



## **RPC 5LGA**

### **Automatic power factor controller**

*User Manual*

---

**WARNING!**

Carefully read the manual before the installation or use.

This device must be installed by qualified personnel, in compliance with current rules and regulations, in order to avoid damages or safety hazards for people and belongings. Before any maintenance operation on the device, cut off the voltage from measuring and supply inputs and short-circuit the Current Transformer input terminals. The Manufacturer shall not be held liable in case of incorrect use of the device.

Products illustrated herein are subject to alteration and changes at any moment and without prior notice. Therefore, technical data and descriptions in the document do not have any contractual value. An interrupting device must be installed close by the equipment and within easy reach of the operator. The device must be marked as the disconnecting device of the equipment (IEC EN 61010-1).

---

1	DESCRIPTION .....	3
2	FRONT KEYBOARD .....	3
3	DISPLAY INDICATIONS .....	3
4	OPERATING MODES .....	3
5	MEASURES .....	4
6	KEYPAD LOCK .....	4
7	EXPANDABILITY .....	5
8	IR PROGRAMMING PORT .....	5
9	PARAMETER SETTING VIA PC.....	5
10	PARAMETER SETTING (SETUP) VIA THE FRONT PANEL .....	5
11	RAPID CT SETUP .....	7
12	PARAMETER TABLE .....	7
13	ALARMS .....	10
14	COMMANDS MENU .....	10
15	WI-FI DONGLE USE (CX02) .....	10
16	INSTALLATION .....	11
17	INFORMATION & SERVICE .....	11
	WIRING DIAGRAMS.....	12
	TERMINALS.....	13
	DIMENSIONS & CUTOUT - [MM].....	13
	TECHNICAL CHARACTERISTICS.....	14


## 1 DESCRIPTION

- Automatic power factor controller.
- Flush-mount, standard 96x96mm housing.
- Backlit LCD screen.
- 5 relays, expandable to 7 max.
- 4 navigation keys for function and settings.
- Alarm messages in 6 languages.
- Expansion bus with 1 slot for expansion modules:
  - RS232, RS485, USB communications interface.
  - Additional relay outputs.
- High accuracy TRMS measurements.
- Wide selection of electrical measures, including voltage and current THD with harmonic analysis up to 15th order.
- Voltage input separated from power supply, suitable for VT connection in medium voltage applications.
- Wide-range power supply (100-440VAC).
- Front optical programming interface: galvanically isolated, high speed, waterproof, USB and WIFI dongle compatible.
- Programming from front panel, from PC or from tablet/smartphone.
- 2-level password protection for settings.
- Backup copy of original commissioning settings.
- Built-in temperature sensor.
- Tool-less panel mount.

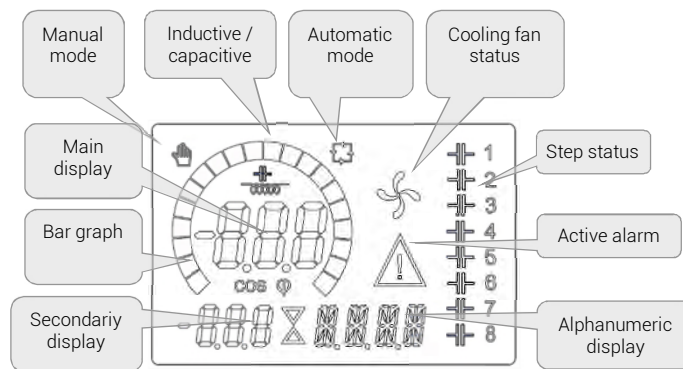
## 2 FRONT KEYBOARD

**MODE** key      Selects among available measurements. Used also to access programming menus.

▼▲ keys      Sets values and selects steps.


 key      Selects operating mode between manual and automatic.

## 3 DISPLAY INDICATIONS




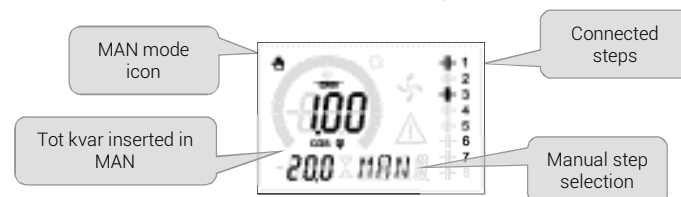
## 4 OPERATING MODES

### 4.1 MAN AND AUT MODES

The icons AUT and MAN indicate the operating mode automatic or manual. To change the mode, press and hold the  key for 1 second. The operating mode remains stored even after removing and reapplying the power supply voltage.

### 4.2 MAN MODE

When the unit is in manual mode, you can select one of the steps and manually connected or disconnect it. In addition to the specific icon, the alphanumeric display shows MAN in order to highlight the manual mode condition. Press **MODE** to view the other measurements as usual. While the display shows MAN, it is possible to select the step to be switched on or off. To select a step, use the ▲ or ▼ keys. The selected step will flash quickly. Press **MODE** to activate or deactivate the selected step. If the selected step has not yet exhausted the reconnection time, the  icon will flash to indicate that the transaction has been accepted and will be conducted as soon as possible. Manual configuration of the steps is maintained even when the power supply voltage is removed. When the power returns, the original state of the steps is restored.



▲▼: Select step - **MODE**: Change step status

### 4.3 AUT MODE

In automatic mode, the controller calculates the optimum configuration of capacitor steps in order to reach the set  $\cos\phi$ . The selection criteria takes into account many variables such as: the power of each step, the number of operations, the total

time of use, the reconnection time, etc. The controller displays the imminent connection or disconnection of the steps with the flashing of their identification number (left). The flashing can last in cases in which the insertion of a step is not possible due to the reconnection time (discharge time of the capacitor). The device initiates automatic corrections when there is an average reactive power request ( $\Delta kvar$ ) higher than 50% of the smallest step, and the measured  $\cos\phi$  is different from the setpoint.

