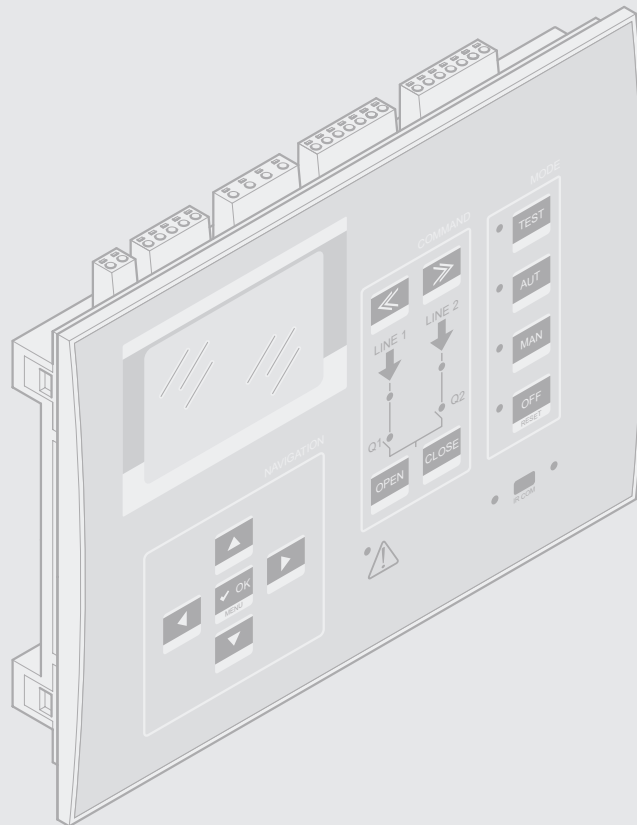


Automatic transfer switch 4 226 83

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WARNING

- Read carefully the manual before the installation or use, taking count of the informations of instruction sheet given with to the product.
- These equipments have to be installed by qualified personnel, in compliance to local standards, to avoid damages or safety hazards.
- Before any device maintenance operation, remove the supply from measuring inputs or isolate them cutting the supply from other sources.
- Legrand assumes no responsibility if the device isn't properly used, if installative informations aren't respected or if the device is tampered.
- Products described here below are subject to alterations and changes without prior notice. For this reason the catalogues data couldn't have contractual value.
- Clean the instrument with a soft dry cloth; do not use abrasives, liquids.
- Due of presence of electrical connections, the safety standards have to be respected.
- The ATS is supplied with Legrand standard parameters. These couldn't respect the necessity of the specific application/ installation. For this reason it is necessary to know the parameters and eventually to modify them in order to better integrate the device to the plant.



SAFETY INSTRUCTIONS

This product should be installed in compliance with installation rules, preferably by a qualified electrician. Incorrect installation and use can lead to risk of electric shock or fire.

Before carrying out the installation, read the instructions and take account of the product's specific mounting location.

Do not open up, dismantle, alter or modify the device.

All Legrand products must be opened and repaired exclusively by personnel trained and approved by Legrand. Any unauthorized opening or repair completely cancels all liabilities and the rights to replacement and guarantees.

Use only Legrand brand accessories.

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1. General features

The automatic transfer switch ref. 422683 has been designed to control and to manage the automatic changeover between two power sources with the followings setups:

- Line–Line (U-U)
- Line–Generator (U-G)
- Generator–Generator (G-G)

The ATS can command and control up to three devices (breakers or contactors): two to manage lines and one to manage the tie breaker.

ATS has an LCD screen to provide a clear and intuitive user interface.

1.1 Description

- 128x80 pixel, backlit LCD screen with 4 grey levels.
- 8 language texts for measurements, settings and messages.
- Fully user-definable alarm properties.
- 100-240VAC power supply.
- Aux supply available at 12-24-48 VDC.
- 2 measure voltages inputs (Three-phases+neutral).
- Voltage thresholds with programmable hysteresis.
- Integrated isolated RS-485 Interface.
- Front optical programming interface, galvanically isolated, connectable with USB and WiFi dongles.
- 8 programmable digital inputs (negative).
- 7 outputs:
 - 2 relays with NO contact 12A 250VAC.
 - 2 relays with NO contact 8A 250VAC.
 - 3 relays with changeover contact NO/NC 8A 250VAC.
- Storage of the last 250 events.
- IP 65 front protection.
- Compatible with App and SW ACU.

1.2 Applications

- To check and to manage lines: line-line (U-U), line-generator (U-G) and generator-generator (G-G).
- Possibility to switch the load in “open transition” (default) or “close transition” modes.
- Control of three-phase, two-phase and single-phase networks.
- Control of phase-phase and / or phase-neutral voltages.
- 5 logics to control 2 lines with tie breaker systems.
- To control 2 lines in “open transition” modality.
- To control 2 lines in “close transition” modality.
- Possibility to choose the kind of sources (line or generator) and its priority for all scenarios.
- Manage of not-priority loads.
- Control of motorized circuit breakers or contactors.
- Control of undervoltage, overvoltage, phase loss, asymmetry, minimum frequency, maximum frequency.
- Possibility to manage custom logic using ladder PLC language (50 lines for 8 columns).

1.3 Installation

- Install the unit following the instruction sheet attached to the product. Evaluate if the default configuration is in compliance with the desired one. Otherwise it is necessary modify the configuration. Check the wiring diagram supplied by Legrand in order to correctly connect the unit and others Legrand devices.
- The ATS standard configuration guarantees the correct work of devices if wiring diagrams supplied are respected.



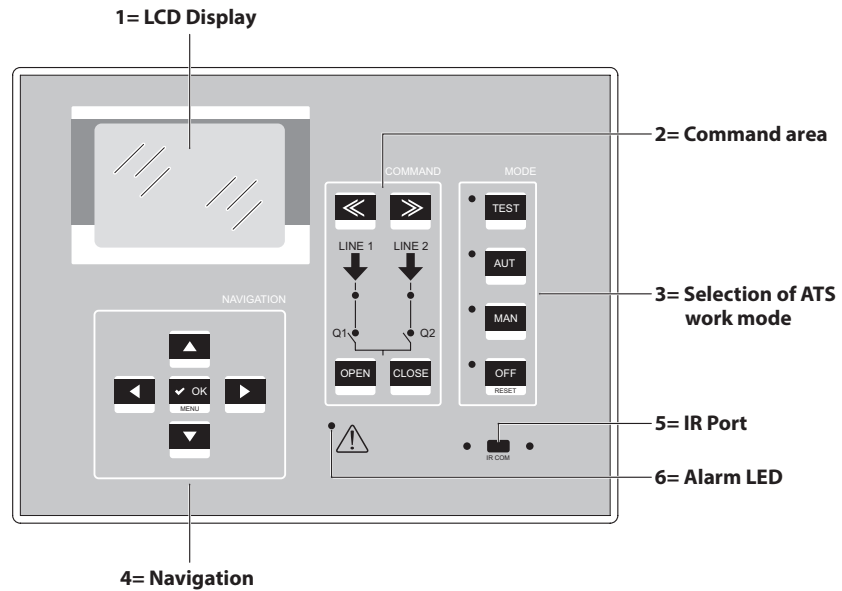
WARNING

the change of parameters, of input functions, of output functions etc... causes a functional change. This could cause incompatibility with standard wiring diagrams. It is recommended to evaluate changes of parameters or functional modes after having read the ATS user manual.

- At first power on, the OFF/RESET mode is activated on the ATS.

2. ATS front panel description

2.1 Identification of ATS check and management area



N.B. If the LED is on, the relative function is activated.

1 = LCD Display

The LCD display allows to see all informations/parameters of ATS. It is possible to have the direct control of changeover system status with synoptic that provides clear and in real time information about the status of lines and devices.

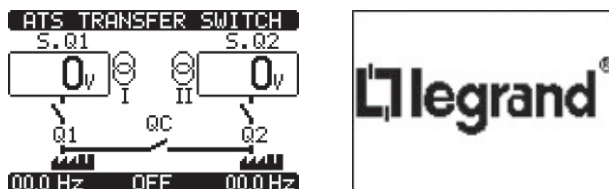
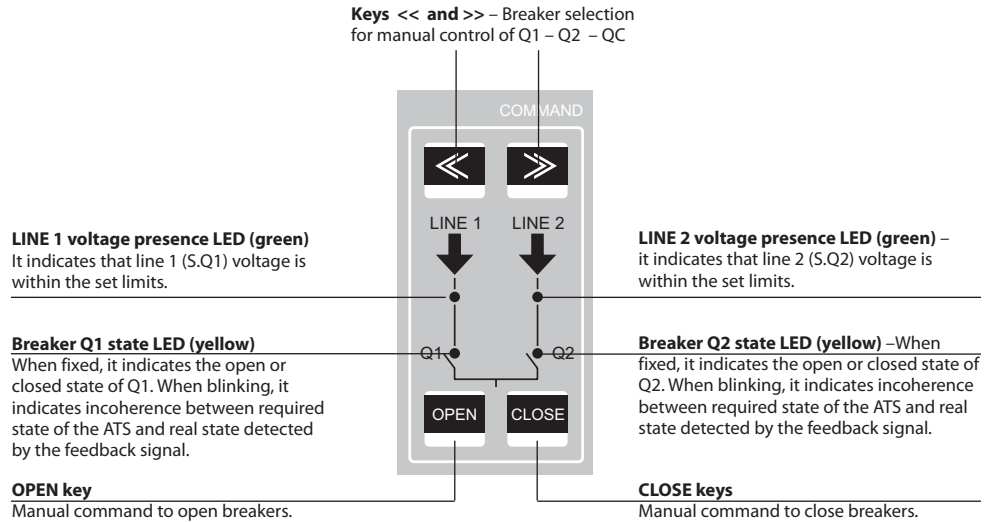


Fig. 1- LCD Display

2. ATS front panel description

2 = Command area (available in MAN modality)



N.B.1 If the LED is on, the relative function is activated.

N.B.2 For QC device (tie breaker) LED indications about status of command and open/close status aren't available. Anyway it is possible to read from display the status open/close of QC .

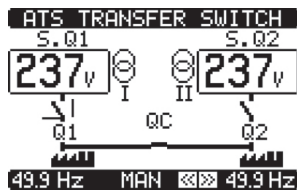


Fig. 2 - QC close (I)

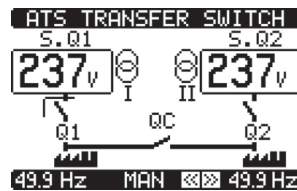
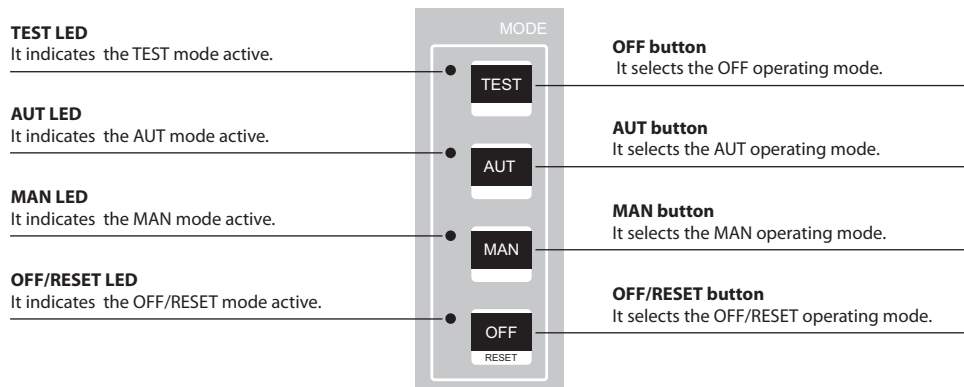


Fig. 3 - QC open (O)

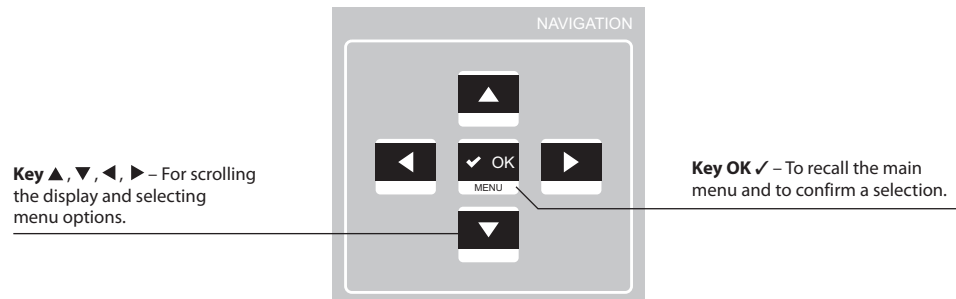
It is recommended to bring on front panel the signal of open/close of breakers Q1, Q2 and in particular QC using OC auxiliary contacts (open/close).

3= Selection of ATS operating mode



N.B. If the LED is on, the relative function is activated.

4= Navigation



5 = IR Port



Connecting IR port to connect IR-USB or IR-WiFi dongle accessories, to allow the dialogue between ATS and SW ACU or APP ACU.

6 = Alarm LED



If it is flashing, it indicates an active alarm.

3. Operating modes

With of **OFF-RESET/MAN/AUT/TEST** keys the desired operating mode can be selected and it will appear on the display.

It is possible to see the selected mode with LED on ATS frontal.

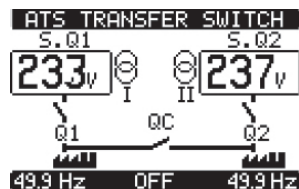


Fig 4 - OFF/RESET mode

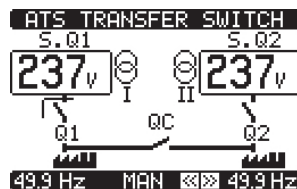


Fig. 5 - MAN mode

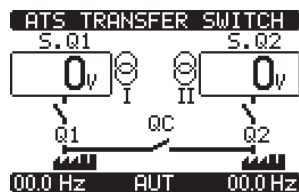


Fig 6 - AUT mode

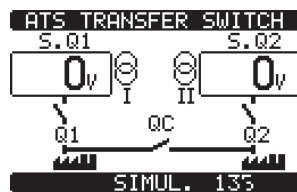


Fig. 7 - TEST mode

The change of operating mode can be done by pressing the specific button for at least 0.5s. After this time the new chosen modality will appear on the display.

3.1 Reset mode (OFF-RESET)

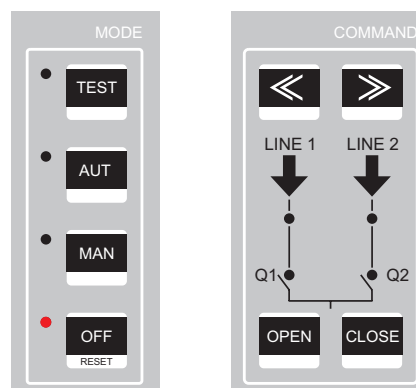
- In this mode the ATS looks over the lines status but it does not perform any changing actions.
- In OFF/RESET mode, measures display and status LEDs remain active.
- Pressing the OFF-RESET button it's possible to reset the retentive alarms, after removing alarm conditions.



N.B. To access the programming menu is necessary to activate the OFF mode.

3.2 Manual mode (MAN)

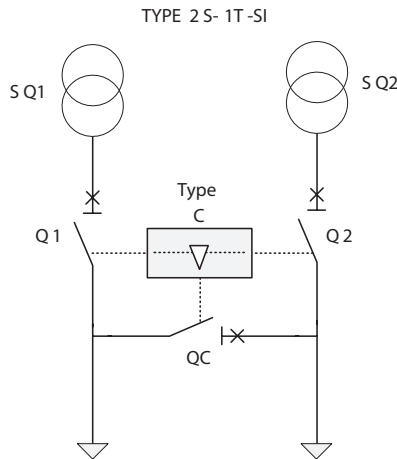
- In MAN mode it is possible to electrically command the devices Q1, Q2 and QC directly from the ATS.



- The command can be selected independently from lines status. If in presence of auxiliary voltage necessary to electric command, it can be done only if it respects the chosen functional logic. The ATS continuously checks, in fact, that the provided command is in compliance to breakers status (Q1 – Q2 – QC) and to functioning logic table chosen for the plant. If the command is not coherent, it will be discarded.

- The command of changeover devices, in Legrand Default configuration, is continuous. The user can set the kind of command modifying the parameter P07.n.06 (using the layout with three devices, it is recommended to use the continuous command).

In the Standard configuration, (device with 2 sources (U-U) and 1 tie breaker), logic control is done respecting the following table:



S.Q1	S.Q2	Q1	Q2	QC
0	0	0	0	0
0	1	0	1	1
1	0	1	0	1
1	1	1	1	0

Fig 8 - Standard configuration.
2 sources (U-U) and 1 tie breaker

To execute the electric command of devices, it is necessary to enter in MAN mode pressing the correct key. On display the synoptic page appears and the MAN mode will be indicated.

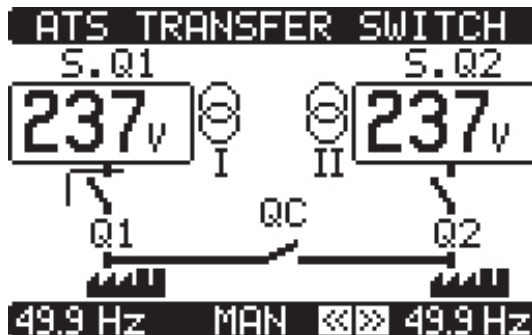


Fig. 9 - MAN Mode Indication

Using **<<** **>>** keys it is possible to select of device to command (Q1, Q2, QC).
The selection of devices is possible in the following order:
Q1>>Q2>>QC and vice versa QC<<Q2<<Q1.

