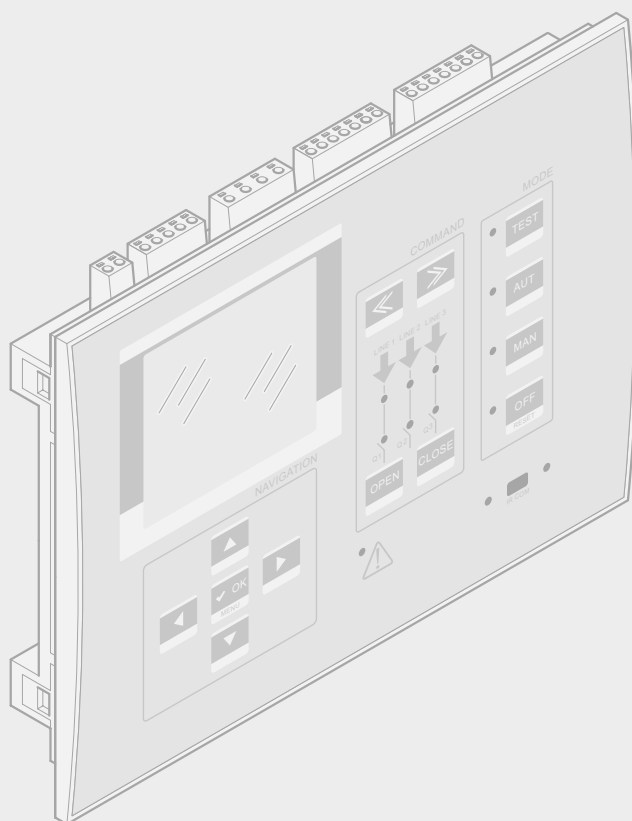


## Three-Sources Management System (T.S.M.S.)

**EN**

ENGLISH

3





## **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.

## Index

<b>1. Introduction</b>	<b>6</b>
1.1 Description	6
1.2 Front button functions	7
1.3 Front LEDs	7
<b>2. Operating modes</b>	<b>8</b>
2.1 Energising the equipment	8
2.2 Main menu	8
2.3 Password protected access	9
2.4 Navigating the display pages	10
2.5 Synoptic	10
2.5.1 Display pages table	11
2.6 Expandability	12
2.7 Communication channels	13
2.8 Inputs, outputs, internal variables, counters, analog inputs	13
2.9 Remote variables (REMX)	14
2.10 User alarms (UAX)	14
2.11 PLC logic (PLCx)	15
2.12 Timers (TIMx)	15
2.13 Automatic test	15
2.14 Keypad lock	16
2.15 IR programming port	16
2.16 Parameter setting from PC	16
2.17 Parameter setting from smartphone or tablet with WIFI DONGLE	16
2.18 Parameter settings (setup) from front panel	17
2.19 Parameter table	18
2.20 Alarms	33
2.21 Alarm properties	33
2.22 Alarms table	34
2.23 Description of the alarms	35
2.24 Programmable input functions table	36
2.25 Programmable input default	39
2.26 Programmable outputs functions table	40
2.27 Programmable outputs default	42
2.28 System layout	42
2.29 Command menu	42
2.30 Installation	43
<b>3. Wiring diagrams</b>	<b>44</b>
3.1 Terminal arrangement	44
3.2 Mechanical dimensions and panel cutout	44
<b>4. Technical characteristics</b>	<b>45</b>

## 1. Introduction

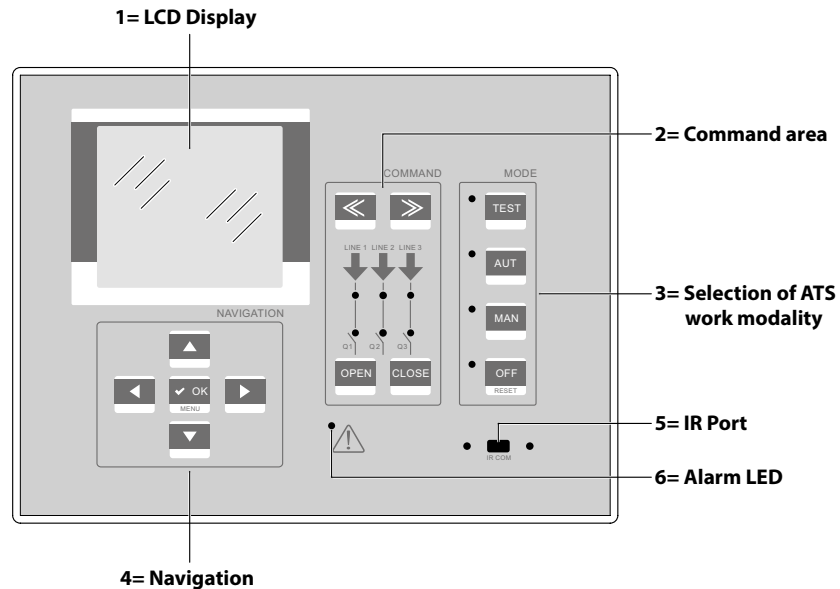
The Legrand 422684 control unit implements state-of-the-art functions required for control and management multisource. The system incorporates a unique series of hardware and software features which guarantee high flexibility, e.g. management of three supply source lines and two tie breakers, graphic display, double power supply, expansion modules, programmable system layout, integrated PLC etc., for use in a wide variety of possible conditions of application, all of which can be programmed by the user.

The graphic display shows and allows to control the system situation effectively. The expansion slots allow to increase the hardware resources also allowing adaptability to future needs.

### 1.1 Description

- Graphic LCD 128x112 pixel, backlit, 4 grey levels.
- Texts for measurements, settings and messages in 8 languages (ENG-ITA-FRA-SPA-DEU-POR-POL-RUS).
- 14 possible system configurations, with 2 or 3 power sources and 1 or 2 tie breakers.
- 3 voltage measuring inputs, three phase + neutral.
- Free source type configuration (mains or genset) and respective priority for all system configurations.
- Non-priority load management.
- Control of motorised breakers, motorised changeover switches or contactors.
- Management of gensets with automatic test and emergency rotation.
- Control of three-phase, two-phase and single-phase networks.
- Control of concatenated voltages and/or phase voltages.
- Control of minimum voltage, maximum voltage, phase loss, asymmetry, minimum frequency, maximum frequency with independent enabling and tripping delay.
- Voltage thresholds with programmable hysteresis.
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation.
- 100-240Vac auxiliary power supply.
- 12-24-48Vdc battery power supply.
- Front optical programming interface.
- Advanced programmable I/O functions.
- Integrated programmable PLC logic (50 lines, 8 columns).
- Alarm properties entirely definable by the user.
- High accuracy of true RMS measurements (TRMS)
- 12 programmable digital inputs (negative).
- 11 digital outputs:
  - 3 relays with NO contact 12A 250VAC.
  - 3 relays with NO contact 8A 250VAC.
  - 4 relays with changeover contact 8A 250VAC.
  - 1 static output.
- Integrated RS-485 isolated interface.
- 3 expansion slots modules.
- Storage of last 250 events.
- Real Time Clock.
- IP40 front protection expandable to IP65 by means of optional gasket.
- Compatible with software and App Legrand ACU Legrand.

## 1. Introduction



### 1.2 Front button functions

**OFF button** - Selects OFF operating mode.

**AUT button** - Selects automatic operating mode.

**MAN button** - Selects manual operating mode.

**TEST button** - Select test operating mode.

**<< and >> buttons** - Breaker selection for manual control.

**OPEN and CLOSE buttons** - Manual controls of breakers.

**▲ ▼ ◀ ▶ buttons** - For scrolling the display and selecting menu options.

**✓ button** - Recall the main menu and confirm a selection.

### 1.3 Front LEDs

**OFF-MAN-AUT-TEST mode LEDs (yellow)** - indicate the selected mode.

**Alarm LED (red)** - Blinking, indicates that an alarm is active.

**LINE1 voltage present LED (green)** - Indicates that the S.1SQ1 line voltage is within the set limits.

**LINE2 voltage present LED (green)** - Indicates that the S.2 line voltage is within the set limits

**LINE3 voltage present LED (green)** - Indicates that the SQ.3 line voltage is within the set limits

**Q1 device state LED (yellow)** - When fixed, indicates the open or closed state of line device 1 (Q1). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.

**Q2 device state LED (yellow)** - When fixed, indicates the open or closed state of line device 2 (Q2). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.

**Q3 device state LED (yellow)** - When fixed, indicates the open or closed state of line device 3 (Q3). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.

## 2. Operating modes

**OFF mode** - The equipment is off and no actions are performed in this mode. All measurement and state LED displays remain active. If the transfer device control is of the pulse type, both open/close controls remains deactivated in OFF mode. In continuous control mode, instead, the behaviour may be selected by means of P07.n.06. Set to OFF mode before accessing the programming menus. Press the OFF-RESET button to reset the retaining alarms providing the conditions which generated the alarm have been removed.

**MAN** (manual) mode - The breakers can be controlled manually in manual mode. The breaker to be controlled can be selected on the display by pressing buttons << and >>. The selected breaker appears surrounded by a blinking box. Press the OPEN and CLOSE buttons to change the selected breaker state.

If the closing of a breaker is manually controlled while one other breaker is still closed, the equipment will not allow the simultaneous closing.

When working with gensets, the starting and stopping of the genset can be manually controlled in the manner similar to that of the breakers. In this case, the MAN button must be held pressed to start and stop the genset. The genset corresponding to the breaker highlighted by the blinking box will be started.

**AUT** (Automatic) mode - In automatic mode, the equipment autonomously carries out the opening and closing operations of the breakers and to start and stop any gensets. When the priority line is out of limits for a time higher than the set delay (green line presence LED off), the device disconnects the load from the priority line and connects to the immediately next priority line, starting of the genset (if applicable) and managing the operation and interlock times. The equipment can be programmed to open the priority line breaker either before or after the alternative line is made available.

When the priority line return within the limits, the device switches the load back onto it and runs the genset cooling cycle, if needed. The automatic return to priority lines can be locked. If possible and necessary, the load can be transferred with closed transition, i.e. with the two power sources momentarily in parallel. There are very many automatic operating cycles which vary according to the defined system configuration (14 possibilities) and according to the type of transfer devices used (motorised breakers, motorised changeover switches or contactors). Refer to the possible system configurations and the respective truth tables which describe the system behaviour in automatic mode.







**TEST** mode - In test mode, the equipment starts the gensets, 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.

**Caution:** this will momentarily interrupt power supply to the load. Lack of the secondary line is then simulated with the further transfer to the third line, if present. Two minutes later, the cycle will go back to the secondary line and finally to the main line in sequence. During this cycle, the message SIMUL appears on the display with a countdown to indicate TEST progress. The simulation cycle may be started on the command menu.

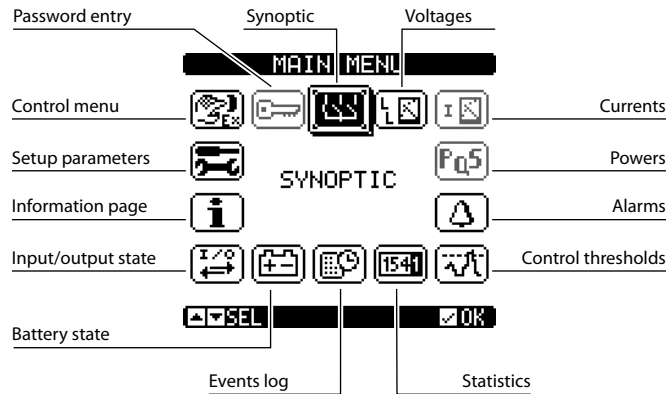
### 2.1 Energising the equipment

- 422684 has two power supplies: 100-240VAC or 12-24-48VDC. Priority is given to the AC power if both are present at the same time.
- The equipment is normally set to the OFF mode when it is switched on. Modify parameter P01.03 in the M01 Utility menu if the operating mode selected before switch-off must be maintained.
- It may be powered at 12 or at 48VDC but the battery voltage must be set correctly in the M04 battery menu otherwise a battery voltage alarm will be generated.
- All LEDs blink during the energising procedure to check operation.

