closed.
06	Negative battery (power tab)	To be connected to EARTH
07	Contact COM Relay output shutdown (8A)	Behavior programmable excitation or de-excitation
08	Contact N.C. Relay output shutdown (8A)	
09	Contact N.O. Relay output shutdown (8A)	
10	Contact relay output alarm signal n.o tele 5A	
11		
12	Relay contact output NO tele signal Engine running 5A	
13		
14	Temperature thermostat input Motor N.O. negative.	Open = Normal temperature
15	Emergency stop input N.C. negative.	Open = Emergency. If not used, keep in negative
16	Multifunction control N.O. Programmable negative: • Presence External network (default), or • Goodwill on a SCR	Both conditions are considered present when the contact is closed to negative.
17	Admission foreign key lock switch and programming - NO negative.	Open = Selector blocked / Programming inhibited. If not used, keep in negative
18	Engine oil pressure switch input N.O. negative.	Open = Oil pressure
19	Input failure available 2 - N.O. negative.	Closed = faulty
20	Input failure available 1 - N.O. negative.	Closed = faulty
21	Input start inhibit automatic N.O. negative.	Closed = prevents starting automatically and in test
22	Contact input reserve fuel N.O. negative.	Open = sufficient fuel. The condition of 'spare' time is used to determine the failure of 'end fuel' programmable.
23	Positive side sensor engine running outside	External sensor for engine running, be fed to the battery voltage with the polarities. When powered, the condition is that the engine has started Leave open the contacts if not used.
24	Negative side engine running outside	
25	RS485 "A"	Use RS485 converter with resistors 'fail safe'. Refer to the guide "Modbus over Serial Line - Specification & Implementation Guide" section "Two-Wire MODBUS Definition"
26	RS485 "B"	
27	RS485 Gnd	
28	Voltage Phase R Network	To use single phase, connect PHASE R and Neutral
29	Voltage Phase S Network	
30	Voltage Phase T Network	
31	Voltage Neutral Network	
32	Phase R Voltage Generator	To use single phase, connect PHASE R and Neutral
33	Voltage Phase S Generator	
34	Voltage Phase T Generator	
35	Neutral Voltage Generator	
36	Relay contact output NC command load on the network (TLR) 8A	Closed = Load Network
37		
38	Relay contact output n.o load command on January (TLG) 8A	Closed = Load Generator
39		
40	Reference Tachometer. Do NOT use with W.	USE ONLY WITH PICK-UP! When using W, leave unplugged.
41	Tachometer input. Connect to W or pick-up	
42	Negative control for external relay	At the time, this output is used to control GLOW PLUG WARMING.
43	Positive supply for external relay	
44	T.A. / 5 Generator Step R	To use single phase, use T.A. R and Common T.A. Connect to EARTH the Common T.A.
45	T.A. / 5 Generator Phase T	
46	Common T.A. Generator	
47	T.A. / 5 Generator Step S	

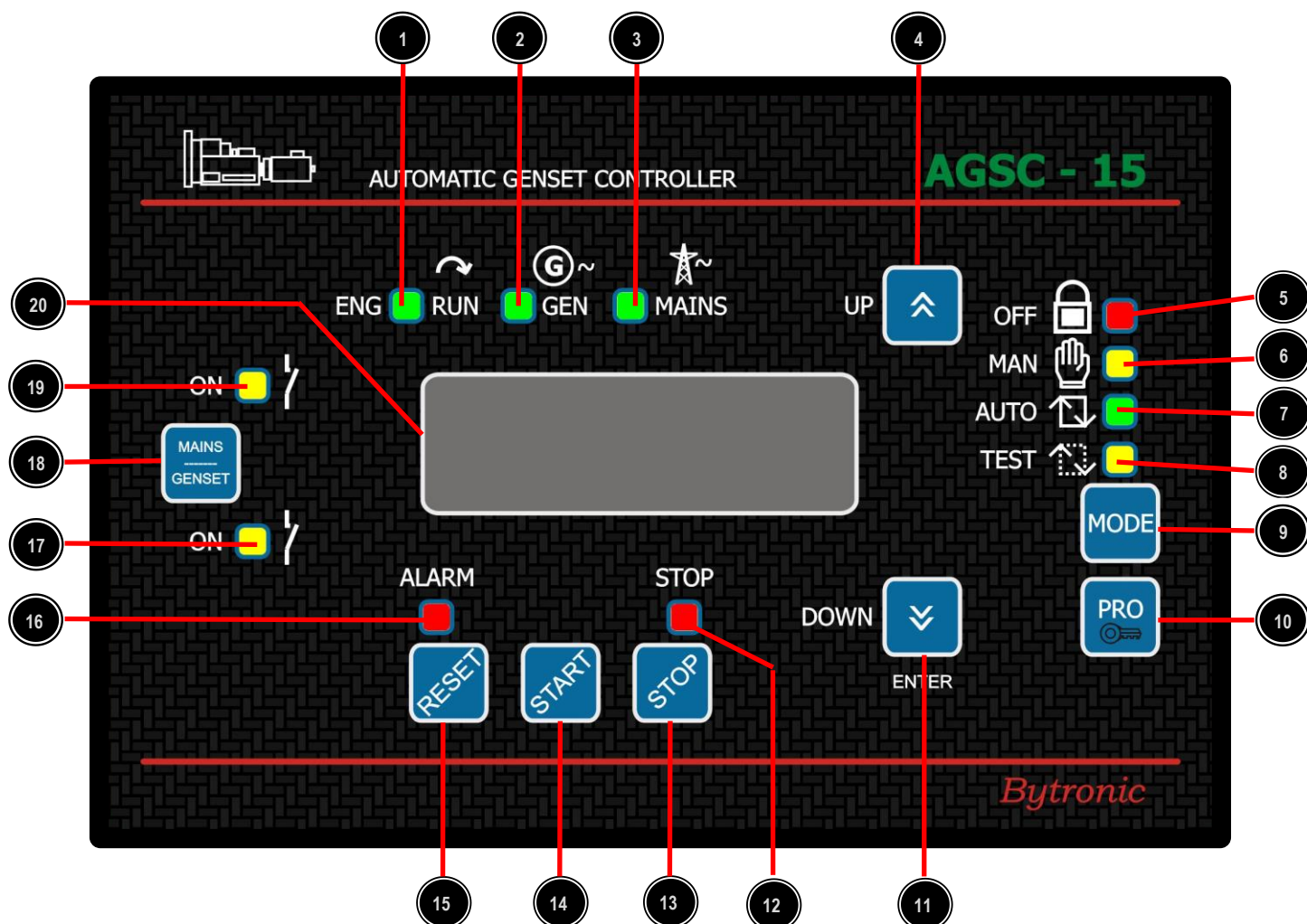
3.2 Selection of the operating voltage



If the battery voltage is 12 volts, J3 must be CLOSED.

If the battery voltage is 24 volts, J3 must be OPEN.

4 MAP OF THE FRONT PANEL AGSC-15



1	Led Engine running	11	"Next" button display / selection menu short or extended
2	Led generator ready to load	12	Led stop command engine / cooling in progress
3	Led Presence Network / Mode SCR	13	Button manual stop engine with and without cooling
4	"Back" button display	14	Manual button engine start
5	Led mode selector LOCKED / Key in OFF	15	Button Reset / End cycle Stop / Exit programming
6	Led switch: MANUAL mode	16	Led failure indication / alarms
7	Led switch: AUTO mode / start inhibit	17	Led load on generator
8	Led switch: TEST mode / weekly test	18	Network-button manual transfer load generator
9	Mode selector button group	19	Led load Network
10	Key programming	20	LCD 16x2

4.1 Operation of the keys

		Settings / input to the setting.	Access to the adjustment of parameters and some adjustments permitted only with the foreign key in ON.
Short press key:		• Pages Time Elapsed Service: entry / exit control • Alarm page with more than one alarm (LED 16 Flashing): Cycle alarms	
Long press key:		• Various settings and adjustments. See below.	
		Change operating status (Sequence OFF-MAN-AUT-TEST and back to OFF)	The change of state of the selector is permitted only with the foreign key in ON.
Short press key:		• The LED operating status brings to the next state. The operating status is NOT confirmed within 1.5 seconds if you press the button again to change state. During the movement of Led selector, within 1.5 seconds, the operating status is still to start. With the button is pressed that released more than 1.5 seconds, the new operating status is acquired. If it is equal to that of departure, there will be no changes to the current state of the group.	
		Page display "forward" / Increase values / Menu short or extended	
Briefly press key normal mode:		• Progress display pages. During pressing, shows the 'cover' of the page that appears when you release the button.	
Long button in normal mode:		• Change the display mode to 'Quick Menu' to 'Extended Menu' and vice-versa.	
Briefly press key mode adjustment values:		• Increase value of a unit	
Long press key mode adjustment values:		• Fast increase of values. More and more you hold down the speed increases (4 speed levels).	
		Display page "back" / Decrease values	
Briefly press key normal mode:		• Receding display pages. During pressing, shows the 'cover' of the page that appears when you release the button.	
Briefly press key mode adjustment values:		• Decrease the value of a unit	
Long press key mode adjustment values:		• Fast decrease of the values. More and more you hold down the speed increases (4 speed levels).	

13		Command MANUAL engine stop with and without cooling cycle	The button is enabled only in "MAN" (Led 6 ON) • If pressed briefly, always starts the cycle of automatic stop with cooling and, if the group is in supply, transfers the load on the network. • When pressed long, force the start of the cycle of automatic stop (even with the engine stopped).
14		Command MANUAL starter motor	The button is enabled with two conditions both exist simultaneously: 1. Switch in "MAN" (6 Led lit) and 2. Engine stopped (LED 1 off) To start the engine you have to hold it down until it is set in motion. The engine turns off immediately even if the key is pressed, to avoid damaging the organs of starting.
15		Reset failure / interruption cycle stop / Special Features.	
Short press in the normal way (without fault):		• Only in "MAN", when you are on the cooling cycle engine cancels allowing the engine to stay in motion	
Short press in programming parameters:		• Exits programming possibly saving the parameter being adjusted.	
Long press in the normal way (without fault):		• In all conditions, when you are on the cycle of the engine stop (12 LEDs illuminated), it is interrupted and is regenerated time to stop security.	
Long press in the normal way (failure):		• If there is a failure and the cause is no longer present, remove the blocking condition.	
18		Command MANUAL load switching network - Generator and vice-versa	The button is enabled with two conditions both exist simultaneously: 1. Switch in "MAN" (6 Led lit) and 2. Generator ready to dispense (LED 2 on) At each pressure the load is exchanged between the network and the generator with a safety delay for switching.

4.2 Views: behavior of Leds

1		Engine running Color: Green	Off: Lit Steady: Flashing:	<i>The engine is NOT running (real-time status).</i> <i>The engine is running (real-time status).</i> N / A
2		Generator ready to dispense Color: Green	Off: Lit Steady: Flashing:	<i>The generator is NOT ready for delivery to the load.</i> <i>The generator is ready for delivery to the load.</i> N / A
3		Presence Network / Mode SCR. Color: Green	Off: Lit Steady: Flashing:	<i>No mains voltage.</i> And no mains input Presence Network absent <i>Mains voltage.</i> This network O input Presence Network this <i>And running the attempt to start automatically forced to request external SCR</i>
5		"OFF" mode (LOCK) / Key in OFF (1) Red Color	Off: Lit Steady: Flashing: Blinking Brief:	<i>The group is NOT in "Locked" and the foreign key is in the ON (1).</i> <i>The group is in "Locked" and the foreign key is in the ON (1).</i> <i>The group is in "Stuck" with the foreign key in OFF (1).</i> <i>The group is NOT in "Locked" and the foreign key is in the OFF (1).</i>
			(1) Key to ON means selector / programming enabled, vice versa (OFF) are disabled.	
6		Mode "MAN" (MANUAL) Color: Yellow	Off: Lit Steady: Flashing:	<i>The group is NOT in "Manual" mode.</i> <i>The group is in "Manual".</i> N / A
7		"AUTO" mode (AUTO) / Inhibition Auto Start Color: Green	Off: Lit Steady: Flashing:	<i>The group is NOT in "Automatic" and this is NOT the command Inhibition Goodwill.</i> <i>The group E 'in "Automatic" and this is NOT the command Inhibition Goodwill.</i> If the only LED on the switch: - The group E 'in "Automatic" and This command Inhibition Goodwill. If it is NOT the only LED on the switch: - The group is NOT in "Automatic" and This command Inhibition Goodwill.
8		So "TEST" (TEST) Color: Yellow	Off: Lit Steady: Flashing:	<i>The group is NOT in "Test"</i> <i>The group is in "Test".</i> <i>It being the weekly test.</i>

12		Led STOP command engine / cooling in progress <i>Red Color</i>	Off:	<i>The shut off the engine is NOT present.</i>
			Lit Steady:	<i>The motor stop command is present.</i> The behavior of the output is controlled by the parameter.
			Flashing:	<i>It being the cooling cycle.</i>
16		Led Alarms / Failure <i>Red Color</i>	Off:	<i>No alarm or fault present.</i>
			Lit Steady:	<i>This one alarm condition or damage.</i>
			Flashing:	<i>There are multiple alarm conditions and no damage.</i>
17		Load Builder <i>Color: Yellow</i>	Off:	<i>The load on the generator is NOT closed.</i>
			Lit Steady:	<i>The load on the generator is closed.</i>
			Flashing:	<i>N / A</i>
19		Load Network <i>Color: Yellow</i>	Off:	<i>The load is NOT closed on the Net.</i>
			Lit Steady:	<i>The load on the network is closed.</i>
			Flashing:	<i>N / A</i>

4.3 Views Display - General

The Language setting allows you to customize the status messages of the group and the messages of alarm / fault. The measures will have real units and headers only in English. In the description below we will refer to messages in Italian.

Scrolling in 'Next' and 'Back' pages by pressing keys respectively  and .

To simplify the display of many pages present, it was decided to split into two menus display:

1. **Menu SHORT**

Composed of a limited number of display pages, containing the main measures that serve as the group was put into service and is running smoothly.

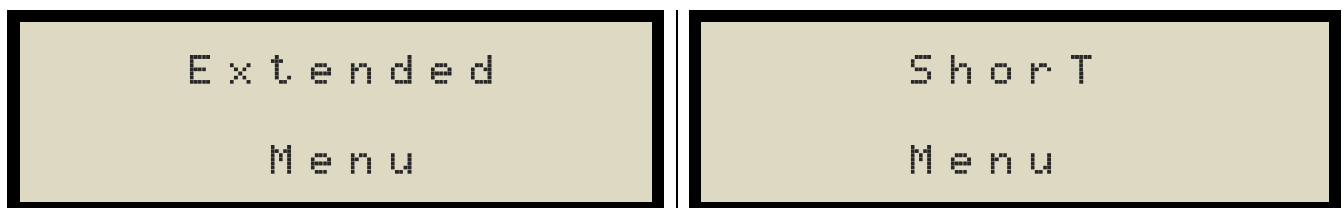
2. **Menu EXTENDED**

Composed by the set of ALL the pages available measurement (including the menu SHORT), serving during commissioning of the group or for special surveillance operations or maintenance.

Switching on the board, is always proposed mode 'Menu SHORT'.

The composition of pages and their contents vary further depending on whether the card is programmed to be able to be used on single-phase or three-phase groups (parameter 65).

To change the menu display from Short to Extended and vice versa, press and hold the button 'Next'  until the corresponding message appears in the language that indicates its status:

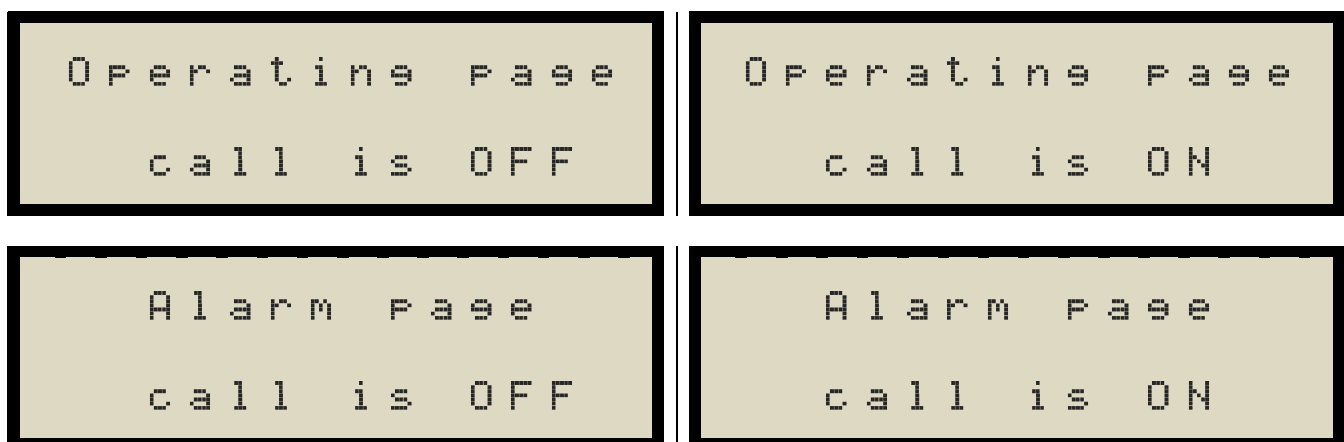


There are two pages that are automatically displayed when something happens that changes the state of the group. The pages in question are:

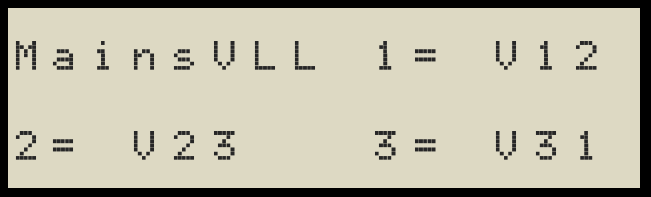
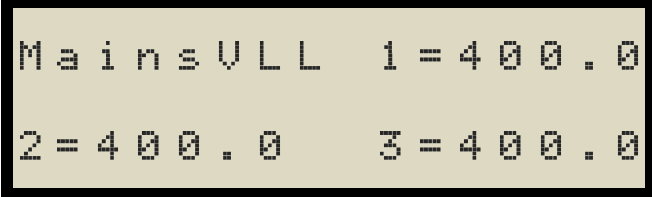
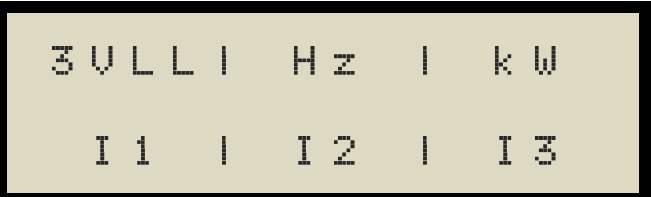
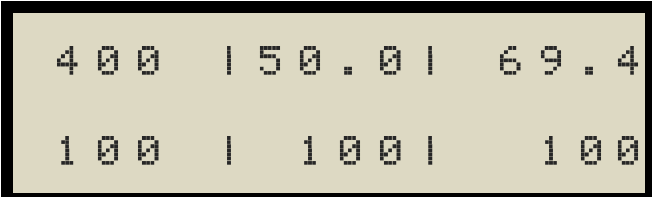
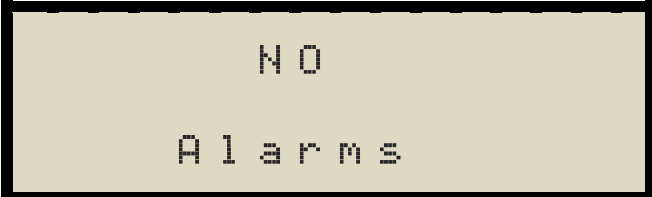
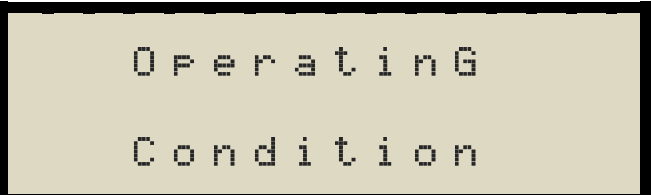
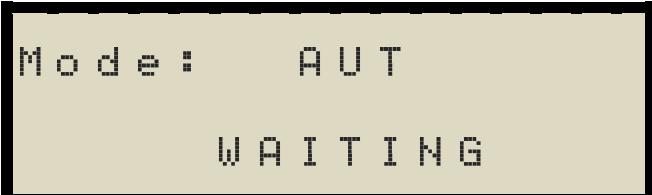
- **State Operating**
- **Condition Alarm**

The recall in the page "Condition Alarm" has priority (in the presence of an alarm) than the recall page "State Operative". However, these changes can be displayed side if you are analyzing or guarding measures or specific states that are changed while the group is operating. The automatic transmission of the page can be deactivated and reactivated separately for the two respective pages. To

do this, move to the desired page between 2 and press and hold key 'Pro' , Getting one of the following messages in the language, even when the Foreign Key is OFF:



4.3.1 Display "MENU SHORT" - Mode TRI-PHASE

0	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Voltage network 1, phase / phase Line 2: Voltages 2 and 3 network, phase / phase	
1	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Medium-phase generator voltage (V) Line 1: Generator Frequency (Hz) Line 1: Three-phase generator active power (kW) Line 2: Phase current generator (A)	
2	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Alarm condition (line 1) Line 2: Alarm condition (line 2) *** Special procedure for activating / deactivating automatic call *** This page is automatically called whenever an alarm or fault. The automatic recall prevails for priority than that of the state operating. The recall is activated / deactivated by holding down the button 'Pro'.	
3	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Operating status (line 1) Line 2: Operating status (line 2) *** Special procedure for activating / deactivating automatic call *** This page is automatically called whenever the group performs operations other than the expectation, showing the message related to the current operation. The call can be excluded. The recall is activated / deactivated by holding down the button 'Pro'.	

	KEY PRESSED (COVER)	BUTTON RELEASED
4	Starts Enø. Time hServ. 1 hServ. 2	1 1 2 7 : 3 4 h 1 = 9 7 2 h 2 = 1 9 7 2
	Line 1: No. of starts made - Hours and minutes of operation Line 2: Time elapsed service maintenance 1 and 2	

4.3.2 Display pages added to the "MENU EXPAND" - Mode TRI-PHASE

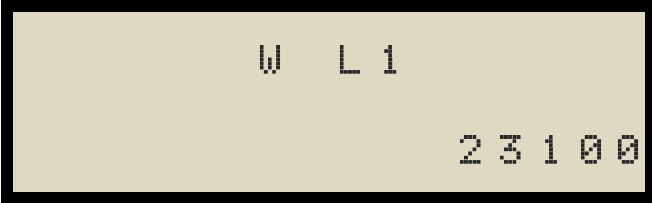
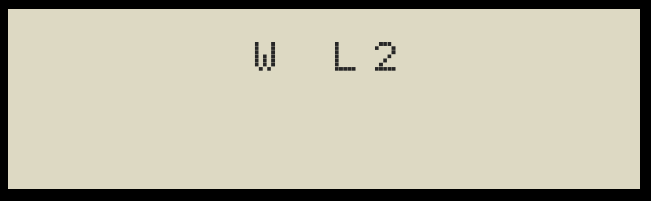
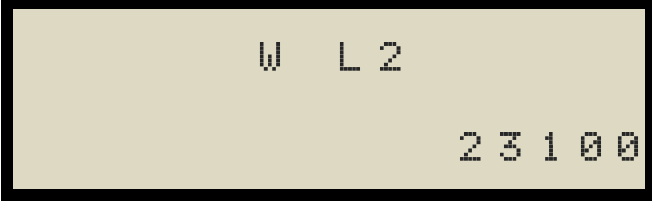
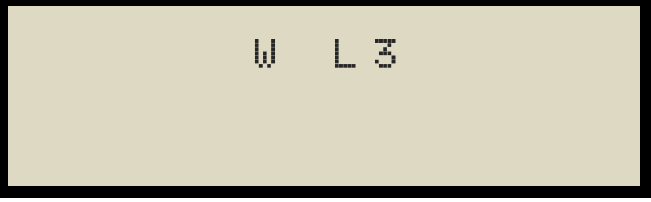
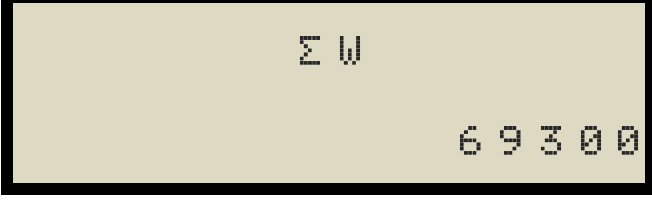
The page numbers that follow are to be 'added' to the last page of the menu short, to get the number of the page displayed.