3. Operating mode

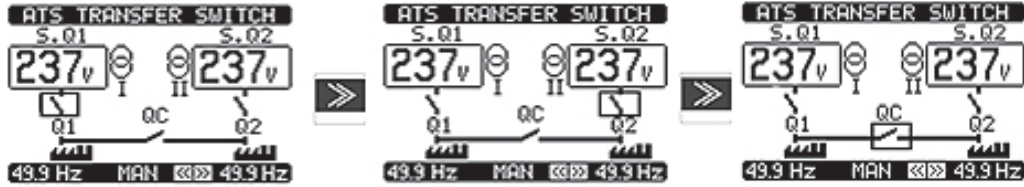


Fig. 10 - Selection of device order Q1>>Q2>>QC

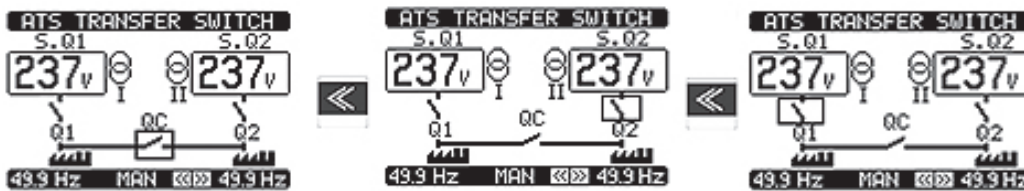


Fig. 11 - Selection of device order QC<<Q2<<Q1

The selected device is highlighted using a blinking square frame around it.

After the device has been selected, the command can be done using the related keys “OPEN” and “CLOSE” in the “command area” (the command will be received if the button is pushed for at least 0.5s).



The command is given only to the selected device. If the command isn't in agreement with the logic control, it will be discarded and the square frame blinks until the command is coherent.

In the setup U-G , Pressing MAN key the generator starting command is automatically given (the relative output must be necessary enabled). For example, if line 2 is set for U-G mode (U-G setup with tie breaker QC), the starting command of generator is possible just when the device Q2 is selected.

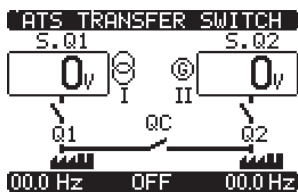


Fig 12 - Utility - Generator setup with tie breaker QC

During generator starting command the MAN LED blinks.

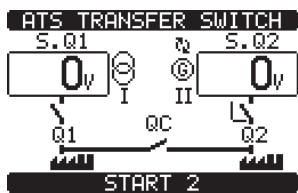


Fig 13 - Generator starting command

To remove the starting generator command, it is necessary to select the device related to generator line and press MAN. The cooling time counter starts, after few time the command is removed and the generator stops.

In case the ATS is set in “closed transition” mode, the command of devices occurs like for “open transition” mode.

3.3 Automatic mode (AUT)

- In automatic mode, the ATS checks permanently the lines and breakers status. Starting from the status of lines S.Q1 and S.Q2, it performs autonomously the closing/opening operations of breakers Q1, Q2 and, in function of command logic chosen, it manages the command of tie breaker QC and the optional startup/shutdown of the generator set.
- When the main line (S.Q1) exceeds the specified limits for a time higher than the one set, the green LED (line presence) switches off giving a "threshold out" alarm. The ATS disconnects the load from S.Q1 and connects it to the S.Q2 (if it is available and within admitted limits) closing also the QC. After S.Q1 returns within the specified thresholds, the ATS moves the load on this one after it has checked the stability and the quality of line and it opens the QC.
- During the transfer operations with tie breaker QC, the device Q2 stays closed assuring the service continuity of load.
- The automatic functioning cycles are different in relation of kind of logic applied.

The programmables logics control are the following:

- Control of 2 lines and 1 tie breaker (2 lines and three devices - Default)
2S - 1T SI Standard Legrand
2S - 1T-PL
2S - 1T-PL
2S - 1T -AI
2S - NPL
- Control of 2 lines and 2 devices in "open transition" mode
- Control of 2 lines and 2 devices in "closed transition" mode

For each logic it is possible to choose the kind of lines control selecting the mode U-U, U-G, G-G, establishing if the command is related to motor breakers or contactors and defining the line priority.

3.3.1 Control of 2 lines and 1 tie breaker QC (2 lines and 3 devices) - Standard

The ATS in standard configuration is able to control 2 lines U-U (Utility - Utility) and 1 tie breaker. This kind of control can be modified in case of necessity to associate a generator.

It is possible to select different kinds of control in function of plant requirements.

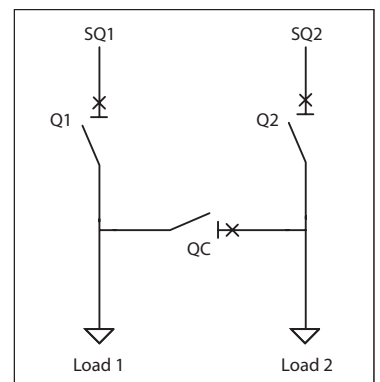
It is possible to bring some changes passing from a control U-U to U-G or G-G. To do this is enough to modify the parameter of line to control, to activate the extended programmables outputs with external modules to control generator.

In the followings tables are shown the different logics:

3.3.2 Logic type C: 2S – 1T – SI Standard Legrand (Default)

With this logic it is possible the control of 2 sources S.Q1 and S.Q2 supplied from transformers or generics lines. The sources characteristics have to allow the contemporary power supply of Load 1 and Load 2. Using this logic, it is possible to supply loads from a single source closing a line breaker Q1 or Q2 and the tie breaker QC.

LINES		Type C: 2S – 1T - SI				
S.Q1	S.Q2	Q1	Q2	QC	Load 1	Load 2
0	0	0	0	0	OFF	OFF
0	1	0	1	1	ON	ON
1	0	1	0	1	ON	ON
1	1	1	1	0	ON	ON



3. Operating mode

Others possible control logics can be chosen modifying parameters of menu M02 "General" P02.01.

The followings logics of control can be chosen:

- Manage of 2 power sources using 3 devices
- Manage of 2 power sources using 2 devices

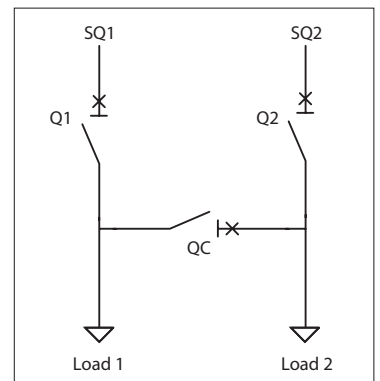
When the logic of control is modified, it is necessary to check the correct modifies and cabling schema.

3.3.3 Logic type B:2S-1T-PL

Control of 2 power sources with 2 independent loads (Load 1 e Load 2) that, in normal conditions, are supplied from S.Q1 and tie breaker QC.

In case of missing of S.Q1, S.Q2 can supply the only Load, otherwise, in case of missing of S.Q2 it is possible to supply both loads with S.Q1 and the closing of tie breaker QC.

LINES		Type B: 2S-1T-PL				
S.Q1	S.Q2	Q1	Q2	QC	Load 1	Load 2
0	0	0	0	0	OFF	OFF
0	1	0	1	0	OFF	ON
1	0	1	0	1	ON	ON
1	1	1	0	1	ON	ON

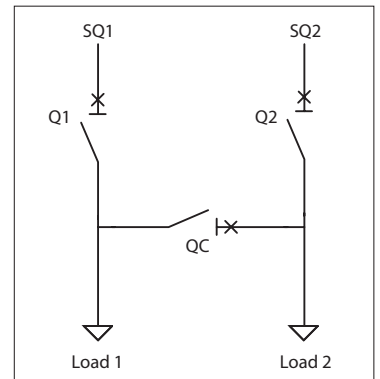


3.3.4 Logic type D: 2S – 1T – AI

Control of 2 power sources with 2 independent loads (Load 1 and Load 2) that, in normal conditions, are supplied from the related source S.Q1 and S.Q2.

In case of missing of S.Q1, S.Q2 can supply the only Load 2, otherwise in case of missing of S.Q2, Load 1 and Load 2 can be supplied from S.Q1 and the closing of QC.

LINES		Type D: 2S – 1T – AI				
S.Q1	S.Q2	Q1	Q2	QC	Load 1	Load 2
0	0	0	0	0	OFF	OFF
0	1	0	1	0	OFF	ON
1	0	1	0	1	ON	ON
1	1	1	1	0	ON	ON



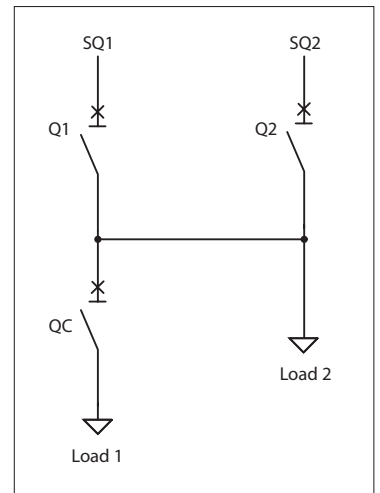
3.3.5 Logic type O: 2S-NPL

Control of 2 power sources with 2 independent loads (Load 1 and Load 2) that, in normal conditions, are supplied from S.Q1.

In case of missing of S.Q1, S.Q2 can supply only the Load 2 with Q2.

In case of presence of both S.Q1 and S.Q2, the priority of supply of Loads is of S.Q1 with Q1 and QC.

LINES		Type O: 2S-NPL				
S.Q1	S.Q2	Q1	Q2	QC	Load 1	Load 2
0	0	0	0	0	OFF	OFF
0	1	0	1	0	OFF	ON
1	0	1	0	1	ON	ON
1	1	1	0	1	ON	ON

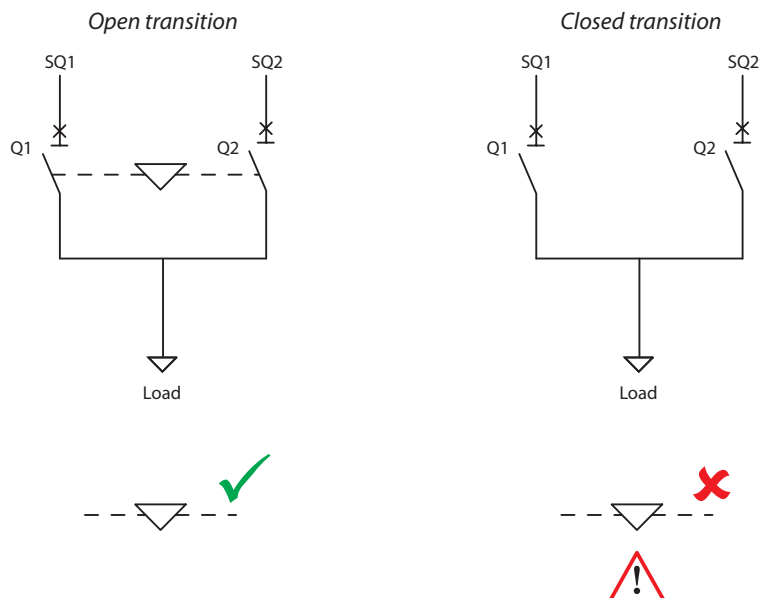


3.3.6 Control of 2 lines and 2 changeover devices

The ATS can control 2 power sources S.Q1 and S.Q2 and control the changeover of them using devices Q1 and Q2.

In this configuration the ATS can manage the changeover in "open transition" or "closed transition" modes.

These different modes of control require different setup of changeover system.



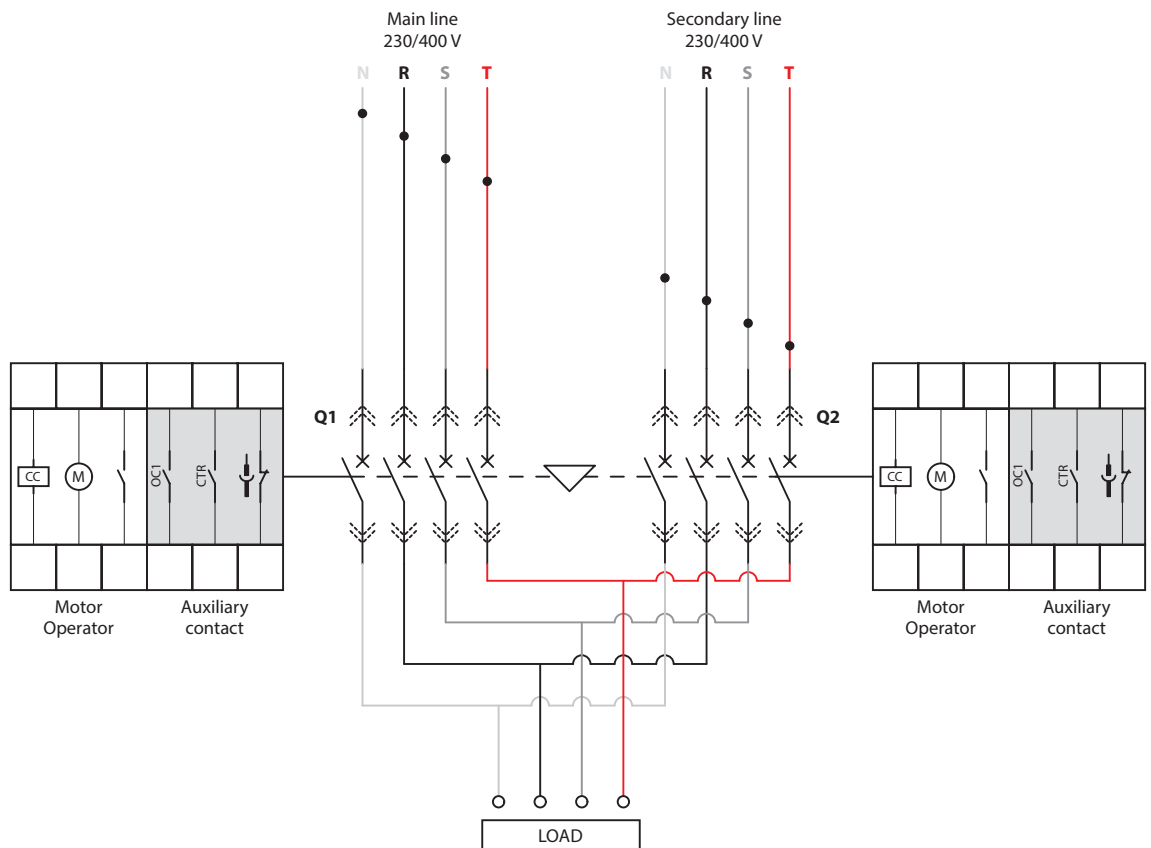
3. Operating mode

3.3.7 "Open transition" changeover:

The logic of control and changeover in mode "open transition" respects the general rules of switch between two lines. This command logic provides to open the device of not commanded line and after the closing of commanded line. The same logic of command is applied when the priority line comes back.

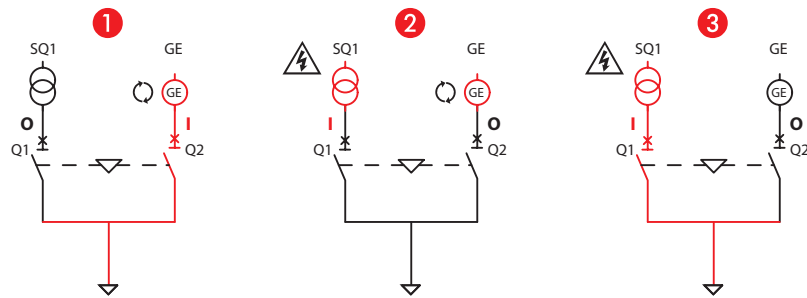
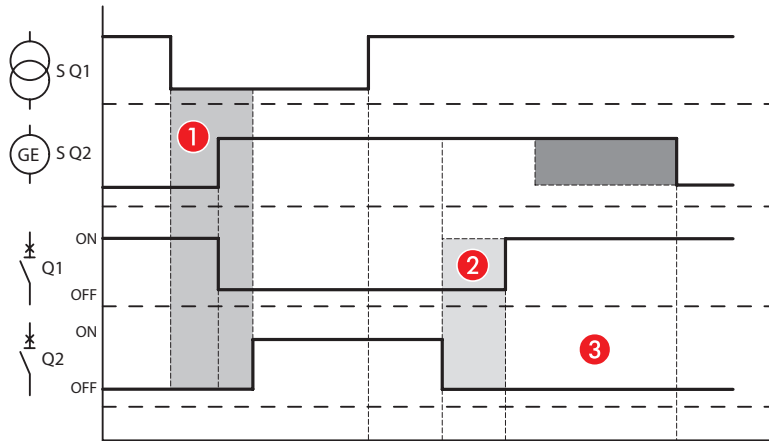
It is possible to apply this logic to systems U-U, U-G and G-G.

The advantage of this kind of management is to have possibility to mechanically interlock breakers and to avoid the temporary closing (also manually of both lines on the load).

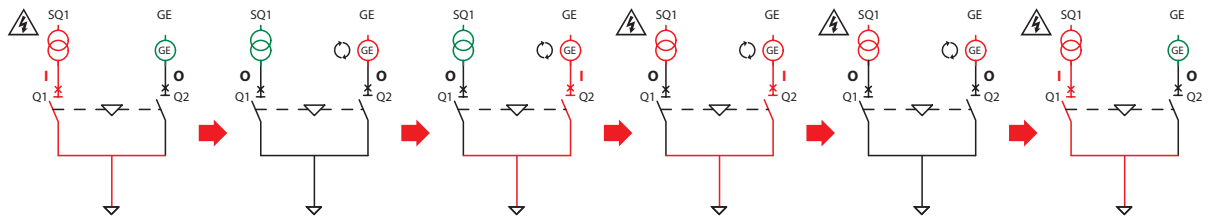


Here it is shown the working logic in mode "open transition" with ATS in AUT and MAN modes.

With this mode, the switching of load from a line (S.Q1) to the other line (S.Q2) or viceversa can happen with a voltage breaking.



Complete sequence of changeover from grid to generator and reverse:



3. Operating mode

3.3.8 "Closed transition" changeover



N.B. The "closed transition" (see parameter P.08.14 of menu M08 "switch") control logic can be used only with ATS in AUT mode (automatic control of sources and devices). If the ATS is switched in MAN mode (electric command of breakers from ATS), it works following the "open transition" logic. The same behaviour is present passing from AUT to OFF/RESET mode.