### 2.2 Main menu

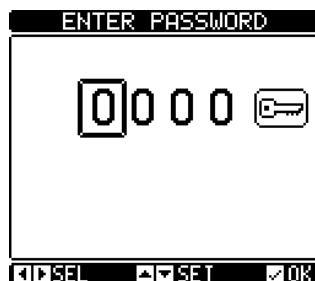
- The main menu consists of a set of graphic icons which allow rapid access to measurements and settings.
- Press button ✓ starting from the normal measurement view. The rapid menu appears on the display.
- Press ◀ or ▶ to turn clockwise/anticlockwise and select the required function. The selected icon is highlighted and the message in the middle of the display indicates the description of the function.
- Press ✓ to activate the selected function.
- If some functions are not available, the corresponding icon will be deactivated, i.e. will be greyed out.
-  etc. - Operate as short cuts which allow to speed up access to pages for displaying measurements, going directly to the selected measurement unit, from which it is possible to move forwards and backwards are usual.
-  - Setting the numeric code which allows to access protected functions (setting parameters, executing controls).
-  - Parameter programming access point. See the dedicated chapter.
-  - Control menu access point, where authorised users can perform a number of resetting and restoring operations.
-  - Access point to statistic operating data supplied by the controller.
-  - Access point to the events list.

## 2. Operating modes



### 2.3 Password protected access

- The password is used to enable or block access to the setting menu and the command menu.
- The password is deactivated and access is free on new equipment (default). If the passwords are enabled, they must be entered to access the equipment (the passwords are numeric).
- See *M03 Password* setting menu for how to enable and define passwords.
- There are two access levels, according to the entered code:
- User level access – it's allowed to reset the programmable counters, limits and changing the parameters of the menu Utilities - M01.
- Advanced level access - the same rights as the user, with the addition of being able to edit all settings.
- In the normal measurements display, press ✓ to recall the main menu, then select the password icon and press ✓.
- The password setting window shown in the figure will appear:



- Press ▲ and ▼ to change the value of the selected digit.
- Press ◀ and ▶ to go from one digit to the next.
- Enter all the digits of the password and then go to the key icon.
- The respective unlock message will appear when the entered password corresponds to the *User level password* or to the *Advanced level password*.
- After having unlocked the password, access will remain enabled until:
  - the equipment is switched off.
  - the equipment is reset (after closing the settings menu).
  - two minutes elapse without the operator touching any button.
- Press ✓ to close password setting and exit.



## 2.4 Navigating the display pages

- The ▲ and ▼ buttons allow the measurement display pages to be scrolled one at a time. The current page is shown on the title bar.
- Some measurements may not be viewed according to the programming and connection of the equipment (e.g. the respective page will not appear if no fuel level sensor is set).
- Some pages have sub-pages which can be accessed by pressing ► (e.g. to view voltages and currents in form of graphic bars).
- The user can specify the page and sub-page to return to automatically after no buttons have been pressed for a given time.
- The system can be programmed so that the view always remains in the position in which it was left.
- See menu *M01 - Utility* for how to set these functions.

## 2.5 Synoptic

- Normally, the main display page shows a synoptic of the system, whose configuration (layout) has been defined by parameter P02.01.
- In the synoptic will find all the most important information, which in combination with the state of the LEDs allow to have a full picture of the supply lines.
- The following is an example of a mimic diagram on the display, with the explanation of the meaning of the various symbols.

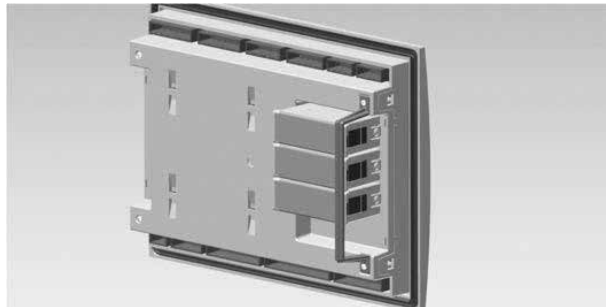
## 2. Operating modes

### 2.5.1 Display pages table

PAGES	EXEMPLE	PAGES	EXEMPLE
Phase to phase voltage		Phase voltage	
Alarm status		Control thresholds	
Statistics		Events list	
Inputs and outputs status		Expansion modules	
Outputs		Inputs	
System info		Date / Time	
		Automatic test	

## 2.6 Expandability

- With its expansion bus, the ref. 422684 be expanded with the additional modules of the EXP... series.
- Up to three EXP... modules can be installed at the same time.
- The EXP... modules supported by the ref. 422684 are divided into the following categories:
  - communication modules
  - digital I/O modules
  - analog I/O modules
- To add an expansion module:
  - remove power from the ref. 422684 remove one or more protective covers from the expansion slots.
  - insert the upper hook of the module in the specific slot to the left of the expansion slot.
  - turn the module rightwards inserting the bus connector.
  - press until the specific clip on the lower side of the module couples by snapping.



- 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
  - position the jumper over the previously coupled modules
  - fasten the screws back in their original seat.
- The ref. 422684 automatically recognises the EXP connected to it when it is powered.
- If the system configuration is different from the one last detected (a module was added or removed), the basic unit will ask the user to confirm the new configuration. If confirmed, the new configuration will be saved and become effective. Otherwise, the discrepancy will be indicated each time the equipment is powered up.

EXPANSION MODULES			
TSMS			
DC			
COM1			
C&			
▲▼SEL			

- The current configuration of the system is shown on the specific display page (expansion modules), indicating the number, type and state of the connected modules.
- The I/O numbering is listed under each module.
- The I/O and communication channel state (on/off) is shown in negative print.

## 2. Operating modes

### 2.7 Communication channels

- The ref. 422684 422684 has an integrated RS-485 communication port named COM1.
- The communication settings menu has three parameter sections (n=1 ... 3) for setting the communication ports.

### 2.8 Inputs, outputs, internal variables, counters, analog inputs

- The inputs and outputs are identified by a code and a sequential number. For example, the digital inputs are named INPx, where x is the input number. Similarly, the digital outputs are named OUTx.
- The input/output numbering is based simply on the assembly position of the expansion modules with a sequential numbering from the top down.
- Up to 6 analog inputs (AINx) can be managed coming from external sensors (temperature measurements, consumption, pressure, flow rate etc.). The value read by the analog inputs may be converted into any engineering unit shown on the display and made available on the communication bus. The quantities read by the analog inputs are shown on the specific page. Limit thresholds (LIMx) may be applied to each one, which in turn can be connected to an inner or outer outputs, or inserted in a PLC logical function.
- 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	BASIC	EXP
INPx	Digital inputs	1...12	13...20
OUTx	Digital outputs	1...11	12...20
COMx	Communication ports	1	2...3
AINx	Analog inputs	-	1...6
AOUx	Analog outputs	-	1...6
RALx	Remote relays for alarms/states	-	1...24

- Like the inputs/outputs, there are internal variables (bit) which may be associated to the outputs or combined. For example, limit thresholds can be applied to the measurements performed by the system (voltage, current etc.). In this case, the internal variable, named LIMx, will be activated when the measurement is beyond the limits defined by the user by means of the respective setting menu.
- Furthermore, up to 8 counters (CNT1...CNT8) which can count pulses come from the outside (thus from INPx inputs) or the number of times for which a given condition occurred. For example, by defining a LIMx threshold as counting source it will be possible to count how many times a measurement exceeds a given value.
- The following table shows all the internal variables managed by the ref. 422684 with their range (number of variables per type).

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

#### Limit thresholds (LIMx)

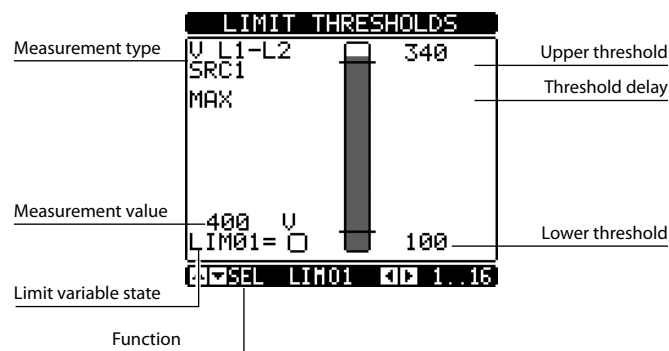
- The LIMn limit thresholds are internal variables the state of which depends on a measurement of those performed by the system going beyond the limits defined by the user, e.g. total active power higher than 25kW).
- To speed up setting considering that each threshold can span across an extremely wide range, each threshold can be set to a base value + a multiplying coefficient (e.g.: 25 x 1k = 25000).
- Two thresholds are available for each LIM (upper than lower). The upper threshold must always be set to a value higher than the lower value.
- The meaning of the thresholds depends on the following functions:

**Min function:** with the Min function the lower threshold is the tripping threshold and the upper threshold is the resetting threshold. The threshold is activated after the set delay when the value of the selected measurement is under the lower limit. Reset is activated after the set delay when the value of the measurement is higher than the upper threshold.

**Max function:** with the Max function the upper threshold is the tripping threshold and the lower threshold is the resetting threshold. The threshold is activated after the set delay when the value of the selected measurement is higher than the upper limit. Reset is activated after the set delay when the value of the measurement is lower than the lower threshold.

**Min+Max function:** with the Min+Max function both the upper and the lower thresholds are intervention thresholds. The threshold is activated after the respective delays when the value of the selected measurement is either lower than the lower limit or higher than the upper limit. Resetting is immediate as soon as the value returns within the limits.

- Tripping may mean energising or de-energising the LIMn limit according to the setting.
- If the LIMn limit is set with memory, manual resetting is possible using the specific control in the command menu.
- See the M15 settings menu.



## 2.9 Remote variables (REMX)

- The ref. 422684 can manage up to 16 variables controlled remotely (REM1...REM16).
- The state of these variables can be edited as required by the user by means of the communication protocol and may be used in combination with outputs, Boolean logic etc.
- Example: a relay using the control software can be freely activated and deactivated by using a remote variable (REMX) as source of an output (OUTx). This would allow to use ref. 422684 422684 output relays to control loads, e.g. lighting or other.
- Another use of the REM variables may be to enable or disable given remote functions by inserting them in a Boolean AND logic with inputs or outputs.

## 2.10 User alarms (UAx)

- The user can define up to 8 programmable alarms (UA1...UA8).
- The following can be established for each alarm:
  - the *source*, i.e. the condition which generates the alarm;
  - the *text* of the message which must appear on the display when the condition occurs;
  - the *properties* of the alarm (like for the standard alarms), i.e. so as to interact with the genset control.
- For example, going beyond a threshold may be a condition which generates the alarm. In this case, the source must be one of the LIMx limit thresholds.
- If instead the alarm must be displayed as a consequence of the activation of an external digital input, then the source will be an 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.
- The user can define a freely programmable message which will appear in the alarm pop-up window.
- Properties can be defined for the user alarms using the same method applied for normal alarms. In other words, it is possible to determine whether a given alarm must stop the motor, sound the siren, close the global alarm output etc. See the Alarm properties chapter.
- Multiple simultaneous alarms will be displayed in sequence and the total number of alarms will be shown.

## 2. Operating modes

- Use the specific control in the command menu to reset a programmed alarm with memory.
- See settings menu M21 for alarm definition.

### 2.11 PLC logic (PLCx)

- *Xpress* can be set using a *ladder* program for creating a PLC internal logic inside the ref. 422684 422684, so as to be able to freely create any function necessary for genset accessory applications.
- In the program logic, all the variables managed internally by the ref. 422684 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 422684 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 by means of the specific ACU configurator software.

### 2.12 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 OUTn outputs or in combination with UAn user alarms.
- Each timer variable has an input which controls it (e.g. a LIMn limit or an INPn 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 TIMn variable also becomes false (this also occurs before the end of the programmed time) and the time counter is reset to zero.

### 2.13 Automatic test

- The automatic test is a periodical test which is run at fixed deadlines (frequency programmed during setup) if the system is in AUT mode and the function is enabled. The test consists in starting the gensets to check their efficiency.
- It is possible to decide which days of the week and what time of the day (hours-minutes) to run the test.
- See menu *M11 Automatic Test* for more information on programming.
- If there are multiple gensets in the system, only one is started for each automatic test. The others will be started in sequence the next time.
- After starting, the genset 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 genset 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 genset by pressing ▲ and ▼. Enable the test with ▶ and disable it with ◀.
  - ✓ Save and exit the setting.



## 2.14 Keypad lock

- The keypad of the **ref. 422684** can be locked by means of:
  - a programmable digital input.
  - a particular front button procedure.
- The message **ACCESS LOCKED** will appear when attempting to use the locked buttons.
- Press **▲** and hold it pressed to lock or unlock the keypad. Press **▼** three times without releasing it at the end.
- Then release **▲** and press it five more times. Then release both buttons.
- The message **KEYPAD LOCKED** will appear on the display when the keypad is locked. The message **KEYPAD UNLOCKED** will appear when it is unlocked, instead.