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 1	Mains V L N 1 = U 1 2 = U 2 3 = U 3	Mains V L N 1 = 2 3 1 . 0 2 = 2 3 1 . 0 3 = 2 3 1 . 0
	Line 1: Voltage 1 network, phase / neutral Line 2: Voltages 2 and 3 network, phase / neutral	

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 2	Gen V L L 1 = U 1 2 2 = U 2 3 3 = U 3 1	Gen V L L 1 = 4 0 0 . 0 2 = 4 0 0 . 0 3 = 4 0 0 . 0
	Line 1: Generator voltage 1, phase / phase Line 2: Generator voltages 2 and 3, phase / phase	

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 3	Gen V L N 1 = U 1 2 = U 2 3 = U 3	Gen V L N 1 = 2 3 1 . 0 2 = 2 3 1 . 0 3 = 2 3 1 . 0
	Line 1: Generator voltage 1, phase / neutral Line 2: Generator voltages 2 and 3, phase / neutral	

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 4	Gen I 1 = I 1 2 = I 2 3 = I 3	Gen I 1 = 1 0 0 . 0 2 = 1 0 0 . 0 3 = 1 0 0 . 0
	Line 1: Current 1 generator Line 2: Currents 2 and 3 generator	

+ 5	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Active Power Phase 1 Generator Line 2: Value Active Power Generator Phase 1 (W)	
+ 6	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Active Power Phase 2 Generator Line 2: Value Active Power Generator Phase 2 (W)	
+ 7	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title 3 Phase Active Power Generator Line 2: Value Active Power Generator Step 3 (W)	
+ 8	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Total Active Power Generator Line 2: Value Total Active Power Generator (W)	
+ 9	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Power factor phase 1 generator Line 2: Power factors Phases 2 and 3 generator	
	<i>The representation of the possible values on this page, it is best illustrated in the chapter "Special notes to Display".</i>	

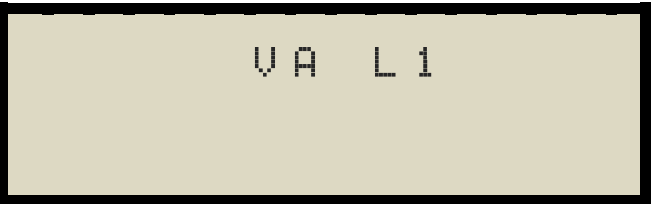
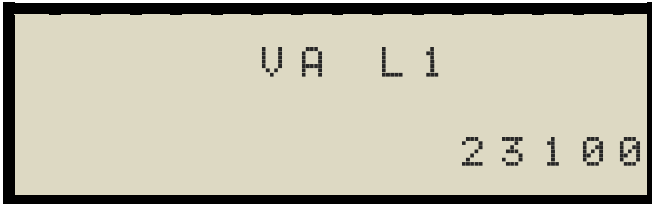
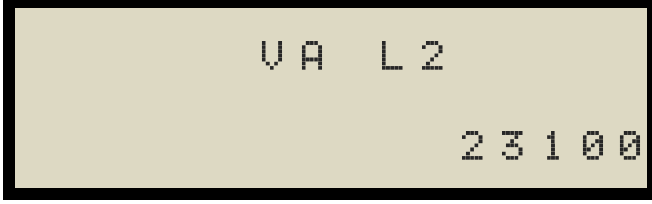
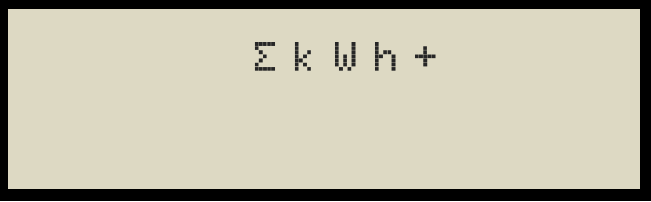
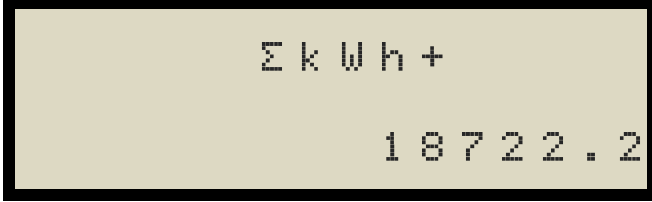
+ 1 0	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Total power factor generator Line 2: Total power factor value generator	
	<i>The representation of the possible values on this page, it is best illustrated in the chapter "Special notes to Display".</i>	

+ 1 1	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Generator Reactive Power Stage 1 Line 2: Value Reactive Power Generator Phase 1 (var)	

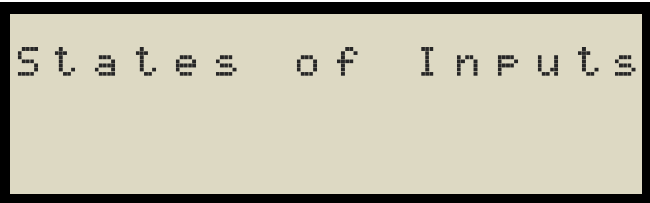
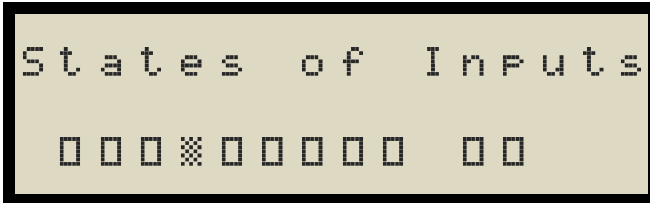
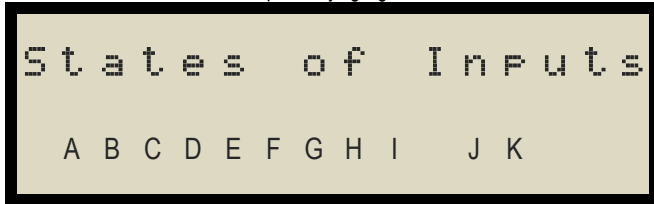
+ 1 2	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Reactive Power Phase 2 Generator Line 2: Value Reactive Power Phase 2 Generator (var)	

+ 1 3	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title 3 Phase Reactive Power Generator Line 2: Value Reactive Power Phase 3 Generator (var)	

+ 1 4	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Total Reactive Power Generator Line 2: Value Total Reactive Power Generator (W)	

+ 1 5	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Apparent Power Phase 1 Generator Line 2: Value Apparent Power Phase 1 Generator (VA)	
+ 1 6	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Apparent Power Phase 2 Generator Line 2: Value Apparent Power Phase 2 Generator (VA)	
+ 1 7	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Apparent Power Phase 3 Generator Line 2: Value Apparent Power Phase 3 Generator (VA)	
+ 1 8	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Total Apparent Power Generator Line 2: Value Total Apparent Power Generator (VA)	
+ 1 9	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Total Active Energy produced Line 2: Value of 'Total Active Energy produced (kWh)	
	*** Procedure to reset totalizer active energy produced *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol '→' And holding the key, the value is reset.	

+ 2 0	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Total Active Energy inverse (absorbed) Line 2: Value of 'Total Active Energy inverse (kWh)	
	*** Procedure to reset totalizer active energy reverse *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol And holding the key, the value is reset.	
+ 2 1	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Total Reactive Energy Line 2: Value of Total Reactive (kvarh)	
	*** Procedure to reset totalizer total reactive energy *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol And holding the key, the value is reset.	
+ 2 2	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Neutral current of the current generator (A) Line 2: Three-phase generator voltage asymmetry (V phase / stage)	
+ 2 3	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Power supply adapter (battery) Line 2: Value Supply voltage (battery, Vdc)	

+ 2 4	KEY PRESSED (COVER)		BUTTON RELEASED	
				
	*** Monitor the condition of the input signals ***			
	Title page "Status Inputs"		The empty squares □ represent the state FALSE (not active). The filled squares ☒ represent the state TRUE (active state).	
	Map identifying signals: 			
<u>The status (active or inactive) is effective, that is, subject to the times of the filter or delay programmed in their parameters</u>				
		A = Thermostat Engine B = Emergency C = Presence Network External / SCR D = Key External E = Engine Oil Pressure F = Failure available 2	G = Failure available 1 H = Inhibition automatic start I = Fuel Reserve J = Excitement alternator carica.batteria (internal) K = External Engine run	

+ 2 5	KEY PRESSED (COVER)		BUTTON RELEASED	
	States of Output		States of Output □ ⊗ ⊗ □ □ □ ⊗ □	
	*** Monitor the conditions of the output signals ***			
	Title page "Status Output"		The empty squares □ represent the state FALSE (provided not active). The filled squares ⊗ represent the state TRUE (active state).	
	Map identifying signals: States of Output A B C D E F G H			
	A = Output N.Ö. Starting Engine B = Output N.Ö. Stop Motor C = Output N.Ö. Remote signaling Engine Run D = Output N.Ö. Alarm / Failure		E = Contact N.Ö. Load network (not available) F = Output N.Ö. Load Generator G = Command excitation alternator H = Output command external relay (preheating)	

+ 2 6	KEY PRESSED (COVER)		BUTTON RELEASED	
	RS 485 Settines		RS Speed: 115200 RS Node: 001	
	Line 1: Serial port speed (bps) Line 2: Node number (address)			

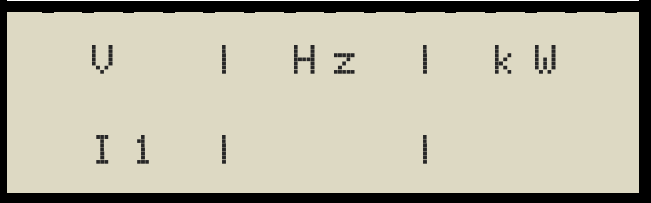
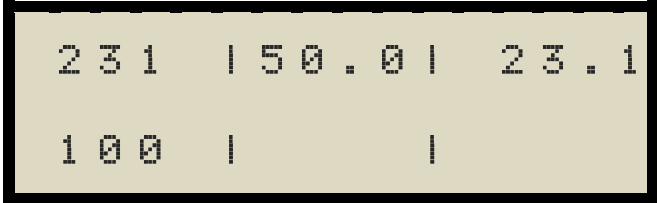
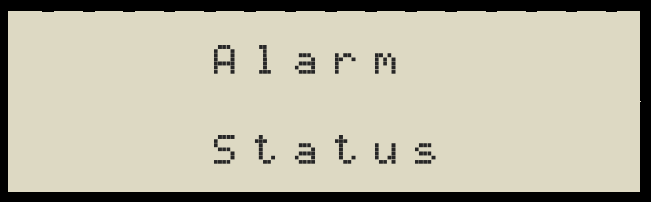
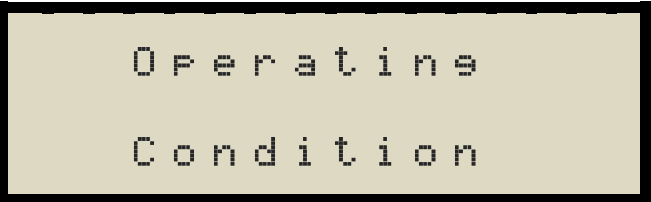
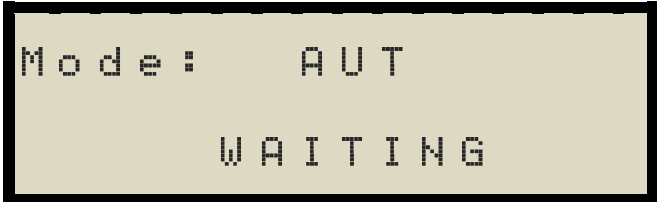
+ 2 7	KEY PRESSED (COVER)		BUTTON RELEASED	
	Supply Time hhhh:mm:ss		Supply Time 75:41,56	
	Line 1: Title Time Total (Live time board) Line 2: Hours minutes and seconds of total time			

+ 2 8	KEY PRESSED (COVER)		BUTTON RELEASED	
	Auto Test Start hhhh:mm:ss		Auto Test Start 167:39,28	
	Line 1: Title Time elapsed interval weekly test Line 2: Hours minutes and seconds of Time elapsed			

	*** Special procedure starting and resetting ***			
	It is necessary that the foreign key is in the ON (unlocked). When the board the Time elapsed is stopped (weekly test off) and display 0: 00.00. Long pressing the key Pro starts a de-counting starts from 168 hours. If the de-count is in progress, a long press Pro it stops and the value is reset. See the description of Test Weekly.			

+ 2 9	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Time elapsed maintenance interval 1 Line 2: Hours minutes and seconds of Time elapsed	
	*** Special procedure of setting *** It is necessary that the foreign key is in the ON (unlocked). Briefly pressing the Pro, you enter and exit the setting of maintenance hours. See the chapter on setting the Time elapsed maintenance.	
+ 3 0	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title Time elapsed maintenance interval 2 Line 2: Hours minutes and seconds of Time elapsed	
	*** Special procedure of setting *** It is necessary that the foreign key is in the ON (unlocked). Briefly pressing the Pro, you enter and exit the setting of maintenance hours. See the chapter on setting the Time elapsed maintenance.	
+ 3 1	KEY PRESSED (COVER)	BUTTON RELEASED
	Line 1: Title tachometer Line 2: Value rev / min.	
	*** Special procedure of setting *** Pre-requisites: • Foreign key to ON (unlocked) and • No fault present. Long pressing the Pro key, you enter in the way 'easy adjustment' of the tachometer and to return to 'normal', just press the button again briefly Pro. See the chapter on adjustment of the tachometer.	

4.3.3 Display "MENU SHORT" - Mode MONO-PHASE

0	* CLOSED DOWN PAGE *	
1	KEY PRESSED (COVER)  Line 1: Generator voltage V1 (F / N) Line 1: Generator Frequency (Hz) Line 2: Active power generator (kW) Line 2: Phase current generator (A)	BUTTON RELEASED 
2	KEY PRESSED (COVER)  Line 1: Alarm condition (line 1) Line 2: Alarm condition (line 2) *** Special procedure for activating / deactivating automatic call *** This page is automatically called whenever an alarm or fault. The automatic recall prevails for priority than that of the state operating. The recall is activated / deactivated by holding down the button 'Pro'.	BUTTON RELEASED 
3	KEY PRESSED (COVER)  Line 1: Operating status (line 1) Line 2: Operating status (line 2) *** Special procedure for activating / deactivating automatic call *** This page is automatically called whenever the group performs operations other than the expectation, showing the message related to the current operation. The call can be excluded. The recall is activated / deactivated by holding down the button 'Pro'.	BUTTON RELEASED 

	KEY PRESSED (COVER)	BUTTON RELEASED
4	<pre> Starts Encl. Time hServ. 1 hServ. 2 </pre>	<pre> 111 27:34 h1 = 9721 h2 = 1972 </pre>
	Line 1: No. of starts made - Hours and minutes of operation Line 2: Tme elapsed maintenance 1 and 2	

4.3.4 Display pages added to the "MENU EXPAND" - Mode PHASE

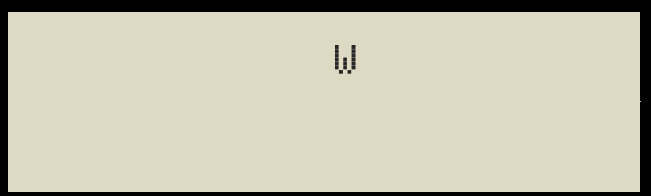
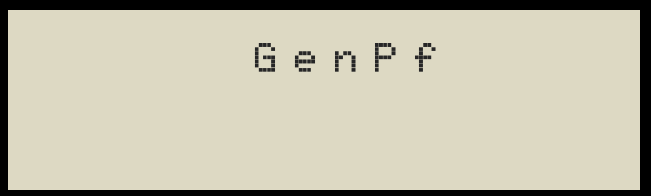
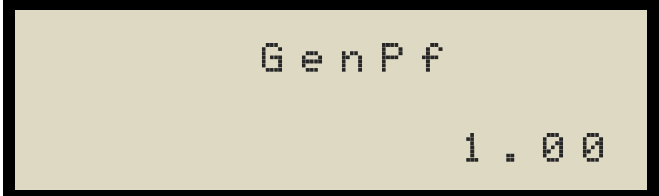
The page numbers that follow are to be 'added' to the last page of the menu short, to get the number of the page displayed.

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 1	<pre> Mains VLN 1 = U1 </pre>	<pre> Mains VLN 1 = 231.0 </pre>
	Line 1: 1 voltage network, phase / neutral Line 2: Empty	

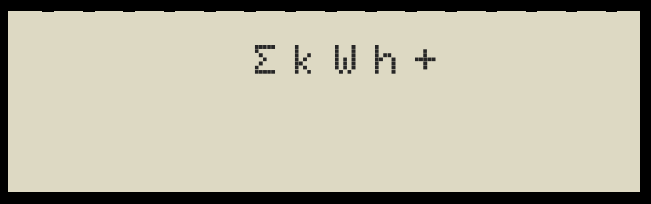
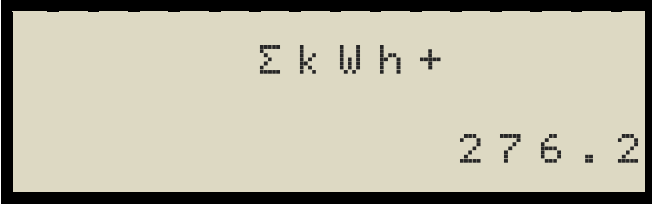
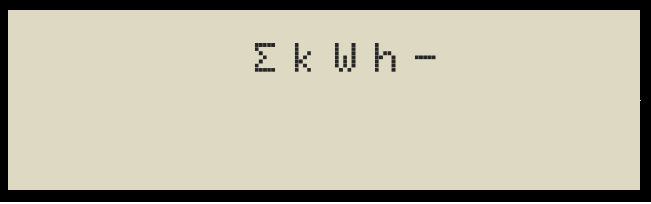
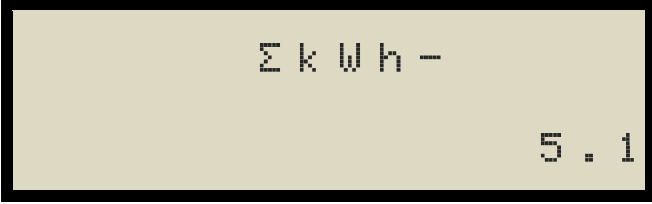
+ 2	* CLOSED DOWN PAGE *	
----------------	----------------------	--

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 3	<pre> Gen VLN 1 = U1 </pre>	<pre> Gen VLN 1 = 231.0 </pre>
	Line 1: Generator voltage 1, phase / neutral Line 2: Empty	

	KEY PRESSED (COVER)	BUTTON RELEASED
+ 4	<pre> Gen I 1 = T h1 e </pre>	<pre> Gen I 1 = 100.0 </pre>
	Line 1: Current 1 generator Line 2: Empty	

+ 5	* CLOSED DOWN PAGE *	
+ 6	* CLOSED DOWN PAGE *	
+ 7	* CLOSED DOWN PAGE *	
+ 8	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Active Power Generator Line 2: Value Active Power Generator (W)	
+ 9	* CLOSED DOWN PAGE *	
+ 10	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Power factor generator Line 2: Power factor value generator	
	<i>The representation of the possible values on this page, it is best illustrated in the chapter "Special notes to Display".</i>	

+ 1 1	* CLOSED DOWN PAGE *						
+ 1 2	* CLOSED DOWN PAGE *						
+ 1 3	* CLOSED DOWN PAGE *						
+ 1 4	<table> <tr> <th>KEY PRESSED (COVER)</th><th>BUTTON RELEASED</th></tr> <tr> <td></td><td></td></tr> <tr> <td colspan="2"> Line 1: Title Reactive Power Generator Line 2: Value Generator Reactive Power (W) </td></tr> </table>	KEY PRESSED (COVER)	BUTTON RELEASED			Line 1: Title Reactive Power Generator Line 2: Value Generator Reactive Power (W)	
KEY PRESSED (COVER)	BUTTON RELEASED						
Line 1: Title Reactive Power Generator Line 2: Value Generator Reactive Power (W)							
+ 1 5	* CLOSED DOWN PAGE *						
+ 1 6	* CLOSED DOWN PAGE *						
+ 1 7	* CLOSED DOWN PAGE *						

+ 1 8	KEY PRESSED (COVER)	BUTTON RELEASED
		
	Line 1: Title Apparent Power Generator Line 2: Value Apparent Power Generator (VA)	
+ 1 9	KEY PRESSED (COVER)	BUTTON RELEASED
		
	Line 1: Title Total Active Energy produced Line 2: Value of Total Active Energy produced (kWh)	
	*** Procedure to reset totalizer active energy produced *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol  And holding the key, the value is reset.	
+ 2 0	KEY PRESSED (COVER)	BUTTON RELEASED
		
	Line 1: Title Total Active Energy inverse (absorbed) Line 2: Value of Total Active Energy inverse (kWh)	
	*** Procedure to reset totalizer active energy reverse *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol  And holding the key, the value is reset.	

+ 2 1	KEY PRESSED (COVER)		BUTTON RELEASED	
	Σ k v a r h		Σ k v a r h 88.2	
	Line 1: Title Total Reactive Energy Line 2: Value of Total Reactive (kvarh)			
	*** Procedure to reset totalizer total reactive energy *** It is necessary that the foreign key is in the ON (unlocked). With this page displayed, press and hold key 'Pro'. Appears in the upper right corner the symbol → ☐ And holding the key, the value is reset.			
+ 2 2	* CLOSED DOWN PAGE *			
+ 2 3	KEY PRESSED (COVER)		BUTTON RELEASED	
	U b a t t e r y		U b a t t e r y 25.76	
	Line 1: Title Power supply board (battery) Line 2: Value Supply voltage board (battery, Vdc)			
+ 2 4	KEY PRESSED (COVER)		BUTTON RELEASED	
	States of Inputs		States of Inputs ☐☐☐☒☐☐☐☐☐☐☐☐☐☐	
	*** Monitor the condition of the input signals ***			
	Title page "Status Inputs"		The empty squares ☐ represent the state FALSE (not active). The filled squares ☒ represent the state TRUE (active state).	
	Map identifying signals:			
	States of Inputs A B C D E F G H I J K			
	The status (active or inactive) is effective, that is, subject to the times of the filter or delay programmed in their parameters			
	A = Thermostat Engine B = Emergency C = Presence Network External / SCR D = Key External E = Engine Oil Pressure F = Failure available 2		G = Failure available 1 H = Inhibition automatic start I = Fuel Reserve J = Excitement alternator (inside) K = External Engine Launched	

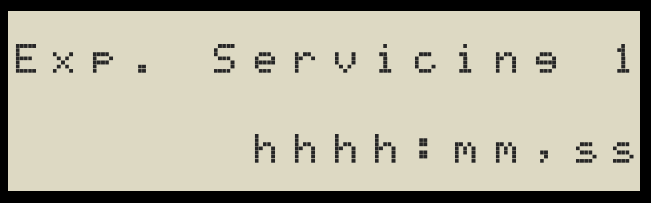
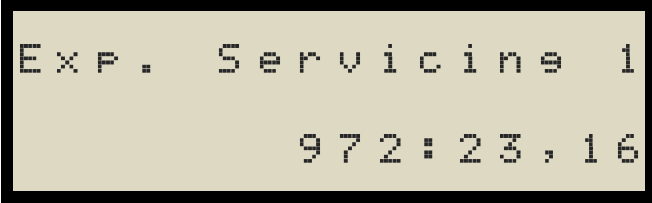
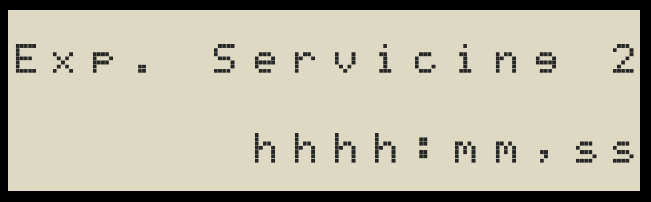
+ 2 5	KEY PRESSED (COVER)		BUTTON RELEASED	
	States of Output		States of Output □ ✖ ✖ □ □ □ ✖ □	
	*** Monitor the conditions of the output signals ***			
	Title page "Status Output"		The empty squares □ represent the state FALSE (not active). The filled squares ✖ represent the state TRUE (active state).	
	Map identifying signals: States of Output A B C D E F G H			
	A = Output N.Ö. Starting Engine B = Output N.Ö. Stop Motor C = Output N.Ö. Remote signaling Engine Run D = Output N.Ö. Alarm / Failure		E = Contact N.Ö. Load network (not available) F = Output N.Ö. Load Generator G = Command excitation alternator H = Output command external relay (preheating)	

+ 2 6	KEY PRESSED (COVER)		BUTTON RELEASED	
	RS 485 Settines		RS Speed: 115200 RS Node: 001	
	Line 1: Serial port speed (bps) Line 2: Node number (address)			

+ 2 7	KEY PRESSED (COVER)		BUTTON RELEASED	
	SUPPLY Time hhhh:mm:ss		SUPPLY Time 75:41,56	
	Line 1: Title Time Total (power tab) Line 2: Hours minutes and seconds of total time			

+ 2 8	KEY PRESSED (COVER)		BUTTON RELEASED	
	Auto Test Start hhhh:mm:ss		Auto Test Start 167:39,28	
	Line 1: Title Time elapsed interval weekly test Line 2: Hours minutes and seconds of time elapsed			

	*** Special procedure starting and resetting ***			
	It is necessary that the foreign key is in the ON (unlocked). When the board the Time elapsed is stopped (weekly test off) and display 0: 00.00. Long pressing the key Pro starts a de-counting starts from 168 hours. If the de-count is in progress, a long press Pro it stops and the value is reset. See the description of Test Weekly.			