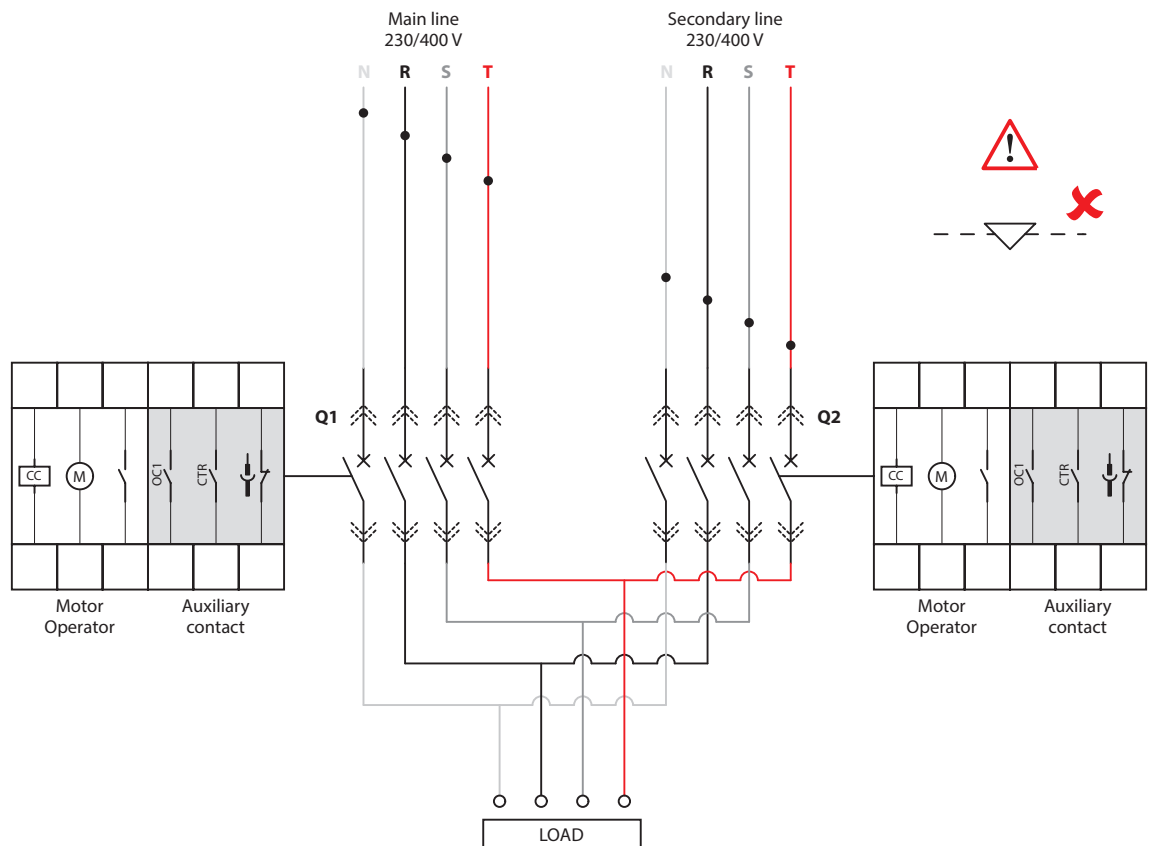
The logic of command and control of two lines for the changeover in "closed transition" is used to reduce to minimum the interruptions of energy. This logic allows to avoid the second interruption of energy during the changeover between secondary line (generator) to primary line (grid). Generally it is applied in changeover system type (U-G). In case of blackout of primary line, the relative breaker is opened and the starting command of generator on secondary line is given. After the secondary line (generator) is available, the breaker Q2 will be closed and the load is supplied from S.Q2.

When the primary line is available again, the ATS waits that all parameters of voltage, frequency and phases synchronism are correct and it commands the closing of Q1. The breaker Q2 will remain anyway close for a configurable time. After, the changeover is completed opening Q2. For a short period, the load is supplied from net and generator in parallel.



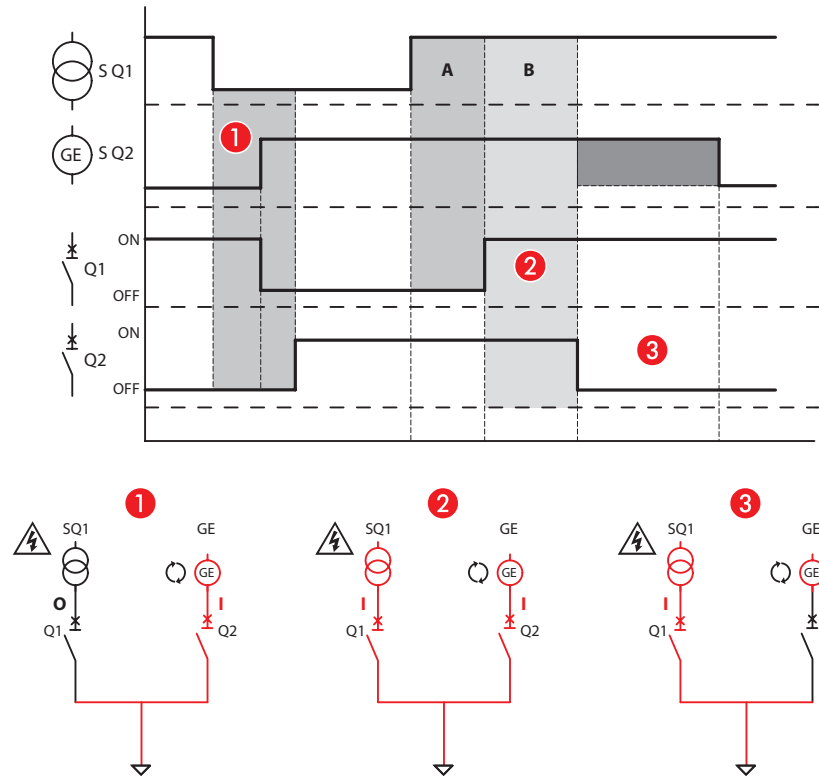
For this application it is MANDATORY to have specific generators capable to self regulate in order to guarantee that 2 lines are in perfect synchronism.

N.B. For this application, the mechanical interlock HAVE NOT TO BE INSTALLED to permit the contemporary closing of the lines.

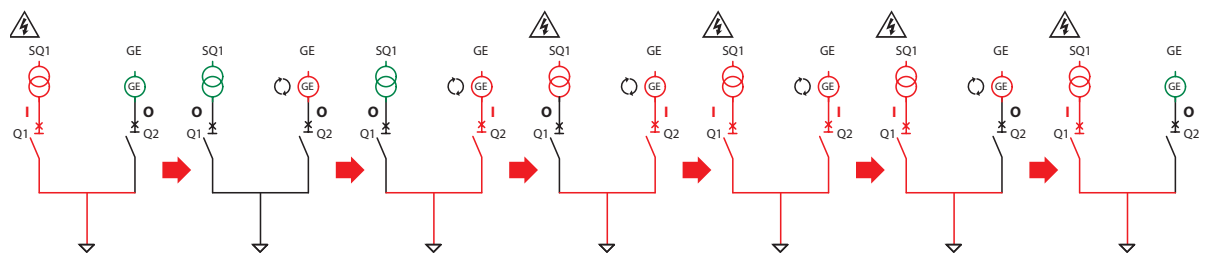


Here it is represented the working logic in mode "closed transition" with ATS in AUT mode.

In the sector A the synchronization of lines is verified and in the sector B the closing of both lines in parallel is done (closed transition):



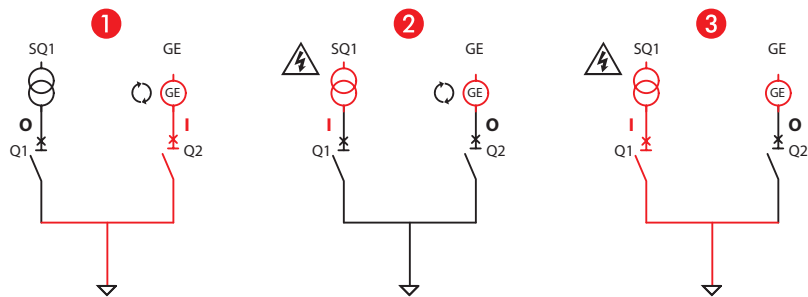
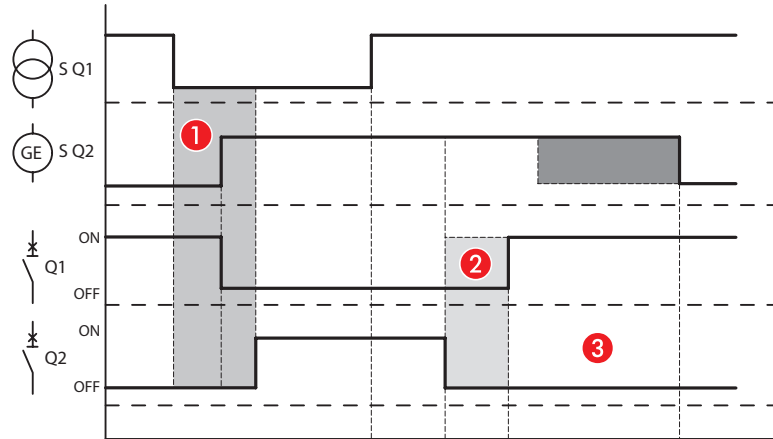
Complete sequence of changeover from grid to generator in "closed transition"



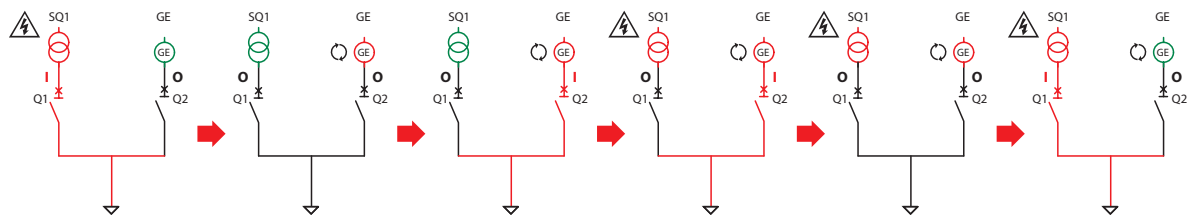
Here it is represented the operating logic "closed transition" mode with ATS in MAN mode.

3. Operating mode

With this mode, as the control of lines synchronization can't be done, it is not possible to manage the simultaneous closing of lines. It is mandatory to apply the "open transition" logic.



Complete sequence of changeover from grid to generator and viceversa in MAN mode.



3.4 Test mode (TEST)

- In test mode, the equipment starts the generators, if present, to test their operation. If the TEST button is held pressed for 5 seconds, the equipment will run a cycle which simulates loss of the priority line anticipated by a notification message with consequent load transfer.



This will momentarily interrupt power supply to the load.

4. Power-up

- The ATS can be supplied at 100-240VAC or 12-24-48VDC. In case of simultaneous presence of both power supplies, priority is given to the AC power supply.
- After first power-up the device normally starts in OFF/RESET mode.
- During the normal work of ATS, if it switches off, when it will be switched on it comes to operating mode active before the switching off.
If it is necessary to modify this behaviour, the parameter P01.03 in the M01 "utilities" menu has to be changed.
- The automatic transfer switch can be supplied with a second Vaux with the input "DC battery" from 12VDC to 48VDC. The same input could be used for the battery control, if it is activated. In this case it is necessary to set the correct battery voltage in the menu M04 "battery".
- During power-up all the LEDs blink in order to verify their operation.

5. Main menu

- The "main menu" is made up of a group of graphic icons that allow to access to functions. In function of selected icon, a description will appear on the display.

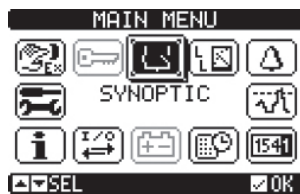


Fig. 14 - Main menu

- The main menu allows the quick access to measurements and settings.
- Starting from main page, press **✓ OK**. The menu screen is displayed.
- Press **◀** or **▶** to rotate clockwise/counter clockwise to select the required function. The selected icon is highlighted and the central part of the display shows the description of the function.
- Press (AUT) **✓ OK** to activate the selected function.
- If some functions are not available, the correspondent icon will be disabled (shown with light grey colour).
- Icons descriptions:

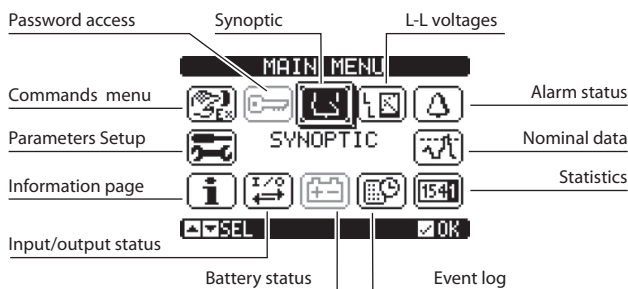


Fig. 15 - Icon description

- – Settings and access to the password insertion.
- – View of voltages.
- – View of voltages.
- – View of alarm status.
- – Access point to nominal data.
- – Access point to the statistic data of the ATS operation.
- – Access point to the event log list.
- – Access point to view of input/output status.
- – Input/output status.
- – Access point to information page.
- – Access point to the setup menu for parameter programming (see dedicated chapter).
- – Access point to the "commands menu (see dedicated chapter).

6. Password access

- The ATS has a password function that at first switching on is not active in order to access to all parameters (Password OFF).
- N.B. In case of password activation/modify, it is recommended to make a copy of it to guarantee future access with desired rights.**
- It is possible to define different level of password in order to permit different access to “settings/commands” menu in function of access rights.
- If password is activated, in order to enter to protected data, it is necessary to insert the correct code.
- To enable password management and to define numeric codes, see M03 “password” menu.
- There are different access levels:
 - Password disabled (OFF)**– The password is disabled. Complete access to all parameters (Legrand Default).
 - Password enabled (ON)** – The password is enabled:
 - Access without to insert password (Lev.1)**- The password is enabled but not inserted. This access allow the visualization only.
 - User Level access (Lev.2)**- It allows the change of mode, the clearing of recorded values and editing of a limited number of setup parameters.
 - Advanced Level access (Lev.3)** - Complete access to all parameters.

MENU	Password OFF			
		Password ON (lev2-lev.3)		
		NO Password Lev 1	Lev. 2	Lev. 3
M01	•	X	•	•
M02	•	X	X	•
M03	•	X	X	•
M04	•	X	X	•
M05	•	X	X	•
M06	•	X	X	•
M07	•	X	X	•
M08	•	X	X	•
M09	•	X	•	•
M10	•	X	•	•
M11	•	X	•	•
M12	•	X	X	•
M13	•	X	X	•
M14	•	X	X	•
M15	•	X	X	•
M16	•	X	X	•
M18	•	X	X	•
M19	•	X	X	•
M20	•	X	X	•
M21	•	X	X	•
M22	•	X	X	•

- Passwords for menu 19 and 20 are only for custom solution: for further info please contact Legrand.
- The default passwords for each level are the following:

Password OFF default Legrand	Level	Password
Password OFF (Default)	-	-
Password ON	1	-
	2	1000
	3	2000

- From normal viewing, press ✓ **OK** to recall main menu, select the password icon and press ✓ **OK**.



Fig. 16 - Enter password

- With keys ▲ and ▼ it is possible to change the selected digit.
- With keys ◀ and ▶ it is possible move through the digits.



ATTENTION! To confirm the password it is mandatory to select  icon and to confirm with ✓ OK. If the code is confirmed with OK without going on key icon "", the value won't be accepted.

- In function of level password "Level 2-User or Level 3-Advanced" the correspondant unlock message is shown.
- Once unlocked the password, the access rights are valid until one of the followings conditions are verified:
 - A timeout period of two minutes elapses without any keystroke.
 - The device is reset (after quitting the setup menu).
 - The device is turned off.
- To quit the password entry screen press ✓ OK key.

7. Table of display pages

- Keys ▲ and ▼ allow to scroll pages of measures.
- Some measures could not be available in function of ATS programming.
Example: if the function “limits” isn’t set, the related page can’t be available.
- The user has the possibility to specify the page shown on display after a time during that anyone press keys. Furthermore the ATS can be programmed so that the display always remains in the position where it was left. To do this, see menu M01 “utility”.
- In default conditions, the main page of display represents the synoptic of plant that can be modified using parameter P02.01.
- In the synoptic there are all informations that, with status of LEDs, allow to have a complete knowledge of power sources status.
- Here below are represented an example of synoptic on display:

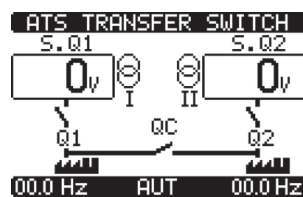


Fig. 17 - Synoptic

- The following table contains the details of display pages.