## 2.15 IR programming port

- The **ref. 422684** parameters may be configured by means of the front optical port using the IR-USB programming dongle or the IR-WiFi dongle.
- Simply approach a CX.. dongle to the front port and insert the plugs in the specific holds to obtain the mutual recognition of the devices as indicated by the green LINK LEDs on the programming dongle.



USB Dongle and WiFi Dongle

## 2.16 Parameter setting from PC

- The configuration and remote monitoring software *ACU Configurator* can be used to transfer the set-up parameters (previously set) from ref. 422684 to the PC hard disk and vice versa.
- Parameter transfer from PC to ref. 422684 3 source management may be partial, i.e. only the parameters of the specified menus.




## 2.17 Parameter setting from smartphone or tablet with WIFI DONGLE

- It is possible to connect to the ref. 422684 by means of the app ACU configurator, available for tablet and Android or iOS smartphones, and the CX02 accessory.
- The app can be used to view alarms, send controls, read measurements, set parameters, download events and sent collected data via e-mail.

## 2. Operating modes

### 2.18 Parameter settings (setup) from front panel

- To access the parameter programming menu (setup):
  - Set the board to **OFF** mode
  - On the normal measurement display, press ▲ and ▼ at the same time to recall the main menu
  - Select the icon . If it is not enabled (greyed out) it means that the password must be entered to unlock it (see *Password protected access*).
  - Press ✓ to access the setup menu.
- The figure shows the setup sub-menus in which all the parameters are grouped according to their function.
- Press ▲ or ▼ to select the required menu and press ✓ to confirm.
- Press **OFF** to exit and go back to the measurements display.



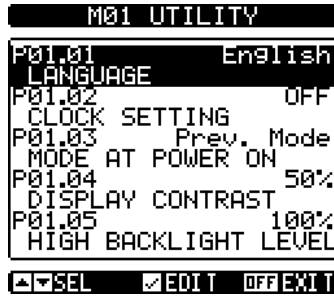
Set-up: menu selection

- The available sub-menus are shown in the following table:

CODE	MENU	DESCRIPTION
<b>M01</b>	UTILITIES	Language, brightness, display pages etc.
<b>M02</b>	GENERAL	Characteristic system data
<b>M03</b>	PASSWORD	Access code setup
<b>M04</b>	BATTERY	Battery parameters
<b>M05</b>	ACOUSTIC ALARMS	Control of internal buzzer and external siren
<b>M06</b>	SOURCE LINES (SQ.x)	Characteristic source data
<b>M07</b>	BREAKERS (Qn)	Characteristic breaker data
<b>M08</b>	SWITCH	Load transfer mode
<b>M09</b>	SOURCE LINE CONTROL (S.x)	Source line acceptability limits n.
<b>M10</b>	COMMUNICATIONS	Communication parameters ()
<b>M11</b>	AUTOMATIC TEST	Period, time, automatic test mode
<b>M12</b>	DIGITAL INPUTS	Programmable digital input functions
<b>M13</b>	DIGITAL OUTPUTS	Programmable digital output functions
<b>M14</b>	MISCELLANEOUS	Functions, such as maintenance etc.
<b>M15</b>	LIMIT THRESHOLDS	Programmable limit thresholds
<b>M16</b>	COUNTERS	Programmable generic counters
<b>M17</b>	TIMERS	Programmable timers for PLC logic
<b>M18</b>	REMOTE ALARMS	Alarm remoting on module
<b>M19</b>	ANALOG INPUTS	Voltage/current/temperature inputs
<b>M20</b>	ANALOG OUTPUTS	Voltage/current outputs
<b>M21</b>	USER ALARMS	Programmable alarms
<b>M22</b>	ALARMS TABLE	Alarm enabling and effect



- Select the sub-menu and press ✓ to view the parameters.
- All parameters are shown with code, description, current value.



*Set-up: parameter selection*

## 2.19 Parameter table

M01 - UTILITIES		UNIT	DEFAULT	RANGE
P01.01❶	Language		English	English Italiano Francais Espanol Deutsch Portuguese Polish Russian
P01.02❶	Clock setting after power-on		OFF	OFF-ON
P01.03❶	Power-on operative mode		Previous	OFF mode Previous
P01.04❶	LCD contrast	%	50	0-100
P01.05❶	Display backlighting intensity high	%	100	0-100
P01.06❶	Display backlighting intensity low	%	25	0-50
P01.07❶	Low backlighting switch time	sec	180	5-600
P01.08❶	Back to default page	sec	300	OFF / 10-600
P01.09❶	Default page		CONFIGURATION	(page list)
P01.10❶	Main page title		TRANSFER SWITCH	20 char. string

❶ These parameters are also accessible with user level password.

**P01.01** - Language selection for text on display.

**P01.02** - Automatic access activation to clock setup after energising.

**P01.03** - When energised, the equipment starts in OFF mode in the mode which was selected when the equipment was switched off.

**P01.04** - LCD contrast adjustment.

**P01.05** - High display backlighting adjustment.

**P01.06** - Low display backlighting adjustment.

**P01.07** - Low display backlighting switch delay.

**P01.08** - Reset to default page delay when buttons are not pressed.

If set to OFF the last manually selected page will always remain on the display.

**P01.09** - Default page shown on the display when it is switched on and after the delay.

**P01.10** - Free text with alphanumeric name identifying the specific system.

## 2. Operating modes

M02 - GENERAL		UNIT	DEFAULT	RANGE
<b>P02.01</b>	System layout		E 3S - 0T	E : 3S - 0T F: 3S - 1T - PL G: 3S - 1T - AI H: 3S - 1T - PS I: 3S -1T - RI J: 3S - 1T - 12 K: 3S - 2T - M2 L: 3S - 2T - FL M: 3S - 2T - 3N N: 3S - 2T - 2L O: (custom)
<b>P02.02</b>	Rated system voltage	V	400	50 - 50000
<b>P02.03</b>	VT Use		OFF	OFF-ON
<b>P02.04</b>	VT Primary	V	100	50-50000
<b>P02.05</b>	VT Secondary	V	100	50-500
<b>P02.06</b>	Phase seence check		OFF	OFF L1-L2-L3 L3-L2-L1
<b>P02.07</b>	Connection type		L1-L2-L3-N	L1-L2-L3-N L1-L2-L3 L1-N-L2 L1-N
<b>P02.08</b>	Rated control type		L-L	L-L L-N L-L + L-N
<b>P02.09</b>	Rated freuency	Hz	50Hz	50 Hz 60 Hz
<b>P02.10</b>	CT position		OFF	OFF LOAD S1 S2 S3
<b>P02.16</b>	Non-priority load management		OFF	OFF Pulse breaker Continuous breaker Contactor
<b>P02.17</b>	Breaker operation max. time non-priority load	sec	5	1...900
<b>P02.18</b>	Open pulse time	sec	10	0-600
<b>P02.19</b>	Close pulse time	sec	1	0-600
<b>P02.20</b>	Minimum coil opening pulse time	sec	1.0	0.1 ... 10.0
<b>P02.21</b>	Delay between min. coils and spring load	sec	0.2	0.1 ... 10.0
<b>P02.22</b>	Tie breaker management (QCCx)		OFF	OFF Pulse breaker Continuous breaker Contactor
<b>P02.23</b>	Maximum tie breaker operation time	sec	5	1...900
<b>P02.24</b>	Open pulse time	sec	10	0-600
<b>P02.25</b>	Close pulse time	sec	1	0-600
<b>P02.26</b>	Minimum coil opening pulse time	sec	1.0	0.1 ... 10.0
<b>P02.27</b>	Delay between min. coils and spring load	sec	0.2	0.1 ... 10.0

M02 - GENERAL		UNIT	DEFAULT	RANGE
<b>P02.28</b>	Description of tie breaker 1		QC1	(char*4)
<b>P02.29</b>	Description of tie breaker 2		QC2	(char*4)
<b>P02.30</b>	Tie breaker closing delay	sec	5.0	0.1 ... 60.0
<b>P02.31</b>	Pre-transfer time load 1	sec	OFF	OFF / 1-1000
<b>P02.32</b>	Post-transfer time load 1	sec	OFF	OFF / 1-1000
<b>P02.33</b>	Pre-transfer time load 2	sec	OFF	OFF / 1-1000
<b>P02.34</b>	Post-transfer time load 2	sec	OFF	OFF / 1-1000
<b>P02.35</b>	Pre-transfer time load 3	sec	OFF	OFF / 1-1000
<b>P02.36</b>	Post-transfer time load 3	sec	OFF	OFF / 1-1000
<b>P02.37</b>	Tie breaker QCC1 continuous control in RESET/OFF mode		NOC	OFF NOC
<b>P02.38</b>	Tie breaker QCC2 continuous control in RESET/OFF mode		NOC	OFF NOC
<b>P02.39</b>	Tie breaker QC21 conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
<b>P02.40</b>	Function index (x)		OFF	OFF / 1...99
<b>P02.41</b>	Tie breaker QCC2 conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
<b>P02.42</b>	Function index (x)		OFF	OFF / 1...99

**P02.01** - System layout, description of the various configurations with respective logical diagrams is shown in this manual in the system layout section at the end of the parameter description section:

**P02.02** - Rated system voltage. Set the concatenated voltage for polyphase systems.

**P02.03** - Use voltage transformers (VT) on the voltage measuring inputs.

**P02.04** - Primary value of any voltage transformers.

**P02.05** - Secondary value of any voltage transformers.

**P02.06** - Phase sequence control enabling. **OFF** = no control. **Direct** = L1-L2-L3. **Inverted** = L3-L2-L1. Note: The corresponding alarms must also be enabled.

**P02.07** - Connection type choice, three-phase with/without neutral, two-phase or single-phase.

**P02.08** - Voltage controls on concatenated voltages, phase voltages or both.

**P02.09** - Rated system frequency.

**P02.16** - Defines whether to manage non-priority load management (for system layouts which does not require it specifically). In addition to enabling management, it defines the control type for the breaker which controls it.

**P02.17** - Timeout between sending of a control to the non-priority load breaker and the actual execution of the operation. After having sent an opening or closing control to the breaker, alarm A31 is generated if it is not positioned correctly within the timeout. It works when the auxiliary state contacts of the breaker is programmed and wired.

**P02.18** - Minimum opening control time. For applications with motorised 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.

**P02.19** - Closing control pulse time.

**P02.20** - Minimum coil deactivation pulse for breaker opening pulse.

**P02.21** - Time elapsed between minimum voltage opening pulse and breaker spring loading control.

## 2. Operating modes

**P02.22** – This defines the control type for tie breakers (Cx). If the system layout includes tie breakers, this parameter must be set to a value other than OFF.

**P02.23-P02.24-P02.25-P02.26-P02.27** – Control parameters of breakers used as tie breakers. Similar to P02.17...P02.21

**P02.28-P02.29** – Alphanumeric description (code) which will be displayed on the synoptic panels on the display to indicate the two tie breakers (where used), respectively.

**P02.30** – Tie breaker closing delay after closing the corresponding line breakers.

**P02.31 – P02.33 – P02.35** – 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-P02.36** – Post-transfer output energising time after conclusion of the load transfer from one line to the other.

**P02.37-P02.38** – When the breaker command mode is set to Continuous (P08.01 = Continuous control Q), this parameter defines the ATL 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 C1 tie breaker. **OFF** = Tie breaker is enabled normally. **(Any other setting)** = C1 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.

**P02.41, P02.42** – Like previous parameters, referred to C2.

M03 - PASSWORD		UNIT	DEFAULT	RANGE
<b>P03.01</b>	Enable password		OFF	OFF-ON
<b>P03.02</b>	User level password		1000	0-9999
<b>P03.03</b>	Advanced level password		2000	0-9999
<b>P03.04</b>	Remote access password		OFF	OFF/1-9999

**P03.01** - If set to OFF, password management is deactivated; access to settings and the command menu is free.

**P03.02** - With P03.01 active, value to be specified to activate user level access. See Password Access section.

**P03.03** - As P03.02, referred to Advanced level access.

**P03.04** - If set to a numeric value, it comes the code to be specified via serial line before being able to send remote controls.

M04 - BATTERY		UNIT	DEFAULT	RANGE
<b>P04.01</b>	Rated battery voltage	V	AUTO	AUTO 12 24 48 OFF
<b>P04.02</b>	MAX voltage limit	%	130	110-140
<b>P04.03</b>	MIN voltage limit	%	75	60-130
<b>P04.04</b>	MIN/MAX voltage delay	sec	10	0-120
<b>P04.05</b>	Local battery charger communication		OFF	

**P04.01** - Rated battery voltage. If set to OFF, disables the battery state alarms and messages on the display.

**P04.02** - MAX battery voltage alarm tripping threshold.

**P04.03** - MIN battery voltage alarm tripping threshold.

**P04.04** - Tripping delay between MIN and MAX battery alarms.

**P04.05-P04.06-P04.07-P04.08** - Serial communication enabling between 422684 and any BCG...RS series communicating battery chargers. It allows to read the voltages, charging currents and alarms concerning the corresponding battery charger and to view information on the dedicated video page. 'Local' means the battery charger connected to the battery which powers the 422684 in DC.