## 5 MEASURES

The RPC 5LGA controller provides a set of measurements displayed on the alphanumeric display, in conjunction with the current  $\cos\phi$  that is always displayed on the main display. Press the **MODE** key to scroll through the measures in rotation. After 30 seconds without pressing any buttons, the display automatically returns to the default measurement defined by P.47. If P.47 is set on the ROT, then the measures rotate automatically every 5 seconds. At the bottom of the list of measures it is possible to set the setpoint of the  $\cos\phi$ , acting on the same value set with P.19. Below is a table with the measurements displayed.

MEASURE	ICON	DESCRIPTION
DELTA-kvar	$\Delta kvar$	kvars needed to reach the $\cos\phi$ setpoint. If delta-kvar is positive capacitors need to be inserted, if negative to be disconnected.
▼	$kvar$	Total kvar of the plant.
▲	$\Delta STEP$	Number of equal steps to achieve the target power factor.
<b>MODE</b>		
VOLTAGE	V	RMS voltage of the plant current.
▼	V HI	Maximum voltage value measured.
<b>MODE</b>		
CURRENT	A	RMS current of the plant voltage.
▼	A HI	Maximum current value measured.
<b>MODE</b>		
AVERAGE PF	WPF	Weekly average power factor.
▼	PF	Instantaneous total power factor.
<b>MODE</b>		
THD CAP.	THdC	Capacitors total harmonic distortion (THD) in current.
▼	TC HI	Maximum THD value measured.
<b>MODE</b>		
TEMPERATURE	°C °F	Temperature of internal sensor.
▼	°CHI °FHI	Maximum temperature value measured.
<b>MODE</b>		
VOLTAGE THD	THDV	Total harmonic distortion % (THD) of plant voltage.
▼▲	VH02... ..VH15	% voltage harmonic content from 2.nd up to 15.th order
<b>MODE</b>		
CURRENT THD	THDI	Total harmonic distortion % (THD) of plant current.
▼▲	IH02... ..IH15	% Current harmonic content from 2.nd up to 15.th order
<b>MODE</b>		
COS $\phi$ SETPOINT	IND CAP	Setting of desired $\cos\phi$ setpoint (same as P.19).
▼▲		
<b>MODE</b>		
STEP POWER	%	① Step residual power, as a percentage of the set rated power.
▼▲		
<b>MODE</b>		
STEP COUNTER	OPC	① Operation counter of the step.
▼▲		
<b>MODE</b>		
STEP HOURS	H	① Hour meter of the step insertion.
▼▲		

① These measures are shown only if the Step trimming function is enabled (P.25=ON) and the advanced password is enabled and entered.

## 6 KEYPAD LOCK

A function to exclude all modification to operating parameters can be enabled; measurement viewing is still provided in any case. To lock and unlock the keypad, press and keep the **MODE** key pressed. Then press the ▲ key three times and the ▼ key

twice and after that release **MODE**..The display will show **LOC** when the keypad is locked and **UNL** when it is unlocked. When the lock is enabled, it is not possible to make the following operations:

- Operation between automatic and manual mode
- Access to set-up menus
- Change of  $\cos\phi$  set-point

By attempting to conduct the above operations, the display will view **LOC** to indicate the locked keypad state.

## 7 EXPANDABILITY

Thanks to expansion bus, the RPC 5LGA can be expanded with one expansion series module.

The supported expansion modules can be grouped in the following categories:

- additional steps
- communication modules
- digital I/O modules

To insert an expansion module:

- remove the power supply to RPC 5LGA regulator.
- remove the protecting cover of the expansion slot.
- insert the upper hook of the expansion module into the fixing hole on the top of the expansion slot.
- rotate down the module body, inserting the connector on the bus.
- push until the bottom clip snaps into its housing.



When the RPC 5LGA regulator is powered on, it automatically recognises the expansion module that have been mounted.

The expansion modules provide additional resources that can be used through the dedicated setup menus.

The setup menus related to the expansions are always accessible, even if the expansion modules are not physically fitted.

The following table indicates which models of expansion modules are supported:

MODULE TYPE	CODE	FUNCTION
ADDITIONAL STEPS	OUT2NO	2 STEP RELAYS'
COMMUNICATION	COM232	RS-232
	COM485	RS-485

## 8 IR PROGRAMMING PORT

The parameters of the RPC 5LGA regulator can be configured through the front optical port, using the IR-USB programming dongle, or with the IR-WiFi dongle. This programming port has the following advantages:

- Allows for configuring and servicing the RPC 5LGA regulator without having to access the rear of the device or having to open the electrical panel.
- It is galvanically isolated from the internal circuits of the RPC 5LGA regulator, guaranteeing the greatest safety for the operator.
- High speed data transfer.
- IP54 front panel protection.
- Limits the possibility of unauthorized access with device configuration since it is necessary to have the IR-USB or IR-WI-FI dongles.

Simply hold the dongle up to the front panel, connecting the plugs to the relevant connectors, and the device will be acknowledged as shown by the LINK LED on the programming dongle flashing green.



USB programming dongle



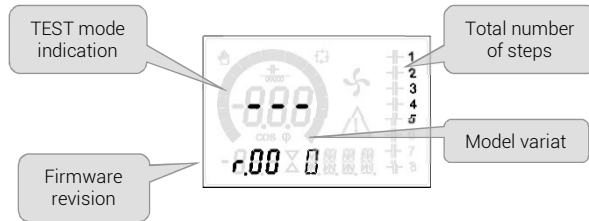
WIFI programming dongle

## 9 PARAMETER SETTING VIA PC

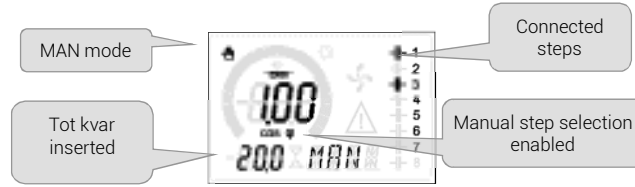
The *PFC Remote monitoring* software can be used to transfer (previously programmed) set-up parameters from the RPC 5LGA regulator to the hard drive of the PC and vice versa. The parameter may be partially transferred from the PC to the RPC 5LGA regulator, transferring only the parameters of the specified menus.