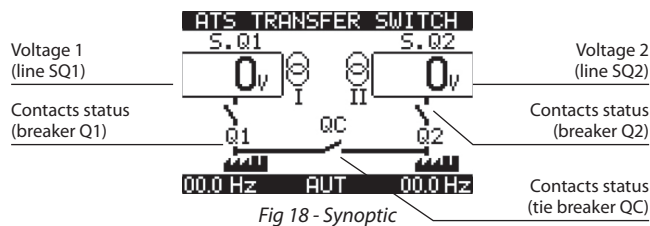


Fig 18 - Synoptic



Fig 19 - Date / Time

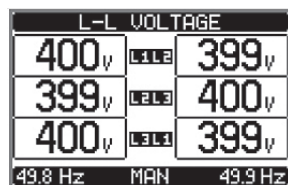


Fig 20 - Phase to phase voltage

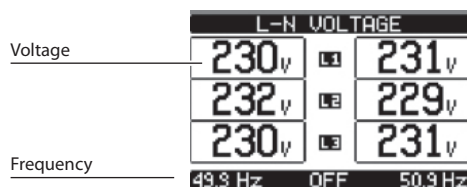


Fig 21 - Phase voltage

ALARMS STATUS					
A01	A09	A17	A25	A33	UA1
A02	A10	A18	A26	A34	UA2
A03	A11	A19	A27	A35	UA3
A04	A12	A20	A28	A36	UA4
A05	A13	A21	A29	A37	UA5
A06	A14	A22	A30	A38	UA6
A07	A15	A23	A31	GL.A	UA7
A08	A16	A24	A32	GL.B	UA8

Active alarms

Fig 22-Alarms

CONTROL THRESHOLDS			
460V	MAX ULL	460V	
---	MAX ULN	---	
340V	MIN ULL	340V	
---	MIN ULN	---	
52.5Hz	MAX Hz	52.5Hz	
47.5Hz	MIN Hz	47.5Hz	
▲▼SEL			

Voltage thresholds

Frequency thresholds

Fig 23-Control thresholds

STATISTICS			
000000	CNT-AUT	000000	AUT mode commutation counter
000001	CNT-MAN	000001	MAN mode commutation counter
000000	A03 A04	000000	Alarms counter A03 A04
01:58s	LOAD	02:23s	Time lapse with load supplied
00:00s	OK	00:00s	Time lapse with lines in the limits
69:35m	KO	07:34m	Time lapse with lines out the limits
NO LOAD		69:31m	Total time with no supplied load
POWER DOWN		000036	ATS total power down counter

Fig. 24 - Statistics

BATTERY STATUS		
00	119	269
99%		
▲▼SEL +OFF=RESET		

Minimum voltage measured

Maximum voltage measured

Actual voltage

Maximum voltage limit

Minimum voltage limit

MAX and min voltages reset

Fig. 25 - Battery status

EXPANSION MODULES			
ATS			
AC DC			
COM1			
IR			
▲▼SEL			

Fig. 26 - Expansion modules

7. Table of display pages

INPUTS/OUTPUTS							
INP				OUT			
01	06	11	16	01	06	11	16
02	07	12	17	02	07	12	17
03	08	13	18	03	08	13	18
04	09	14	19	04	09	14	19
05	10	15	20	05	10	15	20

▲▼SEL

Fig. 27-I/O Status

INPUTS	
INP01	Q1 feedback
INP02	Q1 trip
INP03	Disabled
INP04	Q2 feedback
INP05	Q2 trip
INP06	Disabled
INP07	QC feedback

▲▼SEL ◀▶1..20

Fig. 28 - Input configurations

OUTPUTS	
OUT01	Q1 open
OUT02	Q1 close
OUT03	Q2 open
OUT04	Q2 close
OUT05	Disabled
OUT06	Disabled
OUT07	Global Alarm A

▲▼SEL ◀▶1..20

Fig. 29 - Outputs configurations

INFORMATION PAGE	

Fig. 30 - Info page

SYSTEM INFO	
ATS TRANSFER SWITCH	ATS name
MODEL.....:ATS	
SW.REV.....:02	
HW.REV.....:00	
PAR.REV....:01	
BOOTLOADER:00	
SER.NO.....:15390008	

▲▼SEL ◀▶MORE

Revision
Software
Hardware

Fig. 31 - System info

8. Expandability

- The automatic transfer switch can be expanded with additional modules. It is possible to connect a maximum of 3 expansion modules at the same time.

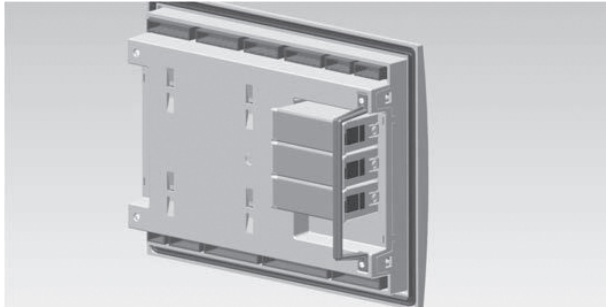


Fig. 32 - Expansion modules

- The expansion modules provide additional resources in order to extend the checking and managing chances. These ones can be parameterized and managed through the dedicated setup menus.
- The supported expansions modules can be grouped in the following categories:
 - I/O modules
- Procedure to add an expansion module:
 - remove the power supply to automatic transfer switch (230VAC and auxiliary in DC, if present);
 - remove the protecting cover of one of the expansion slots;
 - insert the upper hook of the module into the fixing hole on the left of the expansion slot;
 - rotate right the module body, inserting the connector on the bus;
 - push until the bottom clip snaps into its housing.
- Unless otherwise indicated, the insertion order of the modules is free.
- Fit the specific module lock accessory included in the package to improve expansion module fixing safety in applications subjected to strong vibrations.
- To fit this accessory:
 - remove the two right screws with a Torx T7 screwdriver
 - Set the jumper over the previously coupled modules
 - fasten the screws back in their original seat.
- Once expansion modules are installed, the ATS recognize them when it will be powered on. It automatically recognises the kind of mounted expansions modules showing it on display.
- At switching on, if the device configuration has changed compared to the last saved, (one module has been added or removed), the ATS asks the user to confirm the new configuration. In case of confirmation, the new configuration will be saved and will become effective, otherwise the mismatch will be shown at every subsequent power-on of the system.

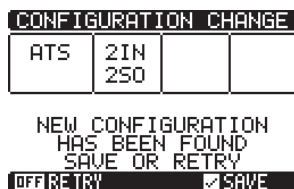
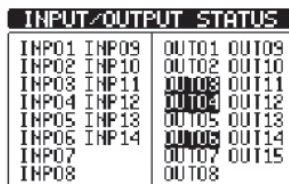


Figura 33 - Configuration change

N.B. One time the module has been installed, the associated functions have to be set by the user.

8. Expandability

- The I/O numbering is shown under each module.
- The I/O status (active/not active) is graphically shown in the following way:
 - ACTIVE: with words in negative (white on black background)
 - NOT ACTIVE: with words in positive (black on white background)



INPUT/OUTPUT STATUS			
INP01	INP09	OUT01	OUT09
INP02	INP10	OUT02	OUT10
INP03	INP11	OUT03	OUT11
INP04	INP12	OUT04	OUT12
INP05	INP13	OUT05	OUT13
INP06	INP14	OUT06	OUT14
INP07		OUT07	OUT15
INP08		OUT08	

Fig. 34- I/O Active/Not active

- The setup menus related to the modules are always accessible, even if the expansion modules are not physically fitted.
- It is possible to add modules I/O of the same type; the setup menus are multiple and identified by a sequential number.
- The following table shows how many modules of each group can be mounted at the same time.

MODULE TYPE	CODE	FUNCTION	MAX Nr.
COMMUNICATION	Standard		
I/O	4 226 90	4 STATIC OUTPUTS	3
	4 226 91	2 CHANGEOVER RELAYS	3
	4 226 92	2 INPUTS + 2 RELAYS NO	3

* maximum 3 for ATS independently from the type

9. Communication

- Into menu "communication" M10 it is possible set COM channel
- The ATS has an integrated communication port RS-485 (COM1).
- The inputs and outputs are identified by a code and a sequence number. Example: the digital inputs are identified by code INPx, where x is the number of the input. In the same way, digital outputs are identified by code OUTx. The numeration of input/output is based on mounting position of expansion modules, with progressive numeration from top to bottom.
- The expansion I/O numbering starts from the last I/O fitted on the base unit. For example, for digital inputs , INP1... INP12 on the basic unit and thus the first digital input on the expansion modules will be named INP13. The I/O numbering is shown in the following table:

CODE	DESCRIPTION	BASE	EXP
INPx	Digital inputs	1...6	9...20
OUTx	Digital outputs	1...7	11...20
COMx	Communication ports	1	-
AINx	Analog inputs	Only for Legrand custom solution	
AOUx	Analog outputs	Only for Legrand custom solution	

- Inputs/outputs can be associated to internal variables (bit) that can be associated between them.
Example: limit thresholds can be applied to detected measures or eventual counter related to an activation or fan input x.
- The following table shows all the internal variables managed by the ATS with their range (number of variables per type).

CODE	DESCRIPTION	RANGE
LIMx	Limit thresholds on measurements	1...16
REMx	Variables remotely controlled	1...16
UAx	User alarms	1...8
CNTx	Programmable counters	1...8
PLCx	PLC logic variables	1...32
TIMx	Timer	1...8

Functions associated to the inputs are the 6 described in the above table.

- **LIMx:** internal variable that identifies a limit value set by the user and managed by the ATS. Its status (active or not) depends by out-of-limits of one measurement set by the user.
- **CNTx:** internal counters that can count pulses coming from an external source (through a digital input INPx) or the times that a certain condition has been verified.
Example: defining a limit threshold LIMx as count source, it will be possible to count how many times one measurement has exceeded a certain limit.
- **REMx:** it allows the managing of remote variables.
- **UAx:** it allows the activation and managing of 4 programmable alarms.
- **PLCx:** management of variables of PLC logic (see dedicated programming manual).
- **TIMx:** management of timer

9.1 Limit thresholds (LIMx)

- The LIMx thresholds are internal variables whose status depends by out-of-limits of one measurement set by the user. (*example*: phase to phase voltage L1-L2 higher than 400V).
- The setting of thresholds value is calculated starting from a base value.
Example: “400 V” adding a multiplicative factor “x 1” → 400 x 1 = 400V).
- For each LIM, there are two thresholds: upper and lower.
 - N.B.** The upper threshold must always be set to a value higher than the nominal one and the lower threshold must always to be set to a value lower than the nominal one.
- The control mode of thresholds can be done in 3 modes:
 - **MIN function**: when the value of selected measure is under lower limit, after the delay set, the threshold will be activated. When the value of selected measure is over the upper limit, after delay set, the threshold will be restored.
 - **MAX function**: when the value of selected measure is higher than the superior limit, after the delay set, the threshold will be activated. When the value of selected measure is under lower limit, after delay set, the threshold will be restored.
 - **MAX+MIN function**: when the value of selected measure is under lower limit or over the upper limit, after the delays set, the threshold will be activated. When the value of selected measure comes back into the limits, the threshold will be restored (if not retentive).
- The managing of limit can be done in 2 modes: with memory or without memory. In the first case the reset of the alarm can be done only manually (retentive); in the second case the reset of alarm is automatic, if the value comes back into the limits. The setting can be done using the dedicated command in the “*commands*” menu.
See setup menu M15 “*Limit thresholds*”.

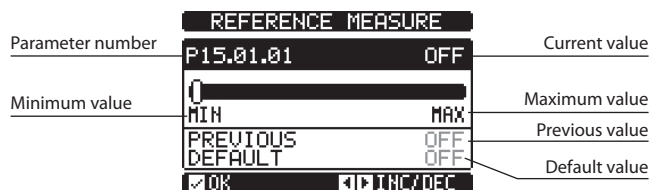


Fig 35-Limit threshold

9.2 Remote-controlled variables (REMx)

- The automatic transfer switch, with an external supervision software, can activate outputs (OUTx) via Modbus protocol RS 485 channel. This can be done with remote variables REMx.

9.3 User Alarms (UAx)

- User can set a maximum of 8 programmable alarms (UA1...UA8).
- Conditions that generates the alarm can be different:
 - In association of one thresholds LIMx set.
 - Activation of digital inputs INPx.
 - The same criterion can be used to combine an alarm to complex conditions resulting from the logical Boolean combination of inputs and thresholds, etc. The PLCx variables will be used in this case.
- For each alarm, the user can define a message that will appear on the alarm page.
- Properties of alarms can be defined by the user in the same way that normal alarms.
- When several alarms are activated at the same time, they are displayed sequentially, and their total number is shown on the status bar.
- To reset one alarm that has been programmed with latch, use the dedicated command in the “*commands*” menu.
- For details on alarm programming and definition, refer to setup menu M21 “*User alarms*”.

9.4 Counters (CNTx)

- This function allows, by selecting a control channel, to activate a counter (see chapter M16 "counters").
- It is possible to count:
 - Impulses acquired from inputs INPx;
 - The numbers of activations of outputs OUTx;
 - The overcome of limits LIMx;
 - Activation of known variables.
- The description of counters CNTx can be customized with a test of maximum 16 characters.
- The unit of measure of counters Umn can be customized with a test of maximum 6 characters.

9.5 PLC Logic (PLCx)

- ACU Software can be set using a ladder program for creating a PLC internal logic inside the ATS, so as to be able to freely manage any function necessary for generator accessory applications.
- In the program logic, all the variables managed internally by the ATS can be entered, such as inputs (INPx), threshold limits (LIMx), remote variables (REMX), controller states (RALx) etc.
- The processing results of the various branches of the ladder logic are stored in internal variables (PLCx), which may later be used to control the ATS outputs, or as support memories to build a more complex logic or to control the alarms defined by the user (UAX).
- It is additionally possible to create timers inside the PLC program using the programmable timers of the M17 menu.
- The operation of the logic created with the ladder program may be checked in real time and possible corrected on the specific ACU software window.

9.6 Timers (TIMx)


- The system includes 8 timer variables, named TIM1..TIM8.
- These variables may be used either in the PLC ladder logic or in combination with the OUTx outputs or in combination with UAX user alarms.
- Each timer variable has an input which controls it (e.g. a LIMx limit or an INPx inputs etc.). The state of this variable changes from FALSE to TRUE (ramp up) and the timing variable also changes from FALSE to true but only remains true for the specified time and then returns FALSE.
- Whenever the input variable becomes false, the TIMx variable also becomes FALSE (this also occurs before the end of the programmed time) and the time counter is reset to zero.

10. Keypad lock

- The automatic transfer switch keypad can be locked, avoiding not desired command.
- Once the keypad is locked, it will only be possible to view measures, but not to change operating mode or to operate in MAN mode on devices. If the icon menu is shown and the keypad is locked, wait 2 minutes to return to main page.
- The activation of keypad lock can be made in the followings ways:
 - With a programmable input (activate the function "keypad lock");
 - With frontal keys;
 - With SW ACU.
- To lock or unlock the keypad, press key ▲ and, while holding it down, press key ▼ three times without releasing it at the end.
Release then key ▲ and then press it 5 times, then release both keys.
- **When the keypad is locked, the display shows the sentence "KEYBOARD LOCKED". If the keypad isn't locked the display shows the sentence "KEYBOARD UNLOCKED".**

11. Programmation

11.1 Parameter setting (setup) from frontal panel

- To access to "parameters" menu and to modify them, it is necessary put the ATS in **OFF** mode, recall the "main" menu (press ▲▼ simultaneously), select the "setup" menu () and confirm with (✓ OK).

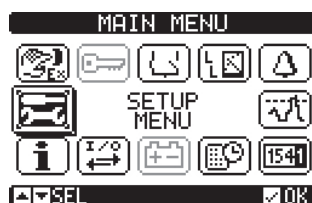
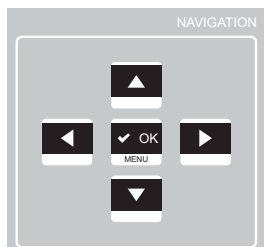


Fig. 36 - Main menu

- Table shown in the following picture is then displayed



Fig. 37 - Setup menu

- With sliding menus Mxx it is possible to select sub-menus where are present all parameters associated to the function.
- Select the required menu with keys ▲ or ▼ and confirm with ✓ OK.
- Press **OFF** to quit and return to the measurement viewing.

N.B. If the icon  is not enabled (grey color), it is necessary to check access privileges to modify parameters (see chapter "passwords").

11.2 Parameter setting (setup) with PC

- The managing of setting parameters can be done also using the PC Software "ACU configurator" (available to free download on Legrand E-catalogue).
- Using software ACU it is possible to transfer set-up parameters from ATS to PC, generating a file. It is also possible to transfer to ATS a file with parameters from SW ACU.
- It is possible to transfer parameters in 2 ways:
 - Total transfer: all parameters are uploaded on ATS in one time
 - Partial transfer: only menu with modified data will be uploaded to the ATS
- The PC can be used also to define "information page" where to add informations, characteristics, data etc...concerning the application.

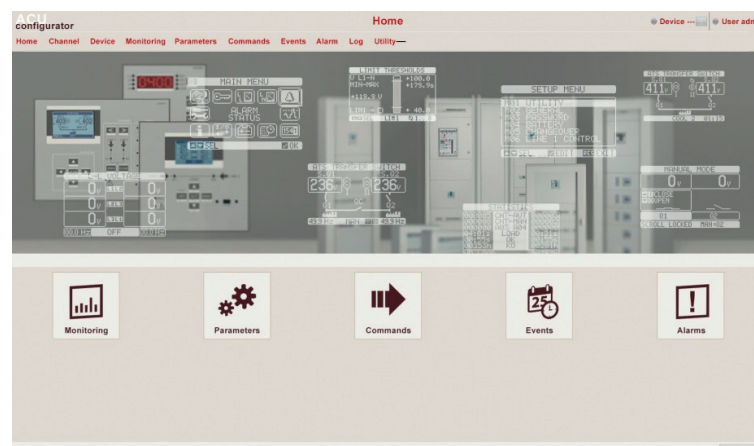


Fig. 38 - Software ACU

For more details refers to manual of Software ACU configurator.

11.3 Parameter setting with smartphone or tablet

- The managing of setting parameters can be done also using the **App** for smartphone and tablet "ACU configurator" (available to free download on Google Play and Apple Store).
- The connection between ATS and App is possible with WiFi dongle (Legrand).
- The App permits to see alarms, to send commands, to read measures, to set parameters, to download events.



Fig. 39 - App

11.4 IR port

- The parameters of the automatic transfer switch can be configured and consulted also through the front optical port, using a **USB** or **WiFi** dongle.
- Using this port it is possible to configure and to dialogue with the automatic transfer switch without the need to access to the rear of the device or having to open the electrical panel. This connection is isolated from internal circuit ensuring safety for the operator.
- This port guarantees IP65 front protection.
- Simply holding the **USB/WiFi** dongle up to the front panel, connecting the plugs to the connectors the device will be connected. The recognition between devices will be shown by the green "LINK" LED on the programming dongle.

12. Generator test

- The ATS allows to the user to program a periodical control of generator start.
- The automatic test is a periodic test carried out at specific intervals (interval managed on from "setup" menu). This test can be done only if the ATS is in AUT mode and the function has been enabled.
- It is possible to decide in which days of the week the automatic test can be executed and at what time of the day (hours; minutes). See menu M11 "automatic test".
- If there are multiple generators in the system, only one is started for each automatic test. The others will be started in sequence the next time.
- After starting, the generator works for a programmable time after which it stops. The message "T.AUT" appears on the display before starting.
- The test can be enabled or disabled for each single generator using the parameters of menu M11 and on the Automatic Test display page without needing to open the setup menu.
 - On the Automatic Test page, press ◀ and ▶ at the same time.
 - Select the required generator by pressing ▲ and ▼. Enable the test with ▶ and disable it with ◀.
 - ✓ **OK** Save and exit the setting.
 - The test can be stopped by pressing key **OFF - RESET**.

12.1 Generator command with simulation of line missing.

- It is possible to simulate the lack of the priority line by SW in order to verify the behavior of the transfer switch system.
- The simulation can be started either using the "commands" menu (command **C.24**) or via a digital input, for example connecting it to a key switch, programming the function of the input to the execution of the command **C.24**.
- The simulation consists in considering the priority line absent for 3 minutes (even if it is actually present). During this time the main page shows the message "SIMUL xxx" with the countdown of the time.
- The simulation will cause the start of the generator (if present) and a load transfer exactly as in the automatic cycle.
- It is possible to stop the simulation at any time by passing in OFF mode.