## Three-Sources Management System (T.S.M.S.)

M05 - ACOUSTIC ALARMS		UNIT	DEFAULT	RANGE
<b>P05.01</b>	Siren sound mode on alarm		Timed	OFF Keypad Timed Repeated
<b>P05.02</b>	Sound activation time on alarm	sec	30	OFF/1-600
<b>P05.03</b>	Sound activation time before starting	sec	OFF	OFF / 1-60
<b>P05.04</b>	Sound activation time on remote control start	sec	OFF	OFF / 1-60
<b>P05.05</b>	Sound activation time for no line S.1	sec	OFF	OFF / 1-60
<b>P05.06</b>	Sound activation time for no line S.2	sec	OFF	OFF / 1-60
<b>P05.07</b>	Sound activation time for no line S.3	sec	OFF	OFF / 1-60
<b>P05.08</b>	Acoustic indication device		BUZZER+SIREN	OFF SIREN BUZZER BUZZER+SIR
<b>P05.09</b>	Buzzer on key press	sec	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 - P05.07** - Acoustic signal activation time following lack of power on S.1/2/3 line.

**P05.08** - Acoustic signalling device choice.

**P05.09** - Buzzer activation and time following button pressing.

M06 - SOURCE LINES (Q.Sx, n=1...3)		UNIT	DEFAULT	RANGE
<b>P06.n.01</b>	Source description		.SQx	(char*6)
<b>P06.n.02</b>	Signal priority		n	1 – 3
<b>P06.n.03</b>	S.x source type		Mains	Mains Genset
<b>P06.n.04</b>	Genset cooling time	sec	120	1-3600
<b>P06.n.05</b>				
<b>P06.n.06</b>				
<b>P06.n.07</b>				
<b>P06.n.08</b>				
<b>P06.n.09</b>				
<b>P06.n.10</b>				
<b>P06.n.11</b>				
<b>P06.n.12</b>				
<b>P06.n.13</b>				

**Note: This menu is divided into 3 sections for source lines S.Q1 S.Q2 S.Q3.**

**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.x line. **Mains** = The mains symbols is shown on the synoptic panel. **Genset** = The genset symbol is shown and the start/stop outputs are managed; is sought.

## 2. Operating modes

**P06.n.04** - Maximum cooling cycle time. Example: time which elapses between the load disconnection of the genset and the actual stopping of the engine.

M07 - BREAKERS (Qn, n=1...3)		UNIT	DEFAULT	RANGE
<b>P07.n.01</b>	Breaker description		Qn	(char*6)
<b>P07.n.02</b>	Interlock time SQ.x → ...	sec	6.0	0.1...1800.0
<b>P07.n.03</b>	Breaker operation max. time (alarm delay A03 and A04)	sec	5	1...900
<b>P07.n.04</b>	Open pulse time	sec	10	0-600
<b>P07.n.05</b>	Close pulse time	sec	1	0-600
<b>P07.n.06</b>	Continuous control in RESET/OFF mode		NOC	OFF NOC
<b>P07.n.07</b>	Breaker following no closing (with feedback open only)		OFF	OFF ON
<b>P07.n.08</b>	Minimum coil opening pulse time	sec	1.0	0.1 ... 10.0
<b>P07.n.09</b>	Delay between min. coils and spring load	sec	0.2	0.1 ... 10.0
<b>P07.n.10</b>	Closing retry		AUT	OFF AUT AUT+MAN CLOSING
<b>P07.n.11</b>	Breaker conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAx
<b>P07.n.12</b>	Function index (x)		OFF	OFF / 1...99

**Note: This menu is divided into 3 sections for controlling the source line breakers Q1..3.**

**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 n 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 motorised 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 n 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 ref. **422684422684** 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 breaker is open, its closing will be avoided. If the breaker is closed, it will be opened.

## Three-Sources Management System (T.S.M.S.)

M08 - SWITCH		UNIT	DEFAULT	RANGE
<b>P08.01</b>	Transfer device type		Pulse control breakers	Pulse control Q. Continuous control Q. Contactor
<b>P08.02</b>	Transfer strategy		OBP	OBP OAP
<b>P08.03</b>	Maximum load not powered time (alarm A09 tripping delay)	sec	60	OFF / 1...3600
<b>P08.04</b>	Automatic return on priority line inhibition		OFF	OFF / ON
<b>P08.05</b>	Genset start delay	sec	OFF	OFF / 1-6000
<b>P08.06</b>	Genset rotation interval		OFF	OFF 1h-2h-3h- 4h-6h-8h- 12h- 1d-2d-3d 4d-5d-6d-7d
<b>P08.07</b>	Genset rotation time	h	0	0...23/OFF
<b>P08.08</b>	Genset rotation minutes	min	0	0...59
<b>P08.09</b>	Distance between genset startups	sec	15	0-9999
<b>P08.10</b>	EJP operating mode		Normal	Normal EJP EJP-T SCR
<b>P08.11</b>	EJP start delay	min	25	0-240
<b>P08.12</b>	EJP switch delay	min	5	0-240
<b>P08.13</b>	EJP re-switch block		ON	OFF / ON
<b>P08.14</b>	Closed transition enable		OFF	OFF ON OFF-SYNC
<b>P08.15</b>	Max. V delta	%	5	0 - 25
<b>P08.16</b>	Max. Hz delta	Hz	0.5	0.0 - 10.0
<b>P08.17</b>	Max. Phi delta	°	5.0	0.0 - 10.0
<b>P08.18</b>	Synchronisation dwell time	sec	0.50	0.00 - 10.00
<b>P08.19</b>	Max. synchronisation time	sec	60	0 - 1000
<b>P08.20</b>	Instantaneous parallel time	sec	0.25	0.01 - 5.00
<b>P08.21</b>	Increase-decrease voltage/freucny pulse ON time	sec	0.5	0.1-10.0
<b>P08.22</b>	Increase-decrease voltage/freucny pulse OFF time	sec	1.0	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 a 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 for longer than this time alarm *A09 load timeout not powered*.

---

## 2. Operating modes

- 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 gensets exchanging the priority between the gensets. P08.06 defines the rotation interval between the gensets. 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 genset not available* is generated and the system starts a second genset, where available.
- P08.10** - This defines the EJP operating mode. **Normal** = Standard opening mode in AUT mode. **EJP** = Two programmable inputs are used set with Start remote load off and remote transfer for operation as EJP. When the start input is closed, the motor start delay time (P08.11) is activated at the end of which time the starting cycle is run. Subsequently, when the transfer enable is received, is the generated started correctly, the load is transferred from the main line to the genset line. The load goes back to the priority line when the transfer enable opens and the genset runs the start cycle when the start input opens. The EJP function is enabled only if the system is in automatic mode. The protections and alarms work as usual. **EJP-T** = The EJP/T function is a simplified variant of the previous EJP, where the genset start-up is controlled identically, but the load is transferred in timed manner instead of with a specific external signal. This function thus uses a single digital input, i.e. the starting input. The transfer delay time starts from when the starting control is closed and can be set by means of parameter P08.12. **SCR** = The SCR function is very similar to the EJP function. In this mode, the start input enables the genset start up as EJP, but without waiting for the start delay time P08.11. The remote transfer input has the function of enabling the transfer which occurs after the transfer delay P08.12.
- P08.11** - Delay between arrival of the EJP genset start signal and the actual start signal.
- P08.12** - Load switch delay from priority line to secondary line in EJP and SCR mode.
- P08.13** - If ON, in EJP mode, EJP-T and SCR the load is not transferred back on the priority line in case of genset failure but only when the signals on the EJP inputs enable them.
- P08.14** - Closed transition enable. This allows to define how the load will be transferred between two power sources, which are both present. **OFF** = the load will be transferred with transition open (default). **ON** = the two sources are synchronised (where possible) or spontaneous synchronisation will be expected within a limit time. The synchronisation thresholds are defined by parameters P08.15 - P08.16 - P08.17 - P08.18. In presence of all synchronisation conditions the load will be transferred with closed transition and instantaneous 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 genset control unit with the purpose of reaching synchronisation conditions.



M09 - SOURCE LINE CHECK (SLC, n=1...3)		UNIT	DEFAULT	RANGE
<b>P09.n.01</b>	MIN release voltage limit	%	85	70-100
<b>P09.n.02</b>	MIN reset threshold	%	90	70-100
<b>P09.n.03</b>	MIN voltage delay	sec	5	0-600
<b>P09.n.04</b>	MAX release voltage limit	%	115	100-130 / OFF
<b>P09.n.05</b>	MAX reset threshold	%	110	100-130 / OFF
<b>P09.n.06</b>	MAX voltage delay	sec	5	0-600
<b>P09.n.07</b>	Mains return delay in limits (when no alternative line is available)	sec	10	1-6000
<b>P09.n.08</b>	Mains return delay in limits (when alternative line is available)	sec	60	1-6000
<b>P09.n.09</b>	No phase threshold	%	70	60% - 80% / OFF
<b>P09.n.10</b>	No phase threshold delay	sec	0.1	0.1s-30s
<b>P09.n.11</b>	MAX asymmetric threshold	%	15	1% -20%/OFF
<b>P09.n.12</b>	MAX asymmetric delay	sec	5	0.1-900
<b>P09.n.13</b>	MAX frequency limit	%	105	100-120/OFF
<b>P09.n.14</b>	MAX frequency delay	sec	3	0-600
<b>P09.n.15</b>	MIN frequency limit	%	95	OFF/80-100
<b>P09.n.16</b>	MIN frequency delay	sec	5	0-600
<b>P09.n.17</b>	SQ.n line control in OFF/RESET mode		OFF	OFF ON OFF+GLOB ON+GLOB
<b>P09.n.18</b>	.n line control in MAN mode		OFF	OFF ON OFF+GLOB ON+GLOB
<b>P09.n.19</b>	Line conditional enable		OFF	OFF INPx OUTx LIMx REMX PLCx Ax UAX
<b>P09.n.20</b>	Function index (x)		OFF	OFF / 1...99

ⓘ These parameters are also accessible with user level password.

**Note:** This menu is divided into 3 sections for Source Line Controls SQ 1..3.

**P09.n.01, P09.n.02, P09.n.03** - The first two parameters define the minimum voltage threshold and the respective reset hysteresis. P09.n.02 cannot be set to a value lower than P09.n.01. P09.n.03 this defines the tripping delay time of this protection.

**P09.n.04, P09.n.05, P09.n.06** - The first two parameters define the maximum voltage threshold and the respective reset hysteresis. P09.n.05 cannot be set to a value higher than P09.n.04. By setting P09.n.04 to OFF, the maximum voltage control is disabled. P09.n.06 defines the maximum voltage tripping delay.

**P09.n.07** - Delay time for S.x to return within the limits, used when an alternative threshold is not available. Normally shorter than P09.n.08, because the load is not powered and supplying voltage is urgent.

**P09.n.08** - Delay time for S.x to return within the limits, used when the load cannot be connected to an alternative line. Normally longer than P09.n.07, because the load is covered and it is possible to wait for longer before conditions that voltage is stably re-established.

**P09.n.09, P09.n.10** - Voltage threshold under which lowering is rapid because of a missing phase. Delay time for the missing phase is specified in P09.n.10.

## 2. Operating modes

**P09.n.11, P09.n.12 - P09.n.11** These define the maximum imbalance threshold between the phases referred to rated voltage and P09.n.12 is the respective tripping delay. This control may be disabled by setting P09.n.11 to OFF.

**P09.n.13** - Maximum frequency tripping threshold; may be deactivated.

**P09.n.14** - Maximum frequency tripping delay.

**P09.n.15** - Minimum frequency tripping threshold; may be deactivated.

**P09.n.16** - Minimum frequency tripping delay.

**P09.n.17** - OFF = voltage control S.n in OFF mode is deactivated. **ON** = voltage control in OFF mode is active. **OFF+GLOB** = voltage control in OFF mode is deactivated but the relay programmed with the global alarm function may intervene or not according to whether the mains are absent or present, respectively. **ON+GLOB** = voltage control in OFF mode is activated but the relay programmed with the global alarm function may intervene or not according to whether the mains are absent or present, respectively.