## 10 PARAMETER SETTING (SETUP) VIA THE FRONT PANEL

To access the programming menu (setup): To enter parameter programming the unit must be in TEST mode (first programming)



or in MAN mode



From the normal measurement display, press and hold **MODE** for 3 seconds to recall the main menu. SET is displayed on the main display.

If the password has been set (P.21 = ON), the display shows PAS (password entry request instead of SET). Set the numeric password using ▲ ▼ and then press to move to next digit. If the password is correct the unit will show OK U or OK A depending on the entered password is user or the advanced level. The password can be defined with parameters P.22 and P.23. Factory default is 001 and 002 respectively. If the entered password is wrong the unit will show ERR. After having entered the password, the access is enabled until the unit is re-initialized or for 2 minutes without pressing any key. After having entered the password, repeat the procedure to access the parameter setting.

Press ▲ ▼ to select the desired submenu (BAS → ADV → ALA ...) that is shown on the alphanumeric display.



The following table lists the available submenus:

COD	DESCRIPTION
BAS	Access to Base menu
ADV	Accesso to Advanced menu
ALA	Accesso to Alarm menu
CMD	Access to Command menu
CUS	Access to Custom menu
EXIT	Exits saving modifications.
SAVE	Exits without saving (cancel)

Press to access the submenu. When in a submenu, the main display shows the code of the selected parameter (eg P.01), while the numeric/alphanumeric displays at the bottom of the screen shows the parameter value and / or description. Press to advance in the selection of items (such as scroll through parameters P.01 → P.02 → P.03...), or press **MODE** to go back to the previous parameter. While a parameter is selected, its value can be increased or decreased with ▲ ▼.




Once the last parameter of the menu has been reached, pressing once more will return back to the submenu selection. Using ▲ ▼, select SAVE to save the changes or EXIT to cancel.



Alternatively, from within the programming, holding for three seconds will save the changes and exit directly. If the user does not press any key for more than 2 minutes, the system leaves the setup automatically and goes back to normal viewing without saving the changes done on parameters (like EXIT). N.B.: a backup copy of the setup data (settings that can be modified using the keyboard) can be saved in the eeprom memory of the RPC 5LGA regulator. This data can be restored

when necessary in the work memory. The data backup 'copy' and 'restore' commands can be found in the **Commands menu**.

## 11 RAPID CT SETUP

When the CT value is not known and only used at the moment of the installation, the P.01 parameter for CT primary can remain set at OFF while all the others can be programmed. In this case, during the system installation and once the controller is powered up, the display will show a flashing CT (Current Transformer). By pressing ▲▼ the CT primary can be set directly. Once programmed, press  to confirm. The unit will store the setting into P.01, and directly restart in automatic mode.



## 12 PARAMETER TABLE

All the programming parameters are listed in the table below. For each parameter, possible setting range and factory default are indicated, as well as a brief explanation of the parameter function. The parameter description shown on the display can in some cases be different from what is reported in the table because of the reduced number of available characters. However, the parameter code can be used as a reference.

**Note** The parameters shown in the table with a shaded background are **essential** to the operation of the system, thus they represent the minimum required programming for operation.

### 12.1 BASE MENU

COD	DESCRIPTION	PSW	UoM	DEF	RANGE
P.01	CT primary	Usr	A	OFF	OFF / 1...10.000
P.02	CT secondary	Usr	A	5	1 / 5
P.03	CT read phase	Usr		L1	L1 / L 2 / L3
P.04	CT wiring polarity	Usr		Aut	Aut / Dir / Inv
P.05	Voltage read phase	Usr		L2-L3	L1-L2 / L2-L3 / L3-L1 / L1-N / L2-N / L3-N
P.06	Smallest step power	Usr	Kvar	1.00	0.10 ... 10000
P.07	Rated installation voltage	Usr	V	400V	50 ... 50000
P.08	Nominal frequency	Usr	Hz	Aut	Aut / 50Hz / 60Hz / Var
P.09	Reconnection time	Adv	sec	60	1 ... 30000
P.10	Sensitivity	Usr	sec	60	1 ... 1000
P.11	Step 1 function	Usr		OFF	OFF / 1...32 / ON NOA / NCA / FAN MAN / AUT A01...A12
P.12	Step 2 function	Usr		OFF	=
P.13	Step 3 function	Usr		OFF	=
P.14	Step 4 function	Usr		OFF	=
P.15	Step 5 function	Usr		OFF	=
P.16	Step 6 function	Usr		OFF	=
P.17	Step 7 function	Usr		OFF	=
P.19	Cos-phi setpoint	Usr		0.95 IND	0.50 Ind – 0.50 Cap
P.20	Alarm messages language	Usr		ENG	ENG / ITA / FRA / SPA / POR / DEU

P.01 The value of the primary current transformer. Example: with CT 800/5 set 800. If set to OFF, after the power-up the device will prompt you to set the CT and allow direct access to this parameter.

P.02 Value of the secondary of the current transformers. Example: with CT 800/5 set 5.

P.03 It defines on which phase the device reads the current signal. The wiring of current inputs must match the value set for this parameter. Supports all possible combinations of parameter P.05.

P.04 Reading the connection polarity of the CT.

AUT = Polarity is automatically detected at power up. Can only be used when working with only one CT and when the system has no generator device.

Dir = Automatic detection disabled. Direct connection.

Inv = Automatic detection disabled. Reverse wiring.

P.05 Defines on which and on how many phases the device reads the voltage signal. The wiring of voltage inputs must match the setting for this parameter. Supports all possible combinations of parameter P.03.