+ 2 9	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Time elapsed maintenance interval 1 Line 2: Hours minutes and seconds of Time elapsed	
	*** Special procedure of setting *** Pre-requisites: • Foreign key to ON (unlocked) and • No fault present. Briefly pressing the Pro, you enter and exit the setting of maintenance hours. See the chapter on setting the time elapsed maintenance.	
+ 3 0	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title Time elapsed maintenance interval 2 Line 2: Hours minutes and seconds of Time elapsed	
	*** Special procedure of setting *** Pre-requisites: • Foreign key to ON (unlocked) and • No fault present. Briefly pressing the Pro, you enter and exit the setting of maintenance hours. See the chapter on setting the time elapsed maintenance.	
+ 3 1	KEY PRESSED (COVER) 	BUTTON RELEASED 
	Line 1: Title tachometer Line 2: Value rev / min.	
	*** Special procedure of setting *** Pre-requisites: • Foreign key to ON (unlocked) and • No fault present. Long pressing the Pro key, you enter in the way 'easy adjustment' of the tachometer and to return to 'normal', just press the button again briefly Pro. See the chapter on adjustment of the tachometer.	

4.3.5 Special notes to display

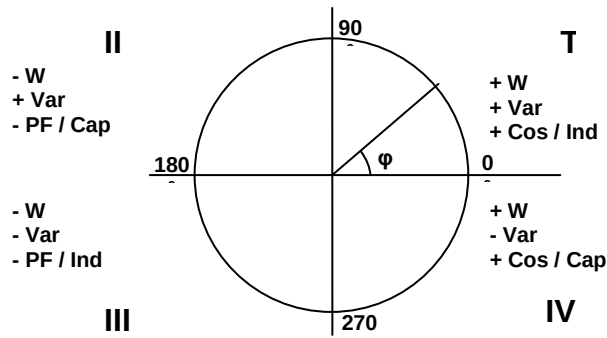
4.3.5.1 Electrical measurement values in 'over range'

When a measured value electrical (voltage, current, power, etc ...) is flashing, it means that the measured variable or one of its basic components is saturating the physical input measurement.

And appropriate action is taken as soon as possible to check that the value of overload is not able to damage the measuring inputs, exceeding the maximum absolute bearable without permanent damage.

4.3.5.2 Representation of Power Factors (PF)

The measurement of the power factor (PF = Power Factor) is made so TPF (Ratio of Powers), on 4 quadrants as described:



The representation of the values of Power Factors ($\cos\phi$) To display, is made in this way:

— — — —	Voltage and current are zero.	The indication is suppressed.
1 . 0 0	Voltage and current are in phase 0 ° (positive active power).	Are absent indications of "I" and "C" because the phase difference is exactly 0 degrees.
. 5 0 0 I	Voltage and current at 60 ° (first quadrant, positive active power).	Zero before the decimal point is deleted (it is implied) and decimals are 3.
. 0 0 0	Voltage and current are exactly out of phase by 90 ° but it is not possible to determine whether leads or lag.	The angle determines the sign of the reactive power: Positive = 90 °, 270 ° = Negative
- 1 . 0 0	Voltage and current are exactly in phase opposition at 180 ° (negative active power).	Are absent indications of "I" and "C" because the phase shift is exactly 180 degrees.
- . 5 0 0 C	Voltage and current at 300 ° (second quadrant, active power negative).	The minus sign indicates the direction of the active component.
. 5 0 0 C	Voltage and current at 300 ° (fourth quadrant, positive active power).	The missing sign (positive), indicating the direction of the active component.

5 PLANTS

5.1 Getting Started

After having followed the electrical connections before turning on the controller you should know a few things.

First, from the factory pre-set are approximately 70 operational parameters modifiable and non-modifiable over 10, the latter considered optimal for any use. It has the foresight to check them ALL to verify that they do not cause harmful or dangerous behavior.

For security, when you turn the AGSC-15 for the first time, the mode selector group is BLOCKED (Led 5  steady or flashing) and starts a cycle stop for safety, lasting 30 seconds, which can be interrupted by long pressing the key .

In this condition is prevented from making any attempt to set in motion, to allow time to change the parameter setting in safety.

Changing parameters is allowed only if the contact of the expected foreign key lock switch is closed to the negative (ON) and that the Led block  NOT is neither regular nor flashing briefly.

If you need to change the operating parameters, you know that this is possible in three different ways:

1. Using the keyboard (see "Adjusting the operating parameters from keyboard")
2. Through the RS485 port quick mode (called "mode recipe")
3. Through RS485 MODBUS RTU in writing on expected adjusters

The keyboard provides for some parameters and functions also the possibility of direct interaction without passing through the procedures of adjustment of the parameters.

The mode parameter programming keyboard is the most immediate and does not require any accessory, but it can be uncomfortable if the parameters to be changed are many.

The mode "recipe" is ideal to customize several control units having available a map of the parameters pre-built that is transferred in one operation via the serial port.

Mode MODBUS serial (RTU or ASCII indifferently) enables users to have an overview of the most complete, depending on the software used to manage.

All these procedures are explained in detail in the relevant sections.

	For maximum flexibility, the change of the parameters is allowed in ALL operating states (not only in locked). This, however, makes the dangerous maneuver, because the modified parameter becomes operational immediately after its storage. Try if possible to work only with the selector mode LOCKED (Led  on).
---	--

As mentioned in the chapter "Display Views" which should be consulted for full details, to scroll through the pages of the display, simply press the keys  (Back) or  (Forward).

With the button pressed, the "title" of the page that will be displayed to the release, will appear when the measures announced by the title.

The key 'forward'  pressed long ago toggle the display mode between 'short menu' and 'Extended Menu'

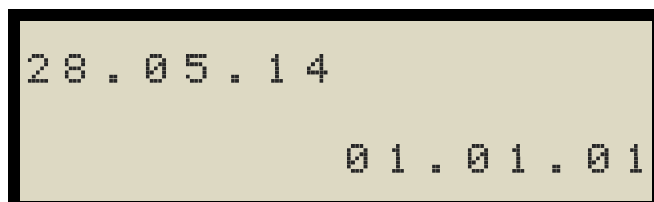
Button , As well as access to the keyboard programming of operating parameters, also serves to handle functions 'special' that will be described hereinafter and already mentioned in the description of the individual display pages.

5.2 On diagnostics

Every time you turn the card AGSC-15 it performs a series of internal diagnostics, proof of Led panel displays and display during the cycle of the source, date, version and revision of firmware.

The test envisages the use of LEDs of all LED simultaneously for about 2 seconds, and immediately after the ignition sequence of each LED individually in anti-clockwise starting from LED 19. Observing the cycle will determine whether the signaling LED are functioning.

The display in the meantime shows the following data:



Top left is the date of the firmware (dd-mm-yy) and lower right model, version and revision of the system.

During the cycle diagnostic internal functions are tested and in case of failure it is given indication in display with a special message. The error messages should be communicated to the technical support service that will give guidance on the solution of the problem.

5.3 Operating parameters from keyboard

The adjustment from the keyboard of the parameters can be performed with the foreign key lock switch in the ON position (unlocked, Led  NOT flashing) and in any state of the switch, in order to correct the behavior of the group even when the engine is running and / or delivery.

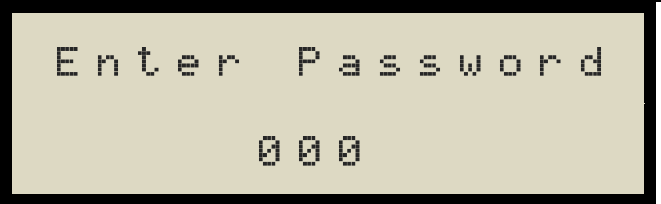
	Caution: if possible, for safety reasons always leave the selector mode LOCKED (Led 5  illuminated), and adjust the parameters in the group stopped. Alternatively, pay EXTREMELY careful not to enter values that can lead to dangerous situations.
---	--

It 'also a PASSWORD that can be used to protect access to the settings, by keyboard or remote.

5.3.1 Password

The password NOT a security password, but only serves to protect the instrument from accidental parameter changes or prevent changes by unauthorized personnel.

Factory has not set a password (password = 000 value) and then access to the programming menu with both keys and remotely is directed, that is to appear without the request. Conversely, if a password is present, with local programming on the keys will prompt the introduction of 3-digit password, between 001 and 999:

— Password input input. Appears only if the parameter [P52] has changed and is equal to 0. If the request is not answered with the correct value, you return to normal viewing of the measures of the menu.	
--	--

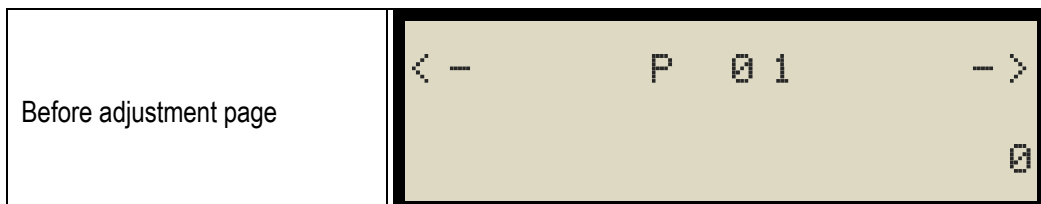
Within 5 seconds you have to press the "forward" or "back" to get to the corresponding number. Pressing and holding the button scrolling speed gradually increases to approach quickly. Reached the number you want, release all buttons and wait about 5 seconds. If the number is recognized as valid then appears the first of adjustable parameters, otherwise it will return to normal in the menu corresponding display. Disabling the password is done by returning the corresponding parameter value to 000.

	Do not lose your password. There is no way to recover it or to reset it. The instrument must be sent back to the factory for reprogramming!
---	--

5.3.2 Procedure

The procedure is as follows:

- Go to a display page that does NOT require a special procedure with the key . See chapter "Views Display" to see which pages are 'free' to access to programming.
- With Led  NOT flashing (foreign key in ON), press and hold the key  until it appears to the first of the programming pages:



- Release the button  and with keys  and  move to the desired parameter
- Briefly press . Disappear indicators parameter selection "<-"And"->"And shows "-SET-"Flashing in the lower left corner:



- Use the keys  and  to adjust the value in the lower right. If the value is far from reach, before assessing whether it is more advantageous to increase or decrease the value (considering that reached the minimum or maximum value is repeated the cycle) and then, while holding down the button, the value change accelerates (4 speed).
 - When the value is correct, you can do two things:
 - If you want to end the editing session parameters and return to normal operation, press the button briefly  or bring the foreign key in OFF otherwise
 - If you want to adjust another parameter, briefly press : The message disappears "-SET-"Flashing and reappear indicators parameter selection "<-"And"->", Allowing you to move to another parameter.
- In both cases, it is expected that the parameter is stored permanently, the storage is automatic.
- To stop and return to normal mode when finished, press  or bring the foreign key in OFF.

Notes:

- The values are used immediately when the message disappears "-SET-" (Or exit with  or bringing the foreign key in OFF), that is, as they are stored, but NOT during adjustment.
- If when adjusting a parameter intervenes failure, it does not affect in any way the adjustment in progress.
- When it is in the process of being adjustable keyboard, any attempts to change the parameters remotely (recipe or Modbus) are NOT accepted by the board.

5.4 Selective adjustments from keyboard

The selective adjustments affect only a few settings that can be changed directly when its page is displayed on the display. See chapter "Display Views", where the pages concerned are those who report in description "Special procedure ...".

When you see one of these pages, the key  serves the specific regulation and therefore is not allowed access to the 'Adjustment of operating parameters from the keyboard'.

Some of these adjustments is 'overlap' with the operating parameters, that is, modifying one or more operating parameters that are involved by the corresponding selective adjustment. Some adjustments may not conform to one or more operational parameters but perform different functions such as resets and settings totalizers and hour meter.

More information is available in the chapters relating to the details of specific functions.

5.5 Settings parameters remotely



Although possible, it is not advisable to make adjustments remotely without being on the set. There may be conditions estremamente dangerous to operators or to the plant itself.

Adjustments remotely parameters are permitted in all conditions, provided that you are not already adjusting parameters in local mode. Unlike the local setting, some parameters can not be accessed remotely.

There are two different ways that provide access to the adjusters via RS485 interface:

1. A single register (parameter) at a time, communicating with Modbus RTU or ASCII.
And 'useful for changes remotely a few parameters, the system is generally already made.
In this mode, the adjustable and locally called P xx, assume an 'address' of reference that will be shown in their description and in the special section.
2. One or more parameters simultaneously by "recipe", communicating with a terminal in ASCII mode.
E 'useful to pre-configure a series of tabs in an identical manner, generally under construction in series of similar plants.

The details of each mode will be explained in detail in the respective sections below.

6 OPERATING PARAMETERS

6.1 Summary Table of Programmable Parameters AGSC-15

Number	Description	Default	Prog.
P01	Message language to Display	0	
P02	Factory Reset	-	-
P03	Value of the full-scale voltage of the network (phase / neutral)	231	
P04	Value of the full-scale voltage of the generator (phase / neutral)	231	
P05	Rated current of the primary generator of CT (/ 5)	100	
P06	Average electrical measurements Network	3	
P07	Average electrical measurements Generator	3	
P08	Duration of the command of diesel engine glow plugs	2.0	
P09	Maximum duration of the automatic start of the engine	5.0	
P10	Length of the pause between pulses automatic starting of the engine	5.0	
P11	Maximum number of attempts automatic start engine	5	
P12	Threshold for ADVICE "Engine running" by Frequency Generator	20.0	
P13	Enabling ADVICE "Starting in progress" by opening the oil pressure switch	1	
P14	Enabling ADVICE condition "Engine running" by excitation alternator	0	
P15	Delay time control alarms from "Engine running"	10.0	
P16	Behavior of the motor stop command	0	
P17	Cycle time automatic engine stop	30	
P18	Voltage threshold for enabling transfer of the load to the generator	300	
P19	Delay automatic transfer of the load to the generator	4	
P20	Voltage threshold for enabling protections Generator	300	
P21	Threshold for ADVICE "Minimum Voltage Network"	320	
P22	Threshold for ADVICE "Maximum Voltage Network"	480	
P23	Late intervention group ADVICE "Network Fault"	2	
P24	Delay exchange network load - Generator and vice versa	2.0	
P25	Delay "Return Network"	60	
P26	Cycle time "Engine cooling"	60	
P27	Threshold for ADVICE "overspeed" by Frequency Generator	60.0	
P28	Threshold for ADVICE "Minimum Voltage Generator"	350	
P29	Threshold for ADVICE "Maximum Voltage Generator"	450	
P30	Threshold for ADVICE "Maximum Asymmetry Voltage Generator"	30	
P31	Threshold for ADVICE "Minimum Frequency Generator"	45.0	
P32	Threshold for ADVICE "Maximum Frequency Generator"	55.0	
P33	Delay action for failure anomalies Tensions Generator	5.0	
P34	Delay action for failure anomalies Frequency Generator	5.0	
P35	Threshold for ADVICE "Overload Generator first level" (alarm)	77	
P36	Threshold for ADVICE "Overload Generator second level" (failure)	83	
P37	Threshold for ADVICE "Inversion energy generator"	6	
P38	Tripping delay fault / alarm overload and reverse energy	5.0	
P39	Threshold for ADVICE "Minimum Voltage Battery"	0.0	
P40	Threshold for ADVICE "Maximum Voltage Battery"	0.0	
P41	Late intervention failure "End Fuel" from ADVICE "Reserve Fuel"	0	
P42	Threshold for ADVICE "Engine running" from Tachometer	500	
P43	Threshold for ADVICE "overspeed" from Tachometer	2100	
P44	Late intervention failure "overspeed" from Tachometer or Frequency Generator	1:00	
P45	Multiplier frequency tachometer get rpm	1	
P46	Divider frequency tachometer get rpm	1	
P47	Media measurement of Tachometer	5	
P48	Enabling the weekly test	0	
P49	Duration of the weekly test	3	
P50	Number of network node communication tool	1	
P51	Communication speed of the serial port	4	
P52	Password	0	
P53	Delay action thermostat input engine	2.0	
P54	Trip Delay input Presence Network / Goodwill SCR	2.0	
P55	Late intervention engine oil pressure switch input	4.0	
P56	Trip Delay input failure Available 1	2.0	
P57	Trip Delay input failure Available 2	2.0	
P58	Inhibition of tripping delay input Automatic start	2.0	
P59	Late intervention reserve fuel input	2.0	
P60	Late intervention internal signal "Excitement Alternator"	0:10	
P61	Trip Delay input "Engine running" external	0:10	
P62	Intervention time safety stop	30	
P63	Hours Time elapsed maintenance 1	-	-
P64	Hours Time elapsed maintenance 2	-	-
P65	Three-phase or single-phase selection group	0	
P66	Mode selection for line Presence Network / SCR	0	

6.2 Programmable Parameters - Details

P01	Message language to Display		Factory setting: 0	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-1 SI YES (257) NO	The available languages are 4 and may vary according to the target area of the device. The standard European dell'AGSC-10 currently includes: 0 = English 1 = Italian	
P02	Factory Reset		Factory setting: N / A	Programmed value: N / A
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-1 NO YES (256.1) NO	It is not a real operating parameter but the way in which the operating parameters to bring ALL factory value. The values of totalization and counting accumulated remain unchanged, even if they appear as operating parameters. To do this, press the "Pro" and immediately the board resets the parameters and performs a reset (reboot as ignition).	
P03	Value of the full-scale voltage of the network (phase / neutral)		Factory setting: 231 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	50-1000 Vn SI YES (258) NO	Represents the nominal value of the full scale of the phase-neutral voltage of each phase. The equivalent phase-phase is this value multiplied by 1,732.	
P04	Value of the full-scale voltage of the generator (phase / neutral)		Factory setting: 231 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	50-1000 Vn SI YES (259) NO	Represents the nominal value of the full scale of the phase-neutral voltage of each phase. The equivalent phase-phase is this value multiplied by 1,732.	
P05	Rated current of the primary of the CT (TA) Generator (/ 5)		Factory setting: 100 A	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	5-5000 A SI YES (260) NO	Represents the nominal value of the primary current transformer that will be used in relation / 5.	
P06	Average electrical measurements Network		Factory setting: 3	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1 -15 SI YES (261) NO	Serves to "stabilize" the values of electrical measurement. With the value 1 measurements are not average. The higher the value, the slower the measure	
	Do not exceed this value. The correct value is what allows you to see the value in the display sufficiently 'stable' but not 'property'. It is likely that I note the "Anomaly Network" and "Return Network" for the start and stop are untimely.			
P07	Average electrical measurements Generator		Factory setting: 3	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1 -15 SI YES (262) NO	Serves to "stabilize" the values of electrical measurement. With the value 1 measurements are not average. The higher the value, the slower the measure	
	Do not exceed this value. The correct value is what allows you to see the value in the display sufficiently 'stable' but not 'property'. I note there is a risk that the value of the threshold power of the group, if too slow, causing problems to the ADVICE of fundamental signals such as the 'engine running', causing it to malfunction.			
P08	Duration of the command of diesel engine glow plugs		Factory setting: 2.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 25.5 Sec SI YES (263) NO	Time output control relay escort, since request is accepted to start when you see the first start command output Command Pos. Goodwill.	

P09	Maximum duration of the automatic start of the engine	Factory setting: 5.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	3.0 - 10.0 Sec SI YES (264) NO	Maximum output control Command Pos. Starting when there is a request for automatic start. The time is stopped and the output set aside if it is detected the engine running.
P10	Length of the pause between pulses automatic starting of the engine	Factory setting: 5.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	3.0 - 10.0 Sec SI YES (265) NO	Pause time Command output Pos. Starting between two start controls when the engine is not set in motion, when there is a request for automatic start. The time is stopped if it is detected the engine running.
P11	Maximum number of attempts automatic start engine	Factory setting: 5	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1-20 SI YES (266) NO	Total number of control pulses (and break) automatic start that can be executed before the engine is put in motion. Performed the last, if the engine does not start is handled the condition of non-starting engine.
P12	Threshold for ADVICE "Engine running" by Frequency Generator	Factory setting: 20.0 Hz	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 -25.0 Hz SI YES (267) NO	And 'the frequency value detected by the R-phase voltage generator, above which the engine can be considered started. Setting 0.0, the threshold is excluded.
P13	Enabling ADVICE "Starting in progress" by opening the oil pressure switch	Factory setting: 1	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-1 SI YES (268) NO	Made 1 allows you to use the condition of engine oil pressure switch (motor NOT still in motion) to suspend or delay the action of the start command. If the pressure switch is open during startup, the cycle is suspended and the status message on the display will be "Goodwill Suspended". If the suspension is prolonged, will speak at the time of intervention safety stop. By setting 0, the ADVICE is excluded.
	When this parameter is = 1, the cycle of automatic starter in order to be started or continued, must see the entrance of the oil pressure switch closed to ground.		
P14	Enabling ADVICE condition "Engine running" by excitation alternator	Factory setting: 0 (Off)	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-1 SI YES (269) NO	Made 1 allows you to use the condition of excitement alternator-battery charger (when the terminals Etc.. Alt. Upload Batt. This is a positive) as an additional sensor engine running. With a value of 1, is also active control of belt breakage which otherwise is off. By setting 0, the ADVICE is excluded.
	When this parameter is = 1, automatically activates the ADVICE of 'anomaly charge alternator (belt breakage). Conversely, when this parameter is = 0, the protection alternator is disabled.		
P15	Delay time control alarms from "Engine running"	Factory setting: 10.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1.0 - 25.5 Sec SI YES (270) NO	And 'the waiting time from when the engine is running when you can begin to control the alarm conditions that require the presence of the engine running. Serves to "nudge" the measures and avoid nuisance tripping alarms.
P16	Behavior of the motor stop command	Factory setting: 0	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-1 SI YES (271) NO	0 = Stop in EXC = Contact N.Ö. Stop relay opened during the stop command and closed in both starter that in blackberries in motion. 1 = Stop in Excitement = Contact N.Ö. Stop relay closed only for the duration of the stop command.