**P09.n.18** - See P09.n.17 but referred to MANUAL mode.

**P09.n.19, P09.n.20** - Conditional enable of the source line. **OFF** = The source line is normally available. (**Any other setting**) = The source line can be used only if the set variable is active.

M10 - COMMUNICATION COMn (n=1...3)		UNIT	DEFAULT	RANGE
<b>P10.n.01</b>	Serial node address		01	01-255
<b>P10.n.02</b>	Serial speed	bps	19200	1200 2400 4800 9600 19200 38400 57600 115200
<b>P10.n.03</b>	Data format		8 bit - n	8 bit, no parity 8 bit, odd bit, even 7 bit, odd 7 bit, even
<b>P10.n.04</b>	Stop bit		1	1-2
<b>P10.n.05</b>	Protocol		Modbus RTU	Modbus RTU Modbus ASCII Modbus TCP

ⓘ These parameters are also accessible with user level password.

**Note:** This menu is divided into 3 sections for communication channels COM1..3.

The channel COM1 identifies the standard RS-485 port, while COM2 and COM3 are reserved to the possible communication ports on expansion modules EXP. The infrared frontal programming port has fixed communication parameters and no setting menu is required.

**P10.n.01** - Serial address (node) of the communication protocol.

**P10.n.02** - Communication port transmission speed (1200 bps not available on slot 1 and 4).

**P10.n.03** - Data format. 7-bit settings available for ASCII protocol only.

**P10.n.04** - Stop bit number.

**P10.n.05** - Communication protocol selection.

**P10.n.06, P10.n.07, P10.n.08** - TCP-IP coordinates for applications with Ethernet interface. Not used with other communication module types.

**P10.n.09** - Port operating mode. **Slave** = normal operation, the device reply to the messages of an external master. **Gateway** = The device analyses the message intended to it (serial address) and forwards those address to other nodes through the RS485 interface.

M11 - AUTOMATIC TEST		UNIT	DEFAULT	RANGE
<b>P11.01</b>	Automatic TEST enable group 1		OFF	OFF / ON
<b>P11.02</b>	Automatic TEST enable group 2		OFF	OFF / ON
<b>P11.03</b>	Automatic TEST enable group 3		OFF	OFF / ON
<b>P11.04</b>	Interval between TESTS	gg	7	1-60
<b>P11.05</b>	Enable TEST for Monday		ON	OFF / ON
<b>P11.06</b>	Enable TEST for Tuesday		ON	OFF / ON
<b>P11.07</b>	Enable TEST for Wednesday		ON	OFF / ON
<b>P11.08</b>	Enable TEST for Thursday		ON	OFF / ON
<b>P11.09</b>	Enable TEST for Friday		ON	OFF / ON
<b>P11.10</b>	Enable TEST for Saturday		ON	OFF / ON
<b>P11.11</b>	Enable TEST for Sunday		ON	OFF / ON
<b>P11.12</b>	TEST start hour	h	12	00-23
<b>P11.13</b>	TEST start minutes	min	00	00-59
<b>P11.14</b>	TEST time	min	10	1-600
<b>P11.15</b>	Automatic TEST with load switching		OFF	OFF Load Dummy load

ⓘ These parameters are also accessible with user level password.

**P11.01 - P11.02 - P11.03** - This activate execution of the periodical test of the respective three gensets.

**P11.04** - Interval time between one periodical test and the next. If the test is not enabled on the period expiration date, the interval will be extended as a consequence to the following enabled day.

**P11.05...P11.11** This enables automatic test execution in the single days of the week. OFF means that the test will not be performed on that day. Caution: The clock must be set correctly.

**P11.12 - P11.13** This establishes the date and minutes from the beginning of the periodical test. Caution: The clock must be set correctly.

**P11.14** - Periodical test time in minutes.

**P11.15** - Load management during periodical test execution: **OFF** = The load is not transferred. **Load** = This enables load transfer to the genset. **Dummy load** = This applies the dummy load while the system load is not switched.

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

**Note:** This menu is divided into 20 sections for each programmable digital input INP1..INP20.

The inputs on the basic board are numbered from INP1 to INP12, while the remaining number refer to the expansion module inputs.

**P12.n.01** - Selection input function selection (see programmable input function table).

**P12.n.02** - Index possibly associated to the function programmed under the previous parameter. Example: If the input function is set to *Control menu execution Cxx* and this input must execute control C.07 in the command menu, then P12.n.02 is set to value 7.

**P12.n.03** - Contact type selection: NO normally open or NC normally closed.

**P12.n.04** - Selected input contact closing delay.

**P12.n.05** - Selected input contact opening delay.

## 2. Operating modes

M13 – DIGITAL OUTPUTS (OUT1...20)		UNIT	DEFAULT	RANGE
<b>P13.n.01</b>	OUTn output function		(miscellaneous)	(see Output functions table)
<b>P13.n.02</b>	Function index (x)		1	OFF / 1...99
<b>P13.n.03</b>	Normal/reverse output		NOR	NOR / REV

**Note:** This menu is divided into 20 sections, referred to digital outputs OUT1...OUT20.

The outputs on the basic board are numbered from OUT1..OUT10, while the remaining to the those on the expansion modules.

**P13.n.01** - Output function selection (see *Programmable output function table*).

**P13.n.02** - Index possibly associated to the function programmed under the previous parameter. Example: If the function of the output is set to the *Alarm Axx* function and this output must be energised when alarm A16 occurs, then P11.n.02 is set to value 16.

**P13.n.03** - This sets the output state when the associated function is not active: **NOR** = de-energised output, **REV** = energised output.

M14 - MISCELLANEOUS		UNIT	DEFAULT	RANGE
<b>P14.01</b>	Maintenance interval hours	h	OFF	OFF / 1...99999
<b>P14.02</b>	Maintenance interval operations		OFF	OFF 1...99999
<b>P14.03</b>	Operative mode output		OFF	OFF O M M - O A ...

**P14.01** - This defines the programmed maintenance frequency, expressed in hours. If set to OFF, this maintenance frequency can be deactivated.

**P14.02** - This defines the programmed maintenance frequency, expressed in number of operations. If set to OFF, this maintenance frequency can be deactivated.

**P14.03** - This defines in which operating modes to activate the output programmed with the *Operating mode* function. For example, if this parameter is programmed on M-O, the Operating mode output will be activated when the **ref. 422684** is in MAN or OFF mode.

M15 - LIMIT THRESHOLDS (LIMn, n = 1...16)		UNIT	DEFAULT	RANGE
<b>P15.n.01</b>	Reference measurement		OFF	OFF- (measurements list) AINx CNTx ....
<b>P15.n.02</b>	Reference measurement source		OFF	OFF S.1 S.2 S.3
<b>P15.n.03</b>	Channel no. (x)		1	OFF/1..99
<b>P15.n.04</b>	Function		Max	Max Min Min+Max
<b>P15.n.05</b>	Upper threshold		0	-9999 - +9999
<b>P15.n.06</b>	Multiplier		x1	/100 - x10k
<b>P15.n.07</b>	Delay	sec	0	0.0 – 600.0
<b>P15.n.08</b>	Lower threshold		0	-9999 - +9999
<b>P15.n.09</b>	Multiplier		x1	/100 - x10k
<b>P15.n.10</b>	Delay	sec	0	0.0 – 600.0
<b>P15.n.11</b>	Home state		OFF	OFF-ON
<b>P15.n.12</b>	Memory		OFF	OFF-ON

**Note: This menu is divided into 16 sections for limit thresholds LIM1..16.**

**P15.n.01** - This defines which measurements supplied by the ref. 422684 to apply the limit threshold.

**P15.n.02** - If the reference measurement is an electric measurement, this defines whether it refers to the mains or the genset.

**P15.n.03** - If the reference measurement is a multichannel internal measurement (e.g. AINx), this defines which channel.

**P15.n.04** - This defines the limit threshold operating mode. **Max** = LIMn active when the measurement is higher than P15.n.03. P15.n.06 is the resetting threshold. **Max** = LIMn active when the measurement is lower than P15.n.06. P15.n.03 is the resetting threshold. **Min+Max** = LIMn active when the measurement is higher than P15.n.03 or lower than P15.n.06.

**P15.n.05 and P15.n.06** - These define the upper threshold which is given by the value of P15.n.03 multiplied by P15.n.04.

**P15.n.07** - Tripping delay on the upper threshold.

**P15.n.08, P08.n.09, P08.n.10** - as above referred to the lower threshold.

**P15.n.11** - This allows to reverse the LIMn limit state.

**P15.n.12** - This defines whether the threshold remains stored or must be manually reset using the command menu (ON) or whether it resets automatically (OFF).

## 2. Operating modes

P16 - COUNTERS (CNTn, n = 1...8)		UNIT	DEFAULT	RANGE
<b>P16.n.01</b>	Counter source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAx RALx
<b>P16.n.02</b>	Channel no. (x)		1	1-99
<b>P16.n.03</b>	Multiplier		1	1-1000
<b>P16.n.04</b>	Splitter		1	1-1000
<b>P16.n.05</b>	Counter description		CNTn	(Text - 16 characters)
<b>P16.n.06</b>	Unit of measurement		UMn	(Text - 6 characters)
<b>P16.n.07</b>	Reset source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAx RALx
<b>P16.n.08</b>	Channel no. (x)		1	1-99

**Note: This menu is divided into 8 sections for counters CNT1..8.**

**P16.n.01** - Signal which causes the counter increments (on ramp up). It may be energised by the ref. **422684** (ON), the exceeding of a threshold (LIMx), the activation of an external input (INPx), a logical condition (PLCx) etc.

**P16.n.02** - Channel number x referred to the previous parameter.

**P16.n.03** - Multiplying K. The counted pulse are multiplied by this value before being displayed.

**P16.n.04** - Fractioning K. The counted pulse are divided by this value before being displayed. If different from 1, the counter is displayed with two decimal digits.

**P16.n.05** - Description of the counter. Free text 16 characters.

**P16.n.06** - Counter unit of measurement. Free text 6 characters.

**P16.n.07** - Signal which causes the resetting of the counter. The counter remains equal to zero for as long as this signal is active.

**P16.n.08** - Channel number x referred to the previous parameter.

M17 - TIMER (TIMn, n = 1...8)		UNIT	DEFAULT	RANGE
<b>P17.n.01</b>	Timer source			OFF ON INPx OUTx LIMx REMX PLCx Axx UAx RALx
<b>P17.n.02</b>	Channel no. (x)		1	1-99
<b>P17.n.03</b>	Delay	sec	0	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.

M18 – REMOTE ALARMS (RALn, n = 1...24)		UNIT	DEFAULT	RANGE
<b>P18.n.01</b>	RALn output function		(miscellaneous)	(see Output functions table)
<b>P18.n.02</b>	Function index (x)		OFF	OFF / 1...99
<b>P18.n.03</b>	Normal/reverse output		NOR	NOR / REV

**Note: this menu is divided into 24 sections for state/alarm remoting variables RAL1...RAL24, available in combination with the external unit RGKRR**

**P18.n.01** - This selects the remote output function RALn. The remote outputs (remote unit relay RGKRR) may assume the same functions as the local outputs, including the operating states, the alarms etc.

**P18.n.02** - Index possibly associated to the function programmed under the previous parameter. Example: If the function of the output is set to the Alarm Axx function and this output must be energised when alarm A31 occurs, then P18.n.02 is set to value 31.

**P18.n.03** - This sets the output state when the associated function is not active: **NOR** = de-energised output, **REV** = energised output.

M21 - USER ALARMS (UAn, n=1...8)		UNIT	DEFAULT	RANGE
<b>P21.n.01</b>	Alarm source		OFF	OFF INPx OUTx LIMx REMX PLCx TIMx
<b>P21.n.02</b>	Channel no. (x)		1	OFF/1...99
<b>P21.n.03</b>	Text		UAn	(text - 20 characters)
<b>P21.n.04</b>	Breaker 1 open		OFF	OFF ON
<b>P21.n.05</b>	Breaker 2 open		OFF	OFF ON
<b>P21.n.06</b>	Breaker 3 open		OFF	OFF ON

---

## 2. Operating modes

**Note: This menu is divided into 8 sections for defining the user alarms UA1...UA8.**

**P21.n.01** - This defines the digital input or internal variable the activation of which generates the user alarm.

**P21.n.02** - Channel number referred to the previous parameter.

**P21.n.03** - Free text which will appear in the alarm window.

**P21.n.04-P21.n.05-P21.n.06** - This defines whether one or more line breakers must be open when a user alarm occurs.

*Example of application: User alarm UA3 must be generated by the closing of the input INP5 and must show the 'Doors open' message without opening any breaker.*

*In the case, set menu section 3 (for alarm UA3):*

*P21.3.01 = INPx*

*P21.3.02 = 5*

*P21.3.03 = 'Doors open'*

*P21.3.04, P21.3.05, P21.3.06 = OFF*

### 2.20 Alarms

- When an alarm occurs, an alarm icon will appear on the display together with an ID code and the description of the alarm in the selected language.
- If the page navigation buttons are pressed, the pop-up window with the alarm indications momentarily disappear and then reappear after a few seconds.
- The red LED next to the alarm icon on the front panel will blink for as long as an alarm is active. If enabled, the local and remote acoustic alarms are activated.
- The alarms can be reset by pressing the OFF button.
- If the alarm is not reset, it means that its cause persists..

