

# Power factor relays

*“Choose the solution that best suits your needs”*



# Power factor relay

## computer *max*

Power factor correction and measurement of the main electrical parameters.

## computer *smart*

Offers in a single device, power factor correction functions, network analyzer and leakage control.

## computer *plus*

Power factor correction measuring in all three phases, functions of a powerful network analyzer and leakage control.



computer *max*



computer *smart*



computer *plus*

	computer <i>max</i>	computer <i>smart</i>	computer <i>plus</i>
Dimensions	144 x 144 mm	144 x 144 mm	144 x 144 mm
Protection degree	IP 52 frontal, IP 21 rear	IP 52 frontal, IP 21 rear	IP 52 frontal, IP 21 rear
Maximum operating temperature	55 °C	55 °C	55 °C
Maximum switching current	3 A	3 A	3 A
Maximum switching voltage	250 V	250 V	250 V
Power Class	0,5	0,5	0,5
Current Class	0,5	0,5	0,5
Voltage Class	0,5	0,5	0,5
Current measurement range	5 A	5 A	1...5 A
Voltage measurement range	230...480 V	110...480 V	110...480 V
Frequency	45...65 Hz	45...65 Hz	45...65 Hz
Consumption	6 VA	10 VA	6 VA
Power supply voltage	230...480 V	110...480 V	110...480 V
Leakage current (CDI series, with external transformers)	-	-	•
RS-485 communications	-	•	•
Earth leakage protection (with external transformer)	-	•	•
TEST function	-	•	•
Alarms	6	12	14
Power analyzer	-	•	•
Plug and Play system	-	•	•
Phase selection function	•	•	•
Type of measurement	Single phase	Single phase	Three phase
Outputs	6 or 12	6 or 12	8 or 14

computer

# max

*Top features, accuracy and technology at the best price*

### User-friendly and fully intuitive installation

**computer max** provides the “phase selection” function, that allows the user choosing the power line phase where the measuring current transformer (C.T.) has been placed in. This option eliminates the difficulty in placing the C.T. in a specific phase of the power line.



### Test abilities

**computer max** allows viewing in display the variation of  $\cos \phi$ , line current and THD(I), when manually connecting or disconnecting capacitor steps.

- $\cos \phi$  Correction Test
- Harmonic Resonance Test

### High accuracy regulation

**computer max** incorporates the FCP system (Fast Computerized Program), characteristic from **CIRCUTOR**, making a regulator with unique capabilities.

- Reduction of switching operations, so increasing the capacitor bank life span
- Increase of response speed, leading to higher energy savings
- Accurate measuring method, avoiding unnecessary connections/disconnections of capacitors
- 4-quadrant compensation, assuring counteraction of reactive energy both in consuming and generating processes

Precision at your reach

### Measurement of basic electrical parameters

**computer max** shows by display:  $\cos \phi$ , voltage, current, THD(I) and, besides, records in memory maximum values for voltage and current.



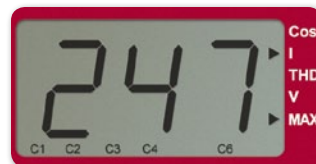
Voltage measurement



Current measurement



THD(I) measurement



Current maximum value



Voltage maximum value

### Built-in alarms

**computer max** automatically assigns the alarm conditions to the last output relay (relay 6 or 12), provided that this is not used for switching a capacitor step.

Indication by display or through relay output of following alarm conditions:

- Compensation failure
- Over-compensation
- Over-voltage
- Over-current
- C.T. not connected or open
- Line current below measurable value



computer

# smart

*PF correction, measuring  
and protection at your reach*

### Built-in power analyzer

**computer smart** has a built in power analyzer allowing the measurement of main electrical parameters (voltage, current, harmonics, active and reactive power, apparent power, etc.). The device gives a detailed information on both, voltage and current harmonic components. **computer smart** measures also ambient temperature and keeps a record of maximum and minimum values of all measured parameters. All these values can be read on the device display or can be sent and displayed in a master PC, equipped with **PowerStudio Scada** software. The data link between the **computer smart** and the PC is performed by means of an RS-485 communications channel.

### Plug&Play function

**computer smart** is a friendly programmable device. The setup, adapting the PF regulator to the installation site, is fully automatic by simply selecting the plug&play menu option and pushing a key.

## POWER FACTOR RELAY

### Serial communications

The **computer smart** regulators are equipped with RS-485 communication with MODBUS protocol. This allows the integration of the PF regulator in a data network driven by a computer (PC) equipped with **Power Studio SCADA**. Enables data recording, remote control, supervision and preventive maintenance of the PF correction equipment itself and of the whole LV network.