P17	Cycle time automatic engine stop	Factory setting: 30 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1-255 Sec SI YES (272) NO	And 'the residence time in the state of' Stop 'of the output relay Stop when you run the command Stop function. During this time, the LED  is steady. If the motor stops before the shutdown cycle is finished, you can long press on the button  to finish. The LED goes off and output relay Stop go to rest.
P18	Voltage threshold for enabling transfer of the load to the generator	Factory setting: 300 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	10-2000 V SI YES (273) NO	Three-phase mode: is the value stage / phase that ALL tensions must be overcome to enable the transfer of the load to the generator. Mode Single-phase: is the value of the phase / neutral that the phase voltage R must overcome to enable the transfer of the load to the generator. When the transfer is enabled, the Led  lights and in "AUT" This involves the separation of the load from the network (opening of the NC contact Load Network).
	This parameter must be equal or greater value to the parameter "Threshold voltage for enabling protections Generator" on which it depends. In fact, because we can enable the transfer must also guards generator are active. If you set the enable value transfer below to enable protections, the enable will occur in correspondence with the approval of protections and not before, with the risk that not all the voltages are in scheme to support the transfer of the load.		
P19	Delay automatic transfer of the load to the generator	Factory setting: 4 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	2-255 Sec SI YES (274) NO	And 'the waiting time between when you enable the load transfer to the generator (while disconnected from the network) to when it is transferred to the generator with the closing of the NO contact Load Generator.
P20	Voltage threshold for enabling protections Generator	Factory setting: 300 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	10-2000 V SI YES (275) NO	Three-phase mode: is the value stage / phase that at least ONE voltage must be overcome to enable the protections of the generator. Mode Single-phase: is the value of phase / neutral voltage phase R must overcome to enable the protections of the generator.
	This parameter must have a value equal to or less than the parameter "Threshold voltage for enabling transfer of the load to the generator." The ADVICE of the authorization protections in the three-phase mode (all stages above the threshold) is different from that of enabling protections (at least one stage above the threshold).		
P21	Threshold for ADVICE "Minimum Voltage Network"	Factory setting: 320 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-2000 V SI YES (276) NO	Three-phase mode: is the value of phase / phase voltage of at least A, below which the network is deemed insufficient and requires the intervention of the generator. Mode Single-phase: is the value of the phase / neutral voltage of phase R, below which the network is deemed insufficient and requires the intervention of the generator. The intervention of this threshold condition is "Network Fault".
P22	Threshold for ADVICE "Maximum Voltage Network"	Factory setting: 480 V	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-2000 V SI YES (277) NO	Three-phase mode: is the value of phase / phase voltage of at least A, above which the network is deemed excessive and requires the intervention of the generator. Mode Single-phase: is the value of the phase / neutral voltage of phase R, below which the network is deemed excessive and requires the intervention of the generator. The intervention of this threshold condition is "Network Fault".
P23	Late intervention group ADVICE "Network Fault"	Factory setting: 2 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1-3600 Sec SI YES (278) NO	In "AUT" is the waiting time since it was detected a condition required starting group "Network Fault" (contact and / or thresholds) to when you have to start the automatic start sequence.

P24	Delay exchange network load - Generator and vice versa	Factory setting: 2.0 Sec	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1.0 - 25.5 Sec SI YES (279) NO	Mode "MAN": is the waiting time between the opening of the NC contact Cargo net and contact closure N.O. Load Generator and conversely between opening the NO contact Load Generator and reclosing of the NC contact Network load when you press the button 18  So "AUT": is the only time between the opening of the NO contact Load Generator and reclosing of the NC contact Network load. The time the opposite, ie transfer from the network to the load, is played by the parameter P19.	
P25	Delay "Return Network"	Factory setting: 60 Sec	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1-3600 Sec SI YES (280) NO	And the waiting time since it was detected the disappearance of the condition of "Anomaly Network" as the sequence will be initiated automatically transfer the load from the generator to the network (so "AUT" and "TEST"). Then depend on how it will start (mode "AUT") or not (so "TEST") the shutdown sequence group.	
P26	Cycle time "Engine cooling"	Factory setting: 60 Sec	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	1-3600 Sec SI YES (281) NO	And the waiting time with the engine running when you start from the normal sequence of automatic shut-off after "Return to Network" or "start inhibit" a group function. During this time, the LED  flashes. The end of the cooling time can be anticipated the mode switch to MAN and a long press on the  button. Thus anticipating the start of the cycle of automatic stop. In case of stopping the group for a failure, this time is canceled and passes directly to the shutdown cycle.	
P27	Threshold for ADVICE "overspeed" by Frequency Generator	Factory setting: 60.0 Hz	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 100.0 Hz SI YES (282) NO	And the frequency value detected by the R-phase voltage generator, above which the engine can be considered out of laps. The ADVICE is continuous, that is NOT subject enabling protections generator. By setting 0, the ADVICE is excluded.	
P28	Threshold for ADVICE "Minimum Voltage Generator"	Factory setting: 350 V	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-2000 V SI YES (283) NO	The ADVICE is only active when the generator protections are active. Three-phase mode: is the value of phase / phase voltage of at least A, below which is considered the voltage generator insufficient. Mode Single-phase: is the value of the phase / neutral voltage of phase R, below which the voltage generator is considered insufficient. By setting 0, the ADVICE is excluded.	
	If the voltages fall below the threshold to enable protections generator, disappear simultaneously or disappears the voltage of phase R in the single-phase mode, the generator protections are switched off and in any case the load is immediately transferred to the network. The ADVICE of ALL other protections enabling subject is excluded. To stop the group will be the failure of 'Absence tensions generator' in 'Auto' mode and 'test' while in manual engine will continue to stay in motion.		
P29	Threshold for ADVICE "Maximum Voltage Generator"	Factory setting: 480 V	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-2000 V SI YES (284) NO	The ADVICE is only active when the generator protections are active. Three-phase mode: is the value of phase / phase voltage of at least A, above which the voltage generator is considered excessive. Mode Single-phase: is the value of the phase / neutral voltage of phase R, above which the voltage generator is considered excessive. By setting 0, the ADVICE is excluded.	
P30	Threshold for ADVICE "Maximum Asymmetry Voltage Generator"	Factory setting: 30 V	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-250 V SI YES (285) NO	The ADVICE is only active when the generator protections are active. Three-phase mode: is the value of phase / phase difference between the voltage phases, to the above which is considered excessive imbalance. Mode Single-phase: is not used. By setting 0, the ADVICE is excluded.	
P31	Threshold for ADVICE "Minimum Frequency Generator"	Factory setting: 45.0 Hz	Programmed value:
Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 100.0 Hz SI YES (286) NO	The ADVICE is only active when the generator protections are active. And the frequency value detected by the R-phase voltage generator, below which the frequency of the generator is to be considered insufficient. By setting 0, the ADVICE is excluded.	

P32	Threshold for ADVICE "Maximum Frequency Generator"	Factory setting: 55.0 Hz	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 100.0 Hz SI YES (287) NO	The ADVICE is only active when the generator protections are active. And the frequency value detected by the R phase of the voltage generator, to the above which the frequency of the generator is to be considered excessive. By setting 0, the ADVICE is excluded.
P33	Delay action for failure anomalies Tensions Generator	Factory setting: 5.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 25.5 Sec SI YES (288) NO	And the delay time between the I note the intervention of a threshold voltage protection Generator (Minimum, Maximum and Asymmetry) and the intervention of failure relative.
P34	Delay action for failure anomalies Frequency Generator	Factory setting: 5.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 25.5 Sec SI YES (289) NO	And the delay time between the I note the intervention of one of the thresholds of protection from frequency generator (Minimum or Maximum) and the intervention of failure relative.
P35	Threshold for ADVICE "Overload Generator first level" (alarm)	Factory setting: 77 kVA	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-20000 kVA SI YES (290) NO	The ADVICE is only active when the generator protections are active. And 'the value of the total three-phase or single-phase apparent power (if in-phase mode), which is reached or exceeded must be issued a warning alert. By setting 0, the ADVICE is excluded.
	Check that the current transformers are able to reach any values of over-current without saturating. Knowing also NOT exceed the values of: P04 * 1.2 for voltages phase / neutral P05 * 1.2 for the currents to avoid the risk of saturating the steps of measuring the card.		
P36	Threshold for ADVICE "Overload Generator second level" (failure)	Factory setting: 83 kVA	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-20000 kVA SI YES (291) NO	The ADVICE is only active when the generator protections are active. the value of the total apparent power three-phase or single-phase (if single-phase mode), which when reached or exceeded is set as the fault condition to excessive load. By setting 0, the ADVICE is excluded.
	Check that the current transformers are able to reach any values of over-current without saturating. Knowing also NOT exceed the values of: P04 * 1.2 for voltages phase / neutral P05 * 1.2 for the currents to avoid the risk of saturating the steps of measuring the card.		
P37	Threshold for ADVICE "Inversion energy generator"	Factory setting: 6 -kw	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0-20000 -kw SI YES (292) NO	The ADVICE is only active when the generator protections are active. the value of negative active power three-phase or single-phase total (if single-phase mode), which when reached or exceeded indicates the excessive energy absorption. By setting 0, the ADVICE is excluded.
	Check that the current transformers are able to reach any values of over-current without saturating. Knowing also NOT exceed the values of: P04 * 1.2 for voltages phase / neutral P05 * 1.2 for the currents to avoid the risk of saturating the steps of measuring the card.		
P38	Tripping delay fault / alarm overload and reverse energy	Factory setting: 5.0 Sec	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 25.5 Sec SI YES (293) NO	the delay time between the I note the intervention of one of the thresholds overload protection / reverse energy generator and the intervention of the alarm or failure relative.
P39	Threshold for ADVICE "Minimum Voltage Battery"	Factory setting: 0.0 Vdc (Off)	Programmed value:
	Setting limits (Min.-Max.) Modifiable "Recipe": Editable remotely via MODBUS: Selective adjustment:	0.0 - 40.0 Vdc SI YES (294) NO	the voltage value to below which gives a warning of too low voltage. By setting 0, the ADVICE is excluded.

P40	Threshold for ADVICE "Maximum Voltage Battery"	Factory setting: 0.0 Vdc (Off)	Programmed value:
	Setting limits (Min.-Max.): 0.0 - 40.0 Vdc Modifiable "Recipe": SI Editable remotely via MODBUS: YES (295) Selective adjustment: NO	the voltage value above which an alert is obtained voltage too high. By setting 0, the ADVICE is excluded.	
P41	Late intervention failure "End Fuel" from ADVICE "Reserve Fuel"	Factory setting: 0 Sec (Off)	Programmed value:
	Setting limits (Min.-Max.): 0-3600 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (296) Selective adjustment: NO	It 's the time to elapse since I note the condition of "Reserve Fuel" before it is considered "End Fuel" is generated and the corresponding failure. By setting 0, the function is excluded.	
P42	Threshold tachometer ADVICE condition of the engine running	Factory setting: 500 RPM	Programmed value:
	Setting limits (Min.-Max.): 0-1000 RPM Modifiable "Recipe": SI Editable remotely via MODBUS: YES (297) Selective adjustment: NO	It 's the number of revolutions detected by the tachometer to the above which the motor is to be considered in motion. By setting 0, the ADVICE is excluded.	
P43	Threshold for ADVICE "overspeed" from Tachometer	Factory setting: 2100 RPM	Programmed value:
	Setting limits (Min.-Max.): 0-5000 RPM Modifiable "Recipe": SI Editable remotely via MODBUS: YES (298) Selective adjustment: NO	It 's the number of revolutions detected by the tachometer to the above which the motor is to be considered out of laps. By setting 0, the ADVICE is excluded.	
P44	Late intervention failure "overspeed" from Tachometer or Frequency Generator	Factory setting: 1:00 Sec	Programmed value:
	Setting limits (Min.-Max.): 0:00 to 2:55 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (299) Selective adjustment: NO	It 's the time to elapse since I note from a condition of "Overspeed" (by frequency generator and / or Tachometer) before it is generated the corresponding failure.	
P45	Multiplier frequency tachometer get rpm	Factory setting: 1	Programmed value:
	Setting limits (Min.-Max.): 1-10000 Modifiable "Recipe": SI Editable remotely via MODBUS: YES (300) Selective adjustment: YES (*)	The pulse rate is in Hertz, measured at terminal "Ing. Laps. " RPM = Frequency * P45 / P46 The multiplier (P45) normally contains the RPM value (on the display), in correspondence with the reference frequency, which is put to the "denominator" (P46)	
	(*) The selective adjustment of the tachometer (Easy Adjustment of Tachometer), automatically changes the parameter		
P46	Divider frequency tachometer get rpm	Factory setting: 1	Programmed value:
	Setting limits (Min.-Max.): 1-10000 Modifiable "Recipe": SI Editable remotely via MODBUS: YES (301) Selective adjustment: YES (*)	The pulse rate is in Hertz, measured at terminal "Ing. Laps. " RPM = Frequency * P45 / P46 The divisor (P46) normally contains the value of the reference frequency at the RPM value, which is put to the "numerator" (P45)	
	(*) The selective adjustment of the tachometer (Easy Adjustment of Tachometer), automatically changes the parameter		
P47	Media measurement of Tachometer	Factory setting: 5	Programmed value:
	Setting limits (Min.-Max.): 1-20 Modifiable "Recipe": SI Editable remotely via MODBUS: YES (302) Selective adjustment: NO	Serves to "stabilize" the measure of the tachometer. With the value 1 measurements are not average. The higher the value, the slower the measure.	
	Do not exceed this value. The correct value is what allows you to see the value in the display sufficiently 'stable' but not 'property'. I note there is a risk that the engine running and overspeed by Tachometer (if used) are too slow and therefore ineffective.		

P48 Enabling the weekly test		Factory setting: 0 (Off)	Programmed value:
Setting limits (Min.-Max.)	0-1	Since you set 1, part Downcounting Testing Interval weekly cycle continues indefinitely until it gets back to zero.	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (303)		
Selective adjustment:	SI		
P49 Duration of the weekly test		Factory setting: 3 min	Programmed value:
Setting limits (Min.-Max.)	3-60 min	And the duration of the test cycle weekly. During this time the engine is running and then go out at the end with a round of automatic stop (without of the cooling).	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (304)		
Selective adjustment:	NO		
P50 Number of network node communication tool		Factory setting: 1	Programmed value:
Setting limits (Min.-Max.)	1-255	And the node address that the instrument has in the remote communications via the serial port, in any network tools. To avoid communication problems, this parameter can be changed only by the "Adjusting operating parameters from the keyboard."	
Modifiable "Recipe":	NO		
Editable remotely via MODBUS:	NO		
Selective adjustment:	NO		
	Do not set the same values on the cards that communicate on the same RS485 network. The simultaneous responses of the cards with the same address cause communication errors on the entire network.		
P51 Communication speed of the serial port		Factory setting: 4	Programmed value:
Setting limits (Min.-Max.)	0-4	Select the speed of the serial port of the 5 available: 0 = 9600 bps, 1 = 19200 bps, 2 = 38400 bps, 3 = 57600 bps, 4 = 115200 bps. To avoid communication problems, this parameter can be changed only by the "Adjusting operating parameters from the keyboard."	
Modifiable "Recipe":	NO		
Editable remotely via MODBUS:	NO		
Selective adjustment:	NO		
P52 Password		Factory setting: 0	Programmed value:
Setting limits (Min.-Max.)	0-999	Protects access to the operating parameters from the keypad or remotely. In case of keyboard access, if the password is not 0, the request appears (in time) of introduction password. By setting 0, the password is excluded (none required).	
Modifiable "Recipe":	NO		
Editable remotely via MODBUS:	YES (1)		
Selective adjustment:	NO		
P53 Delay action thermostat input engine		Factory setting: 2.0 Sec	Programmed value:
Setting limits (Min.-Max.)	0.0 - 25.5 Sec	And the delay time between the closing of I note to negative input Temp. Motor and the confirmation of the state of "high engine temperature."	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (305)		
Selective adjustment:	NO		
P54 Trip Delay input Presence Network / Goodwill SCR		Factory setting: 2.0 Sec	Programmed value:
Setting limits (Min.-Max.)	0.0 - 25.5 Sec	And the delay time between the closing of the intervention I note the negative of multifunctional Pres. Network / SCR and confirmation of the status of "net presence" or "starter SCR".	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (306)		
Selective adjustment:	NO		
P55 Late intervention engine oil pressure switch input		Factory setting: 4.0 Sec	Programmed value:
Setting limits (Min.-Max.)	0.0 - 25.5 Sec	And the delay time between the closing I note to negative input Oil pressure and the confirmation of the status of "low oil pressure".	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (307)		
Selective adjustment:	NO		
	Half the time set here is used to delay the ADVISE untimely stop condition of the engine, due to the loss of signal engine running in the absence of the stop command.		

P56	Trip Delay input failure Available 1	Factory setting: 2.0 Sec	Programmed value:
	Setting limits (Min.-Max.) 0.0 - 25.5 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (308) Selective adjustment: NO	And the delay time between the closing I note to negative input Available 1 and the confirmation of the state of "failure provided 1".	
P57	Trip Delay input failure Available 2	Factory setting: 2.0 Sec	Programmed value:
	Setting limits (Min.-Max.) 0.0 - 25.5 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (309) Selective adjustment: NO	And the delay time between the closing I note to negative input Available 2 and confirmation of the status of "breakdown available 2".	
P58	Inhibition of tripping delay input Automatic start	Factory setting: 2.0 Sec	Programmed value:
	Setting limits (Min.-Max.) 0.0 - 25.5 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (310) Selective adjustment: NO	And the delay time between the closing I note to negative input Inhibition lawyer. and confirmation of the status of "inhibition automatic start".	
P59	Late intervention reserve fuel input	Factory setting: 2.0 Sec	Programmed value:
	Setting limits (Min.-Max.) 0.0 - 25.5 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (311) Selective adjustment: NO	And the delay time between the closing I note to negative input Reserve Fuel. and confirmation of the status of "reserve fuel".	
P60	Late intervention internal signal "Excitement Alternator"	Factory setting: 0:10 Sec	Programmed value:
	Setting limits (Min.-Max.) 0:00 to 2:55 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (312) Selective adjustment: NO	And the delay time between the appearance of positive voltage output Exc. Alt. Upload Batt. (12 or 24V). and confirmation of the status of "excited alternator" detected by the card.	
P61	Trip Delay input "Engine running" external	Factory setting: 0:10 Sec	Programmed value:
	Setting limits (Min.-Max.) 0:00 to 2:55 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (313) Selective adjustment: NO	And the delay time between the detection of power between terminals Ing. Mot. Adv. Est. (Pos and neg) and confirmation of the status of "engine started from outside".	
P62	Intervention time safety stop	Factory setting: 30 Sec	Programmed value:
	Setting limits (Min.-Max.) 30-255 Sec Modifiable "Recipe": SI Editable remotely via MODBUS: YES (314) Selective adjustment: NO	And the time elapsed in the presence of the condition "Alternator Excited" and in the absence of the operating condition of the engine, such as the signal generator engine is running or protections. The purpose is to arrest the Group and / or to put to rest the control signals in conditions of 'suspension' that does not allow them to operate properly. More details in the chapter on.	
P63	Hours Time elapsed maintenance 1	Factory setting: 10000	Programmed value: N / A
	Setting limits (Min.-Max.) 0-10000 Modifiable "Recipe": NO Editable remotely via MODBUS: YES (315) Selective adjustment: SI	It is not an operating parameter real. Not subject to restore the factory settings. Can be adjusted in 2 ways from the keyboard and in both ways the hour setting assumes the zero minute and seconds relative. The adjustment remotely via MODBUS instead allows selective adjustment, in addition to the hours, minutes and even seconds.	
P64	Hours Time elapsed maintenance 2	Factory setting: 10000	Programmed value: N / A
	Setting limits (Min.-Max.) 0-10000 Modifiable "Recipe": NO Editable remotely via MODBUS: YES (318) Selective adjustment: SI	It is not an operating parameter real. Not subject to restore the factory settings. Can be adjusted in 2 ways from the keyboard and in both ways the hour setting assumes the zero minute and seconds relative. The adjustment remotely via MODBUS instead allows selective adjustment, in addition to the hours, minutes and even seconds.	

P65	Three-phase or single-phase selection group	Factory setting: 0	Programmed value:
Setting limits (Min.-Max.):	0-1	Value = 0 = Group phase. Use all the measures in the three-phase mode Value = 1 = Group phase. Use the R phase is that of network generator for all measures.	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (321)		
Selective adjustment:	NO		
P66	Mode selection for line Presence Network / Goodwill SCR	Factory setting: 0	Programmed value:
Setting limits (Min.-Max.):	0-1	Assigns the Presence Network or SCR to its line input. Value = 0 = function Presence Network. When a negative Net Present indicates. Value = 1 = function SCR. When a negative allows goodwill on a SCR.	
Modifiable "Recipe":	SI		
Editable remotely via MODBUS:	YES (322)		
Selective adjustment:	NO		

6.3 Fixed parameters AGSC-15

Description Parameter	Value
Time acquisition of the state of the selector after pressing the button 	1.5 Sec
Time pressure button  for access to programming parameters	3 Sec.
Time pressure buttons  and  beginning to increase / decrease fast values	1.5 Sec
Time pressure button  failure to reset / interrupt cycle automatic shutdown	3 Sec.
Delay acquisition pressure button  so MAN command output for starter	0.2 Sec.
Delay acquisition pressure button  so MAN to cycle automatic stop	2.5 Sec.
Delay foreign key pad entry	0.1 Sec
Delay pad input Puls. in Fungo	0.1 Sec
Delay signal loss "Excitement Alternator"	2 Sec.
Delay signal loss Engine running Outside	0.1 Sec
Average analog Group (Vbattery ...)	3
Average of frequency measurement of the generator	10
Delay ADVICE Minimum and Maximum Voltage Battery	30 Sec
Delay ADVICE Maximum Current Generator	4 Sec
Interval periodic test weekly (hours)	168

7 Adjusting the tachometer

There is more than one method to adjust the tachometer.

Whichever way you want to proceed, it is necessary that the foreign key is in the ON (Unlocked).

7.1 Method "Standard"

The manual introduction of the parameters "Multiplier tachometer frequency" (P45) and "tachometer frequency Divider" (P46) allows to program the number of revolutions to be represented on the display as a function of the number of pulses per second from the rpm sensor. This can be done with the engine stopped, if you already have the number of pulses per revolution. It is enough to calculate:

$$(1) \text{ RPM to represent} = \text{Pulses per second} * \text{Multiplier} / \text{Divider}$$

Where:

$$(2) \text{ pulses per second} = \text{pulses per revolution} * \text{RPM to represent} / 60$$

In the formula (1), just enter the divider value of pulses per second, and the number RPM Multiplier to represent.

7.2 Method "Easy" teach-in

If the standard method seems complicated or if you do not have the data about the number of pulses per revolution, there is the method "EASY" self-learning, which, however, requires:

1. The Engine running at a constant speed.

More speed is close to that of nominal operation and greater will be the accuracy of the calibration that the 'granularity' of the representation. A calibration done at low speeds imposes low numbers in the denominator, which result in a trend to 'shots' to vary the number of revolutions of the input pulses, which is not always recoverable by increasing the value of the mean.

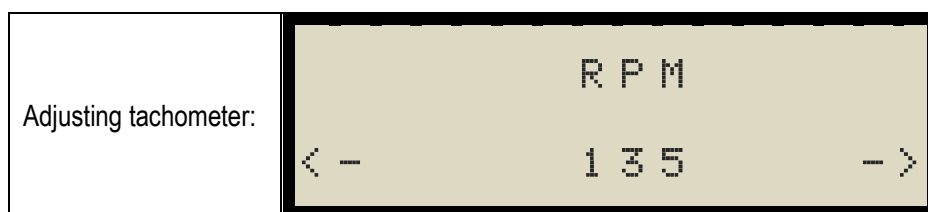
2. The exact number of turns that is making the engine.

E' clearly required the use of a measuring speed applied to the motor.

Obviously, if the engine is running, there is no fault condition, which in any case would prevent access to the adjustment.

The conditions above, you can do the following:

- a) Select the display menu "Extended"
- b) Navigate to the page of the Tachometer
- c) Press and hold the key  until you see two 'arrows' on the left and right on the second line of the display and the value is locked. The page looks like this:



- d) Set on the display the number of revolutions measured, using the key  to increase and  to decrease.
- e) Reached the exact number of turns, press . The arrows disappear and the value in the display reflects the value of revolutions actually measured. The tachometer is regulated.

In the parameters "Multiplier frequency tachometer" (P45) and "Frequency Divider tachometer" (P46) were inserted respectively the speed set with the keys and the corresponding measured value of pulses per second.

If necessary you can calculate the number of pulses per revolution as:

$$(3) \text{ pulses per revolution} = 60 * \text{Divider} / \text{Multiplier}$$

If this number is greater than 1, the tachometer will be precise otherwise its behavior will be 'stepped' much larger than the number will be small.