### 2.21 Alarm properties

Various properties can be assigned to each alarm, including the user alarms (User Alarms, Uax):

- **Enabled alarm** – General alarm enable. If not enabled, it is as if it does not exist.
- **AUT only** – The alarm may only be generated when ref. 422684 ATS is in automatic mode.
- **Retaining alarm** – This remains stored even if its cause was removed.
- **Global alarm A** – This activates the outputs assigned to this function.
- **Global alarm B** – This activates the outputs assigned to this function.
- **Block QQ1** – controls are no longer sent to breaker Q1 when the alarm occurs.
- **Block QQ2** – as above referred to breaker Q2.
- **Block QQ3** – as above referred to breaker Q3.
- **Siren** – Activates the output assigned to this function as configured in the alarms table.
- **Inhibit** – The alarm may be temporarily deactivated by activating a programmable input with the alarm inhibit function.
- **No LCD** – The alarm is normally managed but not shown on the display.



## 2.22 Alarms table

The following table shows the alarm codes, together with a description and the default properties of each one.

CODE	DESCRIPTION	ENABLED	AUT ONLY	RETAINING	ALL. GLOB. A	ALL. GLOB. B	BLOCK Q1	BLOCK Q2	BLOCK Q3	SIREN	NO LCD
A01	Battery voltage too low	•		•		•				•	
A02	Battery voltage too high	•		•		•				•	
A03	Q1 breaker timeout	•	•	•	•		•			•	
A04	Q2 breaker timeout	•	•	•	•			•		•	
A05	Q3 breaker timeout	•	•	•	•				•	•	
A06	Incorrect phase sequence Line .SQ1	•		•	•					•	
A07	Incorrect phase sequence Line .SQ2	•		•	•					•	
A08	Incorrect phase sequence Line .SQ3	•		•	•					•	
A09	Load timeout not powered	•	•		•					•	
A10	Local battery charger failure	•		•	•					•	
A14	Emergency	•		•	•					•	
A15	Q1 breaker protection trip	•		•	•		•	•	•	•	
A16	Q2 breaker protection trip	•		•	•		•	•	•	•	
A17	Q3 breaker protection trip	•		•	•		•	•	•	•	
A18	Q1 breaker withdrawn	•	•	•	•		•			•	•
A19	Q2 breaker withdrawn	•	•	•	•			•		•	•
A20	Q3 breaker withdrawn	•	•	•	•				•	•	•
A21	SQ1 genset line not available	•			•					•	
A22	SQ2 genset line not available	•			•					•	
A23	SQ3 genset line not available	•			•					•	
A24	Maintenance hours SS.Q1	•				•					
A25	Maintenance hours S.Q2	•				•					
A26	Maintenance hours S.Q3	•				•					
A27	Maintenance operations Q1	•				•					
A28	Maintenance operations Q2	•				•					
A29	Maintenance operations Q3	•				•					
A30	Auxiliary voltage breaker alarm	•			•					•	
A31	Non-priority load breaker timeout	•	•	•	•					•	
A32	Tie breaker CQC1 timeout	•	•	•	•		•	•	•	•	
A33	Tie breaker QCC2 timeout	•	•	•	•		•	•	•	•	
A34	NPL (Non-Priority-Load) breaker protection trip	•		•	•		•	•	•	•	
A35	C1 tie breaker protection trip	•		•	•		•	•	•	•	
A36	C2 tie breaker protection trip	•		•	•		•	•	•	•	
A37	NPL (Non-Priority-Load) breaker withdrawn	•	•	•	•					•	•
A38	QCC1 tie breaker withdrawn	•	•	•	•					•	•
A39	QCC2 tie breaker withdrawn	•	•	•	•					•	•
UA1...UA8	User alarms										

## 2. Operating modes

### 2.23 Description of the alarms

CODE	DESCRIPTION	REASON FOR THE ALARM
A01	Battery voltage too low	Battery voltage under minimum threshold for a time longer than set.
A02	Battery voltage too high	Battery voltage under maximum threshold for a time longer than set.
A03	1 breaker timeout	Device of line SQ.1 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.
A04	Q2 breaker timeout	As above, referred to Q2.
A05	Q3 breaker timeout	As above, referred to Q3.
A06	Incorrect phase sequence Line S.Q1	The phase sequence detected on line SQ.1 does not correspond to the programmed value.
A07	Incorrect phase sequence Line S.Q2	As above, referred to SQ.2.
A08	Incorrect phase sequence Line S.Q3	As above, referred to SQ.3.
A09	Load timeout not powered	The load was not powered for a time longer than that programmed under P08.03 either because there were no available power lines or because the breakers were both open.
A14	Emergency	Alarm generated by the opening of the external <i>Emergency</i> input. All breakers are opened.
A15	Q1 breaker protection trip	Breaker Q1 opened because its overcurrent protection tripped, as indicated by the specific input with the <i>Line 1 breaker protection trip</i> function.
A16	Q2 breaker protection trip	As above, referred to Q2.
A17	Q3 breaker protection trip	As above, referred to Q3.
A18	Q1 breaker withdrawn	Breaker Q1 is not available because the input with the <i>Line 1 breaker withdrawn</i> indicates that the breaker is not present in its housing.
A19	Q2 breaker withdrawn	As above, referred to Q2.
A20	Q3 breaker withdrawn	As above, referred to Q3.
A21	S.Q1 genset line not available	Alarm generated by the <i>S.Q1 line genset ready</i> input.
A22	S.Q2 genset line not available	As above, referred to SQ.2.
A23	S.Q3 genset line not available	As above, referred to S.Q3.
A24	Maintenance hours S.Q1	Alarm generated when the maintenance hours related to the SQ.Q1 line reach zero. See menu M12. Use the Control menu to restore the operating hours and reset the alarm.
A25	Maintenance hours S.Q2	As above, referred to S.Q2.
A26	Maintenance hours S.Q3	As above, referred to S.Q3.
A27	Maintenance operations Q1	Alarm generated when the number of operations related to breaker QQ1 of line SQ.Q1 reach the value set in menu M12. Use the <i>Control menu</i> to restore the operation and reset the alarm.
A28	Maintenance operations Q2	As above, referred to Q2.
A29	Maintenance operations Q3	As above, referred to Q3.
A30	Auxiliary voltage breaker alarm	The device which manages the draw of auxiliary voltage from the available line (Legrand DPS Ref. 422686) indicates a fault/malfunctioning.

*continue*

CODE	DESCRIPTION	REASON FOR THE ALARM
<b>A31</b>	NPL (Non-Priority Load) breaker timeout	The non-priority load breaker 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.
<b>A32</b>	QC - QC1 Tie breaker timeout	Tie breaker QC - QC1 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.
<b>A33</b>	QC - QC2 Tie breaker timeout	As above, referred to tie breaker QC - QC2.
<b>A34</b>	NPL (Non-Priority Load) breaker protection trip	NPL breaker opened because its overcurrent protection tripped, as indicated by the specific input with the <i>NPL breaker protection trip</i> function.
<b>A35</b>	QC - QC1 tie breaker protection trip	QC1 - QC1 tie breaker opened because its overcurrent protection tripped, as indicated by the specific input with the <i>QC - QC1 tie breaker protection trip</i> function.
<b>A36</b>	QC - QC2 tie breaker protection trip	As above, referred to QCQC2 tie breaker.
<b>A37</b>	NPL (Non-Priority Load) breaker withdrawn	NPL breaker is not available because the input with the <i>NPL breaker withdrawn</i> function indicates that the breaker is not present in its housing.
<b>A38</b>	QC - QC1 tie breaker withdrawn	QCQC1 tie breaker is not available because the input with the <i>QC - QC1 tie breaker withdrawn</i> function indicates that the breaker is not present in its housing.
<b>A39</b>	QC - QC2 tie breaker withdrawn	As above, referred to tie QC - QC2 breaker.
<b>UA1...UA8</b>	User alarms	The user alarm was generated by the activation of the variable or the associated input by means menu M15.

## 2.24 Programmable input functions table

- The following table shows all the functions which can be associated to the programmable digital inputs INPn.
- Each input may be set so as to have inverted function (NO - NC) because the energising or de-energising may be reset with independent times.
- Other functions require a further numeric parameter defined by index (x) specified by parameter P12.n.02.
- See menu *M12 Digital inputs* for more details.

NR.	FUNCTION	DESCRIPTION
<b>0</b>	Disabled	Disabled input.
<b>1</b>	Configurable	Freely configurable by the user.
<b>2</b>	Line 1 breaker closed (Feedback Q1)	Auxiliary contact which informs the <b>ref. 422684</b> of the open/closed state of breaker Q1. If this signal is not connected, <b>ref. 422684</b> considers the state of the breaker corresponding to the control output state.
<b>3</b>	Line 2 breaker closed (Feedback Q2)	As above, referred to Q2.
<b>4</b>	Line 3 breaker closed (Feedback Q3)	As above, referred to Q3.
<b>5</b>	Line 1 in breaker tripped (Trip Q1)	The input generates breaker Q1 protection tripping when the contact closes.

*continue*

## 2. Operating modes

NR.	FUNCTION	DESCRIPTION
6	Line 2 in breaker tripped (Trip Q2)	As above, referred to Q2.
7	Line 3 in breaker tripped (Trip Q3)	As above, referred to Q3.
8	Line 1 breaker withdrawn (Withdrawn Q1)	The input generates the breaker QQ1 withdrawn alarm when the contact opens.
9	Line 2 breaker withdrawn (Withdrawn Q2)	As above, referred to Q2.
10	Line 3 breaker withdrawn (Withdrawn Q3)	As above, referred to Q3.
11	Transfer to secondary load (remote start on-load)	When closed, causes the priority line detachment and transfer to the first available line. Also if the main line voltage returns within limits. The secondary line breaker remains active until it is comprised in the limits. May also be used for the EJP function.
12	Automatic return to priority line inhibition	In AUT mode, when closed, prevents automatic return to the priority line after it returns into the limits. (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.
13	Automatic return to priority line in open transition inhibition	In AUT mode, when closed, prevents automatic return to the priority line in open transition after it returns into the limits. (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.
14	Priority genset start (Off load)	In AUT mode, when closed, causes the starting of the priority genset after the time set with Pxx.xx. May also be used for the EJP function.
15	Start genset 1	In AUT mode, when closed, overrides starting of genset 1.
16	Start genset 2	As above, referred to genset 2.
17	Start genset 3	As above, referred to genset 3.
18	Emergency	NC contact which, if open, opens all the breakers and generates alarm <i>A14 Emergency</i> (block property of A14 are priority) .
19	Line S.Q1 genset ready	When closed, indicates that the genset connected to the S.Q1 line is available for use. Error A21 is generated if this signal is missing.
20	Line S.Q2 genset ready	When closed, indicates that the genset connected to the S.Q2 line is available for use. Error A22 is generated if this signal is missing.
21	Line S.Q3 genset ready	When closed, indicates that the genset connected to the S.Q3 line is available for use. Error A23 is generated if this signal is missing.
22	External line S.Q1 check	Line S.Q1 voltage from external equipment check signal. Activated indicates voltage within limits.
23	External line S.Q2 check	As above, referred to line S.Q2.
24	External line S.Q3 check	As above, referred to line S.Q3.
25	Load enable on line S.Q1	Enables load connection on line S.Q1, in addition to internal controls.
26	Load enable on line S.Q2	As above, referred to line S.Q2.
27	Load enable on line S.Q3	As above, referred to line S.Q3.
28	Reset line S.Q1 delay	Resets line S.Q1 presence delay.
29	Reset line S.Q2 delay	As above, referred to line S.Q2.
30	Reset line S.Q3 delay	As above, referred to line S.Q3.