P.06 Value in kvar of the smallest step installed (equivalent to the step weight 1). Rated power of the capacitor bank provided at the rated voltage specified in P.07 (example: step 10kvar-460V supplied 400V  $\rightarrow 10 \times (400)^2 / (460)^2 \rightarrow$  set 7,5kvar).

P.07 Installation rated voltage, which is delivered in specified power P.06.

P.08 Working frequency of the system:

Aut = automatic selection between 50 and 60 Hz at power on.

50Hz = fixed to 50 Hz.

60Hz = fixed to 60 Hz.

Var = variable, measured continuously and adjusted.

P.09 Minimum time that must elapse between the disconnection of one step and the subsequent reconnection both in MAN or AUT mode. During this time the number of the step on the main page is blinking.

P.10 Connection sensitivity. This parameter sets the speed of reaction of the controller. With small values of P.10 the regulation is fast (more accurate around the setpoint but with more step switchings). With high values instead we'll have slower reactions of the regulation, with fewer switchings of the steps. The delay time of the reaction is inversely proportional to the request of steps to reach the setpoint: waiting time = (sensitivity / number of steps required).  
Example: setting the sensitivity to 60s, if you request the insertion of one step of weight 1 are expected 60s (60/1 = 60). If instead serve a total of 4 steps will be expected 15s (60/4 = 15).

P11 ... P17 Function of output relays 1 ... 7:

OFF = Not used .

1 ... 32 = Weight of the step. This relay drives a bank of capacitors which power is n times (n = 1...32) the smallest power defined with parameter P.06.

ON = Always on.

NOA = Alarm normally de-energized. The relay is energized when any alarm with the *Global alarm* property arises.

NCA = Alarm normally energized. The relay is de-energized when any alarm with the *Global alarm* property arises.

FAN = The relay controls the cooling fan.

MAN = Relay is energized when device is in MAN mode.

AUT = Relay is energized when device is in AUT mode.

A01 ... A12= The relay is energized when the alarm specified is active.

P.19 Setpoint (target value) of the  $\cos\phi$ . Used for standard applications.

P.20 Language of scrolling alarm messages

## 12.2 ADVANCED MENU

COD	DESCRIPTION	PSW	UOM	DEF	RANGE
P.21	Password enable	Adv		OFF	OFF / ON
P.22	User password	Usr		001	0-999
P.23	Advanced password	Adv		002(*)	0-999
P.24	Wiring type	Usr		3PH	3PH Trifase / 1PH Monofase
P.25	Step trimming	Adv		ON	ON Abilitato / OFF Disabilitato
P.26	Setpoint clearance +	Usr		0.00	0 – 0.10
P.27	Setpoint clearance -	Usr		0.00	0 – 0.10
P.28	Step insertion mode	Usr		STD	STD Standard / LIN Lineare / DISC
P.29	Cogeneration $\cos\phi$ setpoint	Usr		OFF	OFF / 0.50 IND – 0.50 CAP
P.30	Disconnection sensitivity	Usr	sec	OFF	OFF / 1 – 600
P.31	Step disconnection passing in MAN	Usr		OFF	OFF Disabilitato / ON Abilitato
P.32	Capacitor current overload alarm threshold	Adv	%	50	OFF / 0...150
P.33	Capacitor overload immediate disconnection threshold	Adv	%	83	OFF / 0.. 200
P.34	VT primary	Usr	V	OFF	OFF / 50-50000
P.35	VT secondary	Usr	V	100	50-500
P.36	Temperature UoM	Usr		°C	°C °Celsius / °F Fahrenheit
P.37	Fan start temperature	Adv	°	25	0 ... 212
P.38	Fan stop temperature	Adv	°	20	0 ... 212
P.39	Temperature alarm threshold	Adv	°	55	0 ... 212
P.41	Maximum voltage alarm threshold	Adv	%	110	OFF / 90...150
P.42	Minimum voltage alarm threshold	Adv	%	90	OFF / 60...110
P.43	THD V alarm threshold	Adv	%	6	OFF / 1...250
P.44	THD I alarm threshold	Adv	%	12	OFF / 1...250
P.45	Maintenance interval	Adv	h	9000 8760(**)	1 - 30000
P.46	Bar-graph function	Usr		Kvar ins/tot	Kvar ins/tot / Corr att/nom / Delta kvar att/tot
P.47	Default auxiliary measure	Usr		TPF sett.	Delta kvar / V / A / TPF settimanale / THDC / Temp / THDV / THDI / ROT
P.48	Backlight flashing on alarm	Usr		OFF	OFF / ON
P.49	Serial node address	Usr		01	01-255
P.50	Serial speed	Usr	bps	9.6k	1.2k / 2.4k / 4.8k / 9.6k / 19.2k / 38.4k
P.51	Data format	Usr		8 bit – n	8 bit, no parity 8 bit, odd / 8bit, even 7 bit, odd / 7 bit, even
P.52	Stop bits	Usr		1	1-2
P.53	Protocol	Usr		Modbus RTU	Modbus RTU / Modbus ASCII
P.54	Number of insertions for maintenance	Adv	kcnt	OFF	OFF / 1...60

P.21 If set to OFF, password management is disabled and anyone has access to the settings and commands menu.

P.22 With P.21 enabled, this is the value to specify for activating user level access. See Password access chapter.

P.23 As for P.22, with reference to Advanced level access. (\*) Available value only if the controller is not installed on the ICAR cabinet

P.24 Number of phases of the power correction panel.