N.B. Doing the simulation through commands menu, user must start from the OFF mode (which allows access to the menu). Once selected and confirmed the C.24 command, exit the command menu. The unit will independently switch to TEST mode and it starts the simulation.

In the following table are indicated menu available into ATS:

CODE	MENU	DESCRIPTION
M01	UTILITIES	Language, brightness, display pages etc.
M02	GENERAL	Characteristic system data
M03	PASSWORD	Access code setup
M04	BATTERY	Battery parameters
M05	ACOUSTIC ALARMS	Control of internal buzzer and external siren
M06	SOURCE LINES (S.Qn)	Characteristic source data
M07	BREAKERS (Qn)	Characteristic breaker data
M08	SWITCH	Load transfer mode
M09	SOURCE LINE CONTROL (S.Qn)	Source line acceptability limits n.
M10	COMMUNICATIONS	Communication parameters
M11	AUTOMATIC TEST	Period, time, automatic test mode
M12	DIGITAL INPUTS	Programmable digital input functions
M13	DIGITAL OUTPUTS	Programmable digital output functions
M14	MISCELLANEOUS	Functions (maintenance, etc.)
M15	LIMIT THRESHOLDS	Programmable limit thresholds
M16	COUNTERS	Programmable generic counters
M17	TIMERS	Programmable timers for PLC logic
M19	ANALOG INPUTS	Contact Legrand
M20	ANALOG OUTPUTS	Contact Legrand
M21	USER ALARMS	Programmable alarms
M22	ALARMS TABLE	Alarm enabling and effect

- The access to the menu/sub-menu modify page is subject to the input of password (if the function is activated).
- After highlighted the correct menu it is necessary press **✓ OK** to show the parameters.
- Each parameter is shown with code, description and actual setting value.

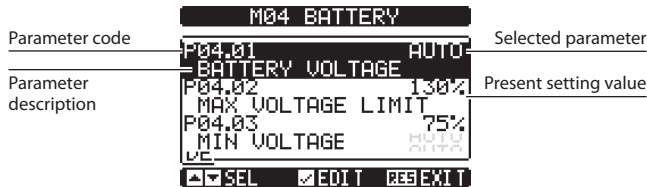


Fig. 40- Battery menu

- To modify the setting of one parameter, select it and then press **✓ OK**.

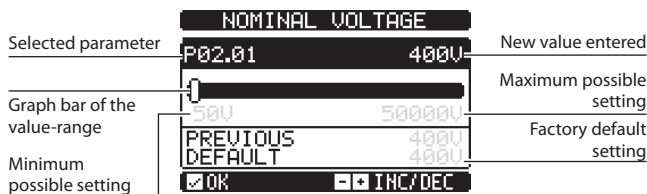


Fig. 41- setting of Nominal Voltage

- The parameter setting can be modified with **▶** and **◀** keys. The screen shows the new setting, a graphic bar with the setting range, the maximum and minimum values, the previous setting and the factory default.
- Pressing **▶** and **▲** the value is set to the maximum admitted, while with **▲** and **◀** it is set to the minimum.

N.B. Pressing simultaneously **▶ and **◀**, the setting is set to factory default.**

During the typing of a text string, keys **▲** and **▼** are used to select the alphanumeric character while **▶** and **◀** are used to move the cursor along the text string.

N.B. Pressing keys **▲ and **▼** simultaneously will move the character selection straight to character "A".**

- Press **✓ OK** to go back to the parameter selection. The entered value is saved.
- Press **OFF** to save all the settings and to quit the setup menu. The controller executes a reset and returns to normal operation.
- In "SET-UP" mode, if the user does not press any key for at least 2 minutes, the system leaves automatically and goes back to normal viewing without saving the changes done on parameters.

13. Parameters

- In menu “parameters” are described all parameters, their changes and it is defined the work mode of ATS. Menu is composed by 22 parts: from M01 to M22.
- Each menu is composed by specific parameters Px that can be modified in function of needs.
For example, the definition of control characteristics of power sources can be defined by the customer using parameters of M08 “load changeover” menu and M09 “source line control ” menu.
- With menu M09 it is possible to set nominal data for power sources such as nominal voltage, nominal frequency that could be used to set thresholds.
- The ATS can be set to do voltage checks in three-phases lines with or without neutral, bi-phases or single-phase (P02.07).
- In case of lines three-phases or bi-phases it is possible to choose if monitor/control phase-phase voltage or phase-neutral voltage or both. (P02.08).

N.B. Nominal voltage set with P02.02 must be referred to phase-phase voltage.

It is possible set a transformation ratio TV associated to the control inputs establishing criteria in M02 “general” menu. In case a lower voltage is applied but proportional to that of plant, limits of measures will be real values of plant.

13.1 Description of “utility” menu

M01 – UTILITY		UoM	DEFAULT	RANGE
P01.01	Language		English	English Italian French Spanish German Portuguese Polish Russian
P01.02	Set real time clock at power-on		OFF	OFF-ON
P01.03	Power-on operating mode		Previous	OFF mode Previous
P01.04	LCD contrast	%	50	0-100
P01.05	Display backlight intensity high	%	100	0-100
P01.06	Display backlight intensity low	%	25	0-50
P01.07	Time to switch to low backlighting	s	180	5-600
P01.08	Return to default page	s	300	OFF / 10-600
P01.09	Default page		Synoptic	(page list)
P01.10	Plant identifier		(empty)	String 20 chr.

- **P01.01** – Select display text language.
- **P01.02** – Active automatic clock settings access after power-up.
- **P01.03** – Start system in OFF mode after power-up or in same mode it was switched off in.
- **P01.04** – Adjust LCD contrast.
- **P01.05** – Display backlight high adjustment.
- **P01.06** – Display backlight low adjustment.
- **P01.07** – Display backlight low delay.
- **P01.08** – Default page display restore delay when no key pressed. If set to OFF the display will always show the last page selected manually.
- **P01.09** – Default page displayed on power-up and after delay.
- **P01.10** – Free text with alphanumeric identifier name of specific plant.

13.2 Description of “general” menu

M02 – GENERAL		UoM	DEFAULT	RANGE
P02.01	Layout plant		C: 2S – 1T - SI	A: 2S – 0T B: 2S – 1T – PL C: 2S – 1T - SI D: 2S – 1T – AI P 2S-NPL Z: (custom)
P02.02	Nominal plant voltage	VAC	400	50÷50000
P02.03	TV Use		OFF	OFF-ON
P02.04	TV Primary	V	100	50÷50000
P02.05	TV Secondary	V	100	50÷500
P02.06	Phase sequence control		OFF	OFF L1-L2-L3 L3-L2-L1
P02.07	Wiring mode		L1-L2-L3	L1-L2-L3-N L1-L2-L3 L1-N-L2 L1-N
P02.08	Voltage control mode		L-L	L-L L-N L-L + L-N
P02.09	Nominal frequency	Hz	50Hz	50 Hz 60 Hz
P02.22	Tie breaker management (QC)		Continuous breaker	OFF Pulse breaker Continuous breaker Contactor
P02.23	Maximum tie breaker (QC) operation time	s	2	1...900
P02.24	Open pulse time	s	10	0÷600
P02.25	Close pulse time	s	2	0÷600
P02.26	UVR opening pulse time	s	1	0.1 ... 10.0
P02.27	Delay between UVR and spring load	s	0.2	0.1 ... 10.0
P02.28	Description of tie breaker QC		QC	(4 caratteri)
P02.30	Tie breaker (QC) closing delay	s	2	0.1...60.0
P02.31	Pre-transfer time load 1	s	OFF	OFF / 1÷1000
P02.32	Post-transfer time load 1	s	OFF	OFF / 1÷1000
P02.33	Pre-transfer time load 2	s	OFF	OFF / 1÷1000
P02.34	Post-transfer time load 2	s	OFF	OFF / 1÷1000
P02.37	Tie breaker QC continuous control in RESET/ OFF mode		NOC	OFF NOC
P02.39	Tie breaker QC conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
P02.40	Function index (x)		1	OFF/1...99

- P02.01 – Set up the layout of plant.
- P02.02 - Rated voltage of grid and generator. Set the line-to-line voltage for polyphase systems.

13. Parameters

- **P02.03** – Using voltage transformers (TV) on voltage metering inputs.
- **P02.04** – Primary value of any voltage transformers.
- **P02.05** – Secondary value of any voltage transformers.
- **P02.06** – Enable phase sequence control.
OFF = no control.
Direct = L1-L2-L3. Reverse = L3-L2-L1.
N.B. Enable also corresponding alarms in case of a control parameter won't be respected.
- **P02.07** – Choosing the type of connection, three-phase with/without neutral, two-phase or single phase.
- **P02.08** – Voltage checks performed on concatenated, phase voltages or both.
- **P02.09** – Rated frequency S.Q1/S.Q2
- **P02.22** – This defines the control type for tie breakers (QC). If the system layout includes tie breaker, this parameter must be set to a value other than OFF.
- **P02.23-P02.24-P02.25-P02.26-P02.27** – Control parameters of breaker used as tie breaker.
- **P02.28** - Alphanumeric description (code) which will be displayed on the synoptic panels on the display to indicate the tie breaker (where used).
- **P02.30** – Tie breaker closing delay after closing the corresponding line breakers.
- **P02.31 – P02.33** - Advance time between energising of pre-transfer output and the actual de-energising of the respective load. This controls the outputs programmed with the pre-transfer function.
- **P02.32-P02.34** – Post-transfer output energising time after conclusion of the load transfer from one line to the other.
- **P02.37**– When the breaker command mode is set to Continuous (P02.22 = Continuous control brk), this parameter defines the ATS behaviour when moving to OFF mode.
OFF = Command relays are de-energized.
NOC = Command relays hold their previous status (NO Change).
- **P02.39- P02.40** - Conditional enable of QC tie breaker. **OFF** = Tie breaker is enabled normally.
Any other setting = The tie breaker is enabled only if the selected variable is active. When the variable is not active, if the tie breaker is open, its closing will be avoided. If the tie breaker is closed, it will be opened.

13.3 Description of “Password” menu

M03 - PASSWORD		DEFAULT	RANGE
P03.01	Password enable	OFF	OFF-ON
P03.02	User level password	1000	0000÷9999
P03.03	Advanced level password	2000	0000÷9999
P03.04	Remote access password	OFF	OFF/0001÷9999

- **P03.01** – If set to OFF, password management is disabled and anyone has access to the settings and commands menu.
- **P03.02** – With P03.01 enabled, levels password are enabled. It is necessary insert the correct value to activate the access to user level (the password can be modified by customer). See “*Password access chapter*”.
- **P03.03** – As for P03.02, with reference to advanced level access.
- **P03.04** – If set to a numeric value, this becomes the code to specify via modbus to permit to send commands from a remote control.

13.4 Description of "battery" menu

The input auxiliary supply "DC battery" is used mainly to feed the ATS with steady DC current.

During the changeover operation, the auxiliary supply "DC battery" allows to guarantee the surveillance of changeover system and, in case of connection via Modbus, the exchange of data with supervision system. With this input it is also possible, in configuration U-G, to check the level of charge of generator battery and to generate an alarm in case of anomaly (see menu "alarms" A01-A02).

Inside the "battery" menu, it is possible enable the check and set nominal values of acceptability thresholds.

M04 - BATTERY		UoM	DEFAULT	RANGE
P04.01	Battery rated voltage	V	OFF	AUTO 12 24 48 OFF
P04.02	MAX. voltage limit	%	130	110÷140
P04.03	MIN. voltage limit	%	75	60÷130
P04.04	MIN./MAX. voltage delay	s	10	0÷120
P04.05	Local battery charger communication		Only for Legrand custom solution	
P04.06	Generator battery charger 1 communication		Only for Legrand custom solution	
P04.07	Generator battery charger 2 communication		Only for Legrand custom solution	

- **P04.01** – Rated battery voltage. If set to OFF, it disables the alarm and the display of the battery status.
- **P04.02** – Battery MAX. voltage alarm intervention threshold.
- **P04.03** – Battery MIN. voltage alarm intervention threshold.
- **P04.04** – Battery MIN. and MAX. alarms intervention delay.
- **P04.05-P04.06-P04.07** – Only for Legrand custom solution

The battery voltage control can be done with of connection to the DC supply terminal block (ATS terminals 26 and 27)

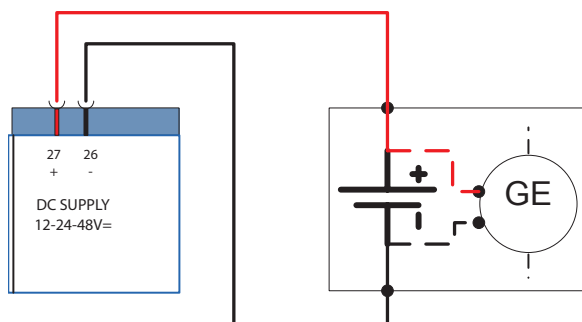


Fig. 42- DC supply terminal block

13. Parameters

13.5 Description of "Acoustic alarms" menu

M05 – ACUSTIC ALARMS		UoM	DEFAULT	RANGE
P05.01	Siren sound mode on alarm		OFF	OFF Keypad Timed Repeated
P05.02	Sound activation time on alarm	s	30	OFF/1÷600
P05.03	Sound activation time before starting	s	OFF	OFF/1÷60
P05.04	Sound activation time on remote control start	s	OFF	OFF/1÷60
P05.05	Sound activation time for no line S.Q1	s	OFF	OFF/1÷60
P05.06	Sound activation time for no line S.Q2	s	OFF	1..900
P05.08	Acoustic indication device		BUZZER+SIREN	OFF SIREN BUZZER BUZZER+SIREN
P05.09	Buzzer on key press	s	0.15	OFF/0.01÷0.50

- **P05.01** - **OFF** = siren deactivated. **Keypad** = Siren sounds continuously until it is cancelled by pressing a button on the front panel. **Timed** = Sounds for the time specified in P06.02. **Repeated** = Sounds for the time in P06.02, pause for a triple time, and then repeats cyclically.
- **P05.02** - Acoustic signal activation time on alarm.
- **P05.03** - Acoustic signal activation time before any starting of the engine.
- **P05.04** - Acoustic signal activation time following activation of a remote control via communication channel.
- **P05.05** - P05.06 - Acoustic signal activation time following lack of power on S.Q1/S.Q2 line.
- **P05.08** - Acoustic signalling device choice.
- **P05.09** - Buzzer activation and time following button pressing.

13.6 Description of "Source Lines (S.Qn)" menu

M06 – SOURCES LINES (S.Qn, n=1,2)		UNIT	DEFAULT	RANGE
P06.n.01	Source description		S.Qn	6 character
P06.n.02	Signal priority		n	1-3
P06.n.03	S.Qn source type		Mains	Mains Generator
P06.n.04	Generator cooling time	s	120	1÷3600

N.B. This menu is divided into 2 sections for source lines SQ.1 e SQ.2.

- **P06.n.01** - Alphanumeric description on the respective power source line which will be shown on the display synoptic panel.
- **P06.n.02** - Power line priority. In case of simultaneous presence of multiple power lines on the same load, the one with priority 1 is connected. If the line with priority 1 is not present, the one with priority 2 is used etc. If two sources are programmed with the same priority, the software attribute higher priority to the one most on the left.
- **P06.n.03** - This defines the type of power source of the S.Qn line. **Mains** = The mains symbols is shown on the synoptic panel. **Generator** = The generator symbol is shown and the start/stop outputs are managed; is sought.
- **P06.n.04** - Maximum cooling cycle time. Example: time which elapses between the load disconnection of the generator and the actual stopping of the engine.

13.7 Description of "Breakers" menu

M07 – BREAKERS (Qn, n=1,2)		UoM	DEFAULT	RANGE
P07.n.01	Breaker description		Qn	Max. 6 characters
P07.n.02	Interlock time S.Qn	s	3.0	0,1÷1800,0
P07.n.03	Breaker operation max. time (alarm delay A03 and A04)		2	1÷900
P07.n.04	Open pulse time	s	10	0÷600
P07.n.05	Close pulse time	s	1	0÷600
P07.n.06	Continuous control in RESET/OFF mode	s	NOC	OFF NOC
P07.n.07	Breaker following no closing (with feedback open only)		OFF	OFF ON
P07.n.08	Minimum coil opening pulse time	s	1.0	0.1÷10.0
P07.n.09	Delay between UVR and spring load		0.2	0.1÷10.0
P07.n.10	Closing retry	s	OFF	OFF AUT AUT+MAN CLOSING
P07.n.11	Breaker conditional enable	s	OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
P07.n.12	Function index (x)	s	1	OFF/1÷99

N.B. This menu is divided into 2 sections for controlling the source line breakers S.Q1 and S.Q2

- **P07.n.01** - Alphanumeric description which identifies the line breaker on the display synoptic panel.
- **P07.n.02** - Interlock time from the opening instant of the breaker Qn to the closing of another breaker.
- **P07.n.03** - Timeout between sending of a control from a line breaker and the actual execution of the operation. After having sent an opening or closing control to the breaker, alarms A03 or A04 are generated if it is not positioned correctly before the timeout. It works when the auxiliary state contacts of the breakers is programmed and wired.
- **P07.n.04** - Minimum opening control time, when the breaker control is defined by means of a pulse (P08.01 = Pulse breaker). For applications with motorized line breakers, this must be set to a sufficient time to allow complete charging of the springs. This time is considered also when working in continuous control mode.
- **P07.n.05** - Closing control pulse time.
- **P07.n.06** - Otherwise, the breaker control is selected as continuous (**P08.01** = Continuous breaker), defines the behaviour of the board when it switches to the OFF operating mode. **OFF** = The control relays are de-energised. **NOC** = The control relays remain in their original state (No Change).
- **P07.n.07** - In case of timeout caused by the line breaker Qn failing to close (open feedback contact) causes the transfer of the load on an alternative line.
- **P07.n.08** - Minimum coil deactivation pulse duration for breaker opening pulse.
- **P07.n.09** - Time elapsed between minimum voltage opening pulse and breaker spring loading control.
- **P07.n.10** - This defines whether in case of failure to close the ATS must perform a retry consisting of a cycle of opening/spring recharging cycles followed by a new closing attempt. The failed closing alarm will be generated if the second attempt also fails. **OFF** = Closing is not retried. **AUT** = Retry is manual only. **AUT+MAN** = Retry enabled in both modes. **CLOSING** = Closing retry is executed in AUT or MAN only in case of failed closing but not when breaker opens unexpectedly.
- **P07.n.11, P07.n.12** - Conditional enable of breaker. **OFF** = Breaker is enabled normally. **Any other setting** = The breaker is enabled only if the selected variable is active. When the variable is not active, if the tie breaker is open, its closing will be avoided. If the breaker is closed, it will be opened.