*continue*

## Three-Sources Management System (T.S.M.S.)

NR.	FUNCTION	DESCRIPTION
31	Keypad lock	If closed, locks all front keyboard functions except for measurement display.
32	Parameter setting lock	If closed, the setup menu access is locked.
33	Remote control lock	Locks control and writing operations via serial port. Data reading is always possible.
34	Siren OFF	Deactivates the siren.
35	Automatic test	Starts a periodical test managed by an external timer.
41	Reset alarms	Reset retraining alarms the causing condition of which has ceased.
42	Control menu C(xx)	Executes the command menu control defined by the index parameter (xx).
43	Simulate OFF button	Closing the input is equivalent to pressing the button.
44	Simulate MAN button	Closing the input is equivalent to pressing the button.
45	Simulate AUT button	Closing the input is equivalent to pressing the button.
46	Simulate TEST button	Closing the input is equivalent to pressing the button.
47	Automatic test inhibition	Prevents automatic test execution.
48	LED test	Lights up all LEDs on the front panel making them blink.
49	Close Q1	Closes breaker Q1 in manual mode.
50	Open Q1	Opens breaker Q1 in manual mode.
51	Toggle Q1	Toggles the state of breaker Q1 in manual mode.
52	Close Q2	Closes breaker Q2 in manual mode.
53	Open Q2	Opens breaker Q2 in manual mode.
54	Toggle Q2	Toggles the state of breaker Q2 in manual mode.
55	Close Q3	Closes breaker Q3 in manual mode.
56	Open Q3	Opens breaker Q3 in manual mode.
57	Toggle Q3	Toggles the state of breaker Q3 in manual mode.
58	Auxiliary voltage ready	NC contact which, if opened, generates alarm <i>A30 Auxiliary voltage breaker alarm</i> . Used in combination with the DPS REF . 422686 DUAL POWER SUPPLY alarm relay.
59	Service mode	If enable for system Service, this causes: <ul style="list-style-type: none"> <li>• Deactivation of feedback timeout alarms A03 A04 A05</li> <li>• Switching to OFF mode</li> <li>• Energising of minimum voltage coils.</li> </ul>
60	Non-priority load breaker feedback	Auxiliary contact which informs the <b>ref. 422684</b> of the open/closed state of breaker which breaks the non-priority load. If this signal is not connected, <b>ref. 422684</b> considers the state of the breaker corresponding to the control output state.
61	Maximum priority line S.Q1	When closed, line SQ1 becomes the priority line.
62	Maximum priority line S.Q2	As above, referred to line S.Q2.
63	Maximum priority line S.Q3	As above, referred to line S.Q3.
64	Tie breaker QC1 feedback	Auxiliary contact which informs the <b>ref. 422684</b> of the open/closed state of tie breaker QC1. If this signal is not connected, <b>ref. 422684</b> considers the state of the tie breaker corresponding to the control output state.
65	Tie breaker Q.C2 feedback	As above, referred to Q.C2.
66	NPL breaker protection trip	The input generates NPL breaker protection tripping when the contact closes.

*continue*

## 2. Operating modes

NR.	FUNCTION	DESCRIPTION
67	Q.C1 tie breaker protection trip	As above, referred to Q.C1.
68	Q.C2 tie breaker protection trip	As above, referred to Q.C2.
69	NPL breaker withdrawn	The input generates NPL breaker withdrawn alarm when the contact opens.
70	Q.C1 tie breaker withdrawn	As above, referred to Q.C1.
71	Q.C2 tie breaker withdrawn	As above, referred to Q.C2.
72	Close Q.C1	When in MAN mode, commands Q.C1 closing.
73	Open Q.C1	When in MAN mode, commands Q.C1 opening.
74	Toggle Q.C1	When in MAN mode, commands Q.C1 toggle.
75	Close Q.C2	When in MAN mode, commands Q.C2 closing.
76	Open Q.C2	When in MAN mode, commands Q.C2 opening.
77	Toggle Q.C2	When in MAN mode, commands Q.C2 toggle.

### 2.25 Programmable input default

INPUT	TERMINALS	DEFAULT FUNCTION
INP1	40	Breaker Q1 closed (Feedback 1)
INP2	41	Breaker Q2 closed (Feedback 2)
INP3	42	Breaker Q3 closed (Feedback 3)
INP4	43	Breaker Q1 closed (Trip 1)
INP5	44	Breaker Q2 closed (Trip 2)
INP6	45	Breaker Q3 closed (Trip 3)
INP7	46	Priority genset start (Off load)
INP8	47	Transfer to secondary load (remote start on-load)
INP9	49	Automatic return to priority line inhibition
INP10	50	Disabled
INP11	51	Disabled
INP12	52	Disabled

## 2.26 Programmable outputs functions table

- The following table shows all the functions which can be associated to the programmable digital outputs OUTn.
- Each output may be controlled in normal or inverted function (NOR or REV).
- Other functions require a further numeric parameter defined by index (x) specified by parameter P13.n.02.
- See menu *M13 Programmable outputs* for more details.

NR.	FUNCTION	DESCRIPTION
0	Disabled	Output disabled.
1	Configurable	Freely configurable by the user.
2	Close contactor/breaker line 1	Closing control of relay/switch / Line 1 (Q1).
3	Open breaker Line 1	Opening control of breaker Line 1 (Q1) and possible spring loading.
4	Close contactor/breaker line 2	Closing control of relay/switch / Line 2 (Q2).
5	Open breaker Line 2	Opening control of breaker Line 2 (Q2) and possible spring loading.
6	Close contactor/breaker line 3	Closing control of relay/switch / Line 3 (Q3).
7	Open breaker Line 3	Opening control of breaker Line 3 (Q3) and possible spring loading.
8	Open Q1/2/3	Opening of both breakers/neutral position motorised transfer.
9	Minimum coil Q1 (UVR )	Controls the minimum voltage coil by opening breaker Q1 before the spring loading cycle.
10	Minimum coil Q2 (UVR )	As above, referred to Q2.
11	Minimum coil Q3 ( UVR)	As above, referred to Q3.
12	Control genset 1	Control remote start/stop of genset on line S.Q1.
13	Control genset 2	As above, referred to S.Q2.
14	Control genset 3	As above, referred to S.Q3.
15	ATS ready	ATS in automatic, without alarms, ready to transfer.
16	Global alarm A	Output activated in presence of any alarm with <i>Global alarm A</i> property activated.
17	Global alarm B	Output activated in presence of any alarm with <i>Global alarm B</i> property activated.
18	Voltage state line S.Q1	Output energised when all conditions exit to connect the load to the Q.S1 line.
19	Voltage state line S.Q2	As above, referred to S.Q2.
20	Voltage state line S.Q3	As above, referred to S.Q3.
21	Siren	Powers the acoustic warning siren.
22	Operative mode	Output energised when the <b>ref. 422684</b> is in one of the modes set with parameter P14.03.
23	OFF mode	Energised when <b>ref. 422684</b> is in OFF mode.
24	MAN mode	Energised when <b>ref. 422684</b> is in MANUAL mode.
25	AUT mode	Energised when <b>ref. 422684</b> is in AUT mode.
26	TEST mode	Energised when <b>ref. 422684</b> is in TEST mode.
27	REM(x) remote variable	Output controlled by remote variable REMx (x=1..16).
28	LIM (x) limits	Output controlled by limit threshold state LIM(x) (x=1..16) defined by the index parameter.
29	Dummy load Line S.Q1	Output enabled when the automatic test is performed with dummy load line SQ1.
30	Dummy load Line S.Q2	As above, referred to line SQ2.
31	Dummy load Line S.Q3	As above, referred to line SQ3.
32	Load on Line S.Q1	Breaker Q1 closed.

*continue*

## 2. Operating modes

NR.	FUNCTION	DESCRIPTION
33	Load on Line S.Q2	Breaker Q2 closed.
34	Load on Line S.Q3	Breaker Q3 closed.
35	Alarms A01-Axx	Output energised when alarm Axx is active (xx=1...alarm number).
36	Alarms UA1..Uax	Output energised when alarm Uax is active (x=1...8).
38	Timer TIM(x)	Output controlled by state of timer variable TIM(x). (x=1..8) is defined by the index parameter.
39	Close NPL	Closing control of non-priority load relay / breaker .
40	Open NPL	Opening of non-priority load breaker and possible spring loading.
41	NPL minimum voltage coil	Controls the minimum voltage coil by opening the non-priority breaker before the spring loading cycle.
42	PLC(x)	Output controlled by state of timer variable PLC(x). (x=1..32) is defined by the index parameter.
43	Pre-transfer load 1	Energised output before the load is transferred from one source to another, both present. Programmable advance time using parameter P02.22.
44	Post-transfer load 1	Energised output after the load is transferred from one source to another. Programmable indicating time using parameter P02.23.
45	Pre-transfer load 2	As above, referred to load 2.
46	Post-transfer load 2	As above, referred to load 2.
47	Pre-transfer load 3	As above, referred to load 3.
48	Post-transfer load 3	As above, referred to load 3.
49	Increase voltage line S.Q1	Signal of line S.Q1 genset to increase voltage.
50	Increase voltage line S.Q2	As above, referred to line S.Q2.
51	Increase voltage line S.Q3	As above, referred to line S.Q3.
52	Decrease voltage line S.Q1	Signal of line S.Q1 genset to decrease voltage.
53	Decrease voltage line S.Q2	As above, referred to line S.Q2.
54	Decrease voltage line S.Q3	As above, referred to line S.Q3.
55	Increase line S.Q1 frequency	Signal to governor of line S.Q1 genset to increase rpm/frequency.
56	Increase line S.Q2 frequency	As above, referred to line S.Q2.
57	Increase line S.Q3 frequency	As above, referred to line S.Q3.
58	Decrease line S.Q1 frequency	Signal to governor of line S.Q1 genset to decrease rpm/frequency.
59	Decrease line S.Q2 frequency	As above, referred to line S.Q2.
60	Decrease line S.Q3 frequency	As above, referred to line S.Q3.
61	Close contactor/tie breaker 1	Closing control of relay/breaker Q.C1.
62	Open contactor/tie breaker 1	Opening control of breaker Q.C1 and possible spring loading.
63	Minimum coil tie breaker 1	Controls the minimum voltage coil by opening breaker Q.C1 before the spring loading cycle.
64	Close contactor/tie breaker 2	Closing control of relay/breaker Q.C2.
65	Open tie breaker 2	Opening control of breaker Q.C2 and possible spring loading.
66	Minimum coil tie breaker 2	Controls the minimum voltage coil by opening breaker Q.C2 before the spring loading cycle.
67	Sync 1<->2	Active during synchronization between S.Q1 and S.Q2
68	Sync 2<->3	Active during synchronization between SQ2 and S.Q3
69	Sync 3<->1	Active during synchronization between SQ3 and SQ1



## 2.27 Programmable outputs default

OUTPUT	TERMINALS	DEFAULT FUNCTION
OUT1	55-56	Open breaker Line 1 (Q1)
OUT2	56-57	Close contactor/breaker line 1 (Q1)
OUT3	58-59	Open breaker Line 2 (Q2)
OUT4	59-60	Close contactor/breaker line 2 (Q2)
OUT5	61-62	Open breaker Line 3 (Q3)
OUT6	62-63	Close contactor/breaker line 3 (Q3)
OUT7	19-20-21	Global alarm A
OUT8	28-29	ATS Ready
OUT9	30-31-32	Control genset 1
OUT10	33-34-35	Control genset 2
OUT11	36-37-38	Control genset 3

## 2.28 System layout

The possible system layouts supported by the ref. 422684 are listed below. The following information is provided for each one:

- The code used for selecting the layout type in the parameter setting P02.01 of the GENERAL menu (example: B: 2S-1T-PL)
- An example of synoptic
- A truth table
- A description of a typical application.

Codes are used by way of examples in these synoptic to identify the single elements. Note that the text of these codes can be freely programmed to make them correspond to the real system. In our examples, the code indicate the following:

- Q.Sx = SOURCE power line Corresponding to the Q.Sx power lines.
- Qx = Line breaker. Corresponding to the Qn breakers.
- TBx = Tie Breaker.
- LOADx = User load.
- NPL = Non-Priority Load.

## 2.29 Command menu

- The *Command menu* is used to perform occasional operations, like resetting measurements, counters, alarms etc.
- If the advanced access password was entered, the command menu can also be used to perform automatic operations useful for configuring the instrument.
- The following table shows the functions which are available with the command menu divided according to the required access level.