8 DESCRIPTION OF OPERATION

8.1 View

Operating states from AGSC-15 4:

1. **Stuck** (OFF), indicated by the LED ,
2. **Manual** (MAN), indicated by the LED ,
3. **Automatic** (AUT), indicated by the LED ,
4. **Test** (TEST), .

In order to change the state, it is required that the expected contact for the foreign key must be closed (ON = Unlocked).

The foreign key, when it is in the OFF (Blocked), has the effect of flash the LED .

The light pattern changes depending on whether the selector is in the Lock position (flashing lights = off) or in a different location (flashing switched off short and long).

So, when the Led  NOT flashing, the key is in the ON (Unlocked) and acting with repeated presses on the button  moves the indication on the LED next lower then start again from the one at the top.

The operating status NOT CHANGE if you move within 1.5 seconds.

To change the state, it is necessary that an LED stays on for more than 1.5 seconds after being selected. In that case the new operating status will be that corresponding to the LED on.

This system allows you to switch from one state to another even if they are adjacent (ie. Going from AUT to MAN TEST without activating the state and the OFF state if you maneuver within 1.5 seconds for each move)

However, there are common behaviors in all operating states, with some minor differences.

Among the most important are the following:

- The alarms are not subject to conditions enabling details are shown in all states.
- The damage is not subject to conditions enabling special intervene in all states.
- Both alarms breakdowns are shown on the LED 16  and simultaneously with the closing of the NO contact Alarm (signaling).
- The measurements are performed and displayed regardless of the operating status.
- The ADVICE of the condition of the engine running is active in all conditions.

In the OFF condition (Locked) the only initiative allowed is the indication of LED 1  and the closing of the contact of the relay Mot. Adv. (Signaling).

- The cycle of automatic engine stop can always be interrupted at any operating state, by holding down the button  getting even the cancellation of any failure stored whose causes have been removed.
- The condition of the block starts automatic entrance Inhibition lawyer. or by remote control (Modbus register 256.7), is indicated in all states with the flashing LED .

- It 'always shows the status of the Network on Led  Including the status of the line Pres. Network / SCR when it is active for the way SCR (flashing).

8.2 Operating status "Locked" (OFF)

And 'the state in which the AGSC-15 stands at power.

The Led  is steady if the foreign key is in the ON (Selector Unlocked - Programming permitted), or if flashing OFF (Block Selector and Programming).

Whenever it enters this state, power or with the shift selector, starts a cycle of the engine stop (Led 12  steady throughout the cycle).

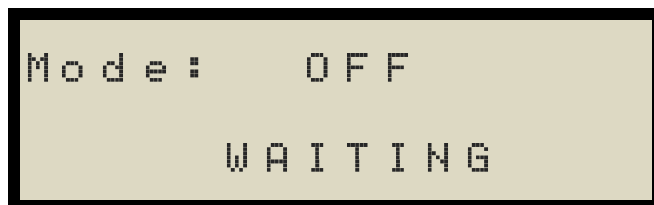
The cycle of automatic shutdown can be shortened (canceled) by long pressing .
Except when the card is turned on, when you start the cycle arrest page State Operative appear automatically, unless:

- A fault is present or at least one alarm, which makes prevalent calling the page of the alarm condition,
- Been excluded the call to the page of the State Operational (see chapter "Display Views").

In Operational Status page, you may see the following message in the language:



At the end of the stop cycle of the engine, in rest conditions without alarm or a failure, the message will be:



In state "Locked" is not allowed in any way the command of starting the engine.

Are inhibited both keys manually operated all input lines and all the conditions that enable the automatic start, including the weekly test, the power failure etc ...

The controls are always active alarm and failure, which are usually managed.

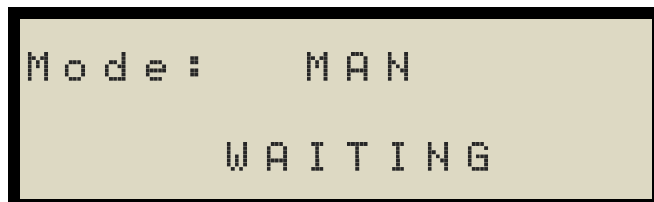
This mode is the only one that allows you to work safely on the engine.

8.3 Operating status "Manual" (MAN)

And 'the state in which you can work with the control buttons on the panel.

The state is indicated by the LED    is steady.

Operating conditions in the state of the group at rest, is to hold:



In state "Manual" is not allowed to start the engine with automatic sequences.

In case of power failure, the only warning is given to display the page of the State Operations for the duration of the time set in parameter [P23].

Upon expiration of the weekly test interval when the switch is in the manual, it is simply canceled and no longer considered until the next deadline.

Any start command so SCR has the sole effect of being indicated by LEDs  flashing.

8.3.1 Commands as 'Manual'

8.3.1.1 STOP button

Button  is only active in this mode.

The press briefly always starts the cycle Automatic stop with cooling (8.6.4) and if the group is in dispensing (Led 17  is on), the pressure on the button SHORT  causes the immediate transfer of the load to the network, with the expected sequence which is explained in more detail below.

Once the cooling cycle is in progress (Led  flashing), it can be canceled with a SHORT pressing the button . Thus allowing the engine to stay in motion.

The PROLONGED button  starts the cycle Automatic stop is precisely true (Led  illuminated), disrupting the cooling cycle when it is in progress.

8.3.1.2 START button

Button  is active only with the engine off and there are no faults.

The permanent pressure on the button, before activating the output Goodwill, enables other signals required to prepare the engine to put in motion (solenoid, excitation alternator, glow if any) with the schedule.

Some of these steps are shown on the display in the Operational Status page, in language, in sequence starting from pressing the button:

Glow plugs preheating. Is executed only if the parameter [P08] is greater than zero.	<pre> PREHEATING IN PROGRESS... </pre>
Goodwill. The output contact relay Goodwill is closed and the engine is trying to start.	<pre> STARTING IN PROGRESS... </pre>

If adjustments to the Group are correct, you can safely hold the start button even after the engine has been set in motion, because the operating parameters responsible for ADVICE of the condition of the engine running automatically disable the relay start.

When the engine starts, Goodwill is counted more on the appropriate counter and the State Operations is as follows:

Delay protection tripping. The control signals of failure / engine alarms that must be detected ONLY with the engine running, is delayed by the time set by [P15].	<pre> ENG. PROTECTIONS DISABLED </pre>
--	--

After the delay of P15, the new condition will be:

Engine running. The Group has started and all the engine guards are active.	<pre> ENGINE RUNNING </pre>
---	---------------------------------------

If the engine does not set in motion and release the start button, the State Operations is as follows:

Starting Suspended. All the signals for start-up are maintained for a time equal to [P62].	<pre> STARTING SUSPENDED </pre>
--	---

After the interval [P62] (Safety stop) without being pressed or the start button or the stop button, it starts a cycle of automatic stop to put to rest the output signals. For details of the cycle and the automatic shutdown timer security, see the related chapters.

8.3.1.3 Button Load Transfer



Button  is active for load switching from network to generator only when the engine is running and have detected the condition of "Enabling load transfer to the generator" (threshold [P18] exceeded, Led 2  on).

When you press the button with the button enabled, the switching operation is not instantaneous, but regulated by a programmable interval between the detachment and reattachment of the load on the network is that the generator, to avoid dangerous situations on-stage.

When you press to transfer the load to the generator, language messages in Operational Status page are in the following sequence:

Closing GCB underway.

Is held open contact N.C. Network load, even without closing the NO contact Load generator, which will be closed at the end of this time determined by [P24].

G C B C L O S I N G
I N P R O G R E S S . . .

When you see this message, both Led 17:19  are off.
At the end of time:

Group operating.

The contact is closed N.Ö. Load Generator. The Group is fully operational and delivery on the load.

G E N S E T
I S O P E R A T I N G

When you see this message, the LED 17  it's on.

Cones button enabled and the load on the generator, if you press the key again to get the transfer of load to the network, with the following messages in sequence:

Closing MCB underway.

Opens the contact N.Ö. Load Generator, still without closing the NC contact Load Network, which will be closed at the end of this time determined by [P24].

M C B C L O S I N G
I N P R O G R E S S . . .

When you see this message, both Led 17:19  are off.

At the end of the time, the contact N.C. Network load is closed and the LED 19  it turns on.

If the engine is left running, the message will state "Engine running"

When the load is on the generator (Operation Group), if there is no enabling transfer of the load to the generator (Led 2 turns off), the load is immediately taken off the generator, transferred on the network with the sequence of delay described and disabled button .

In order to do special tests by authorized service personnel and avoid the automatic, you must manually modify the parameters that apply to both the protections that the threshold of the generator transfer enabling the load.

8.4 State "Automatic" (AUTO)

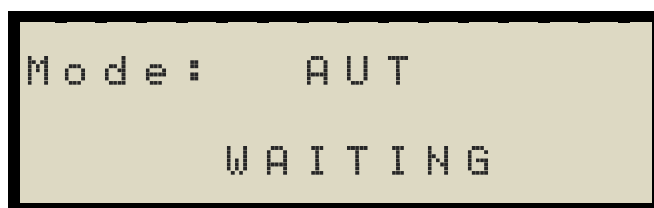
And 'the state in which it operates normally AGSC-15.

The state is indicated by the LED  turned on and the condition of the other LED selector mode.

As this LED can be flashing if there is the condition of "Inhibition automatic start" (entrance Inhibition adv. Or remotely, Modbus register 256.7) regardless of the state of the switch, in order to identify the status 'automatic' is necessary that:

- The Led  is steady, or that
- The Led  is the only flashing selector (= AUTO + Start inhibit), or that
- The Led  is flashing with LED  flashing BRIEFLY (AUTO mode with start inhibit + Key External OFF)

However, at rest without start inhibit, the State Operative language confirmation if you are in automatic:



The normal operation of the system in the state automatically is to monitor the conditions that determine the intervention group and simultaneously monitor all proposed safety systems to prevent damage to the Group that is eventually fed to the load.

The intervention of Group can be total (with transfer of the load) or partial (for example with test set in motion weekly without load transfer).

8.4.1 Terms of Start / Stop mode 'Automatic'

There are several conditions that can be combined with each other to change the behavior of the system because it is able to meet all requests.

All considerations are made assuming that is NOT present any failure.

The following table summarizes the local conditions for which the group (in the absence of failure) starts or stops and the consequences for the state of the motor and load.

Where it says "YES" is the presence of command / status or effect, where "NO" command / condition or the effect is absent and if you see the "x" to the presence or absence of the command / status is indifferent.

	CONTROLS / CONDITIONS					EFFECTS	
	Start inhibit (Entrance or remotely)	Way SCR (Entrance or remotely)	Try weekly intervention	Input so Presence Network	Vmains in range	State motor	Load Builder
1	SI	x	x	x	x	FREEZE	NO
2	NO	SI	x	x	x	STARTED	SI
3	x	NO	NO	SI	x	FREEZE	NO
4	x	NO	NO	x	SI	FREEZE	NO
5	NO	NO	NO	NO	NO	STARTED	SI
6	NO	NO	SI	x	SI	STARTED	NO
7	NO	NO	SI	SI	x	STARTED	NO
8	NO	NO	SI	NO	NO	STARTED	SI

1. Presence of command start inhibit automatic line 'start inhibit' or remote (Reg. Modbus 256.7)

E 'can both prevent the departure of the engine, is to stop the group with a cycle complete shutdown cooling.

The inhibit command line input is active after the delay time set by the parameter [P58], while remote is active immediately.

When it is present, prevents the automatic starting of the engine for any reason.

The presence of the command inhibition is indicated by a flashing LED 7  and simultaneously to the idle state of the engine, the State Operating language will be:

**2. Presence of start control SCR, line Pres. Network / SCR so SCR [P66 = 1] or remotely (Reg. Modbus 256.6).**

Force the status of "Network Fault" with a complete start of the group and transfer the load to the generator.

The command is active after the delay time set by parameter [P54], while remotely becomes effective immediately.

The behavior and directions during startup are THE SAME goodwill from "Network Fault" (see point 5).

And 'prevailing over all other conditions of automatic start.

The presence of the command so SCR is signaled by flashing LED 3 .

3. Presence of command line Pres. Network / SCR so Pres. Network [P66 = 0] with the other commands starting all absent.

The presence of the command on the line in "Presence Network" has the same effect of the condition of "Network voltages in range". The command is active after the delay time set by the parameter [P54].



The indication of the LED on steady is shared between the line condition Presence Network active and the condition of "Network voltages in range", ie above the minimum and below the maximum. Just one of the two conditions is active to keep the LED lit and groped stop / hold the group on the status of "Net Present".

When the Group is operating in conditions of 'Anomaly Network', or you see the 'Net Present', begins the shutdown sequence with cooling even though it had executed a time of 'Return Network' determined by the parameter [P25], during which the condition 'Net Present' must always be maintained. The passing of this time is indicated by the appearance of the following message in the language on the display, the page of the State Operations:



At the end, the load is switched on Network and begins the shutdown sequence with engine cooling.

4. Presence of condition 'Main Voltage Range in' with the other commands starting all absent.

The same behavior of point 3.

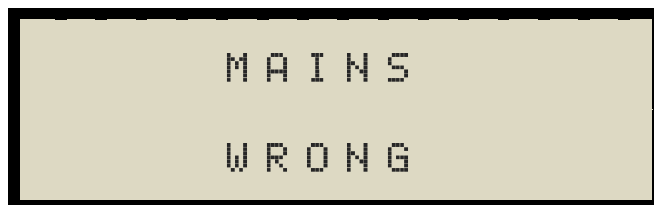
5. Absence of both conditions 'Presence Network' with other controls all absent.

And 'the normal condition of intervention of the group.



The Led it's off.

The starting sequence begins only after a time determined by the parameter [P23], during which the condition of 'Network Anomaly' must always be maintained. The passing of this time is indicated by the appearance of the following message in the language on the display, in Operational Status page:



At the end, begins the sequence of automatic starting of the engine.

6., 7. and 8. Execution 'weekly test'.

The execution of the 'Weekly test' is indicated by a flashing LED 8 .

Because it can be done, must be fulfilled the following conditions:

- The mode of operation must be automatic,
- There should be a failure,
- Must be absent condition "Inhibition automatic start",
- The parameter [P48] must be 1 so that it is active Downcounting weekly test,
- The countdown has reached zero hours, zero minutes and zero seconds.

There are various ways to set the parameter [P48] to 1 or zero:

- Taking in the page display, and press and hold the key , Or
- By adjusting parameters from the keyboard, or
- Remotely via MODBUS, setting to 1 or 0 in the register 303.

Apply the rules of access to the settings mentioned above (password, foreign key etc ...) to which we refer.

The countdown interval week (168 hours) since the [P48 = 1] and then continues cyclically until the parameter is reset to zero.

If upon expiration of de count is there any condition that does not allow the departure, the cycle is canceled and will be repeated the following week, and so on.

The conditions referred to in paragraphs 6, 7 and 8 show that the cycle is executed.

The Group is started and kept in motion for the time indicated by the parameter [P49]

During the tests as per points 6 and 7 ("Net Present"), the message display language in Operational Status page, is as follows:



PROGRAMMED TEST
IN PROGRESS...

If during the execution of the test involved the condition of "Network Fault" as in step 8, the load is transferred immediately to the Group without further delay. From that moment the management is like that 'standard' scheduled for the condition of "Network Fault".

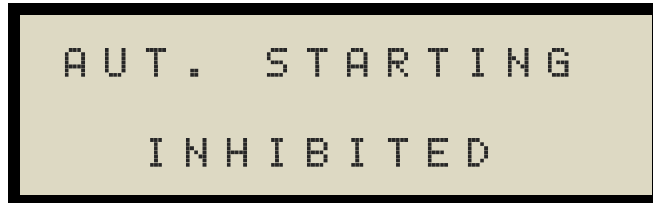
If this becomes the condition of "Net Present" and is handled before the end of the trial period, the load will be transferred to the Net and the cycle will continue until the end of the test, when it started a cycle of automatic stop.

8.5 Operating status "Test" (TEST)

Lets start the Group without transferring the load to the generator.

Order to be executed, need not be present nor a fault condition or the command Inhibition automatic start.

The presence of the command inhibition is indicated by a flashing LED 7 **AUTO**  and simultaneously to the idle state of the engine, the State Operating language will be:



If allowed to start automatically, as soon as you enter the mode 'TEST' with the selector (8 Led **TEST**  illuminated), is immediately executed Cycle Automatic start.

During the test is allowed to load switching from Network Group and vice-versa in only two cases:

- It has a start command in 'Mode SCR' transferring the load to the generator, and / or
- Is detected the condition of "Anomaly Network" and "Return Network"

The key difference with the "AUTO" mode is that in the "TEST" basically trying to keep the engine running without starting the cycle never stop automatically.

However, as already mentioned, both the command start inhibit automatic intervention of a fault condition are able to stop the test and turn off the engine with the cycle of automatic stop, even if the switch remains on 'TEST'.

8.6 Control of the motor

As already seen, the diesel engine can be started and stopped manually using the buttons on the front.

Automatically and in a 'test', the starting and stopping are executed with "Sequences" commands, which define the "Cycle Automatic Start" and "Stop Auto Cycle".

There are various parameters that must be developed in an optimal way to start and stop the engine correctly and safely.

8.6.1 *Common parameters when starting (manual and automatic)*

When you want to start the engine, one must determine how to have used the control outputs as a function of the type of engine or Group plant.

First you have to determine how you used the relay stop and determine the parameter [P16] whether it should have behavior "excitation" or "in excitement."

You also need to know if you need to run the cycle of glow plugs or not before giving the start impulse, and this must be set with the parameter [P08].

Because the engine can be considered "on the fly" and then among other promptly remove the command to the starter, there are various parameters that can be tuned properly provide this indication. Just one of them to intervene because the engine is considered "initiated" / "on the fly". These parameters are:

- [P12], Motor bikes Frequency Generator,
- [P14], Motor bikes Excitement Alternator
- [P20], Engine running by enabling voltage protections Generator
- [P42], Engine running from Tachometer

In addition to these parameters, contributes to the presence of the external signal "engine running" input Mot. Adv. Est.

8.6.2 *Parameters related to the goodwill automatic*

The cycle Automatic Start requires that developed additional parameters:

- [P09], Pulse duration to the starter,
- [P10], Pause between start pulses if the engine fails to start operating,
- [P11], Maximum number of start attempts
- [P13], ADVICE "Starting in progress" by opening the oil pressure switch, excludable.

8.6.3 *Automatic start cycle*

The messages that evolve when starting the cycle Automatic start, are substantially the same as when you start manually. There are obviously differences.

The first consists in the fact that the message of "Starting Suspended" can be generated by a malfunction of the oil pressure when using [P13 = 1]. In fact the control of the oil pressure to control the starting requires that it must be closed before a pulse to the starter motor. If this does not happen, and the condition is prolonged, will address the safety timer to stop the start-up sequence with its message of failure. See the chapter on safety timer for more details.

The second difference is that there is a limit to start attempts, beyond which is generated the failure of vehicle fails to start.

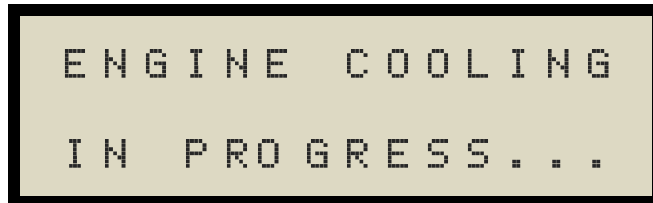
As for the manual start-up, each time it is detected the actual starting of the engine, a starter is counted in more into the counter starts.

8.6.4 Stop and Cycle Automatic shutdown

The cycle of automatic stop requires the development of some parameters.

It can be preceded by a "cooling cycle" when the load is disconnected from the generator before starting the shutdown sequence. The parameter in question is [P26].

When the "Cooling cycle" is the course, the Led  flashes and the display in Operational Status page is the message:



The actual duration of the cycle Automatic stop is determined by the [P17], during which the Led  is steady and the indication in the display language, in Operational Status page:



As mentioned, you can end the cycle stop by long pressing the key .

During the cycle, with the selector **AUTO**  under specific conditions of the restart of the group (eg. SCR, Power failure, weekly test ...), it will be interrupted and will be tried the automatic start.

Even the displacement of the selector **TEST**  has the same effect.

8.6.5 Safety timer

It's a timer which has the function to perform a cycle of automatic stop (in manual mode) when certain conditions too slow to occur and the Group is likely to remain "on hold" indefinitely.

At the end of this time, depending on the state of the Group and the mode of operation, can be stopped by the engine with or without an indication of failure.

The time is activated by the presence of the signal excitation alternator to one of the outputs (12 or 24V).

The length of time is determined by the [P62].

The time is stopped and reset when engaging both the condition of "Engine running" that the condition of "Enabling protections Generator", or when the signal disappears Excitement Alternator.

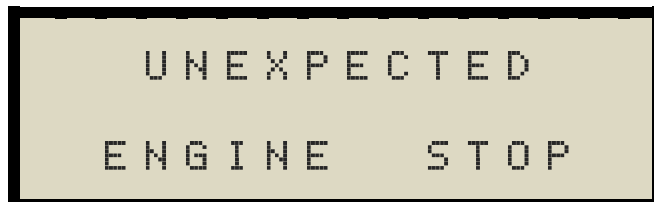
After the clock security, since the failure of "Enabling protections Generator" is always absent, what happens is summarized in the table:

Engine Running	State Selector	Automatic stop cycle	Breakdown
NO	Manual	YES	NO
YES	Manual	NO	NO
NO	Auto / Test	YES	YES (Start aut. Locked)
YES	Auto / Test	YES	YES (Voltage January Absent)

Note that in Manual mode, it is allowed to keep the engine without the ADVICE of the presence of voltage generator, for diagnostic purposes, and adjustment.

8.6.6 With the engine running ...

The condition of "Engine running" is stored internally, in order to intercept a possible arrest untimely, namely the loss of the signal of the motor in motion without the card he has commanded the arrest. In that case the anomaly, in language, in the display to page Alarm condition is as follows:



Immediately after the engine starts up, spends a time of 'inhibition' of the ADVICE of those anomalies that must be recognized only when the engine is running, such as the high engine temperature or low oil pressure. This time is adjustable with the parameter [P15]. During this time, the State Operations is as follows:



At the end, the message 'Motor Motorcycles' enshrines the actual start of the full control of the anomalies and engine alarms.

Since the engine is detected in motion, is counted operating time counter on the appropriate time and at the same time is scaled on the two Time elapsed maintenance which, when they reach the zero hour, minute and second, generate the appropriate warning maintenance request.

As already described, if by the time [P62] is not detected the activation of the generator protections, will address the safety timer in the manner described in the chapter.



Enabling the transfer of the load (manual or automatic, Led  GEN on) will allow the maneuver depending on the state in which you are operating (manual or automatic / test).

The project will result in a failure of the direct start of the cycle Automatic stop (in the manual), without cooling cycle, and with the activation of signs required.

8.7 Management automatic transfer of the load

We have already seen that the load can be moved manually with the use of the switch.

It is defined as "Network Fault" condition can initiate and / or transfer the load from the generator to the network.

This condition can be obtained in the following conditions:

Conditions for "Network Fault"		
Line Status Pres. Network / SCR	Programming line Pres. Network / SCR [P66]	Voltage measured Network
Not active	Indifferent	Minor [P21] or Greater than [P22]
Active	1 = Mode SCR	Indifferent

Conversely, we can define the conditions of the "Network Present", which is to transfer the load from the generator to the network:

Conditions for "Network Present"		
Line Status Pres. Network / SCR	Programming line Pres. Network / SCR [P66]	Voltage measured Network
Not active	Indifferent	Between [P21] and [P22]
Active	1 = Pres. Network	Indifferent

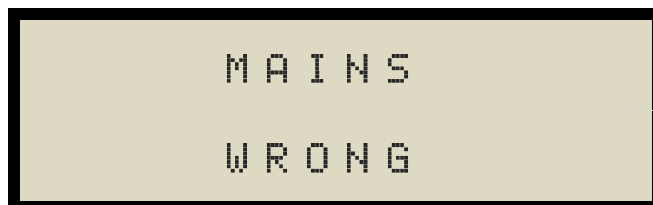
In automatic mode, when you see the condition "Disturbance Network", we distinguish two cases:

1. The Group is stopped
2. The Group is already in motion (for example during the weekly test)

In case 2 also includes the test mode, if the Group is already performing the test.