P.25 Enables the measurement of the actual power of the step, performed each time they are switched in. The measure is calculated, as the current measurement is referred to the whole load of the plant. The measured power of the steps is adjusted (trimmed)



- after each switching and is displayed on the step life statistic page. When this function is enabled, a 15 sec pause is inserted between the switching of one step and the following, necessary to measure the reactive power variation.
- P.26 – P.27 Tolerance around the setpoint. When the  $\cos\phi$  is within the range delimited by these parameters, in AUT mode the device does not connect / disconnect steps even if the delta-kvar is greater than the smallest step
  - P.28 Selecting mode of steps insertion.  
 Standard mode - Normal operation with free selection of the steps  
 Linear mode - the steps are connected in progression from left towards right only following the step number and according to the LIFO (Last In First Out) logic. The controller will not connect a step when the system steps are of different ratings and by connecting the next step, the set-point value would be exceeded.  
 Disc - As in the Standard mode but with reduced time spent in capacitive
  - P.29 Setpoint used when the system is generating active power to the supplier (with negative active power / power factor).
  - P.30 Disconnection sensitivity. Same as the previous parameter but related to disconnection. If set to OFF the disconnection has the same reaction time of connection set with the previous parameter.
  - P.31 If set to ON, when switching from AUT mode to MAN mode, steps are disconnected in sequence.
  - P.32 Capacitors overload protection Trip threshold (alarm A07), that will arise after an integral delay time, inversely proportional to the overload value.  
 Note: You can use this protection only if the capacitors are not equipped with filtering devices such as inductors or similar.
  - P.33 Threshold beyond which the integral delay for tripping of the overload alarm is zeroed, causing the immediate intervention of the A08 alarm.
  - P.34 – P.35 Data of VTs eventually used in the wiring diagrams.
  - P.36 Unit of measure for temperature.
  - P.37 – P.38 Start and stop temperature for the cooling fan of the panel, expressed in the unit set by P.36. The cooling fan is started when the temperature is  $\geq$  to P.37 and it is stopped when it is  $<$  than P.38.
  - P.39 Threshold for generation of alarm A08 *Panel temperature too high*.
  - P.41 Maximum voltage alarm threshold, referred to the rated voltage set with P.07, beyond which the alarm A06 *Voltage too high* is generated.
  - P.42 Undervoltage alarm threshold, referred to the rated voltage set with P.07, below which the alarm A05 *voltage too low* is generated.
  - P.43 Maximum installation voltage THD alarm threshold, beyond which the alarm A10 *THDV too high* is generated.
  - P.44 Maximum installation current THD alarm threshold beyond which the alarm A05 *voltage too low* is generated.
  - P.45 Maintenance interval in hours. When it is elapsed, the alarm A12 *Ordinary maintenance* will be generated. The hour count increments as long as the device is powered. (\*\*) If the controller is installed on the ICAR cabinet
  - P.46 Function of the semi-circular bar-graph.  
 Kvar ins/tot: The bar graph represents the amount of kvar actually inserted, with reference to the total reactive power installed in the panel.  
 Curr act/nom: Percentage of actual plant current with reference to the maximum current of the CT.  
 Delta kvar: bar graph with central zero. It represents the positive/negative delta-kvar needed to reach the setpoint, compared to the total kvar installed.
  - P.47 Default measure shown on the secondary display. Setting the parameter to ROT, the different measures will be shown with a sequential rotation.
  - P.48 If set to ON, the display backlight flashes in presence of one or more active alarms.
  - P.49 Serial (node) address of the communication protocol.
  - P.50 Communication port transmission speed.
  - P.51 Data format. 7 bit settings can only be used for ASCII protocol.
  - P.52 Stop bit number.
  - P.53 Select communication protocol.
  - P.54 Defines the number of the step (considering the step that has the highest count) beyond which the maintenance alarm A12 is generated.

**12.3 ALARM MENU**

COD	DESCRIPTION	PSW	UOM	DEF	RANGE
P.61	A01 Alarm enable	Adv		ALA	OFF / ON / ALA / DISC / A+D
P.62	A01 alarm delay	Adv		15	0-240
P.63	A01 delay uom	Adv		min	Min / Sec
...	....	...	...	...	...
P.94	A12 Alarm enable	Adv		ALA	OFF / ON / ALA / DISC / A+D
P.95	A12 alarm delay	Adv		120	0-240
P.96	A12 delay uom	Adv		sec	Min / Sec

- P.61 Enable alarm A01 and defines the behavior of the controller when the alarm is active:  
 OFF - Alarm disabled  
 ON - Alarm enabled, only visual  
 ALA - Alarm enabled, global alarm relay energized (if set)  
 DISC - Alarm enabled, logoff step  
 A + D = Alarm relay energized and disconnection of the steps.  
 Note: When you access the parameters P61, P.64, P67, etc., the auxiliary display shows the relative alarm code.
- P.62 Delay alarm A01.
- P.63 Unit of delay alarm A01.
- P.64 Like P.61 for alarm A02.
- P.65 Like P.62 for alarm A02.
- P.66 Like P.63 for alarm A02.
- ...
- P.94 Like P.61 for alarm A12.
- P.95 Like P.62 for alarm A12.
- P.96 Like P.63 for alarm A12.2.

### 13 ALARMS

When an alarm is generated, the display will show an alarm icon, the code and the description of the alarm in the language selected. If the navigation keys in the pages are pressed, the scrolling message showing the alarm indications will disappear momentarily, only to reappear again after 30 seconds. Alarms are automatically reset as soon as the alarm condition that has generated them disappears. In case of one or more alarms, the behaviour of the RPC 5LGA regulator depends on the **properties** settings of the active alarms.