CODE	CONTROL	ACCESS LEVEL	DESCRIPTION
C01	RESET MANTENACE HOURS 1	ADVANCED	Reset maintenance interval hours of the breaker 1
C02	RESET MANTENACE HOURS 2	ADVANCED	Reset maintenance interval hours of the breaker 2
C03	RESET MANTENACE HOURS 3	ADVANCED	Reset maintenance interval hours of the breaker 3
C04	RESET MANTENACE COUNTER 1	ADVANCED	Reset maintenance interval operations of the breaker 1
C05	RESET MANTENACE COUNTER 2	ADVANCED	Reset maintenance interval operations of the breaker 2
C06	RESET MANTENACE COUNTER 3	ADVANCED	Reset maintenance interval operations of the breaker 3
C07	RESET GENERIC COUNTERS CNTX	USER	Resets generic counters CNTx
C08	RESET LIMX	USER	Reset limits LIMx variable status
C09	RESET HOURS SOURCE 1	ADVANCED	Reset hours counter of load supplied by source 1

*continue*

## 2. Operating modes

CODE	CONTROL	ACCESS LEVEL	DESCRIPTION
C10	RESET HOURS SOURCE 2	ADVANCED	Reset hours counter of load supplied by source 2
C11	RESET HOURS SOURCE 3	ADVANCED	Reset hours counter of load supplied by source 3
C12	RESET HOURS BREAKER 1	ADVANCED	Reset hours counter breaker 1 closed
C13	RESET HOURS BREAKER 2	ADVANCED	Reset hours counter breaker 2 closed
C14	RESET HOURS BREAKER 3	ADVANCED	Reset hours counter breaker 3 closed
C15	RESET OPERATION BREAKER 1	ADVANCED	Reset breaker 1 operations counter
C16	RESET OPERATION BREAKER 2	ADVANCED	Reset breaker 2 operations counter
C17	RESET OPERATION BREAKER 3	ADVANCED	Reset breaker 3 operations counter
C18	RESET EVENTS LIST	ADVANCED	Resets the list of historical events
C19	SETUP TO DEFAULT	ADVANCED	Resets all the parameters in the setup menu to the default values
C20	SAVE SETUP COPY	ADVANCED	Copies the parameters currently set to a backup for restoring in the future
C21	RELOAD PARAMETERS FROM BACKUP MEMORY	ADVANCED	Transfers the parameters saved in the backup memory to the active settings memory
C22	FORCED I/O	ADVANCED	Enables test mode so you can manually energize any output. <b>Warning! In this mode the installer alone is responsible for the output commands</b>
C23	RESET A03/04/05 ALARMS	ADVANCED	Restores the opening and closing command of the commutation devices after generating alarms A03 – A04 – A05
C24	SIMULATE LINE FAILURE	ADVANCED	The device moves to AUT mode and simulates the lack of the priority source for one minute. It then switches the load with the automatic procedure as programmed
C25	RESET PLC MEMORY	ADVANCED	Reset PLCx variable status

### 2.30 Installation

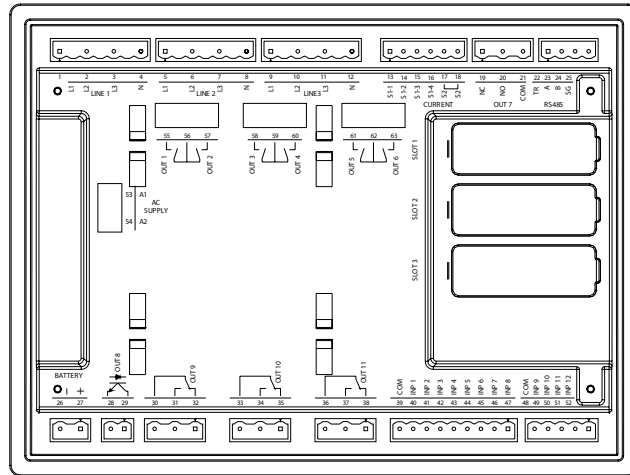
- 422684 is designed to be flat panel mounted. Frontal protection of IP65 is guaranteed with correct assembly and optional sealing.
- Insert the system in the panel hole making sure that the seal, if present, is correctly positioned between the panel and instrument frame.
- Make sure that the customisation label is not folded under the seal, which would compromise sealing. The label must be positioned correctly inside the panel.
- In the panel, for each of the four fixing clips, place the metallic clip in the hole on the sides of the container and then move it backwards to insert the hook in the seat.



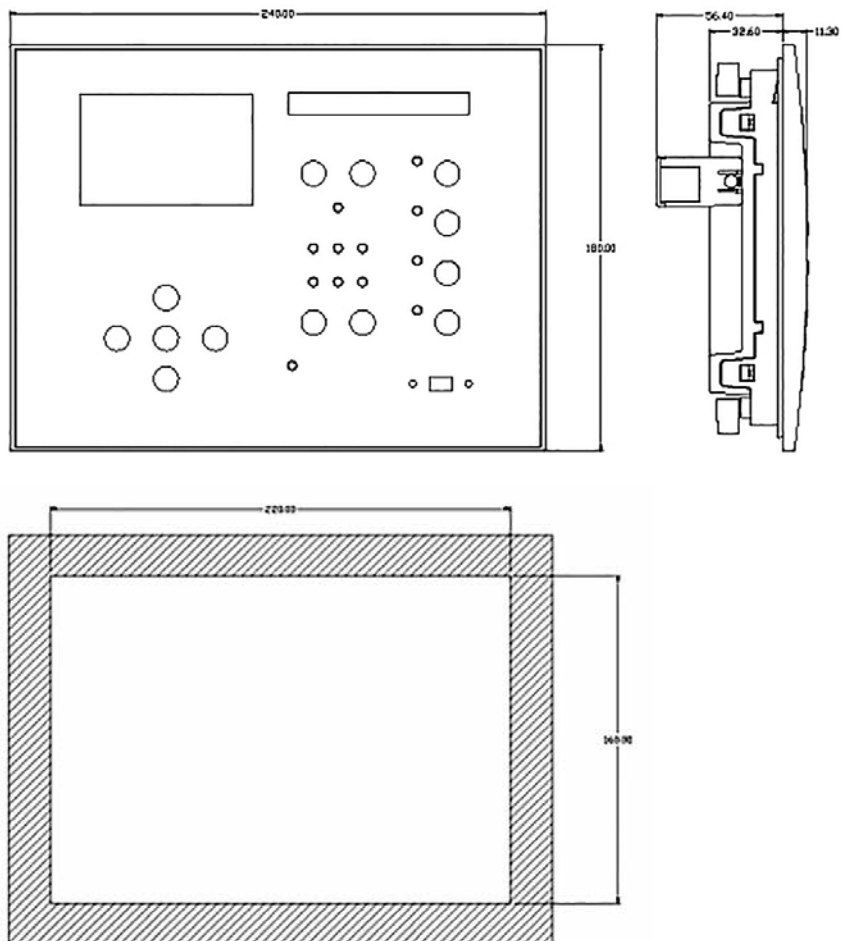
- Repeat the operation for the four clips.
- Tighten the fixing screw with a maximum torque of 0.5Nm.
- If the device must be disassembled, loosen the four screws and reverse the order.
- For electric connections, refer to the connection diagrams shown in the specific chapter and the requirements shown in the technical features table.

## 3. Wiring diagrams

### 3.1 Terminal arrangement



### 3.2 Mechanical dimensions and panel cutout



## 4. Technical characteristics

<b>TECHNICAL CHARACTERISTICS</b>	
<b>AC power: terminals 53, 54</b>	
Us rated voltage	100 – 240V~
Operating limits	90 – 264V~
Frequency	45 – 66Hz
Drawn/dissipated power	100V~ 12,5VA, 7W 240V~ 16,5VA, 7,3W
Micro-interruption immunity time (without expansion modules)	≤40ms (110V~) ≤200ms (220V~)
Micro-interruption immunity time (with 3 expansion modules)	≤20ms (110V~) ≤100ms (220V~)
<b>DC Power: terminals 26, 27</b>	
Rated battery voltage	12 – 48V=
Operating limits	7,5 – 57,6V=
Maximum drawn current	510mA a 12V= 260mA a 24V= 135mA a 48V=
Maximum drawn/dissipated power	6,5W
Recommended fuses	T3,15A (delayed)
<b>Voltmeter inputs Line 1, Line 2, Line3: terminals 1-4, 5-8 and 9-12</b>	
Ue max rated voltage	600VAC L-L (346VAC L-N)
Measuring range	50...720V L-L (415VAC L-N)
Frequency range	45...65Hz – 360...440Hz
Measurement type	True RMS (TRMS)
Measurement input impedance	> 0.55MΩ L-N > 1,10MΩ L-L
Connection modes	Three-phase line with or without neutral balanced three-phase
<b>Digital inputs: terminals : 39 – 47 and 48-52</b>	
Input type	negative
Input current	≤8mA
Low input signal	≤2,2V
High input signal	≥3.4V
Input signal delay	≥50ms
<b>RS485 serial interface: terminals 22-25</b>	
Interface type	Isolated
Baudrate	programmable 1200...38400 bps
<b>Real Time Clock</b>	
Reserve charge	Back-up capacitor
Operation without power voltage	Approximately 14 days
<b>Outputs OUT1, OUT3 and OUT5: terminals 55-56, 58-59 and 61-62</b>	
Contact type	3 x 1 NO
Rating	AC1 – 12A 250V~ AC15 -1,5A 250V~
Maximum usage voltage	300V~
Electrical/mechanical time	1x10 <sup>7</sup> / 1x10 <sup>5</sup> operations
Maximum current on terminals 55, 59 and 62	12A

## Three-Sources Management System (T.S.M.S.)

TECHNICAL CHARACTERISTICS			
<b>Outputs OUT2, OUT4 and OUT6: terminals 56-57, 59-60 and 62-63</b>			
Contact type	3 x 1 NO		
Rating	AC1 – 8A 250V~ AC15 -1,5A 250V~		
Maximum usage voltage	300V~		
Electrical/mechanical time	1x10 <sup>7</sup> / 1x10 <sup>5</sup> operations		
Maximum current on terminals 55, 59 and 62	12A		
<b>Outputs OUT7, OUT9, OUT10 and OUT 11: terminals 19-21, 30-32, 33-35 and 36-38</b>			
Contact type	1 in scambio		
Rating	AC1 – 8A 250V~ DC1 – 8A 30V= AC15 -1,5A 250V~		
Maximum usage voltage	300V~		
Electrical/mechanical time	1x10 <sup>7</sup> / 1x10 <sup>5</sup> operations		
<b>Static output OUT 8</b>			
Output type	NO		
Voltage range	10 – 30V=		
Maximum current	50mA		
<b>Insulation voltage</b>			
<b>AC power</b>			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
<b>Voltmeter inputs Line 1, Line 2 and Line 3</b>			
Rated insulation voltage	Ui 600V~		
Rated impulse withstand voltage	Uimp 9,8kV		
Operating frequency withstand voltage	5,2kV		
<b>Uscite OUT1-2, OUT3-4, OUT5-6</b>			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
<b>Uscita OUT7, OUT9, OUT10, OUT11</b>			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
<b>Uscite SSR OUT8</b>			
Operating frequency withstand voltage	1kV		
<b>RS485 serial interface</b>			
	Towards Line 1-2-3 inputs	Towards relay outputs and AC supply	Towards DC logic
Rated impulse withstand voltage	Uimp 9,8kV	Uimp 7,3kV	Uimp 7,3kV
Operating frequency withstand voltage	5,2kV	3kV	3kV

## 4. Technical characteristics

<b>TECHNICAL CHARACTERISTICS</b>	
<b>Ambient operating conditions</b>	
Temperature of use	-30 - +70°C
Storage temperature	-30 - +80°C
Relative humidity	< 80% (IEC/EN 60068-2-78)
Maximum environmental pollution	Degree 2
Overvoltage category	3
Measurement category	III
Climate 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)
<b>Connections</b>	
Terminal types	Removable screw-type
Wire cross-section area (min. and max.)	0,2-2,5 mm (24÷12 AWG)
UL use data Wire cross-section area (min. and max.)	0,75-2.5 mm <sup>2</sup> (18-12 AWG)
Tightening torque	0,56 Nm (5 Lbin)
<b>Housing</b>	
Installation	Flush mount
Material	Polycarbonate
Frontal degree of protection	IP40 on front, IP65 with optional gasket IP20 on terminals
Weight	680g
<b>Certifications and compliance</b>	
Certifications obtained	EAC
Comply with standards	IEC/EN 61010-1, IEC/EN 61010-2-030, IEC/EN 61000-6-2, IEC/ EN 61000-6-4,



LEGRAND  
Pro and Consumer Service  
BP 30076 - 87002  
LIMOGES CEDEX FRANCE  
[www.legrand.com](http://www.legrand.com)

┌ Installer stamp ─┐  
└──────────────────┘

┌ ───────────────────┘  
└ ───────────────────┘