In the first case runs a delay time of "Intervention Group" [P23] before beginning the cycle Automatic start.

This part-time by the ADVICE of the condition of "Network Fault". During this time, the status display in the Operational Status page will be:



After the group has started and is in motion, we are in the second case.

As soon as you enable the protections generator is opened to load Network (NC Load network opens) and part time delay automatic transfer of the load to the generator [P19], during which the message in Operational Status page is:



In this condition both Led 17:19  are off.

At the end of this time the contact N.Ö. Load Generator is closed by transferring the load (LED 17  on).
To display the new condition set by the State Operations will:

GENSET
IS OPERATING

If it is a condition of "Net Present", the time is started for "Return Network" established by [P25] and the new condition of the State Operative becomes:

MAINS
PRESENT



If the condition of "net present" takes place before the Group steps into operational status, that is, by the time delay automatic transfer of the load to the generator [P19], the time for "Return Network" is not executed.

At the end, the load is taken off the generator and start the transfer time to the network, coinciding with the delay exchange Load Generator - Network [P24], with the new condition of State Operations:

MCB CLOSING
IN PROGRESS...

In this condition both Led 17:19  are off.

ENGINE COOLING
IN PROGRESS...

After the load is put on Network (Led 19  on) and starts the "Cooling cycle" engine, the duration established by the [P26], with the following message in Operational Status page:

During the entire time the Led  flashes. Only in MAN operating mode (Led  on), you can cancel it by allowing the engine to remain in motion or force it to end and start the cycle stop (see the relevant chapter). At the end, if the state of the Group is Auto and not on the weekly test, runs a cycle Automatic stop. If the mode is Test or Automatic with weekly test cycle in progress, the engine keeps running. See the respective chapters for details.



When the load is transferred to the generator, if it fails for any reason to enable load transfer (Led  turns off), the load is immediately released and transferred over the Net.
Later, if conditions permit, the reappearance of the authorization to transfer the load will repeat the entire operation of transfer to generator as described from step 2.

8.8 Alarms and Failures

The AGSC-15 runs:

- **ALARMS**, That is more or less critical conditions that NOT stop the engine and are only reported, and
- **FAILURES**, ie critical conditions such as to require, in addition to signaling, the possible detachment of the load from the generator, the intervention of the stopping of the engine and the interruption of the functionality of the group until manually reset.

Both alarms breakdowns are shown on the LED 16  and simultaneously with the closing of the NO contact Alarm (signaling).

Normally, the arrival of a new alarm or failure of the display page is automatically shifted to the "State of Alarm" showing the message language.

As mentioned in the chapter "Display Views", this automatic shift can be avoided if it is disruptive to other surveillance operations during commissioning or maintenance. Just press and hold the key  in all operating conditions when the page is displayed alarm condition, to activate or deactivate the automatic recall. All details are described in the chapter "Display Views".

The diversity of behavior and management between failure and alarm is described below.

8.8.1 Features Alarms

The presence of only one alarm condition is signaled by the fixed Led 16 .
With multiple conditions simultaneously, the LED is blinking.

Conditions ALARM fact are handled multiple, ie more conditions can be displayed simultaneously on the display, the corresponding language message on the page display of alarm condition.

To see them all, just bring on the page of the State of Alarm and press the button briefly in succession .
They appear one after another cyclically.

When an alarm condition is added, it will be displayed first, and runs in the recall page Condition Alarm (if enabled).

When an alarm condition is exhausted, it is removed automatically and the call is still performed in page Alarm condition (if enabled).

8.8.2 Features of Failures

A condition of FAILURE is 'stored' intervention and become 'exclusive', that is the only one to be shown on the display, covering and canceling any existing alarm conditions.

The presence of the condition of failure is signaled by the fixed Led 16  and the corresponding language message on the page display of alarm condition.

If there are simultaneously more conditions that can set the condition of failure, it is only for the one stored before it is considered.

Following a failure of the load is always disconnected from the generator and triggered a cycle of stopping the motor without cooling cycle.

The fault condition must be removed by pressing down the key  or remotely via Modbus (register 256.5 = 1).

If the fault condition remains after reset, means that one or more causes are still present and must be removed.

Only when all potential causes of failure have been removed, the reset will remove the fault.

8.8.3 Summary of the differences in behavior between ALARMS and FAULTS

Signaling or Command	ALARM	BLOCK
Ability to detect another anomaly	SI	NO
Led 16 lit	fixed with 1 alarm, > + 1 = flashing	fixed
Inhibition automatic operation	NO	SI
Remote signaling 'FAILURE'	SI	
Forcing switching Generator -> Network	NO	SI
Sequence engine stop	NO	SI
Automatic reset when the fault disappears	SI	NO

Enabling the intervention of some alarms and failures is subject to the ADVICE of certain conditions, such as enabling the engine running or ADVICE from tension generator generator. Will be summarized in a separate table below.

8.8.4 Summary Table of Alarms and Failures

Message number Modbus register 809	Description	Requires authorization from the engine running	Need enabling protections Generator	Unloaded at Generator	Performs cycle automatic shutdown
2	Low engine oil pressure	•	-	•	•
3	High engine temperature	•	-	•	•
4	Reserve fuel	-	-	-	-
5	Spent fuel	-	-	•	•
6	Tachometer from overspeed or Frequency Generator	-	-	•	•
7	Emergency stop	-	-	•	•
8	Failure to start the engine	-	-	-	•
9	Failure automatic engine stop	-	-	(1)	-
10	Unexpected shutdown of the engine	•	-	•	•
11	Low Voltage Generator	-	•	•	•
12	High Voltage Generator	-	•	•	•
13	Generator voltage asymmetry	-	•	•	•
14	Low-frequency generator	-	•	•	•
15	High Frequency Generator	-	•	•	•
16	Maximum current generator	-	-	•	•
17	Overload Generator (1 Liv.)	-	•	-	-
18	Overload Generator (2 ° Liv.)	-	•	•	•
19	Reverse power generator	-	•	•	•
20	Low battery voltage	-	-	-	-
21	High voltage battery	-	-	-	-
22	Failure available 1	-	-	•	•
23	Failure available 2	-	-	•	•
24	Request maintenance 1	-	-	-	-
25	Request maintenance 2	-	-	-	-
26	Automatic start blocked	-	-	-	•
27	Absence tensions Generator	-	-	(2)	•
28	Alternator failure (Breaking Belt)	•	-	•	•

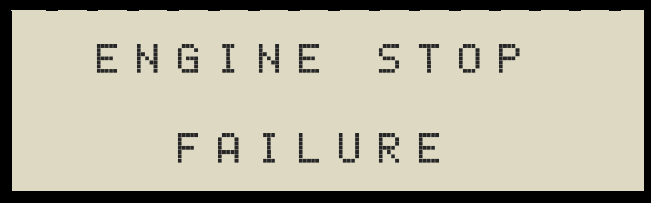
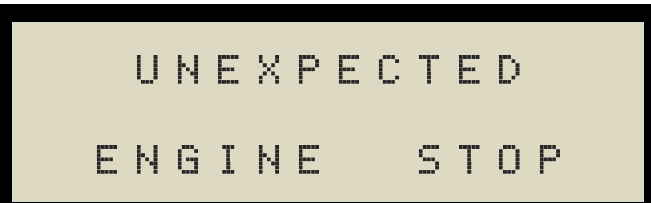
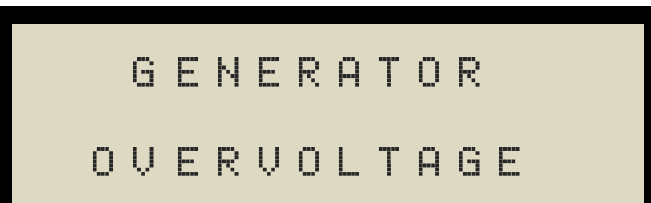
Notes:

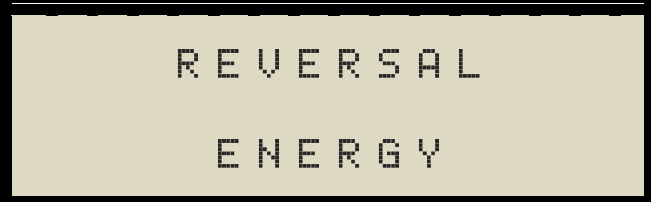
(1): The load has already been transferred to the Net from Cycle Automatic stop just ran.

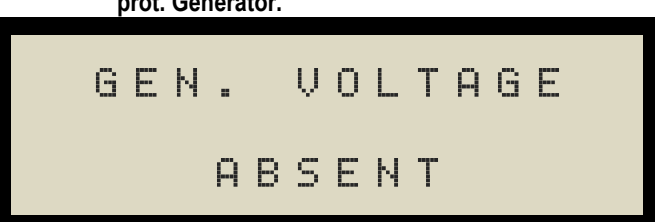
(2): The load has already been transferred to the network by the loss of the authorization to transfer the load on the generator.

8.8.5 List FAILURES available

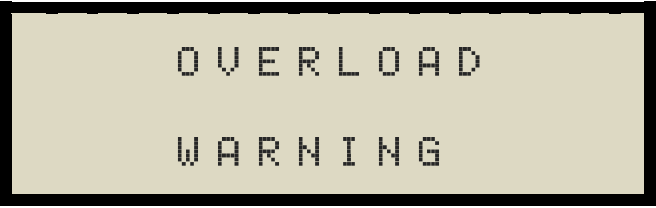
Low engine oil pressure	From: Ing. Pressure Oil closed at negative
Requires authorization from the engine running: SI Need enabling protections Generator: NO Message number Modbus register 809: 2 Intervenes after the time [P55] by the ADVICE of the condition, if it persists.	
High engine temperature	From: Ing. Temp. Motor closed in negative
Requires authorization from the engine running: SI Need enabling protections Generator: NO Message number Modbus register 809: 3 Intervenes after the time [P53] by the ADVICE of the condition, if it persists.	
Spent fuel	From: Timed P41 from alarm reserve fuel (Ing. Reserve Fuel closed to ground)
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 5 Excluded permanently with [P41 = 0]. Intervenes when the time [P41], if the alarm condition 'Reserve Fuel' is always present.	
Tachometer from overspeed or Frequency Generator	From: Giri> [P43] or frequency January> [P27]
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 6 Permanently excluded from Giri with [P43 = 0]. Permanently excluded from Freq. with [P27 = 0]. The surgery is delayed by [P44].	
Emergency stop	From: Ing. Button Mushroom open
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 7 Usually associated to the contact N.C. the 'emergency stop'. The operation is almost instantaneous.	
Failure to start the engine	From: Attempts to overcome [P11] in automatic start
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 8 The intervention is instantaneous after the break last pulse.	

Failure automatic engine stop	From: Engine running after the cycle Automatic stop
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 9 The surgery immediately upon expiration of the cycle of automatic stop after [P17] seconds after the output relay is controlled shutdown, if it remains the condition of the engine is running.	
Unexpected shutdown of the engine	From: Loss signal engine running without stop command.
Requires authorization from the engine running: SI Need enabling protections Generator: NO Message number Modbus register 809: 10 The surgery is delayed by half of [P55] seconds from the ADVICE of the condition, if it persists.	
Low Voltage Generator	From: Minor tensions generator <[P28]
Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 11 Excluded permanently with [P28 = 0]. Intervenes after the time [P33] by the ADVICE of the condition, if it persists.	
High Voltage Generator	From: Increased tensions generator > [P29]
Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 12 Excluded permanently with [P29 = 0]. Intervenes after the time [P33] by the ADVICE of the condition, if it persists.	
Generator voltage asymmetry (Just so trriface)	From: Voltage difference between the phases > [P30].
Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 13 Excluded permanently with [P30 = 0]. Intervenes after the time [P33] by the ADVICE of the condition, if it persists.	
Low-frequency generator	From: Value Frequency Generator <[P31].
Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 14 Excluded permanently with [P31 = 0]. Intervenes after the time [P34] by the ADVICE of the condition, if it persists.	

High Frequency Generator Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 15 Excluded permanently with [P32 = 0]. Intervenes after the time [P34] by the ADVICE of the condition, if it persists.	From: Value Frequency Generator> [P32]. 
Maximum current generator Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 16 The intervention is delayed 4/2 fixed by the ADVICE and occurs when the signal applied to the measurement of a generator current exceeds the limit its value in the display is flashing. Failure can not be excluded.	From: Overflow measurement of a Stream Generator 
Overload Generator (Level 2) Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 18 Excluded permanently with [P36 = 0]. Intervenes after the time [P38] by the ADVICE of the condition, if it persists.	From: Measure apparent power generator ≥ [P36] 
Reverse power generator Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 19 Excluded permanently with [P37 = 0]. Intervenes after the time [P38] by the ADVICE of the condition, if it persists.	From: Measure negative active power ≥ [P37]. 
Failure available 1 Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 22 Intervenes after the time [P56] by the ADVICE of the condition, if it persists.	From: Ing. Available 1 closed in negative 
Failure available 2 Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 23 Intervenes after the time [P57] by the ADVICE of the condition, if it persists.	From: Ing. Available 2 closed in negative 

Automatic start blocked	From: Safety timer in AUTO / TEST> [P62] with Exc. Alt. Upload Batt. Active and engine off
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 26 Only in Auto or Test. The surgery is delayed by [P62] seconds after the release is controlled Etc. Alt, if it remains without the engine running.	
Absence tensions Generator	From: Safety timer in AUTO / TEST> [P62] with Exc. Alt. Upload Batt. Active, engine running without enable prot. Generator.
Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 27 Only in Auto or Test. The surgery is delayed by [P62] seconds after the release is controlled Etc. Alt, if still no enabling protections generator engine is running.	
Alternator failure (breakage Belt)	From: Etc. loss. Alt. Upload Batt engine running
Requires authorization from the engine running: SI Need enabling protections Generator: NO Message number Modbus register 809: 28 Excluded permanently with [P14 = 0]. Intervenes after time 2/2 ADVICE from the loss of the condition of "Excitement Alternator", if it persists.	

8.8.6 List ALARMS available

Reserve fuel Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 4 Intervenes after the time [P59] by the ADVICE of the condition, if it persists.	From: Ing. Fuel Reserve 
Overload Generator (Level 1) Requires authorization from the engine running: NO Need enabling protections Generator: SI Message number Modbus register 809: 17 Excluded permanently with [P35 = 0]. Intervenes after the time [P38] by the ADVICE of the condition, if it persists.	From: Measure apparent power generator between [P35] and [P36] 
Low battery voltage Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 20 Excluded permanently with [P39 = 0]. The surgery is delayed by 30 seconds from the ADVICE of the condition, if it persists.	From: Measure battery voltage <[P39] 
High voltage battery Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 21 Excluded permanently with [P40 = 0]. The surgery is delayed by 30 seconds from the ADVICE of the condition, if it persists.	From: Measure battery voltage > [P40] 
Request maintenance 1 Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 24 Occurs when the count of the hours, minutes and seconds maintenance 1 is zero. The intervention is instant after time. The time de-counts only the engine is running. The alarm is permanent until you set a new time > 0.	From: Time expired maintenance 1 (0 hours, 0 min., 0 sec.) 
Request maintenance 2 Requires authorization from the engine running: NO Need enabling protections Generator: NO Message number Modbus register 809: 25 Occurs when the count of the hours, minutes and seconds maintenance 1 is zero. The intervention is instant after time. The time de-counts only the engine is running. The alarm is permanent until you set a new time > 0.	From: Maintenance Time expired 2 (0 hours, 0 min., 0 sec.) 

8.9 Serial communications

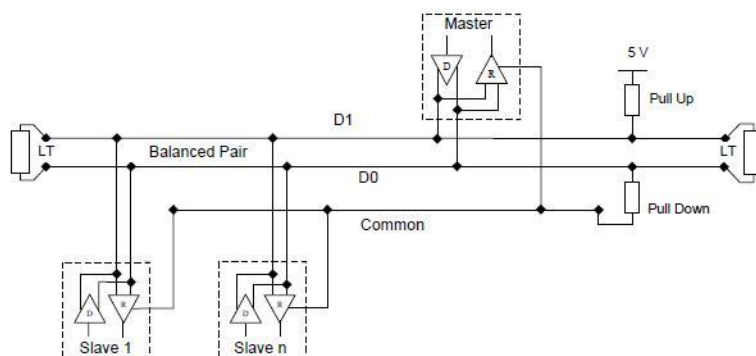
8.9.1 Overview & Specifications Connection

The AGSC-15 has an isolated RS485 interface to 3 kV for high-speed communications, selectable from 9600 to 115,200 bps. The interface allows you to connect up to 32 devices to each other.

There are various scenarios for connecting the RS485 network.

If the instrument is connected to an existing network and it will NOT be the last in the chain, simply connect terminals Rs485 "A", Rs485 "B" and the mass of the screen (Common), if present, to terminal Rs485 Gnd.

In general, always refer to the "MODBUS over serial line specification and implementation guides V1.02", which must be observed especially for the 2-wire RS485 connection.



The "Master", usually a PC, must be connected to the network with a dedicated RS485 converter.

If the AGSC-15 (Slave) is alone or is on a network of Sun AGSC-15, the converter RS485 System Master MUST have resistors fail-safe built (in the diagram above as "Pull Up" and " Pull Down ").

It's important that the network is "finished" with the resistance LT whose typical value is 120Ω.

Bytronic has prepared its own converter and cable adapter already meet the specifications above.

This is the converter CNV-M-BY4750 and cable CV- BY4750-485.500. See the chapter "Options and Accessories".



8.9.2 Communication parameters

Every software that will be used to communicate with the AGSC-15, will be configured this way:

Parameter	Setting
Baud rate	As parameter [P51] instrument
Equality	No (N)
Data bits	8
Stop bits	1
Flow Control	None

In addition, the address of the card to be used in the communication software is that indicated by the [P50].



Do not set the same values of [P50] on the cards that communicate on the same RS485 network. The simultaneous responses of the cards with the same address cause communication errors on the entire network.

8.9.3 Communication Protocols

Each communication protocol that covers the RS485 port of the tool is of type 'slave' and the tool can be inserted only in infrastructure that support the master / slave communication compatible.

Established the desired communication speed, and the network address of the instrument, it is able to understand commands in 4 formats simultaneously and consequently to respond in an appropriate manner without there being any need of special selections.

Supported protocols are 4:

1. **ASCII custom**, Impartibili series of commands from the terminal (eg. HYPERTERMINAL) in order to modify the operating parameters of the instrument or to configure it completely in 'recipe' by sending a text file containing the parameter values that you want to edit,
2. **Modbus RTU**, Binary suitable for normal communication infrastructure RS485 standard,
3. **Modbus ASCII**, Usually used to communicate via modem (and RS485 converter in this case),
4. **Bootloader mode** in special format that requires special software on PC (for now only for Windows OS TM) for updating firmware.

The change in mainstream operating parameters of the instrument through the serial port is possible.

However, not all are accessible in this mode, for safety reasons.

For example you can not change by remote communication parameters such as the number of network node or the communication speed of the instrument, to avoid having unwanted ambiguity on the network which then would create problems to the system in general.

Each protocol will be explained in detail in the respective chapter.

8.9.4 Custom ASCII protocol - Reading and changing operating parameters

8.9.4.1 Generality

The main use of this way of communicating, is to quickly transfer a 'recipe' of parameters to configure the card quickly, or a group of cards in the same way, without using dedicated programs on personal computers.

Just because a 'simple' terminal emulation program compatible with any operating system, configured to communicate as "Configuration Parameters".

In addition to these parameters, must be set:

- Echo typed characters locally,
- Minimum interval between characters = 25 msec
- Minimum interval line feed = 50 msec
- Adding in receipt of a line feed to each carriage return it receives.

In this mode, in addition to using the data transfer mode "recipe", one can type manually one by one by changing the desired parameters.

8.9.4.2 Preparation

- Disconnect the AGSC-15 from the RS485 communications network and connect it exclusively (individually) to the terminal (PC) with the appropriate RS485 converter.



The parameter values that will be accepted will be IMMEDIATELY operational and immediately alter the behavior of AGSC-15. For security reasons, if you can not remove the card from the group, leaving the system in a safe if possible, with the switch in the LOCK mode to prevent erroneous values assigned to the parameters cause unexpected behavior or dangerous.

- The AGSC-15 must not be in "Settings parameters from keyboard", otherwise it will not accept any change.
- To speed up and simplify procedures, if a password is set it is recommended to remove it ([P52 = 0]). However, in a more complex way you can still access the programming terminal, admitted knowing the password.
- Prepare the terminal program by configuring as described above, activating it for communication.

8.9.4.3 Command Format ASCII Custom

The commands for changing the parameters have a very specific format in order to be recognized and enforced by the AGSC-15. The format is as follows:

NNN: RRR: VVVV

NNN = Modbus node number ([P50]) [:].

- It should be always written with a fixed length, 3 decimal places, followed by a colon.

RRR = Number of the parameter to be changed [:].

- It should be always written with a fixed length, 3 decimal places, followed by a colon.
- The number of the parameter is described in the sections parameters and standard analog modules, first on the left.

VVVV = Parameter value [enter].

- It should be always written with a fixed length, 5 decimal digits, followed by a carriage return (enter).
- The value of the parameters that provides the comma should be multiplied by 10 or 100 until you get the integer value (eg. 231.0 becomes 02310 and 02000 becomes 20:00)
- The adjustment range is specified allowable for each parameter in the parameters, and is identical regardless of the mode of regulation.
- If you set a value outside the accepted limits, it will simply be ignored leaving the parameter to the current value.
- Negative numbers, if allowed, must be provided with the decimal value in 2's complement 16-bit.
To speed up the calculation, may aid a calculator with functions hexadecimal. For example, if we set -100, we write it in decimal normally in the calculator, then press HEX to convert it to hexadecimal. You have to copy in hexadecimal format, only the first four digits to the right and then press DEC. The number that appears to be written always 5 digits in VVVVV.
In the specific case: -100 → Hex → FFFFFFFF9C. Delete and type FF9C → Dec = 65436, which is the value to be placed on VVVVV.

To READ the entire list of editable parameters only need to provide the appropriate code, manually followed by "Enter":

NNN: 000: 00000

To SAVE the new parameters must provide the appropriate code, manually followed by "Enter":

NNN: 000: 00001

Without the code storage, turn off the board changes are lost.

The storage code can be entered manually at the end of the changes, or after sending the 'Recipe', or be added to the bottom of the file 'Recipe', followed by "Enter", so that after being transmitted, the storing automatic operation.



Following modification of one or more parameters using this method, the AGSC-15 DOES NOT respond, in agreement with the other protocols. The only way to test whether the parameters are affected by this command is to read the whole list and check that those concerned have taken the desired value. To ensure that they were in fact stored, repeat the operation after power cycled the board.

8.9.4.4 Creating a 'Recipe' basis with the read command

Write a recipe from scratch using any text editor "pure", it could be a long operation and not too simple.

We must therefore comply with certain rules:

- The Editor program must produce ONLY ASCII text files, without any formatting or special character. By way of example, the program "Notepad TM" for Windows is fine.
- You have to respect STRICTLY syntax, without including alphabetic characters, punctuation extra, notes etc. The only characters allowed are: Numbers, colon where expected and carriage returns to separate lines.
- And 'forbidden to add the recipe code reading, which causes the prompt issuance of the list being sent recipe resulting conflict communication.

The degrees of flexibility are:

- It is not necessary (although strongly recommended) to send the complete list of parameters. Just send only those that are to be changed and the code of Storing closing. Will be changed only the changed parameters and the others remain unchanged.
- It is not important that the list of parameters sent is ordered. There is no obligation to 'sequence', even if an ordered list promotes reading and control.