#### 13.1 ALARM DESCRIPTION

COD	ALARM	DESCRIPTION
A01	Undercompensation	In automatic mode, all the available steps are connected but the cosphi is still more inductive than the setpoint.
A02	Overcompensation	In automatic mode, all the steps are disconnected but the cosphi is still more capacitive than the setpoint.
A03	Current too low	The current flowing in the current inputs is lower than minimum measuring range. This condition can occur normally if the plant has no load.
A04	Current too high	The current flowing in the current inputs is higher than maximum measuring range.
A05	Voltage too low	The measured voltage is lower than the threshold set with P.42.
A06	Voltage too high	The measured voltage is higher than the threshold set with P.41.
A07	Capacitor current overload	The calculated capacitor current overload is higher than threshold set with P.32 and P.33. After the alarm conditions have disappeared, the alarm message remains shown for the following 5 min or until the user presses a key on the front.
A08	Temperature too high	The panel temperature is higher than threshold set with P.39.
A09	No-Voltage release	A no-voltage release has occurred on the line voltage inputs, lasting more than 8ms.
A10	Voltage THD too high	The THD of the plant voltage is higher than the threshold set with P.43.
A11	Current THD too high	The THD of the plant current is higher than the threshold set with P.44.
A12	Ordinary maintenance requested	The maintenance interval set with P.45 has elapsed. To reset the alarm use the command C.01 (see Command menu).

#### 13.2 DEFAULT ALARM PROPERTIES

COD.	DESCRIPTION	ENABLE	ALARM RELAY	DISCONNECTION	DELAY
A01	Undercompensation	•	•		15 min
A02	Overcompensation				120 s
A03	Current too low	•	•	•	30 s
A04	Current too high	•	•		60 s
A05	Voltage too low	•	•		60 s
A06	Voltage too high	•	•	•	15 min
A07	Capacitor current overload	•	•	•	3 min
A08	Temperature too high	•	•	•	60 s
A09	No-Voltage release	•	•	•	0 s
A10	Voltage THD too high	•	•	•	60 s
A11	Current THD too high	•	•	•	60 s
A12	Maintenance requested	•	•		0s



### 14 COMMANDS MENU

The commands menu allows executing some occasional operations like reading peaks resetting, counters clearing, alarms reset, etc. If the Advanced level password has been entered, then the commands menu allows executing the automatic operations useful for the device configuration. The following table lists the functions available in the commands menu, divided by the access level required. With controller in MAN mode, press **MODE** for 5s. Press **▲** to select CMD. Press **☰** to access the *Commands menu*. Select the desired command with **MODE** or **☰**. Press and hold for three seconds **▲** to execute the selected command. The RPC 5LGA regulator shows OK? with a countdown. By pressing and holding the **▲** key until the end of the countdown, the command is executed, while if the key is released before the end, the command is canceled.

COD.	COMMAND	PSW	DESCRIPTION
C01	RESET MAINTENANCE	Usr	Reset maintenance service interval.
C02	RESET STEP COUNT	Adv	Reset step operation counters.
C03	RESET STEP TRIMMING	Adv	Reload originally programmed power into step trimming.
C04	RESET STEP HOURS	Adv	Reset step operation hour meters.
C05	RESET MAX VALUES	Adv	Reset maximum peak values.
C06	RESET WEEKLY TPF	Usr	Resets weekly total power factor history.
C07	SETUP TO DEFAULT	Adv	Resets setup programming to factory default.
C08	SETUP BACKUP	Adv	Makes a backup copy of user setup parameters settings.
C09	SETUP RESTORE	Usr	Reloads setup parameters with the backup of factory settings.

### 15 WI-FI DONGLE USE (CX02)

The WI-FI dongle offers WI-FI access point capability for connection to PC, Tablet or Smartphone. In addition to this function it also offer the possibility to store and transfer a block of data from/to the RPC 5LGA regulator.

Insert the interface WI-FI into the IR port of RPC 5LGA regulator on the front plate. Switch WI-FI dongle on by pressing the button for 2 sec. Wait until the LINK LED becomes orange flashing. Press 3 times consecutively and fast the dongle button. At this point the display of the RPC 5LGA regulator shows the first of the 6 possible commands (D1...D6). Press ▲▼ to select the desired command. Press  to execute the selected command. The unit will prompt for a confirmation (OK?). Press once again  per confermare, or **MODE** to cancel. The following table lists the possible commands:

CODE	COMMAND	DESCRIPTION
D1	SETUP DEVICE → CX02	Copies Setup settings from RPC 5LGA regulator to WI-FI dongle.
D2	SETUP CX02 → DEVICE	Copies Setup settings from WI-FI dongle to RPC 5LGA regulator.
D3	CLONE DEVICE → CX02	Copies Setup settings and working data from RPC 5LGA regulator to WI-FI dongle.
D4	CLONE CX02 → DEVICE	Copies Setup settings and working data from WI-FI dongle to RPC 5LGA regulator.
D5	INFO DATA CX02	Shows information about data stored into WI-FI dongle.
D6	EXIT	Exits from dongle menu.

## 16 INSTALLATION

RPC 5LGA regulator is designed for flush-mount installation. With proper mounting, it guarantees IP54 front protection. From inside the panel, for each four of the fixing clips, position the clip in one of the two sliding guide, then press on the clip corner until the second guide snaps in. Push the clip forward pressing on its side and making it slide on the guides until it presses completely on the internal surface of the panel.




For the electrical connection see the wiring diagrams in the dedicated chapter and the requirements reported in the technical characteristics table.