13. Parameters

13.8 Description of "Switch" menu.

In the following menu are contained the necessary main parameters to identify the plant set up and to define the characteristics of control and manage of the ATS on changeover system.

M08 – SWITCH		UoM	DEFAULT	RANGE
P08.01	Transfer device type		Continuous control breakers	Pulse control breakers Continuous control breakers Contactor
P08.02	Transfer strategy		OBP	OBP OAP
P08.03	Maximum load not powered time (alarm A09 tripping delay)	s	30	OFF / 1÷3600
P08.04	Automatic return on priority line inhibition		OFF	OFF/ON
P08.05	Generator start delay	s	OFF	OFF/1÷6000
P08.06	Generator rotation interval		OFF	OFF 1h-2h-3h-4h-6h-8h-12h- 1d-2d-3d 4d-5d-6d-7d
P08.07	Generator rotation time	h	0	0÷23/OFF
P08.08	Generator rotation minutes	min	0	0÷59
P08.09	Distance between generator startups	s	15	0÷9999
P08.10	EJP operating mode		Normal	Normal EJP EJP-T SCR
P08.11	EJP start delay	min	25	0÷240
P08.12	EJP switch delay	min	5	0÷240
P08.13	EJP re-switch block		ON	OFF/ON
P08.14	Closed transition enable		OFF	OFF ON IN PHASE
P08.15	Max. V delta	%	5	0 ÷25
P08.16	Max Hz delta	Hz	0,5	0,0 ÷10,0
P08.17	Max Phi delta	°	5	0,0 ÷10,0
P08.18	Synchronisation dwell	s	0,5	0,00 ÷10,00
P08.19	Max. synchronisation time	s	60	0 ÷1000
P08.20	Instantaneous parallel time	s	0,25	0,01÷5,00
P08.21	Increase-decrease voltage/frequency pulse ON time	s	0,5	0,1÷-10,0
P08.22	Increase-decrease voltage/frequency pulse OFF time	s	1	OFF /0,1÷10,0

- **P08.01** – This defines the transfer device type for power lines valid for all breakers Qn defined in menu M07. **Pulse breaker** = Motorised breakers with pulse control. **Continuous breaker** = motorised breakers with continuous control. **Contactor** = Contactor coil control.
- **P08.02** - This defines the transfer strategy. **OBP** = (Open Before Presence) this means that in automatic mode the opening control of a switch is generated when the line is beyond the limits regardless of the alternative line state. **OAP** = (Open After Presence) this means that in automatic mode the opening control of breaker is only sent after an alternative line is present in the limits.
- **P08.03** - If in automatic mode all the sources are simultaneously non available (feedback with OC contact) for longer

than this time alarm A09 load timeout not powered appears.

- **P08.04** - If this parameter is enabled after a transfer to an alternative line the return on the priority line does not occur automatically when it is re-established but must be controlled in manual mode.

OFF = Automatic return **ON** = Return to manual.

- **P08.05** - Motor start-up delay when the priority line is not within the set limits. If it is set to OFF, the starting cycle starts at the same time as the opening of the priority line breaker.
- **P08.06 – P08.07 – P08.08** - These parameters allow a timed rotation in the application with multiple generator exchanging the priority between the generators. P08.06 defines the rotation interval between the generator. The day of the day at which the rotation will occur is defined by P08.07 and P08.08.

If the rotation range is higher than 24h, then the rotation always occurs at the indicated time every n days. If it is lower than 24h, then it occurs at the indicated time and in the sub-multiples. For example, if the time is set to 12:30 with the rotation every 6h, there will be a rotation at 12:30, one at 18:30, one at 0:30 etc.

- **P08.09** - This defines the time which separates the starting for one unit from the following one. If this time elapses after sending a start control without having detected the presence of voltage, alarm A2n Line n generator not available is generated and the system starts a second generator, where available.
- **P08.10 – Normal** = This parameter is set in normal modality for default. In this modality the ATS manages in automatic lines in function of quality and stability criteria set in menu *"parameters"*.

EJP (Effacement Jours Pointe) = in this modality, the ATS manage the lines in function of external signals that command the load transfer from the grid to the generator. This request is managed in two times using 2 programmable inputs set with the functions *"Remote starting off load"* and *"Remote changeover"* for EJP.

When the starting of generator is requested by means of closing of contact *"remote changeover"*, the starting generator delay starts (P08.11). At the end the generator starts. After, when changeover command arrives, the ATS checks the status of generator and the load is transferred.

Load will be supplied by the generator until the changeover command input persists. When this command lapses, the ATS prepares to transfer the load on the main line starting the cooling cycle of generator. The EJP function is only enabled if the system is in automatic mode. The cutouts and alarms function as usual.

EJP-T = The EJP/T function is a simplified variation of the previous EJP, and in this case the engine start is controlled in the same way, but a timer switches the load instead of an external signal. This function therefore uses only one digital input, the starting input. The switching delay starts from when the programmable input INPx associated to the starting command closes (parameter P08.12).

SCR = The SCR function is very similar to the EJP function. In this mode, the starting input enables generator starting as for EJP, without waiting for start delay P08.11. The remote changeover input still has a switching go-ahead function after *"Changeover delay"* P08.12.

- **P08.11** - Delay between the EJP start signal and the effective start signal sent to the generator.
- **P08.12** - Delay for switching the load from S.Q1 to S.Q2 in EJP and SCR mode.
- **P08.13** - If ON, in EJP, EJP-T and SCR mode, the load will not be switched back to the priority line in the case of a generator failure, but only when the signals on the EJP inputs give a go-ahead.
- **P08.14** - Enabling to "close transition". It allow how the changeover of load will be manage between two power sources all present (see chapter 3.3.7 - 3.3.8).

OFF = the load will be switched with "open transition" (Default).

ON = two power sources will be synchronized (if it is possible) or a spontaneous synchronization will be waited until a specific time.

The synchronization thresholds are defined from parameters P08.15 - P08.16 - P08.17 - P08.18. In presence of all synchronizations conditions, the load will be switched with "close transition" and temporary parallel. Obviously, the breakers and external protections must be appropriately configured in this case.

IN-PHASE = In this case, the synchronisation conditions will be sought but transfer will occur in all cases with the transition open. In this case, the load is passed to a new source the amplitude and phase of which is synchronised with the previous one

- **P08.15** - Maximum voltage difference between the two sources to be synchronised expressed as a percentage of the rated voltage.
- **P08.16** - Maximum frequency difference between the two sources to be synchronised.
- **P08.17** - Maximum phase angle difference between the two sources to be synchronised.
- **P08.18** - Minimum simultaneous dwell time between the three previous conditions before the synchronism is considered reliable.
- **P08.19** - Maximum waiting time for the synchronisation conditions. After this time, an open transition is performed.
- **P08.20** - Instantaneous parallel time in closed transition.
- **P08.21 - P08.22** - These define the ON and OFF time of the pulse controls for increasing or decreasing the voltage or frequency, respectively. These times influence the programmed outputs with the increase voltage, decrease voltage, increase frequency and decrease frequency functions. The signals are intended to be sent to a generator control unit with the purpose of reaching synchronisation conditions.

13. Parameters

13.9 Description of menu "Source line control S.Qn "

In this paragraph control parameters, thresholds setting and control levels of power sources defining acceptability criteria are described. In this menu is also possible set the insensibility level to micro interruptions



N.B. The insensibility level to micro interruptions can be modified using parameter P09.10 (standard value 100ms). This could be extended until 30s in case of disturbed lines.

M09 – SOURCE LINE CONTROL (S.Qn, n=1,2)		UoM	DEFAULT	RANGE
P09.n.01	MIN voltage limit for trip	%	85	70÷100
P09.n.02	MIN voltage restore	%	90	70÷100
P09.n.03	MIN voltage delay	s	5	0÷600
P09.n.04	MAX voltage limit for trip	%	115	100÷130 / OFF
P09.n.05	MAX voltage restore	%	110	100÷130 / OFF
P09.n.06	MAX voltage delay	s	5	0÷600
P09.n.07	Return of power in the limits delayed (when any source not available)	s	10	1÷6000
P09.n.08	Return of power in the limits delayed (when a source available)	s	60	1÷6000
P09.n.09	Phase failure threshold	%	70	60% ÷80% / OFF
P09.n.10	Phase failure delay	s	0,1	0,1s÷30s
P09.n.11	MAX Asymmetry limit	%	15	1% ÷20%/OFF
P09.n.12	MAX Asymmetry delay	s	5	0,1÷900
P09.n.13	MAX frequency limit	%	105	100÷120/OFF
P09.n.14	MAX frequency delay	s	3	0÷600
P09.n.15	MIN frequency limit	%	95	OFF/80÷100
P09.n.16	MIN frequency delay	s	5	0÷600
P09.n.17	S.Qn control OFF mode		OFF	OFF ON OFF+GLOB ON+GLOB
P09.n.18	S.Qn control MAN mode		OFF	OFF ON OFF+GLOB ON+GLOB
P09.n.19	Line conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
P09.n.20	Function index (x)		1	OFF / 1÷99

N.B. These parameters are also accessible with "user" level password. This menu is divided into 2 sections for Source Line Controls S.Q1 and SQ.2.

- **P09.n.01, P09.n.02, P09.n.03** – The first two parameters define the minimum voltage threshold and the related hysteresis upon restore. **P09.n.02** cannot be set to a lower value than **P09.n.01**. **P09.n.03** defines the intervention delay of this protection.
- **P09.n.04, P09.n.05, P09.n.06** – The first two parameters define the maximum voltage threshold and the related hysteresis upon restore. **P09.n.05** cannot be set to a value exceeding **P09.n.04**. Setting **P09.n.04** to OFF will disable the maximum voltage control. **P06.n.06** defines the maximum voltage intervention delay.
- **P09.n.07** – Delay for S.Qn restores to the limit range, used when any source is not available. Generally shorter than **P09.n.08**, as there is the urgent need to supply power because the load is not energized.
- **P09.n.08** – Delay for S.Qn restores to the limit range, used when a source is available. Generally longer than **P09.n.07**, as the load is energized and consequently it is possible to wait longer before considering voltage steadily restored.
- **P09.n.09, P09.n.10** – Voltage threshold below which a phase loss intervention occurs, generally quicker than the drop. The delay for the phase loss is specified by **P09.n.10**.
- **P09.n.11, P09.n.12** – **P09.n.11** defines the maximum threshold for unbalance between phases, referred to voltage rating, and **P09.n.12** defines the related intervention delay. This control may be disabled by setting **P09.n.11** to OFF.
- **P09.n.13** – Max. frequency intervention threshold (it can be disabled).
- **P09.n.14** – Max. frequency intervention delay.
- **P09.n.15** – Min. frequency intervention threshold (it can be disabled).
- **P09.n.16** – Min. frequency intervention delay
- **P09.n.17** – Parameters and described characteristics are referred to ATS in AUT mode.
OFF = S.Qn (line n) voltage control in OFF mode disabled.
ON = Voltage control in OFF mode enabled.
OFF+GLOB = Voltage control in OFF mode disabled, but the relay programmed with the global alarm function activates or not depending on whether the voltage is respectively absent or present.
ON+GLOB = Voltage control in OFF mode enabled, and the relay programmed with the global alarm function activates or not depending on whether the voltage is respectively absent or present.
- **P09.n.18** – Parameters and described characteristics are referred to ATS in MAN mode.
OFF = S.Qn (line n) voltage control in OFF mode disabled.
ON = Voltage control in OFF mode enabled.
OFF+GBL = Voltage control in OFF mode disabled, but the relay programmed with the global alarm function activates or not depending on whether the voltage is respectively absent or present.
- **P09.n.19, P09.n.20** – Conditional enable of the source line. **OFF** = The line is normally available.
Any other setting = The line can be used only if the set variable is active.

13. Parameters

13.10 Description of "Communication" menu

M10- COMMUNICATION (COMn, n=1...3)		UoM	DEFAULT	RANGE
P10.n.01	Serial address node		05	01-247 (248 ... 255 internal use)
P10.n.02	Serial port speed	bps	19200	1200 2400 4800 9600 19200 38400 57600 115200
P10.n.03	Data format		8 bit, even	8 bit –no par. 8 bit, odd 8 bit, even 7 bit, odd 7 bit, even
P10.n.04	Stop bits		1	1-2
P10.n.05	Protocol		Modbus RTU	Modbus RTU Modbus ASCII

N.B. These parameters are also accessible with "user" level password.

The channel COM1 identified the RS-485 port. The front IR communication port for connection with **SW ACU** and **APP** via WiFi or USB has fixed communication parameters, so no setup is required.

- **P10.n.01** – Serial (node) address of the communication protocol.
- **P10.n.02** – Communication port transmission speed.
- **P10.n.03** – Data format. 7 bit settings can be used for ASCII protocol only.
- **P10.n.04** – Stop bit number.
- **P10.n.05** – Select communication protocol.
- **P10.n.06...P08.n.08** – Not available.
- **P10.n.09** – Not available.
- **P10.n.10** – Not available.
- **P10.n.11...P08.n.13** – Not available.

13.11 Description of “ Automatic Test” menu

M11 – AUTOMATIC TEST		UoM	DEFAULT	RANGE
P11.01	Enable automatic TEST generator 1		OFF	OFF / ON
P11.02	Enable automatic TEST generator 2	dd	7	1÷60
P11.04	Time interval between TESTS		ON	OFF / ON
P11.05	Enable TEST on Monday		ON	OFF / ON
P11.06	Enable TEST on Tuesday		ON	OFF / ON
P11.07	Enable TEST on Wednesday		ON	OFF / ON
P11.08	Enable TEST on Thursday		ON	OFF / ON
P11.09	Enable TEST on Friday		ON	OFF / ON
P11.10	Enable TEST on Saturday		ON	OFF / ON
P11.11	Enable TEST on Sunday		ON	OFF/ON
P11.12	TEST start time	h	12	00÷23
P11.13	TEST start minutes	Min	00	00÷59
P11.14	TEST duration	Min	10	1÷600
P11.15	Automatic TEST with load switching		OFF	OFF Load Dummy-Load

N.B. These parameters are also accessible with “user” level password.

- **P11.01 – P11.02** – Enable programmed periodical test of 2 generators.
- **P11.04** – Time interval between one periodic test and the next. If the test isn’t enabled the day the period expires, the interval will be extended to the next enabled day
- **P11.05÷P11.11** It enables the automatic test in each single day of the week. OFF means the test will not be performed on that day.
N.B. The calendar clock must be set to the right date and time.
- **P11.12 – P11.13** It sets the time (hour and minutes) when the periodic test starts.
N.B. The calendar clock must be set to the right date and time.
- **P11.14** – Duration in minutes of the periodic test.
- **P11.15** – Load management during the periodic test:
OFF = The load will not be switched; the checks of correct start of generator are done.
Load = It enables switching the load from the mains to the generator.
Dummy load = The dummy load is switched in, and the system load will not be switched.

13. Parameters

13.12 Description of “digital inputs” menu

M12– DIGITAL INPUTS (INPn, n=1...20)		UoM	DEFAULT	RANGE
P12.n.01	INPn input function		(miscellaneous)	(see Input functions table)
P12.n.02	Function index (x)		OFF	OFF / 1÷99
P12.n.03	Contact type		NO	NO/NC
P12.n.04	Closing delay	s	0.05	0.00÷600.00
P12.n.05	Opening delay	s	0.05	0.00÷600.00

Note: This menu is divided into 20 sections that refer to 12 possible digital inputs INP1...INP12, which can be managed by the ATS. Other inputs can be managed using the expansion modules.

- **P12.n.01** – It selects the functions of the chosen input (see “programmable inputs functions table”).
- **P12.n.02** – Index associated with the function programmed in the previous parameter P12.n.01 (“input function selection”).
Example: If the input function is set to Cxx “commands menu execution”, and if this input has to perform command C.07 in the commands menu, P12.n.02 should be set to value 7.
- **P12.n.03** – Select type of contact: NO (Normally Open) or NC (Normally Closed).
- **P12.n.04** – Contact closing delay for selected input.
- **P12.n.05** – Contact opening delay for selected input.



The configuration installed on ATS by Legrand ensures the correct work if standard wiring diagrams supplied are respected.

WARNING: the modify of parameters could generate incompatibility with supplied wiring diagrams. It is recommended to not modify the original configuration.

Using expansion modules is possible to increase the amount of inputs available in order to do additional checks and controls (this solution is recommended to avoid the change of work mode of inputs in case of specific applications).

13.13 Description of “Programmable outputs” menu

M13 – PROGRAMMABLE OUTPUTS (OUTn n=1...20)		UoM	DEFAULT	RANGE
P13.n.01	Output function OUTn		(various)	(see Output functions table)
P13.n.02	Function index (x)		1	OFF / 1÷99
P13.n.03	Normal/reverse output		NOR	NOR / REV

Note: This menu is divided into 20 sections that refer to 10 possible digital outputs OUT1... OUT10 managed by the ATS, and others inputs managed using the expansion modules.

- **P13.n.01** – It selects the functions of the selected output (see “programmable outputs functions” table).
- **P13.n.02** – Index associated with the function programmed in the previous parameter P13.n.01 (“output function selection”).
Example: If the output function is set to “Alarm” Axx, and it’s needed to energize this output for alarm A16, then P13.n.02 should be set to value 16.
- **P13.n.03** – It sets the state of the output when the function associated with the same is inactive: **NOR** = output de-energized, **REV** = output energized.



The configuration installed on ATS by Legrand ensures the correct work if standard wiring diagrams supplied are respected.

WARNING: the modify of parameters could generate incompatibility with supplied wiring diagrams. It is recommended to not modify the original configuration.

Using expansion modules is possible to increase the amount of outputs available in order to do additional checks and controls (this solution is recommended to avoid the change of work mode of outputs in case of specific applications).