### AUTO-ON-OFF function

This function allows to define the operating mode of each individual capacitor step:

- Automatic mode (auto)
- Fixed mode (on): capacitor is always ON
- Disconnected mode (off). capacitor is always OFF

### Open programming

**smart** allow to combine capacitor steps of different powers (kvar). Over 150 different programming combinations can be selected in the setup menu.



### Built-in leakage control

The **smart** regulators have a built in circuit to measure the earth leakage current through a **WGC** transformer. The regulator is able to measure the individual leakage of each capacitor. This allows to disable a damaged capacitor if an excess of leakage current is detected without interrupting the supply service.

### Safety and maintenance

- **computer smart** perform a capacitor test every time that a capacitor step is switched ON. The real power and the leakage current of each step can be displayed.\*
- Up to 14 different alarm conditions can be programmed. This are related with maximum or minimum values of different electrical or thermal parameters measured or calculated by the regulator. The alarms can be associated with a built-in relay tripping.
- Internal counter register which counts the number of operations of each individual capacitor step.

\*An external CT, type **WGC**, must be provided in order to measure the earth leakage current.

computer  
**plus**

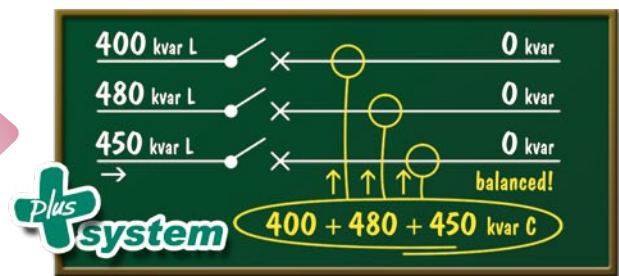
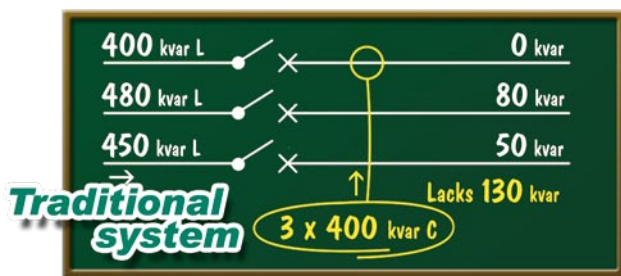
### *Innovation in power factor correction*



#### Intelligent regulators

**computer plus** regulators are a new concept in Power Factor Correction:

- They measure on the three phases and accurately compensate the total reactive energy
- They compensate reactive energy using individual phase control in real time and in addition to correcting the total reactive to zero; they also achieve a balance of active power between phases
- Plug and Play, start up at the touch of a key.



#### FULL CONTROL AND MAXIMUM INNOVATION

##### Easy

**computer plus** regulators are equipped with intelligent controllers designed to make adjustment and navigation through the different menus and display of all the registered parameters easy. They begin working just pushing a key.

##### Measurement

**computer plus** regulators include a three-phase network analyzer, enabling instantaneous display of all the network electrical parameters (voltage, current, active power, reactive power, energies, harmonics, etc.). The three-phase network analyzer shows the instantaneous values, of electrical parameters and the recording of maximum values.

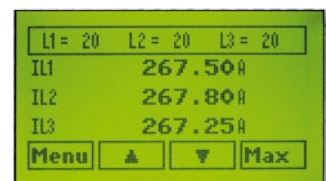
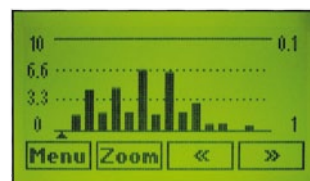
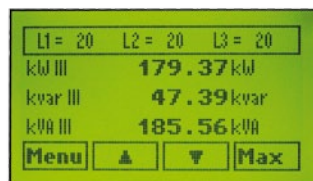
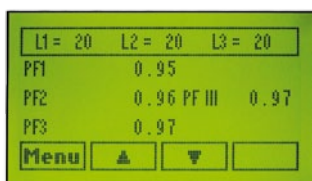
##### Communications

**computer plus** regulators are fitted with RS-485 comms. to display a large amount of information available.

- Enables the remote control, supervision and preventive maintenance both of the capacitor bank and the network
- RS-485 communications (Modbus protocol)
- SCADA software allows the display on a PC of cos  $\phi$ , leakage levels, general status of the capacitor bank and electric parameters of the network.

##### Leakage control

**computer plus** measures the leakage current in real time and step by step, and disconnects only the damaged capacitor.





# Power factor relays

+ information: [central@circutor.es](mailto:central@circutor.es)

**[www.circutor.com](http://www.circutor.com)**



**CIRCUTOR, SA** - Vial Sant Jordi, s/n  
08232 Viladecavalls (Barcelona) Spain  
Tel. (+34) **93 745 29 00** - Fax: (+34) **93 745 29 14**  
[central@circutor.es](mailto:central@circutor.es)