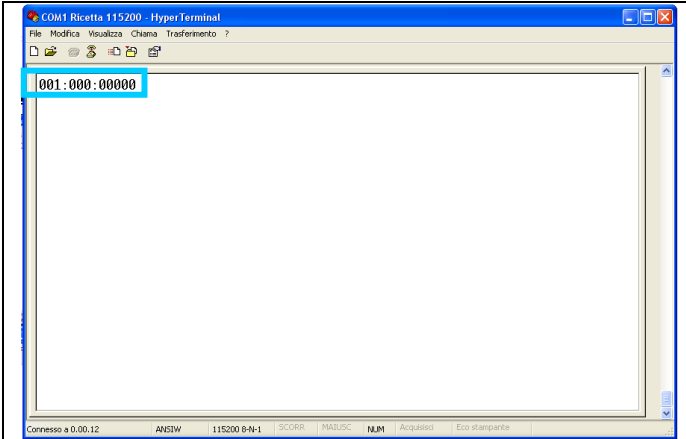
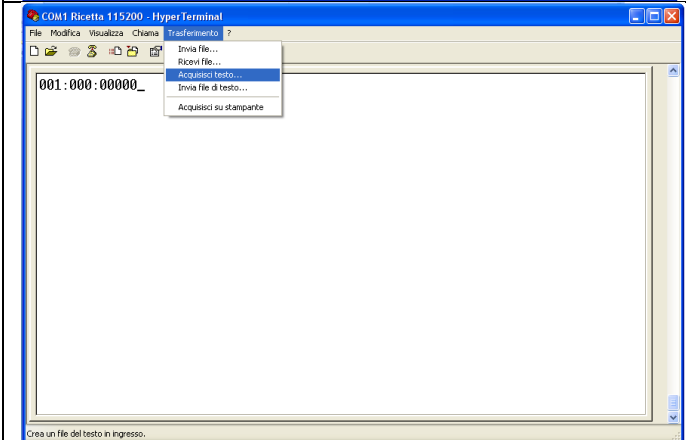
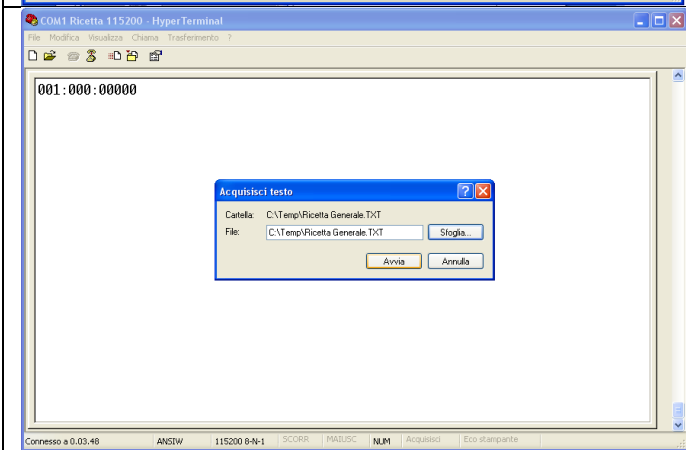
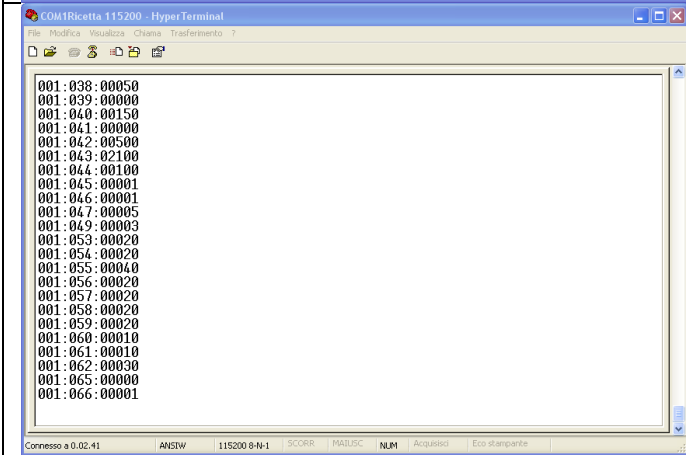
The advantages of creating a recipe "exporting" in a text file, the response of a read command to the card are multiple:

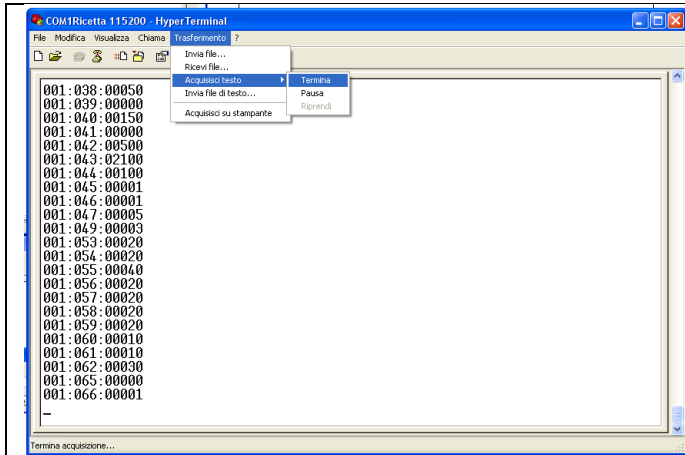
- Is already produced the list 'selective' parameter, excluding from the parameters can not be modified.
- The parameters that provide the commas are already properly multiplied
- The parameter list is sorted
- The list is already syntactically correct

With programs Terminal without export functions or other Operating Systems, the aim is to 'Copy' and 'Paste' from the Terminal window the entire list in a text file, not including the read command, adding hand at the bottom of the storage code and the code "Enter." The resulting file will lend itself to being modified and sent cards to program, through how to send text files present in all programs of the Terminal.

Following example, using the terminal program HyperTerminal TM and Notepad TM for Windows TM.

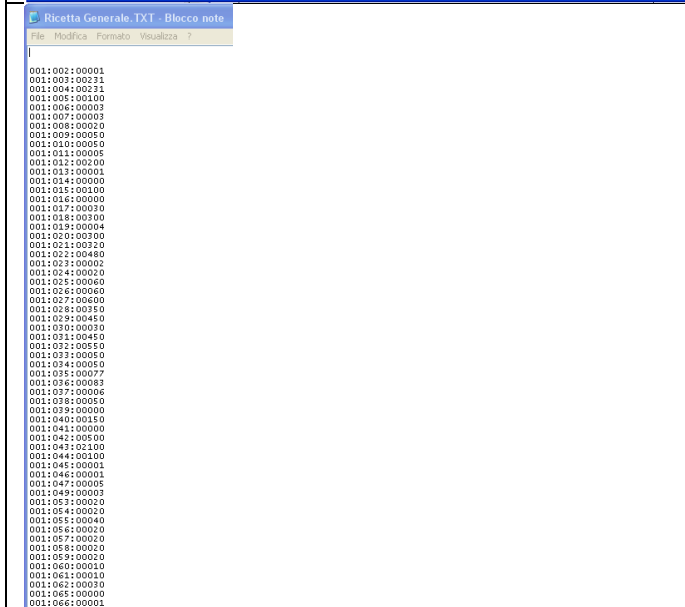
To obtain a "Recipe" basic you should reset the factory parameters before proceeding.

	Step 1: retrieve the list of all device parameters with their values and create a recipe 'general'. We set the read command parameters (for example) to node number 001, WITHOUT PRESS ENTER.
	Select "Capture Text"
	Assign a name and location for the file that will be saved and click start. When the window closes, press ENTER key.
	Very quickly is transmitted from the instrument to the first node of the list only modifiable parameters (read and written). Those who are lacking in list are reserved or write-only. Refer to the sections of the programming of parameters in this manual for all references.  ATTENTION: This list is not yet saved. If you do not get any response, pause and check: power adapter, connections and polarity RS485 converter, program configuration terminal (parameters, number of communication port ...), enabling the communication port by the program of Terminal ... Then try to read the parameters until you have an answer before returning here.



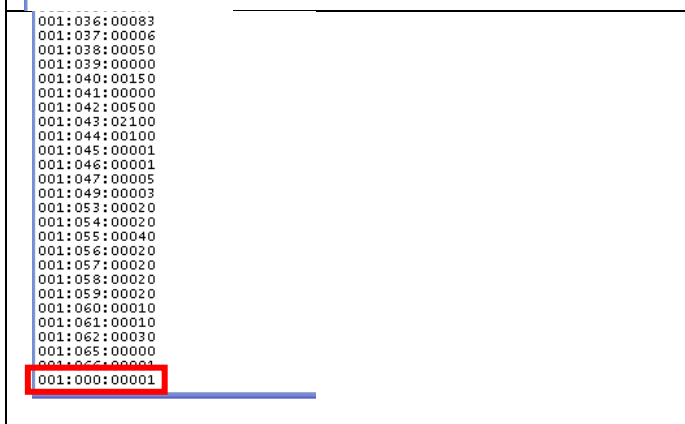
To save the list in the file chosen, we have to stop capturing, click 'Finish'.

At this point the file with the parameter list is ready for archiving or editing, copying etc ...



The list is quite long and contains ALL the modifiable parameters remotely. It can be kept as is to completely reconfigure an instrument of node 1, sending it as it is MA remembering that if you want this 'recipe' store permanently all parameters must be modified by adding HAND at the bottom of the list command of permanent storage.

Note:
the two blank lines at the top of the list have no effect and can be eliminated if its interesting compact the file.



Adding the save command for the node 1, followed by "Enter."

Save the file that now is a real recipe.

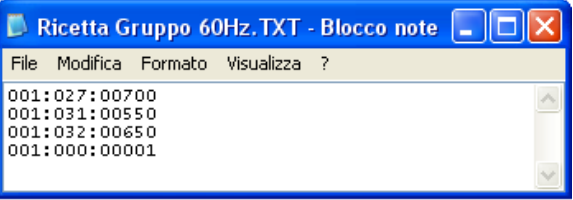
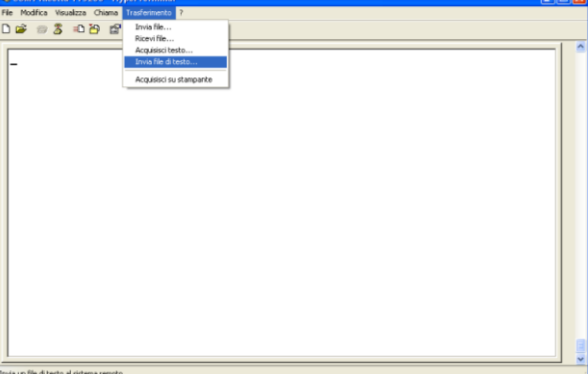
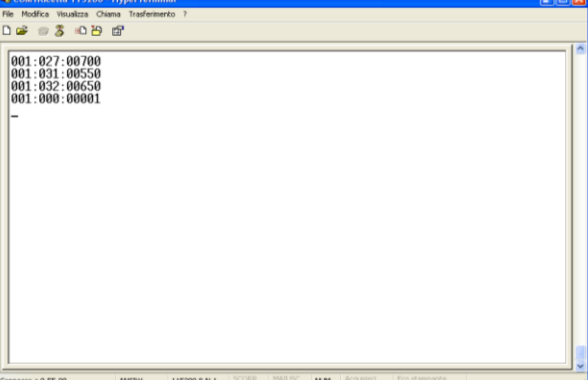
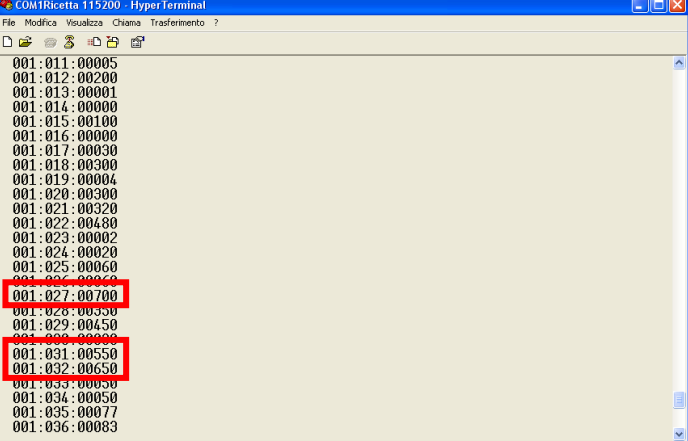
8.9.4.5 Selective editing of parameters so 'Recipe'

The "recipe" obtained before, lends itself to be manipulated entirely or partially.

If it is a 'Basic Recipe', that contains all the factory parameters of the card, it is convenient to use it in full, only changing the values of the parameters to be changed, resulting in a "Recipe complete." In this way you get a configuration "certain" of all parameters.

If you should only proceed to the modification of some parameters while maintaining the configuration that may already be customized before, you can create a "Recipe selective" that contains ONLY the parameters to be changed and the code storage in closing.

As follows:

	Now manipulate the recipe, creating a new one so that changes only the parameters 027 = 00700, 00550 and 031 = 032 = 00650, for example, to set up a group to 60Hz. Remember that if the numbers have the comma, the number should be multiplied by 10 or 100 until you get the whole number. (Eg. 60.0 = 00600)
	To send just select send text file.  WARNING: Before you send it, make sure it is not already running one of the programming parameters from the keypad. In this case no parameters will be changed.
	Appear all the characters gradually transferred.
	To test whether the parameters have been changed, ask for the list. Backward scrolling the buffer, you may find that the parameters were actually modified. To check if they were stored, turn off the instrument for a few seconds, then on again and re-read the list.

8.9.4.6 Manual changes of parameters so ASCII Custom

The logic is the same as described for mode 'Recipe', only that the lines must be typed character by character (address, colon, parameter number, colon, value and Enter)

In case of wrong typing NOT use the correct buttons as 'Backspace' or 'Delete' because they are managed by the board, but rather cancel the whole line.

To cancel the line just generate a syntax error (eg lengthen the line, providing unexpected characters, etc ..) or just type 'Enter' before typing all the characters required to ensure that the instrument cancels all characters typed on the line.

To be sure to start with the first character after an error, prefix from 'Enter' (several times) the first character.

8.9.5 MODBUS - JBUS way MODBUS RTU and ASCII**8.9.5.1 Generality**

The system communicates using the MODBUS Slave protocol, managed in RTU mode (and JBUS) or MODBUS ASCII. The recognition of the protocol ASCII or RTU is automatic: the instrument responds with the same protocol in demand.

Are implemented only 3 Function codes:

Function	Command
READING	0x03 (Read Holding Registers)
	0x04 (Read Input Registers)
WRITING	0x06 (Write Single Register)

The 2 Function Codes 3:04 are perfectly overlapping, ie act identically on all registers accessible for reading.

All Function Codes implemented are fully supported by the relative error codes and exception codes.

The register addresses described are related to the standard MODBUS RTU. Remain valid for JBUS and MODBUS ASCII.
Refer to specific MODBUS for details.

8.9.5.2 Basic structure of the registers

The architecture and identification of records is very different from the classical "device oriented" than the standard MODBUS expected. The reasons for this can be summed up in a better and more streamlined management of communication, that given the relative simplicity of the system here is suitable.

The records were identified and collected in functionally homogeneous groups:

Type of group	Description
WO (Write Only)	The records of the groups defined WO can only write with the [06] but not read.
RW (Read / Write)	The records of the groups defined RW can both read and write [03] = [04] / [06].
RO (Read Only)	The records of the defined groups RO can only be read [03] = [04].

This allows to predefine a 'mapping' groups, chosen that the maximum size of each group is to 255/256 logs and, therefore, that the maximum number of groups is 256.

Among the three types groups, we identify the four schools of series (called 'Base') typical application

Map of the groups Base	Range addresses	
	HEX	DECIMAL
Registers WO Base	0x001 - 0x0FF	001-255
Registers R / W Base - Parameters	0x100 - 0x1FF	256-511
Registers RO Base - Electric	0x200 - 0x2FF	512-767
Registers RO Base - Group	0x300 - 0x3FF	768 - 1023

Depending on the model or version of the card may also be present one or more groups "extended", with the same ratings.

8.9.5.3 Reading MODBUS registers in binary (RTU)

The interview takes place in binary bytes.

Read function RTU			
Request frame rail		Response frame rail	
Field	Range	Field	Description
Node	1-255	Node	The same request
Function	3 - 4	Function	The same request
The top address	1-65535 (0-0xFFFF)	Number Bytes	BYTES length of the data block returned. Worth double of the required logs.
Lower part address			
The top N ° reg. required	Always 0		
Lower part N ° reg. required	1-125 (1-0x7D)		
The lower part of CRC	Calculated between 0 and 65535 (0-0xFFFF)	Bytes Required (2 x Register)	
The top CRC		The lower part of CRC	Calculated between 0 and 65535 (0-0xFFFF)
		The top CRC	65535 (0-0xFFFF)
TOTAL: 8 Bytes		TOTAL: 5 + N. Bytes Bytes Required	

The associated response in case of error is the following:

Error framing read function RTU		
Field	Range	Description
Node	The same request	
Function	The same request + 128 (0x80)	If demand = 3, 131 = function (83 Hex) otherwise if = 4, function = 132 (84 Hex)
Exception Code	1 - 4	1 = Not supported 2 = Address records or invalid range 3 = Quantity required logs invalid 4 = Function unavailable / busy
The lower part of CRC	Calculated between 0 and 65535 (0-0xFFFF)	
The top CRC		
TOTAL: 5 Bytes		

8.9.5.4 Reading logs in ASCII mode MODBUS

The interview takes place in 7-bit ASCII characters, and couples are the HEX value of the data to send or receive.

Both in transmission and reception, the telegrams always open with ":" (colon) and close again with CR (Carriage Return), ie binary bytes = 13 and LF (Line Feed) that is worth 10 in binary.

Unlike the RTU mode, the CRC calculation is replaced by the LRC (Longitudinal Redundancy Check).

Read function ASCII			
Request frame ASCII-HEX		Response frame ASCII-HEX	
Field	Range	Field	Description
Start Transmission	":"	Start Transmission	The same request
Node	01 - FF	Node	The same request
Function	03-04	Function	The same request
The top address	0001 - FFFF	Number Bytes	BYTES length of the data block returned (02 - FA)
Lower part address			
The top N ° reg. required	00 (More)	Bytes Required in ASCII-HEX (2 x Byte)	
Lower part N ° reg. required	01 -7D		
LRC	Calculated between 00 and FF	LRC	Calculated between 00 and FF
Carriage Return	13 bin (1 character)	Carriage Return	13 bin (1 character)
Line Feed	10 bin (1 character)	Line Feed	10 bin (1 character)
TOTAL: 17 Characters		TOTAL: 11 + 2 for each byte characters required	

The associated response in case of error is the following:

Error framing read function ASCII		
Field	Range	Description
Start Transmission	":"	
Node	The same request	
Function	HEX-ASCII value of the requested function + 0x80	If demand = 03, 83 = function otherwise if = 04, 84 = function
Exception Code	01-04	01 = Not supported 02 = Address records or invalid range 03 = Quantity required logs invalid 04 = Function unavailable / busy
LRC	Calculated between 00 and FF	
Carriage Return	13 bin (1 character)	
Line Feed	10 bin (1 character)	
TOTAL: 11 Characters		

8.9.5.5 Writing records in binary (RTU)

The interview takes place in binary bytes.

Write function RTU			
Request frame rail		Response frame rail	
Field	Range	Field	Description
Node	1-255	Node	The same as the request frame.
Function	6	Function	
The top address	1-65535 (1-0xFFFF)	The top address	
Lower part address		Lower part address	
The upper part of the figure	0 - 65535 (0-0xFFFF)	The upper part of the figure	
Lower part of the figure		Lower part of the figure	
The lower part of CRC	Calculated between 0 and 65535 (0-0xFFFF)	The lower part of CRC	
The top CRC		The top CRC	
TOTAL: 8 Bytes		TOTAL: 8 Bytes	

The response in case of error is the following:

Error framing write function RTU		
Field	Range	Description
Node	The same request	Request = 6, 134 = function (86 Hex)
Function	The same request + 128 (0x80)	
Exception Code	1 - 4	1 = Not supported 2 = register address is not valid 3 = Invalid value 4 = Function unavailable / busy
The lower part of CRC	Calculated between 0 and 65535 (0-0xFFFF)	
The top CRC		
TOTAL: 5 Bytes		

8.9.5.6 Writing records in ASCII mode

Same as before about reading in ASCII mode

Write function ASCII			
Request frame ASCII-HEX		Response frame ASCII-HEX	
Field	Range	Field	Description
Start Transmission	":"	Start Transmission	The same as the request frame.
Node	01 - FF	Node	
Function	06	Function	
The top address	0001 - FFFF	The top address	
Lower part address		Lower part address	
The upper part of the figure	0000 - FFFF	The upper part of the figure	
Lower part of the figure		Lower part of the figure	
LRC	Calculated between 00 and FF	LRC	
Carriage Return	13 bin (1 character)	Carriage Return	
Line Feed	10 bin (1 character)	Line Feed	
TOTAL: 17 Characters		TOTAL: 17 Characters	

The associated response in case of error is the following:

Error framing write function ASCII		
Field	Range	Description
Start Transmission	":"	
Node	The same request	
Function	HEX-ASCII value of the requested function + 0x80	Request = 06, 86 = function
Exception Code	01-04	01 = Not supported 02 = Address records or invalid range 03 = Quantity required logs invalid 04 = Function unavailable / busy
LRC	Calculated between 00 and FF	
Carriage Return	13 bin (1 character)	
Line Feed	10 bin (1 character)	
TOTAL: 11 Characters		

8.9.5.7 List of registers available - Legend

ADDRESS = Register number modbus [.Bit register]. When the log contains a numeric value, its address is FULL. When it contains the boolean value of its specific bits (flags), the bit must be identified by the dot followed by its positional value 0-15 from the right. (Eg. 258.10 indicates the eleventh bits of the register 258).
TYPE = BBBB - BB - Bb -bb. Identifier management composite log (32bit), 16bit integer register or semi-register (8 bits). With BBBB to indicate a value to be obtained from two consecutive registers, whose upper part is the address indicated, followed immediately at + 1 from the low. With BB you want to specify a value to be obtained from the entire register (16bit). With Bb to indicate a 8-bit value contained in the top half of the register. With bb instead an 8-bit value contained in the lower half of the register.
FORMAT = DEC - DECS - BOL - HEX - BCD. The binary value 32, 16 or 8 bits must be converted into: DEC = Value unsigned decimal value DECS = signed decimal BOL = True or False value of the bit specified in the address HEX = value BCD = A character 0-9 every 4 bits
AUTHORIZATIONS = RO - RW - WO remote authorizationhs. With RO is not allowed to change the value of the register. With RW allowed to change the value of the registry, using the command to write. With WO permitted to write the value of the registry, using the command to write, but not read it (send mode commands - the physical register does not exist).
FACTOR = D - C - M -DM - N decimal separator position. It only makes sense in formats Decimal (DEC or DECS). With N, the decimal place remains whole. With D, the value is to be understood multiplied by 0.1. With C, the value is to be understood multiplied by 0.01. With M, the value is to be understood multiplied by 0.001. With DM, the value is to be understood multiplied by 0.0001.