13.14 Description of “Miscellaneous” menu

M14 – MISCELLANEOUS		UoM	DEFAULT	RANGE
P14.01	Service interval in hours	h	OFF	OFF / 1÷99999
P14.02	Service interval operations		OFF	OFF/ 1÷99999
P14.03	Operative mode output		OFF	OFF O M M – O A Etc...

- **P14.01** – It defines the programmed maintenance period in function of customer needs, in hours. If set to OFF, this interval is disabled.
- **P14.02** – It defines the programmed maintenance period in function of customer needs, in number of operations. If set to OFF, this interval is disabled.
- **P14.03** – It defines in which operating mode the programmed output with the “operating mode” function is enabled. *Example*, if this parameter is programmed for M –O, the “operating mode” output will be enabled when the automatic transfer switch is in MAN or OFF mode.

13.15 Description of “Limit thresholds” menu

M15 – LIMIT THRESHOLDS (LIMn, n = 1...16)		UoM	DEFAULT	RANGE
P15.n.01	Reference measurement		OFF	OFF- (list measure) AINx CNTx Etc...
P15.n.02	Reference measurement source		OFF	OFF S.Q1 S.Q22
P15.n.03	Channel no. (x)		1	OFF/1÷99
P15.n.04	Function limit check		Max	Max Min Min+Max
P15.n.05	Upper threshold		0	-9999 ÷ +9999
P15.n.06	Multiplier upper threshold		x1	/100 – x10k
P15.n.07	Delay	s	0	0.0 ÷ 600.0
P15.n.08	Multiplier lower threshold		0	-9999 ÷ +9999
P15.n.09	Multiplier		x1	/100 – x10k
P15.n.10	Delay	s	0	0.0 ÷600.0
P15.n.11	Idle state		OFF	OFF-ON
P15.n.12	Memory		OFF	OFF-ON

Note: this menu is divided into 16 sections for the limit thresholds LIM1...16

- **P15.n.01** – It defines to which automatic transfer switch measurements the limit threshold applies.
- **P15.n.02** – If the reference measurement is an electrical one, this defines if it refers to the S.Q1 or S.Q2.
- **P15.n.03** – If the reference measurement is an internal multichannel measurement, the channel is defined with this parameter.
- **P15.n.04** – – It defines the operating mode of the limit threshold.
MAX = LIMn enabled when the measurement exceeds P15.n.05 multiplied P15.n.06. P15.n.08 multiplied P15.n.09 is the reset threshold. **MIN** = LIMn enabled when the measurement is less than P15.n.08 multiplied P15.n.09. P15.n.05 multiplied P15.n.06 is the reset threshold. **MIN+MAX** = LIMn enabled when the measurement is greater than P15.n.05

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- multiplied P15.n.06 or less than P15.n.08 multiplied P15.n.09.
- **P15.n.05 e P15.n.06** – It defines the upper threshold, obtained by multiplying value P15.n.03 (unitary) by P15.n.04 (coefficient useful for example with a TV).
- **P15.n.07** – Upper threshold intervention delay.
- **P15.n.08, P15.n.09, P15.n.10** – As P15.n.05, P15.n.06, P15.n.07 referred to the lower threshold.
- **P15.n.11** – It inverts the state of limit LIMn.
- **P15.n.12** – It defines whether the threshold remains memorized and is reset manually through command menu (ON) or if it is reset automatically (OFF).

13.16 Description of “Counters” menu

M16 – COUNTERS (CNTn, n = 1...8)		UoM	DEFAULT	RANGE
P16.n.01	Count source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAx
P16.n.02	Channel number (x)		1	OFF/1÷99
P16.n.03	Multiplier		1	1÷1000
P16.n.04	Divisional		1	1÷1000
P16.n.05	Description of the counter		CNTn	(Text – 16 characters)
P16.n.06	Measurement unit		UMn	(Text – 6 characters)
P16.n.07	Reset source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAx
P16.n.08	Channel number (x)		1	1÷99

Note: this menu is divided into 8 sections for counters CNT1..8. Using this function it is possible to count how many time one event, associated to a LIMx and/or external command by means of inputs, occurs.

- **P16.n.01** – Signal that increments the count (on the output side). This may be a threshold is exceeded (LIMx), an external input is enabled (INPx), etc.
- **P16.n.02** – Channel number x with reference to the previous parameter.
- **P16.n.03** – Multiplier K. The counted pulses are multiplied by this value before being displayed.
- **P16.n.04** – Divisional K. The counted pulses are divided by this value before being displayed. If other than 1, the counter is displayed with 2 decimal points.
- **P16.n.05** – Counter description. 16-character free text.
- **P16.n.06** – Counter unit of measurement. 6-character free text.
- **P16.n.07** – Signal that resets the count. As long as this signal is enabled, the count remains zero.
- **P16.n.08** – Channel number x with reference to the previous parameter.

13.17 Description of "Timer" menu

M17 – TIMER (TIMn, n = 1...8)		UoM	DEFAULT	RANGE
P17.n.01	Timer source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAX
P17.n.02	Channel no. (x)		1	1÷99
P17.n.03	Delay	s	1	0.0÷6000.0

Note: This menu is divided into 8 sections for the timers TIM1..8.

- P17.n.01 – Source variable which controls the starting and resetting of the concerned timer.
- P17.n.02 – Channel number referred to the previous parameter.
- P17.n.03 – Timer time.

13.18 M19 Description of "Analog inputs" menu

ONLY for Legrand custom solution.

13.19 M20 Description of " Analog outputs " menu

ONLY for Legrand custom solution.

13.20 Description of "User alarms" menu

M21 – USER ALARMS (UAn, n=1...8)		UoM	DEFAULT	RANGE
P21.n.01	Alarm source		OFF	OFF INPx OUTx LIMx REMx PLCx TIMx
P21.n.02	Channel number (x)		1	OFF/1÷99
P21.n.03	Text		UAn	(text – 20 characters)
P21.n.04	Q1 opening		OFF	OFF ON
P21.n.05	Q2 opening		OFF	OFF ON

Note: this menu is divided into 8 sections for user alarms UA1÷UA8.

- P21.n.01 – It defines the digital input or internal variable that generates the user alarm when it is activated.
- P21.n.02 – Channel number x with reference to the previous parameter.
- P21.n.03 – Free text that appears in the alarm window.
- P21.n.04 –P21.n.05 Line to open in case of this alarm.

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Example: the user alarm UA3 has to be generated from closure of INP5 and it has to shown a message without to open any breaker.

In this case it is necessary set the section 3 of the menu (for alarm UA3):

P21.3.01 = INPx

P21.3.02 = 5

P21.3.03 = "...message..."

P21.3.04, P21.3.05 = OFF

13.21 Description of "Alarms" menu

- When an alarm is generated, the display will show an alarm icon, the code and the description of the alarm in the language selected.



Fig. 43 - Example of alarm message

- If the navigation keys in the pages are pressed, the pop-up window showing the alarm indications will disappear momentarily, to reappear again after a few seconds.
- The red LED near the alarm icon on the front panel will flash when an alarm is active. In the area of synoptic on the display remains a flashing icon that represents the type of the alarm.
- Alarms can be reset by pressing the OFF key.
- If the alarm cannot be reset, the problem that generated the alarm must be solved.
- In the case of one or more alarms, the behaviour of the automatic transfer switch depends on the properties settings of the active alarms.

13.22 Alarm properties

The ATS has the possibility to manage and generate different types of user alarms (*User Alarms, Uax*) and for each one can be associated different properties:

- **Alarm enabled** – General enabling of the alarm. If the alarm isn't enabled, it's like if it doesn't exist.
- **Only AUT** – The alarm can be generated only when automatic transfer switch is in AUT operating mode.
- **Retained alarm** – It remains in the memory even if the cause of the alarm has been eliminated.
- **Global alarm** – It activates the output assigned to this function.
- **Q1 Locked** – When the alarm is active, no commands are sent to Q1.
- **Q2 Locked** – Like previous property, referred to Q2.
- **Siren** – It activates the output assigned to this function, as configured in the alarm table.
- **Inhibition** – The alarm can be temporarily disabled by activating an input that can be programmed with the Inhibit alarms function.
- **No LCD** – The alarm is normally managed, but not shown on the display. This property is associated only if the alarm is not retenitive.

13.23 Alarm table

CODE	DESCRIPTION	ENABLED	ONLY AUT	RETAINED	GLOB. ALM. A	GLOB. ALM. B	LOCK Q1	LOCK Q2	SIREN	INHIBITION	MODEM	NO LCD
A01	Low battery voltage	•		•		•			•		•	
A02	High battery voltage	•		•		•			•		•	
A03	Q1 switch failure	•	•	•	•		•		•		•	
A04	Q2 switch failure	•	•	•	•			•	•		•	
A06	Incorrect S.Q1 phase sequence	•		•	•				•		•	
A07	Incorrect S.Q2 phase sequence	•		•	•				•		•	
A09	Load not powered timeout	•	•		•				•		•	
A10	Local battery charger failure	•		•	•				•		•	
A11	Gen. 1 battery charger failure	•		•	•				•		•	
A12	Gen. 2 battery charger failure	•		•	•				•		•	
A14	Emergency stop	•		•	•				•		•	
A15	Q1 breaker trip	•		•	•		•	•	•		•	
A16	Q2 breaker trip	•		•	•		•	•	•		•	
A18	Q1 breaker withdrawn	•	•	•	•		•		•		•	•
A19	Q2 breaker withdrawn	•	•	•	•			•	•		•	•
A21	S.Q1 not ready	•			•				•		•	
A22	S.Q2 not ready	•			•				•		•	
A24	Maintenance 1 Requested	•				•					•	
A25	Maintenance 2 Requested	•				•					•	
A27	Maintenance 1 NR. Requested	•				•					•	
A28	Maintenance 2 NR. Requested	•				•					•	
A30	Aux voltage failure	•			•				•		•	
A32	Tie breaker QC switch failure	•	•	•	•		•	•	•		•	
A35	QC breaker trip	•		•	•		•	•	•		•	
A38	QC breaker withdrawn	•	•	•	•				•		•	•
UA1..8	UAX	•		•		•			•		•	

13. Parameters

13.24 Alarm description

CODE	DESCRIPTION	ALARM EXPLANATION
A01	Low battery voltage	Battery voltage beyond the lowest threshold for a time exceeding the time set.
A02	High battery voltage	Battery voltage beyond the highest threshold for a time exceeding the time set.
A03	Q1 switch Time out	The Q1 changeover device did not perform the opening or closing operation within the max. time set. After alarm A03 generation, the opening or closing command is inhibited. Alarms are generated only if at least one of the two power sources S.Q1 or S.Q2 are present.
A04	Q2 switch Time out	The Q2 changeover device did not perform the opening or closing operation within the max. time set. After alarm A04 generation, the opening or closing command is inhibited. Alarms are generated only if at least one of the two power sources S.Q1 or S.Q2 are present.
A06	Incorrect S.Q1 phase sequence	The phase sequence recorded on S.Q1 (line 1) does not correspond to the one programmed.
A07	Incorrect S.Q2 phase sequence	The phase sequence recorded on S.Q2 (line 2) does not correspond to the one programmed.
A09	Load not powered timeout	The load has been without power for a time longer than the maximum specified with P05.11, either because both source lines (S.Q1 and S.Q2) were absent or because both Q1 and Q2 remained open.
A10	Local battery charger failure	Alarm generated by the input programmed with the Local battery charger alarm function connected to an external battery charger when at least one of the sources is in the limits.
A11	Gen. 1 battery charger failure	Alarm generated by the input programmed with the generator 1 battery charger alarm function connected to an external battery charger when at least one of the sources is in the limits.
A12	Gen. 2 battery charger failure	Alarm generated by the input programmed with the generator 2 battery charger alarm function connected to an external battery charger when at least one of the sources is in the limits.
A14	Emergency stop	Alarm generated by the opening of the external input with Emergency function. Both Q1 and Q2 will be opened.
A15	Q1 breaker trip	Q1 (Line 1) has tripped because of a plant protection (contact CTR), signalled by activation of the input with function "Q1 breaker trip".
A16	Q2 breaker trip	Q2 (Line 2) has tripped because of a plant protection (contact CTR), signalled by activation of the input with function "Q2 breaker trip".
A18	Q1 breaker withdrawn	Q1 is not available because the input with function "Q1 breaker withdrawn" indicate that the breaker is not inserted into the base.
A19	Q2 breaker withdrawn	Q2 is not available because the input with function "Q2 breaker withdrawn" indicate that the breaker is not inserted into the base.
A21	S.Q1 not ready	Alarm generated by the input Generator S.Q1 (Line 1) ready.
A22	S.Q2 not ready	Alarm generated by the input Generator S.Q2 (Line 2) ready.
A24	Maintenance 1 Allert	Alarm generated when the maintenance hours for S.Q1 arrive to zero. See M12 menu. Use the command menu to restore the working hours and to reset the alarm.

CODE	DESCRIPTION	ALARM EXPLANATION
A25	Maintenance 2 Allert	Alarm generated when the maintenance hours for S.Q2 arrive to zero. See M12 menu. Use the command menu to restore the working hours and to reset the alarm.
A27	Maintenance 1 NR. Allert	Alarm generated when the number of operations for S.Q1 reach the value sated in the menu M12. Use the menu commands to restore the function and to reset the alarm.
A28	Maintenance 2 NR. Allert	Alarm generated when the number of operations for S.Q2 reach the value sated in the menu M12. Use the menu commands to restore the function and to reset the alarm.
A30	Aux voltage failure	The device that manages the draw of auxiliary power supply from one of the available lines (DPS-auxiliary contact) signals a failure or improper operation.
A32	Tie breaker QC switch failure	QC did not perform the opening or closing operation before the timeout. The opening or closing control is inhibited after the alarm has been generated. The alarms are only generated if one of the power sources is present, i.e. higher than the minimum programmed thresholds.
A35	QC breaker trip	QC has tripped because of a plant protection (contact CTR), signalled by activation of the input with function "QC breaker trip".
A38	QC breaker withdrawn	QC is not available because the input with function "QC breaker withdrawn" indicate that the breaker is not inserted into the base.
UA1..8	UAx	The user alarm is generated by enabling the variable or associated input in menu M15.

14. Function I/O

14.1 Programmable inputs function table



The configuration installed on ATS by Legrand ensures the correct work if standard wiring diagrams supplied are respected. **WARNING: the modify of parameters could generate incompatibility with supplied wiring diagrams. It is recommended to not modify the original configuration.**

Using expansion modules is possible to increase the amount of inputs available in order to do additional checks and controls (this solution is recommended to avoid the change of work mode of inputs in case of specific applications).

- The following table shows all the functions that can be attributed to the INPn programmables digital inputs.
- Each input can be set for an reverse function (NA – NC), delayed energizing or de-energizing at independently set times.
- Some functions require another numeric parameter, defined in the index (x) specified by parameter **P12.n.02**.
- See menu M12 “Programmable inputs” for more details.

FUNCTION	DESCRIPTION
Disabled	Input disabled
Configurable	Free user configuration
Q1 Feedback	Auxiliary contact informing the automatic transfer switch of the open/closed status of Q1 contact OC line 1. Wiring mandatory.
Q2 Feedback	Auxiliary contact informing the automatic transfer switch of the open/closed status of Q2 contact OC line 2. Wiring mandatory.
Q1 Trip	When the contact is closed, it informs the ATS of Q1 trip status (CTR). It generates an alarm for Q1 intervention.
Q2 Trip	When the contact is closed, it informs the ATS of Q2 trip status (CTR). It generates an alarm for Q1 intervention.
Q1 Withdrawn	The contact generates the breaker Q1 withdrawn alarm when the contact is open.
Q2 Withdrawn	The contact generates the breaker Q2 withdrawn alarm when the contact is open.
Remote switch	When closed, it causes changeover to secondary line even if main line voltage is within limits. It could be used to change priority between S.Q1 and S.Q2. The secondary line circuit breaker remains activated until this line remains within limits. It can be used for EJP function.
Inhib. Return pri.li	In AUT mode, when closed, it inhibits the return to main line after it has reverted to the limit range. It is used to prevent the second power cut out due to re-transfer from occurring automatically at an unforeseeable time.
Inhib. Return open tra.	In AUT mode, when closed, it prevents automatic return to the priority line in open transition after it returns into the limits (it prevents opening of the line in use in the following conditions: input closed and so line in limits). This prevents the second energy interruption caused by retransfer occurring automatically in an unpredictable moment in open transition.
Rem. Start off load	In AUT mode, when closed, it causes the starting of the priority generator after the time set with Pxx.xx. May also be used for the EJP function.
Gen 1 start off load	In AUT mode, when closed, it overrides starting of generator 1.
Gen 2 start off load	In AUT mode, when closed, it overrides starting of generator 2.
Emergency stop	NC contact which, if open, it causes both circuit Q1 and Q2 open and it generates alarm A09.
Generator 1 ready	When closed, it signals that the generator connected to line 1 is available for use. If this signal is missing, alarm A12 is generated.
Generator 2 ready	When closed, it signals that the generator connected to line 2 is available for use. If this signal is missing, alarm A13 is generated.
Emergency stop	NC contact which, if open, it causes both circuit Q1 and Q2 open and it generates alarm A09.
Generator 1 ready	When closed, it signals that the generator connected to line 1 is available for use. If this signal is missing, alarm A12 is generated.
Generator 2 ready	When closed, it signals that the generator connected to line 2 is available for use. If this signal is missing, alarm A13 is generated.
Ext S.Q1 control	Line 1 voltage control signal from external device. Enabled, it indicates the voltage is within the limits.
Ext S.Q2 control	Line 2 voltage control signal from external device. Enabled, it indicates the voltage is within the limits.