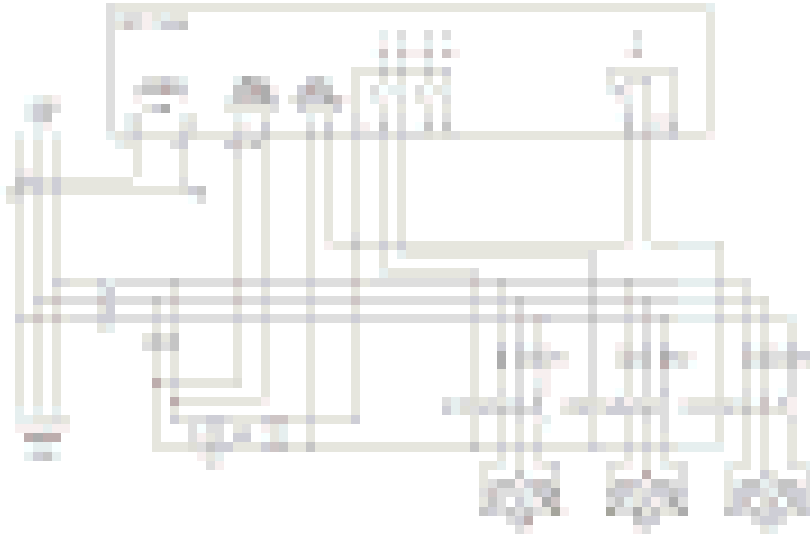
## 17 INFORMATION & SERVICE

ICAR by ORTEA NEXT  
 ORTEA S.p.A  
 Via dei Chiosi 21 20873 Cavenago B.za (MB) – Italy  
 Tel. +39 02 9591 7800  
 www.next.ortea.com  
 ortea@ortea.com

**WIRING DIAGRAMS**

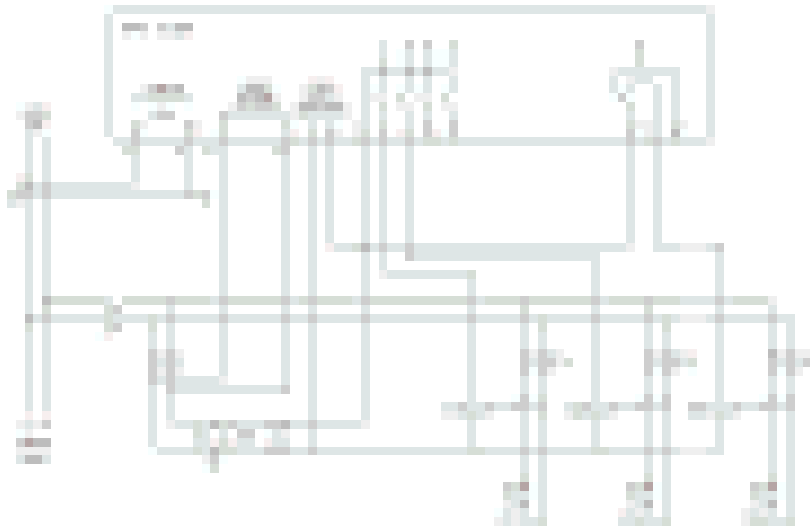
	<p><b>WARNING!</b> Disconnect line and supply when operating on terminals.</p>
---	--

**STANDARD 3-PH. INSERTION**



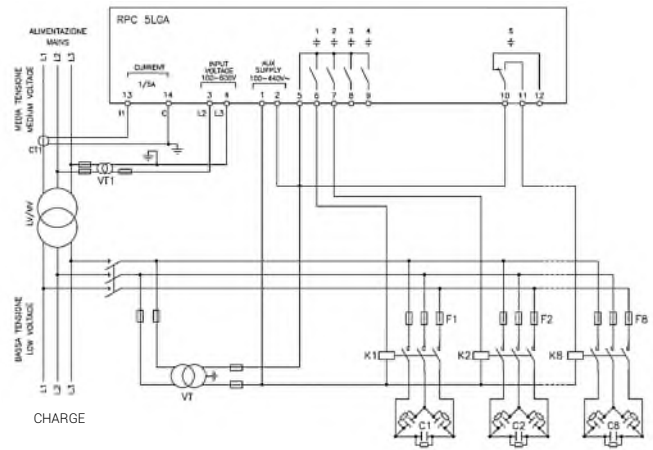
<b>THREE-PHASE STANDARD CONNECTION (default)</b> Default wiring configuration for standard applications	
Voltage measure	1 ph-to-ph voltage reading L2-L3
Current measure	L1 phase
Phase angle offset	Between V (L2-L3) and I (L1) ⇒ 90°
Capacitor overload current measure	1 reading calculated on L2-L3
Parameter setting	P.03 = L1 - P.05 = L2-L3 - P.24 = 3PH
NOTES	
For three-phase connection, the voltage input must be connected phase to phase; the current transformer must be connected on the remaining phase. The polarity of the current/voltage input is indifferent.	

**1-PH. CONNECTION**



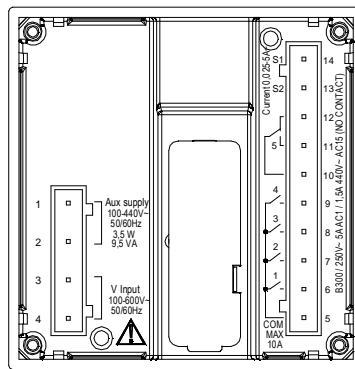
<b>SINGLE-PHASE CONNECTION</b> Wiring configuration for single-phase applications	
Voltage measure	1 phase voltage reading L1-N
Current measure	L1 phase
Phase angle offset	Between V (L1-N) and I (L1) ⇒ 0°
Capacitor overload current measure	1 reading calculated on L1-N
Parameter setting	P.03 = L1 - P.05 = L1-N - P.24 = 1PH
NOTES	
IMPORTANT! The polarity of the current/voltage input is indifferent.	