8.9.5.8 List of registers available - WO BASIC, 1-255

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
1	BB	PASSWORD	DEC		WO	N

8.9.5.9 List of registers available - RW BASIC, 256-511

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
256.0	BB	SYS CMD: 1 = RESET (Power On)	BOL		RW	N
256.1	BB	SYS CMD: 1 = Default parameters [P02]	BOL		RW	N
256.2	BB	SYS CMD: 1 = Reset Energy produced	BOL		RW	N
256.3	BB	SYS CMD: 1 = Reset Energy reverse	BOL		RW	N
256.4	BB	SYS CMD: 1 = Reset Reactive energy	BOL		RW	N
256.5	BB	SYS CMD: 1 = Removes condition Lock (res)	BOL		RW	N
256.6	BB	SYS CMD: 1 = Automatic start SCR	BOL		RW	N
256.7	BB	SYS CMD: 1 = Inhibit Automatic start	BOL		RW	N
257	BB	[P01] Language	DEC		RW	N
258	BB	[P03] Full scale voltages Network (F / N)	DEC	V	RW	N
259	BB	[P04] Full scale voltage generator (F / N)	DEC	V	RW	N
260	BB	[P05] Rated current of the CT primary generator	DEC	A	RW	N
261	BB	[P06] Media electrical measurements Network	DEC		RW	N
262	BB	[P07] Media electrical measurements Generator	DEC		RW	N
263	BB	[P08] Duration cycle glow plugs	DEC	sec	RW	D
264	BB	[P09] Pulse duration ON Auto Start.	DEC	sec	RW	D
265	BB	[P10] Duration pulse pause Goodwill Auto.	DEC	sec	RW	D
266	BB	[P11] Maximum attempts starter	DEC		RW	N
267	BB	[P12] Threshold motor started by Frequency Generator	DEC	Hz	RW	D
268	BB	[P13] Relief lawyer. going to press. Oil (0 = Off)	DEC		RW	N
269	BB	[P14] Relief in motion by Excite. Altern. (0 = Off)	DEC		RW	N
270	BB	[P15] Delay control alarm with engine running	DEC	sec	RW	D
271	BB	[P16] Type stop motor (0 = Disecc. 1 = Excite)	DEC		RW	N
272	BB	[P17] Time duration cycle stop	DEC	sec	RW	N
273	BB	[P18] VFF threshold enabling transformer. Load (TLG)	DEC	V	RW	N
274	BB	[P19] Delay Load aut. Builder by enabling	DEC	sec	RW	N
275	BB	[P20] VFF threshold enabling protections Generator	DEC	V	RW	N
276	BB	[P21] VFF minimum threshold voltage Network	DEC	V	RW	N
277	BB	[P22] VFF maximum threshold voltage Network	DEC	V	RW	N
278	BB	[P23] Late intervention group from lack Network	DEC	sec	RW	N
279	BB	[P24] Delay exchange TLR-TLG and vice versa	DEC	sec	RW	D
280	BB	[P25] Delay return Network	DEC	sec	RW	N
281	BB	[P26] Duration cooling cycle engine	DEC	sec	RW	N
282	BB	[P27] Threshold generator overspeed by F (0 = Off)	DEC	Hz	RW	D
283	BB	[P28] VFF Failure minimum threshold V Gen (0 = Off)	DEC	V	RW	N
284	BB	[P29] VFF maximum failure threshold V Gen (0 = Off)	DEC	V	RW	N
285	BB	[P30] VFF failure threshold asymmetry Gen (0 = Off)	DEC	V	RW	N

List of registers available - RW BASIC, 256-511 Continued

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
285	bB	[P30] VFF failure threshold asymmetry Gen (0 = Off)	DEC	V	RW	N
286	BB	[P31] Failure minimum threshold F Gen (0 = Off)	DEC	Hz	RW	D
287	BB	[P32] Failure Threshold Maximum F Gen (0 = Off)	DEC	Hz	RW	D
288	bB	[P33] Trip Delay Generator Failures V	DEC	sec	RW	D
289	bB	[P34] Trip Delay Generator Failures F	DEC	sec	RW	D
290	BB	[P35] Overload alarm threshold 1 (0 = Off)	DEC	kVA	RW	N
291	BB	[P36] Threshold Failure Overload 2 (0 = Off)	DEC	kVA	RW	N
292	BB	[P37] Failure threshold inversion energy (0 = Off)	DEC	-kw	RW	N
293	bB	[P38] Delay post. Overload failures. / Inv. energy	DEC	sec	RW	D
294	BB	[P39] Threshold Alarm battery low voltage (0 = Off)	DEC	Vdc	RW	D
295	BB	[P40] Threshold Alarm maximum battery voltage (0 = Off)	DEC	Vdc	RW	D
296	BB	[P41] Delay Failure End Fuel (0 = Off)	DEC	sec	RW	N
297	BB	[P42] Threshold motor started by tachometer (0 = Off)	DEC	rpm	RW	N
298	BB	[P43] Overspeed threshold by tachometer (0 = Off)	DEC	rpm	RW	N
299	bB	[P44] Late intervention overspeed Failures	DEC	sec	RW	C
300	BB	[P45] Multiplier freq. tachometer for rpm	DEC		RW	N
301	BB	[P46] Frequency divider to get rpm tachometer	DEC		RW	N
302	bB	[P47] Media measurement tachometer	DEC		RW	N
303	bB	[P48] Enable periodic test (1 = Enabled)	DEC		RW	N
304	bB	[P49] Duration of the periodic test	DEC	min	RW	N
305	bB	[P53] Trip Delay input ATM	DEC	sec	RW	D
306	bB	[P54] Late intervention Pres.Rete input / SCR	DEC	sec	RW	D
307	bB	[P55] Trip Delay input BPO	DEC	sec	RW	D
308	bB	[P56] Trip Delay input failure disp. 1	DEC	sec	RW	D
309	bB	[P57] Trip Delay input failure disp. 2	DEC	sec	RW	D
310	bB	[P58] External input inhibition delay intervention	DEC	sec	RW	D
311	bB	[P59] Trip Delay input Reserve Comb.	DEC	sec	RW	D
312	bB	[P60] Delay acquisition Excite. Alt. Inside	DEC	sec	RW	C
313	bB	[P61] Engine running late intervention input	DEC	sec	RW	C
314	bB	[P62] Time intervention safety shutdown	DEC	sec	RW	N
315	BB	[P63] Hours decontaore maintenance 1	DEC	h	RW	N
316	bB	Minutes of decontaore maintenance 1	DEC	min	RW	N
317	bB	Seconds of decontaore maintenance 1	DEC	sec	RW	N
318	BB	[P64] Hours decontaore maintenance 2	DEC	h	RW	N
319	bB	Minutes of decontaore maintenance 2	DEC	min	RW	N
320	bB	Seconds of decontaore maintenance 2	DEC	sec	RW	N
321	bB	[P65] Selector group phase (0) or single (1)	DEC		RW	N
322	bB	[P66] Input Selector. Presence Network (0) or SCR (1)	DEC		RW	N

8.9.5.10 List of registers available - RO BASIC, 512-767 - Electric

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
512	BB	Product Code	DEC		RO	N
513	BB	Code Manufacturer	DEC		RO	N
514	BBBB	CPU Serial Number	DEC		RO	N
516	Bb	Model Tool	DEC		RO	N
516	bB	Tool version	DEC		RO	N
517	Bb	Revision	DEC		RO	N
517	bB	Day	DEC		RO	N
518	Bb	Month	DEC		RO	N
518	bB	Year	DEC		RO	N
519	BB	CPU ID	DEC		RO	N
520	Bb	Version data memory (FRAM)	DEC		RO	N
520	bB	Revision data memory (FRAM)	DEC		RO	N
521	Bb	Bootloader Version (Major)	DEC		RO	N
521	bB	Bootloader version (Minor)	DEC		RO	N
522	BB	Value K_RMS_FACTOR	DEC		RO	N
523	BB	Value cal. offset IGEN1 (* K_RMS_FACTOR)	DECS		RO	N
524	BB	Value cal. offset IGEN2 (* K_RMS_FACTOR)	DECS		RO	N
525	BB	Value cal. offset iGen3 (* K_RMS_FACTOR)	DECS		RO	N
526	BB	Value cal. offset VGEN1 (* K_RMS_FACTOR)	DECS		RO	N
527	BB	Value cal. offset VGEN2 (* K_RMS_FACTOR)	DECS		RO	N
528	BB	Value cal. offset VGEN3 (* K_RMS_FACTOR)	DECS		RO	N
529	BB	Value cal. full scale IGEN1 (* K_RMS_FACTOR)	DEC		RO	N
530	BB	Value cal. full scale IGEN2 (* K_RMS_FACTOR)	DEC		RO	N
531	BB	Value cal. full scale iGen3 (* K_RMS_FACTOR)	DEC		RO	N
532	BB	Value cal. full scale VGEN1 (* K_RMS_FACTOR)	DEC		RO	N
533	BB	Value cal. full scale VGEN2 (* K_RMS_FACTOR)	DEC		RO	N
534	BB	Value cal. full scale VGEN3 (* K_RMS_FACTOR)	DEC		RO	N
535	BB	Value cal. offset VRETE1 (* K_RMS_FACTOR)	DECS		RO	N
536	BB	Value cal. offset VRETE2 (* K_RMS_FACTOR)	DECS		RO	N
537	BB	Value cal. offset VRETE3 (* K_RMS_FACTOR)	DECS		RO	N
538	BB	Value cal. full scale VRETE1 (* K_RMS_FACTOR)	DEC		RO	N
539	BB	Value cal. full scale VRETE2 (* K_RMS_FACTOR)	DEC		RO	N
540	BB	Value cal. full scale VRETE3 (* K_RMS_FACTOR)	DEC		RO	N
541	BB	Value cal. Frequency Generator	DEC		RO	N
542	bB	Number decimal measures voltages Generator	DEC		RO	N
543	BB	VGEN1 voltage (F / N)	DEC		RO	D
544	BB	VGEN2 voltage (F / N)	DEC		RO	D
545	BB	VGEN3 voltage (F / N)	DEC		RO	D
546	BBBB	Voltage VGEN12	DEC		RO	D
548	BBBB	Voltage VGEN23	DEC		RO	D
550	BBBB	Voltage VGEN31	DEC		RO	D
552	BBBB	Average voltage three-phase generator	DEC		RO	D
554	BBBB	Phases generator voltage asymmetry (f / f)	DEC		RO	D
556	bB	Number decimal measures of current generator	DEC		RO	N
557	BB	Current IGEN1	DEC		RO	D
558	BB	Current IGEN2	DEC		RO	D
559	BB	Current iGen3	DEC		RO	D
561	BB	Current in Generator Neutral	DEC		RO	D
562	bB	Number decimal measures voltages Network	DEC		RO	N
563	BB	VRETE1 voltage (F / N)	DEC		RO	D
564	BB	VRETE2 voltage (F / N)	DEC		RO	D
565	BB	VRETE3 voltage (F / N)	DEC		RO	D
566	BBBB	Voltage VRETE12	DEC		RO	D
568	BBBB	Voltage VRETE23	DEC		RO	D
570	BBBB	Voltage VRETE31	DEC		RO	D

List of registers available - RO BASIC, 512-767 - Electric - CONTINUE

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
572.0	BB	1 = Overflow current IGEN1	BOL		RO	N
572.1	BB	1 = Overflow current IGEN2	BOL		RO	N
572.2	BB	1 = Overflow current iGen3	BOL		RO	N
572.3	BB	1 = Overflow current IGEN_N	BOL		RO	N
572.4	BB	1 = Overflow voltage VGEN1	BOL		RO	N
572.5	BB	1 = Overflow voltage VGEN2	BOL		RO	N
572.6	BB	1 = Overflow voltage VGEN3	BOL		RO	N
572.7	BB	1 = Overflow measurement Frequency Generator	BOL		RO	N
573.0	BB	1 = Overflow voltage VRETE1	BOL		RO	N
573.1	BB	1 = Overflow voltage VRETE2	BOL		RO	N
573.2	BB	1 = Overflow voltage VRETE3	BOL		RO	N
574	bB	Decimal number to measure the frequency	DEC		RO	N
575	BBBB	Measurement Frequency Generator	DEC	Hz	RO	D
577	BB	Media measurement frequency generator	DEC		RO	N
578	BB	Power factor phase 1 Generator	DECS	Cos	RO	M
579	BB	Power factor phase 2 Generator	DECS	Cos	RO	M
580	BB	Power factor phase 3 Generator	DECS	Cos	RO	M
581	BB	Total power factor Generator	DECS	Cos	RO	M
582.0	bB	Sign PF Total Gen (1 = Cap / 0 = Ind)	BOL		RO	N
582.1	bB	Sign PF Phase 1 Gen (1 = Cap / 0 = Ind)	BOL		RO	N
582.2	bB	Sign PF Phase 2 Gen (1 = Cap / 0 = Ind)	BOL		RO	N
582.3	bB	Sign PF Phase 3 Gen (1 = Cap / 0 = Ind)	BOL		RO	N
583	bB	Number decimal measures of the power generator	DEC		RO	N
584	BBBB	Active power phase 1 Generator	DECS		RO	N
586	BBBB	Active power phase 2 Generator	DECS		RO	N
588	BBBB	Active power phase 3 Generator	DECS		RO	N
590	BBBB	Total active power generator	DECS		RO	N
592	BBBB	Reactive power phase 1 Generator	DECS		RO	N
594	BBBB	Reactive power phase 2 Generator	DECS		RO	N
596	BBBB	Reactive power phase 3 Generator	DECS		RO	N
598	BBBB	Total reactive power generator	DECS		RO	N
600	BBBB	Apparent power phase 1 Generator	DEC		RO	N
602	BBBB	Apparent power phase 2 Generator	DEC		RO	N
604	BBBB	Apparent power phase 3 Generator	DEC		RO	N
606	BBBB	Total apparent power generator	DEC		RO	N
608	bB	Unit measure energies Gen (0 = Unit- 1 = k - 2 = M)	DEC		RO	N
609	bB	Decimal number to totalizers energy generator	DEC		RO	N
610	BBBB	Active energy produced by the generator	DEC	kWh	RO	D
612	BBBB	Reverse energy generator	DEC	kWh	RO	D
614	BBBB	Total reactive energy generator	DEC	kvarh	RO	D

8.9.5.11 List of registers available - RO BASIC, 768 - 1023 - Group

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
768	BB	Voltage Battery	DEC		RO	C
769	BB	Rev counter (RPM)	DEC	RPM	RO	N
770	BB	CPU Temperature	DECS	° C	RO	D
771	BB	Voltage circuit board (+ 5V)	DEC	Vdc	RO	M
772	BB	CPU core voltage (+ 3.3V)	DEC	Vdc	RO	M
773	BBBB	Hours Hour Meter TOTAL	DEC	h	RO	N
775	bB	Minutes of the hour meter TOTAL	DEC	min	RO	N
776	bB	Hour meter seconds of TOTAL	DEC	sec	RO	N
777	BB	Hours Hour counters	DEC	h	RO	N
778	bB	Minutes of the Hour counters	DEC	min	RO	N
779	bB	Seconds of the Hour counters	DEC	sec	RO	N
780	BB	Hours elapsed interval periodic test	DEC	h	RO	N
781	bB	Minutes of elapsed interval periodic test	DEC	min	RO	N
782	bB	Elapsed seconds of interval periodic test	DEC	sec	RO	N
783	bB	Downcounting Minutes of periodic test in progress	DEC	min	RO	N
784	BB	Countdown of seconds to End Fuel	DEC	sec	RO	N
785.0	BB	0 = Input closed ATM	BOL		RO	N
785.1	BB	0 = Input Emergency Stop closed	BOL		RO	N
785.2	BB	0 = Input Presence Network / SCR closed	BOL		RO	N
785.3	BB	0 = Input Key closed	BOL		RO	N
785.4	BB	0 = Input BPO closed	BOL		RO	N
785.5	BB	0 = Input Failure Available 2 closed	BOL		RO	N
785.6	BB	0 = Input Failure Available 1 closed	BOL		RO	N
785.7	BB	0 = Input Inhibition closed	BOL		RO	N
785.8	BB	0 = Input Reserve Fuel closed	BOL		RO	N
785.9	BB	0 = Signal Excite. This internal alternator	BOL		RO	N
785.10	BB	0 = Input Engine running this	BOL		RO	N
786.0	bB	1 = Led ON MAINS	BOL		RO	N
786.1	bB	1 = Led GENSET ON ON	BOL		RO	N
786.2	bB	1 = Led ON MAINS ON	BOL		RO	N
787.8	BB	1 = Led OFF ON	BOL		RO	N
787.9	BB	1 = AUT LED lit	BOL		RO	N
787.10	BB	1 = Led ON MAN	BOL		RO	N
787.11	BB	1 = Led ON TEST	BOL		RO	N
787.12	BB	1 = STOP LED lit	BOL		RO	N
787.13	BB	1 = ALARM LED lit	BOL		RO	N
787.14	BB	1 = RUN LED lit	BOL		RO	N
787.15	BB	1 = Led January LIVE ON	BOL		RO	N
787.0	BB	1 = NO contact output Start is active	BOL		RO	N
787.1	BB	1 = NO contact output STOP is closed	BOL		RO	N
787.2	BB	1 = Command Excitement This alternator	BOL		RO	N
787.3	BB	1 = NO contact output teles. Engine running is closed	BOL		RO	N
787.4	BB	1 = NO contact output teles. Failure is closed	BOL		RO	N
787.5	BB	1 = NC relay contact TLR (MCB) is open	BOL		RO	N
787.6	BB	1 = NO contact relay TLG (GCB) is closed	BOL		RO	N
787.7	BB	1 = Output command glow plug is active	BOL		RO	N
788.0	BB	Vision display short (0) or extended (1)	BOL		RO	N
788.1	BB	1 = switch OFF (Blocked) is confirmed	BOL		RO	N
788.2	BB	1 = selector in MAN (manual) is confirmed	BOL		RO	N
788.3	BB	1 = switch in AUT (Automatic) is confirmed	BOL		RO	N
788.4	BB	1 = switch to TEST (test) is confirmed	BOL		RO	N
788.5	BB	1 = alarm present	BOL		RO	N
788.6	BB	1 = Genset in failure	BOL		RO	N
788.7	BB	= 1 Condition of persistent failure	BOL		RO	N
788.8	BB	1 = Ongoing maintenance adjustment Time elapsed 1	BOL		RO	N
788.9	BB	1 = Ongoing adjustment Time elapsed maintenance 2	BOL		RO	N
788.10	BB	1 = Ongoing adjustment tachometer	BOL		RO	N
788.11	BB	1 = Call in page were oper. display is OFF	BOL		RO	N
788.12	BB	1 = Call in page cond. alarm display is OFF	BOL		RO	N

List of registers available - RO BASIC, 768 - 1023 - Group - CONTINUE

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	DECIMALS
789.0	BB	1 = Safety time being	BOL		RO	N
789.6	BB	1 = Delay alarm control motor in progress	BOL		RO	N
789.7	BB	1 = Protections engine running are active	BOL		RO	N
790.0	BB	1 = Pulse engine start is present	BOL		RO	N
791.0	BB	1 = Motor is running (real state)	BOL		RO	N
791.1	BB	1 = Motor is running (stored)	BOL		RO	N
791.2	BB	1 = Recurring test in progress	BOL		RO	N
792	BB	No. of starts executed	DEC		RO	N
793	bB	Number attempts failed start in progress	DEC		RO	N
800	bB	Number Alarms present	DEC		RO	N
801.0	bB	1 = Low Voltage Alarm Battery	BOL		RO	N
801.1	bB	1 = Warning Maximum Voltage Battery	BOL		RO	N
801.2	bB	1 = Alarm Fuel Reserve	BOL		RO	N
801.3	bB	1 = Alarm maintenance request 1	BOL		RO	N
801.4	bB	1 = Alarm maintenance request 2	BOL		RO	N
801.5	bB	1 = Overload alarm generator (first liv.)	BOL		RO	N
802.0	bB	1 = Failure high frequency generator	BOL		RO	N
802.1	bB	1 = Low Frequency Generator Failure	BOL		RO	N
802.2	bB	1 = Failure Overload Generator (second liv.)	BOL		RO	N
802.3	bB	1 = failure reversal energy generator	BOL		RO	N
802.4	bB	1 = failure Maximum current generator	BOL		RO	N
802.5	bB	1 = failure Alternator	BOL		RO	N
803.0	BB	1 = Failure Emergency Stop	BOL		RO	N
803.1	BB	1 = Failure Not Start Group	BOL		RO	N
803.2	BB	1 = failure automatic start blocked	BOL		RO	N
803.3	BB	1 = failure tensions generator absent	BOL		RO	N
803.4	BB	1 = failure Engine stop unexpectedly	BOL		RO	N
803.5	BB	1 = Failure Failure to stop the engine	BOL		RO	N
803.6	BB	1 = failure low engine oil pressure	BOL		RO	N
803.7	BB	1 = Failure high engine temperature	BOL		RO	N
803.8	BB	1 = Failure available 1	BOL		RO	N
803.9	BB	1 = Failure available 2	BOL		RO	N
803.10	BB	1 = Failure end fuel	BOL		RO	N
803.11	BB	1 = Failure engine overspeed	BOL		RO	N
803.12	BB	1 = Failure high voltage generator	BOL		RO	N
803.13	BB	1 = failure low voltage generator	BOL		RO	N
803.14	BB	1 = failure imbalance voltage generator (asymmetry)	BOL		RO	N
804.0	BB	1 = Pressure DOWN key (down)	BOL		RO	N
804.1	BB	1 = Pressure UP key (up)	BOL		RO	N
804.2	BB	1 = Pressure PROG	BOL		RO	N
804.3	BB	1 = Pressure RESET button	BOL		RO	N
804.4	BB	1 = Pressure MODE	BOL		RO	N
804.5	BB	1 = Pressure START button	BOL		RO	N
804.6	BB	1 = Pressure STOP button	BOL		RO	N
804.7	BB	1 = Pressure button TLG_TLR	BOL		RO	N
805	bB	Display: Page Number of measurement displayed	DEC		RO	N
806	bB	Display: Page Number of current programming	DEC		RO	N
807	bB	Display: 0 = Nor - 1 = Cover - 2 = ProgMode	DEC		RO	N
808	bB	Display: Pointer current operational status message	DEC		RO	N
809	bB	Display: Pointer current message alarm	DEC		RO	N

8.9.5.12 Troubleshooting Modbus

The system DOES NOT respond only in three cases:

1. Hardware Failure (incorrect connections, card off, hardware failure, ...)
2. The Node Address is not that of the board
3. The CRC or LRC Telegram is wrong.

9 Technical Specifications

Auxiliary power supply

Voltage:

- nominal value in Vdc from battery
- field of use
- maximum burden

12 or 24 Vdc
0.9...1.3 UAUX
4 W

Type of measurement

Voltages, currents and powers
Voltages and currents

True RMS up to 20th harmonics
Peak factor = 2.5

Voltage input circuits

Line-line voltage:

- direct input models
- permanent overload
- thermal overload (1 s)
- input impedance of direct input circuits
- input impedance of circuits with input from TV/100
- adjustment range of TV ratio

max 500 V
120%
150%
≈ 2 MΩ Phase-Neutral/Phase-Phase
≈ 500 KΩ Phase-Neutral/Phase-Phase
50...4615VLN (87... 8kVLL)

Current input circuits

Current:

- nominal current
- permanent overload
- thermal overload (5 s) (1.2VA at the terminals)
- adjustment range of TA ratio

5 A
120%
200%
5...4500

Voltage measurement at terminals

Measurement range:

- measurement range VLN (phase voltage with direct input)
- measurement range VLN (phase voltage with input from TV/100)
- precision

0...290 V (0...500VLL)
0... 72.5 V (0...125VLL)
0.5% f.s ± 2 digits

Current measurement at terminals

Measurement range:

- measurement range with input on secondary TA
- precision within measurement range 0.05...5.00 A

0.05...5.00 A
0.5% f.s ± 2 digits

Frequency measurement on single-phase V1

Measurement range:

- nominal value (1)
- measurement range
- precision
- response time

50 / 60 Hz
45...80 Hz
0.3% vm ± 1 digit
< 300mS

Active Power Measurement (P1, P2, P3)

- measurement range
- precision

85 MW
1% f.s ± 2 digits

Reactive Power Measurement (Q1, Q2, Q3)

- measurement range
- precision

85 MVAR
1% f.s ± 2 digits

Apparent Power Measurement (S1, S2, S3)

- measurement range
- precision

85 MVA
1% f.s ± 2 digits

Active Energy Measurement (Wh)

- import / export counters
- can be set to zero
- counting time
- energy count
- precision with current 0.05...1.0 In

Two, separate

Yes

15 minutes

4.294.967.295 kWh

2% fs ± 2 digits

Reactive Energy Measurement (VARh)

- energy count
- can be set to zero
- counting time
- precision with current 0.05...1.0 In

4.294.967.295 kVARh

Yes

15 minutes

2% fs ± 2 digits

Power factor measurement

- measurement range cosφ
- precision with current 0.1...1.0 In and voltage 0.8...1.2 Un

-1...0...+1

2% fs ± 2 digits

Measurement of equivalent three-phase voltages

- equivalent voltage measurement on 3-phase sys. without neutral

$V=(V12+V23+V31)/3$

Operating hours

- Total operating hours
- Partial operating hours

hh:mm auxiliary power present

hh:mm from previous reset

Digital filter

- Time constant of measurement integration

Average 1...15

Compatible current transformers

- Nominal current
- Transformation ratio

5 A

1...900

Mechanical characteristics

- mounting type
- protection degree

built-in Panel

full device IP20/ front IP55

Electrical characteristics of serial port

Electrical insulation

- RS 485

3kV

Environmental conditions

Ambient temperature:

- Nominal range
- Extreme range
- Storage temperature
- Relative humidity
- Atmospheric pressure

0...+45 °C

-5...+55 °C

-10...+70 °C

10...95 %

70...110 kPa

Reference standards:

CEI standards:

- Safety
- Precision
- Electromagnetic compatibility (Immunity)
- Electromagnetic compatibility (Emission)
- Case protection grade (IP rating)

EN 61010-1 300V CLASS III

EN 60688

EN 61000-6-2 (ex EN 50082-2)

EN 61000-6-4 (ex EN 50081-2)

EN 60529