FUNCTION	DESCRIPTION
Load to S.Q1	It allows load connection on S.Q1, in addition to internal controls.
Load to S.Q2	It allows load connection on S.Q2, in addition to internal controls.
Delay 1 bypass	Reset the delay presence on S.Q1
Delay 2 bypass	Reset the delay presence on S.Q2
Keyboard lock	If closed, it locks all the functions from front keypad except measure viewing.
Settings lock	If closed, it locks the access to setup menus.
Remote control lock	If closed, it locks write access through serial interface ports.
Reset siren	It disables the siren.
Start automatic test	It starts the periodic test managed by an external timer.
Battery charger fail	With the input enabled, it generates the alarm A10 "External battery charger fault". The alarm is only generated when there is almost a power source.
Bat char. fail GEN. 1	With the input enabled, it generates the alarm A11 "Battery 1 charger fault". The alarm is only generated when there is almost a power source.
Bat char. fail GEN. 2	With the input enabled, it generates the alarm A12 "Battery 2 charger fault". The alarm is only generated when there is almost a power source.
Alarm inhibition	If enabled, it disables the alarms that have the property Inhibit alarms activated.
Alarm reset	It resets the retained alarms for which the condition that triggered the same has stopped.
Commands menu Cxx	It executes the command from the commands menu defined by index parameter (xx).
Key OFF	Closing the input, it is the same of pressing the key.
Key MAN	Closing the input, it is the same of pressing the key.
Key AUT	Closing the input, it is the same of pressing the key.
Key TEST	Closing the input, it is the same of pressing the key.
Test inhibition	It inhibits the automatic test
Test LED	It makes all the LEDS blink on the front panel flash.
Close brk1	Close the Q1 in manual mode.
Open brk1	Open the Q1 in manual mode.
Toggle 1	Toggle the Q1 in manual mode.
Close brk2	Close the Q2 in manual mode.
Open brk2	Open the Q2 in manual mode.
Toggle 2	Toggle the Q2 in manual mode.
Auxiliary voltage ready	NC contact which, if opened, it generates alarm A18. Used, for example, in conjunction with the alarm relay of DPS.
Revision	In case of revision of the system, if enabled, it causes: <ul style="list-style-type: none"> • Switch to OFF mode • Disabling alarms feedback A03 - A04 • Excitement of any undervoltage coils
Top priority S.Q1	When closed, S.Q1 becomes the priority line.
Top priority S.Q2	When closed, S.Q2 becomes the priority line.
QC Feedback	Auxiliary contact (OC) which informs the ATS of the opened/closed state of tie breaker QC. If this signal is not connected, ATS considers the state of the QC corresponding to the control output state.
QC Trip	The input generates tie breaker QC protection tripping when the contact closes.
QC Withdrawn	The contact generates the breaker QC withdrawn alarm when the contact is opened.
Close QC	Close the QC in manual mode.
Open QC	Open the QC in manual mode.
Toggle QC	Toggle the QC in manual mode.

14. Function I/O

14.2 Default programmable inputs

INPUT	TERMINAL	DEFAULT INPUT FUNCTION
INP1	40	Q1 closed (Feedback Q1)
INP2	41	Q1 tripped (Trip Q1)
INP3	42	Disabled
INP4	43	Q2 closed (Feedback Q2)
INP5	44	Q2 tripped (Trip Q2)
INP6	45	Disabled
INP7	46	QC closed (Feedback QC)
INP8	47	QC tripped (Trip QC)

14.3 Output function table



The configuration installed on ATS by Legrand, ensures the correct work if standard wiring diagrams supplied are respected. **WARNING: the modify of parameters could generate incompatibility with supplied wiring diagrams. It is recommended to not modify the original configuration.**

Using expansion modules is possible to increase the amount of outputs available in order to do additional checks and controls (this solution is recommended to avoid the change of work mode of outputs in case of specific applications).

- The following table shows all the functions that can be assigned to the OUTn programmable digital inputs.
- Each output can be configured so it has a normal or reverse (NOR or REV) function.
- Some functions require another numeric parameter, defined in the index (x) specified by parameter **P13.n.02**.
- See menu M13 "Programmable outputs" for more details.

FUNCTION	DESCRIPTION
Disabled	Output disabled
Configurable	User configuration free
Q1 Close	Command to close Q1
Q1 Open	Command to open Q1 and eventual springs charging
Q2 Close	Command to close Q2
Q2 Open	Command to open Q2 and eventual springs charging
Q1+2 Open	Open both Q1 and Q2.
Min V Coil 1	It controls the UVR, opening Q1 before the spring load cycle
Min V Coil 2	It controls the UVR, opening Q2 before the spring load cycle
Control generator 1	Start /Stop remote control of S.Q1 generator
Control generator 2	Start /Stop remote control of S.Q2 generator
ATS ready	Automatic transfer switch in automatic mode, without alarms, ready to switch
Global alarm A	Output enabled in the presence of any alarm with the "Global alarm A" propriety enabled
Global alarm B	Output enabled in the presence of any alarm with the "Global alarm Battery"
S.Q1 voltage ok	Output energized when there are all conditions to be able to connect the load to the S.Q1
S.Q2 voltage ok	Output energized when there are all conditions to be able to connect the load to the S.Q2
Siren	It powers the siren.
Operating mode	Output energized when the ATS is in one of the modes set with parameter P14.03
Operating mode OFF	Energized when the automatic transfer switch is OFF
Operating mode MAN	Energized when the automatic transfer switch is in MANUAL mode
Operating mode AUT	Energized when the automatic transfer switch is in AUT mode
Operating mode TEST	Energized when the automatic transfer switch is in TEST mode


FUNCTION	DESCRIPTION
REM(x)	Output controlled by remote variable REMx (x=1..16)
LIM (x)	Output controlled by the state of the limit threshold LIM(x) (x=1..16) defined by the index parameter
Dummy load 1	Output enabled when self-test with dummy load on S.Q1 is running.
Dummy load 2	Output enabled when self-test with dummy load on S.Q2 is running.
S.Q1 conn. To load	Q1 closed
S.Q2 conn. To load	Q2 closed
Axx	Output energized with alarm Axx is enabled (xx=1...alarms number)
Uax	Output energized with alarm Uax is enabled (x=1...8)
TIM(x)	Output controlled by state of timer variable TIM(x). (x=1..8) is defined by the index parameter.
PLC(x)	Output controlled by state of timer variable PLC(x). (x=1..32) is defined by the index parameter
Pre-transfer 1	Energised output before the load is transferred from one source to another, both present. Programmable advance time using parameter P02.22.
Post-transfer 1	Energised output after the load is transferred from one source to another. Programmable indicating time using parameter P02.23.
Pre-transfer 2	Energised output before the load is transferred from one source to another, both present. Programmable advance time using parameter P02.22.
Post-transfer 2	Energised output after the load is transferred from one source to another. Programmable indicating time using parameter P02.23.
Increase AVR Line 1	Signal to increase voltage of generator of S.Q1.
Increase AVR Line 2	Signal to increase voltage of generator of S.Q2.
Decrease AVR Line 1	Signal to reduce voltage of generator of S.Q1.
Decrease AVR Line 2	Signal to reduce voltage of generator of S.Q2.
Increase GOV Line 1	Signal to increase frequency of generator of S.Q1.
Increase GOV Line 2	Signal to increase frequency of generator of S.Q2.
Decrease GOV Line 1	Signal to reduce frequency of generator of S.Q1.
Decrease GOV Line 2	Signal to reduce frequency of generator of S.Q2.
QC Close	Closing command of QC.
QC Open	Opening command of QC and eventual springs charge.
Min coil tie breaker 1	Command the UVR opening QC before the cycle of springs charge.

14.4 Default programmable outputs

OUTPUT	TERMINALS	DEFAULT OUTPUT FUNCTION
OUT1	55-56	Command ST Line 1 (Q1)
OUT2	56-57	Command CC Line 1 (Q1)
OUT3	58-59	Command ST Line 1 (Q2)
OUT4	59-60	Command CC Line 1 (Q2)
OUT7	19-20-21	Global alarm A
OUT9	30-31	Command CC tie breaker (QC)
OUT10	33-34	Command ST tie breaker (QC)

15. Commands menu

- The commands menu allows executing some operations like reading peaks resetting, counters clearing, alarms reset, etc.
- If the Advanced level password has been entered, then the commands menu allows executing the automatic operations useful for the device configuration.
- The following table lists the functions available in the commands menu, divided by the access level required.

CODE	COMMAND	ACCESS LEVEL	DESCRIPTION
C01	Reset maintenance hours S.Q1	Advanced	Reset maintenance interval hours S.Q1
C02	Reset maintenance hours S.Q2	Advanced	Reset maintenance interval hours S.Q2
C04	Reset maintenance operations S.Q1	Advanced	Reset maintenance interval operations S.Q1
C05	Reset maintenance operations S.Q2	Advanced	Reset maintenance interval operations S.Q2
C07	Reset generic counters CNTx	User	Reset generic counters CNTx.
C08	Reset LIMx limits	User	Reset limits LIMx variable status
C09	Reset hours counter S.Q1	Advanced	Reset counter of presence / absence of S.Q1 in the respective limits
C10	Reset hours counter S.Q2	Advanced	Reset counter of presence / absence of S.Q2 in the respective limits
C12	Reset hours counter Q1	Advanced	Reset counter opening / closing Q1
C13	Reset hours counter Q2	Advanced	Reset counter opening / closing Q2
C15	Reset Q1 operation	Advanced	Reset Q1 operations counter
C16	Reset Q2 operation	Advanced	Reset Q2 operations counter
C18	Reset events list	Advanced	Reset the list of historical events
C19	Reset default parameters	Advanced	Reset all the parameters in the setup menu to the default values
C20	Save parameters in backup memory	Advanced	Copy the parameters currently set to a backup for restoring in the future
C21	Reload parameters from backup memory	Advanced	Transfer the parameters saved in the backup memory to the active settings memory
C22	Forced I/O	Advanced	Enable test mode so you can manually energize any output.  WARNING! In this mode the installer only is responsible for the output commands
C23	Reset A03 – A04 alarms	Advanced	Restore the opening and closing command of the commutation devices after generating alarms A03 – A04
C24	Simulate line failure	Advanced	The device moves to AUT mode and simulates the lack of the priority line for one minute. It then switches the load with the automatic procedure as programmed
C25	Reset PLC memory	Advanced	It cancels the memory of PLC ladder language.

- Once the required command has been selected, press ✓ to execute it.
The device will prompt for a confirmation. Pressing ✓ again, the command will be executed.
- To cancel the command execution press **RESET**.
- To quit command menu press **RESET**.

16. Installation

- The automatic transfer switch is designed with IP65 protection.
- Insert the device into the panel hole,
- From inside the panel, for each four of the fixing clips, position the clip in its square hole on the housing side, then move it backwards in order to position the hook.

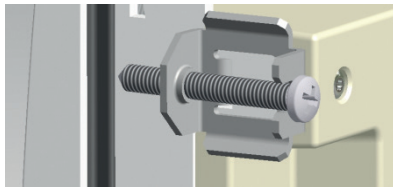
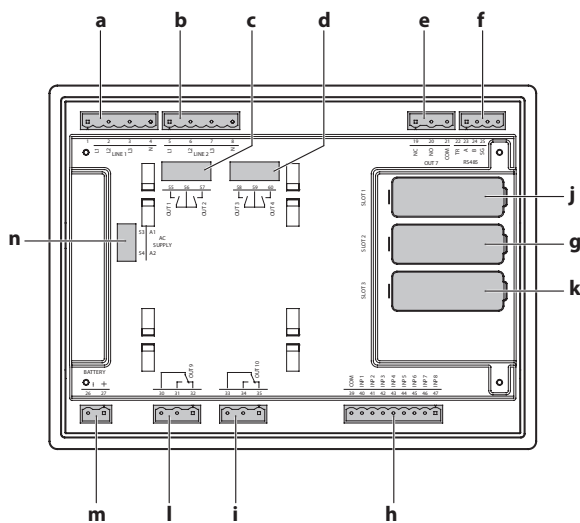


Fig. 44 - Mounting

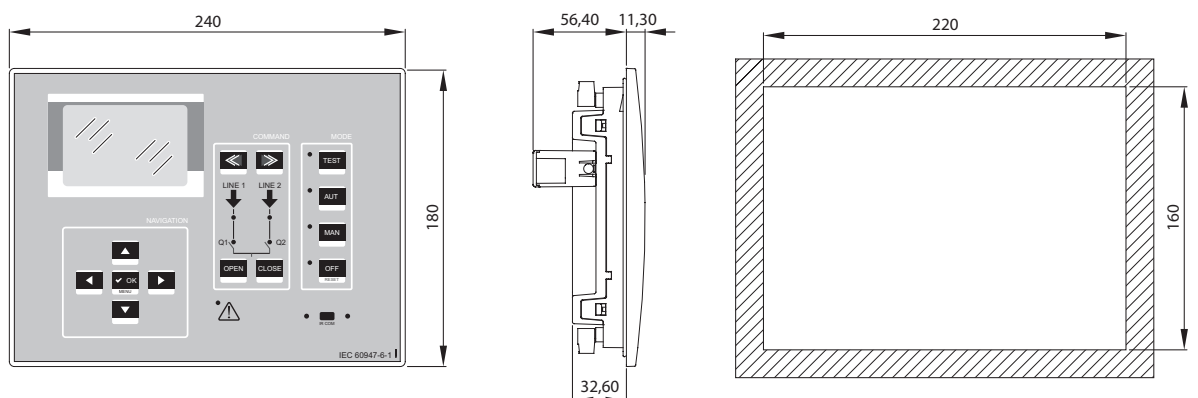
- Repeat the same operation for the four clips.
- Tighten the fixing screw with a maximum torque of 0.5Nm.
- In case it is necessary to dismount the system, unloose the screws.
- For the electrical connection see the Legrand wiring diagrams.

17. Terminals position



CODE	DESCRIPTION
a	Line 1 voltage control(S Q1)
b	Line 2 voltage control(S Q2)
c	OUT1 - OUT2 - (NO) Programmable relay
d	OUT3 - OUT4 - (NO) Programmable relay
e	OUT 7 - (NO/NC) Programmable relay
f	RS485 Communication Port
g	COM 2
h	Programmable inputs(INP xxx)
i	OUT 10 - (NO/NC) Programmable relay
j	COM 1
k	COM 3
l	OUT 9 - (NO/NC) Programmable relay

18. Dimensions



19. Technical characteristics

TECHNICAL CHARACTERISTICS	
AC Supply : terminals 53-54	
Rated voltage Us	100 - 240VAC
Operating voltage range	90 - 264VAC
Frequency	45 - 66Hz
Power consumption/dissipation	100VAC 10VA, 5,3W 240VAC 12,5VA, 5,5W
Immunity time for microbreakings (without expansions connected)	≤40ms (110VAC) ≤200ms (220VAC)
Immunity time for microbreakings (with 2 expansions connected)	≤20ms (110VAC) ≤100ms (220VAC)
Recommended fuses	F1A (fast)
DC supply: terminals 26-27	
Battery rated voltage	12÷48VDC
Operating voltage range	7,5-57.6VDC
Maximum current consumption	230mA a 12VDC 120mA a 24VDC 100mA a 48VDC
Maximum power consumption/dissipation	4,8W
Recommended fuses	T3,15A (delayed)
Line 1 and Line 2 voltage inputs: terminals 1÷4 and 5÷8	
Maximum rated voltage Ue	600VAC L-L (346VAC L-N)
Measuring range	50÷720VAC L-L (415VAC L-N)
Frequency range	45÷65Hz-360÷440Hz
Measuring method	(TRMS)
Measuring input impedance	> 0,5MΩ L-N > 1,1MΩ L-L
Wiring mode	Three-phase with or without neutral or balanced three-phase system.
Measuring accuracy	
Mains and generator voltage	±0,25% f.s. ±1digit
Real time clock	
Energy storage	Back-up capacitors
Operating time without supply voltage	About 14 days
Digital inputs: terminals 39 ÷ 47	
Input type	negative
Current input	≤8mA
Input "low" voltage	≤2,2V
Input "high" voltage	≥3.4V
Input delay	≥50ms
Serial port terminals 22÷25	
Baud rate	programmable 1200÷38400 bps
Outputs OUT1 and OUT3: terminals 55-56,58-59	
Contact type	2 NO
Rated current	AC1 - 12A 250VAC AC15 -1,5A 250VAC
Max rated voltage	300VAC
Mechanical /electrical endurance	10 ⁷ / 10 ⁵ operations
Maximum current at contact terminals 56, 59	12A
Outputs OUT2 and OUT4: terminals 56-57,59-60	
Contact type	2 NO
Rated current	AC1 - 8A 250VAC - AC15 -1,5A 250VAC

TECHNICAL CHARACTERISTICS			
Max rated voltage	300VAC		
Mechanical /electrical endurance	10 ⁷ / 10 ⁵ operations		
Outputs OUT7, OUT 9 and OUT 10: terminals 19÷21,30÷32,33÷35			
Contact type	changeover		
Rated current	AC1 - 8A 250VAC DC1 - 8A 30VDC AC15 -1,5A 250VAC		
Max rated voltage	300VAC		
Mechanical /electrical endurance	10 ⁷ / 10 ⁵ operations		
Insulation voltage			
AC Supply			
Rated insulation voltage	Ui =250VAC		
Rated impulse withstand voltage	Uimp =7,3kV		
Power frequency withstand voltage	3kV		
Line 1 and Line 2 voltage inputs			
Rated insulation voltage	Ui= 600VAC		
Rated impulse withstand voltage	Uimp= 9.8kV		
Power frequency withstand voltage	5.2kV		
Output OUT1-2 e OUT 3-4			
Rated insulation voltage	Ui = 250VAC		
Rated impulse withstand voltage	Uimp =7,3kV		
Power frequency withstand voltage	3kV		
Serial port RS485			
	Input Line 1-2-3	Output relays and AC supply	Logic DC
Rated impulse withstand voltage	Uimp = 9,8kV	Uimp = 7,3kV	Uimp = 7,3kV
Power frequency withstand voltage	5,2kV	3kV	3kV
Ambient operating conditions			
Operating temperature	-30 ÷ 70°C		
Storage temperature	-30 ÷ 80°C		
Relative humidity	< 80% (IEC/EN 60068-2-78)		
Maximum pollution degree	2		
Overvoltage category	3		
Measurement category	III		
Climatic sequence	Z/ABDM (IEC/EN 60068-2-61)		
Shock resistance	15g (IEC/EN 60068-2-27)		
Vibration resistance	0.7g (IEC/EN 60068-2-6)		
Connections			
Terminal type	Plug-in / removable		
Cable cross section (min... max)	0,2÷2,5 mm ² (24...12 AWG)		
Tightening torque	0,5 Nm		
Housing			
Version	Flush mount		
Material	Polycarbonate		
Degree of protection	IP65 on front - IP20 terminals		
Weight	680g		
Certifications and compliance			
Certifications obtained	EAC		
Reference standards	IEC/EN 61010-1, IEC/EN 61000-6-2 IEC/ EN 61000-6-3 IEC/EN 60947-6-1		