**CONFIGURATION WITH MV MEASUREMENT AND CORRECTION**

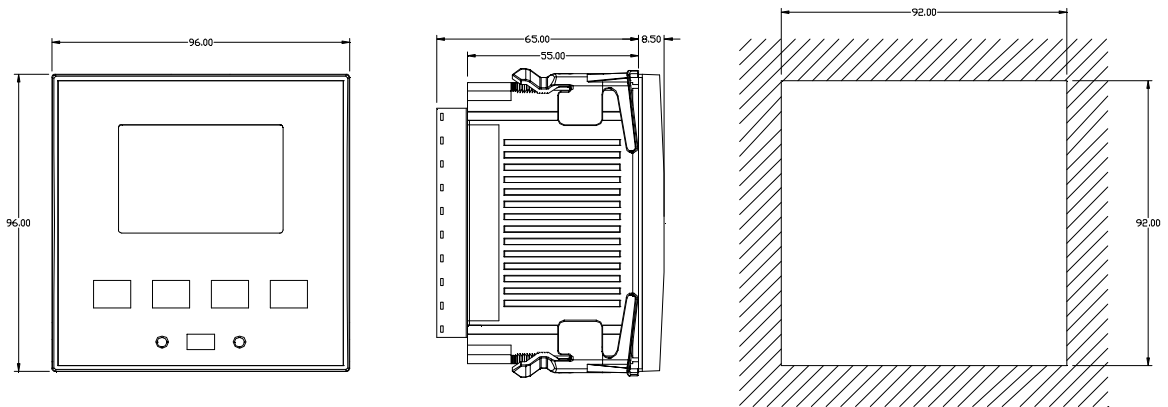


CONFIGURATION WITH MV MEASUREMENT AND CORRECTION			
Voltage measure	1 ph-to-ph voltage reading L2-L3 on MV side		
Current measure	L1 phase on MV side		
Phase angle offset	90°		
Parameter setting	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">P.03 = L1 P.05 = L2-L3 P.24 = 3PH</td> <td style="width: 50%;">P.34 = VT1 primary P.35 = VT1 secondary</td> </tr> </table>	P.03 = L1 P.05 = L2-L3 P.24 = 3PH	P.34 = VT1 primary P.35 = VT1 secondary
P.03 = L1 P.05 = L2-L3 P.24 = 3PH	P.34 = VT1 primary P.35 = VT1 secondary		

**TERMINALS**



**DIMENSIONS & CUTOUT - [mm]**



**TECHNICAL CHARACTERISTICS****SUPPLY**

Rated voltage Us <sup>①</sup>	100 - 440V~ 110 - 250V=
Operating voltage range	90 - 484V~ 93,5 - 300V=
Frequency	45 - 66Hz
Power consumption/dissipation	3,5W – 9,5VA
No-voltage release	>= 8ms
Immunity time for microbreakings	<= 25ms

**VOLTAGE INPUTS**

Maximum rated voltage Ue	600VAC L-L (346VAC L-N)
Measuring range	50...720V L-L (415VAC L-N)
Frequency range	45...65Hz
Measuring method	True RMS
Measuring input impedance	> 0,55M $\Omega$ L-N > 1,10M $\Omega$ L-L
Wiring mode	1-ph.; 2-ph.; 3-ph. (+N); balanced 3-ph.
Accuracy of measurement	$\pm$ 1% $\pm$ 0,5 digit

**CURRENT INPUTS**

Rated current Ie	1A~ o 5A~
Measuring range	5A: 0,025 - 6° - 1A: 0,025 – 1,2A~
Type of input	TA ext bt / Lv ext CT / TI ext bt 5A max.
Measuring method	True RMS
Overload capacity	+20% Ie
Overload peak	50A / 1 sec
Accuracy of measurement	$\pm$ 1% (0,1...1,2In) $\pm$ 0,5 digit
Power consumption	<0,6VA

**MEASURING ACCURACY**

Line voltage	$\pm$ 0,5% f.s. $\pm$ 1digit
--------------	------------------------------

**RELAY OUTPUT: OUT 1 - 4**

Contact type	4x1 NO+cont. common
UL Rating	B300 30V= 1A aux
Max rated voltage	440V~
Rated current	AC1-5A 250V~ AC15-1,5A 440V~
Maximum current at contact common	10A

**RELAY OUTPUT: OUT 5**

Contact type	1 changeover cont.
UL Rating	B300 / 30V= 1A aux
Max rated voltage	415V~
Rated current	AC1-5A 250V~ AC15-1,5A 440V~ (NO)

**INSULATION VOLTAGE**

Rated insulation voltage Ui	600V~
Rated impulse withstand voltage Uimp	9,5kV
Power frequency withstand voltage	5,2kV

**OPERATING CONDITIONS**

Operating temperature	-20 - +60°C
Storage temperature	-30 - +80°C
Relative humidity	<80% (IEC/EN 60068-2-78)
Maximum pollution degree	2
Overvoltage category	3
Measurement category	III
Climatic sequence	Z/ABDM (IEC/EN 60068-2-61)
Shock resistance	15g (IEC/EN 60068-2-27)
Vibration resistance	0.7g (IEC/EN 60068-2-6)

**CONNECTIONS**

Terminal type	Removable
Cable cross section (min... max)	0,2...2,5 mmq (24 $\pm$ 12 AWG)
UL Rating: Cable cross section (min... max)	0,75...2.5 mm <sup>2</sup> (18-12 AWG)
Tightening torque	0,56 Nm (5 LBin)

**HOUSING**

Version	Flash mount
Material	Polycarbonate
Degree of protection	IP54 front IP20 terminals
Weight	350g

**CERTIFICATIONS AND COMPLIANCE**

cULus	Pending
Reference standards	IEC/EN 61010-1, IEC/EN 61000-6-2 IEC/ EN 61000-6-4 UL508 e CSA C22.2-N°14
UL Marking	Use 60°C/75°C copper (CU) conductor only AWG Range: 0,75...2.5 mm <sup>2</sup> (18 - 12 AWG) stranded or solid Field Wiring Terminals Tightening Torque: 0,5Nm ( 4.5lb.in) Flat panel mounting on a Type 1 enclosure

① Auxiliary supply drawn from a system with phase-to- neutral voltage  $\leq$ 300V





ORTEA SpA  
Via dei Chiosi, 21  
20873 Cavenago Brianza – Milan – ITALY  
Tel.: ++39 02 95917800  
[www.next.ortea.com](http://www.next.ortea.com)

ORTEA SpA INTEGRATED MANAGING SYSTEM IS APPROVED BY LRQA ACCORDING TO:  
ISO9001 ISO14001 ISO45001

---