



S.A DE CONSTRUCCIONES INDUSTRIALES

POWER FACTOR CONTROLER

REG144

INSTRUCTION MANUAL

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1.-GENERAL FEATURES

The REG144, is an automatic Power Factor Controller that only requires one current signal and the 3 voltages L1, L2 and L3.

The measurement comes from the secondary, with no need of Primary current.

Therefore it does not require manual setting.

Main Advantages:

- True RMS value measurement.
- Large LCD display.
- The current transformer can be connected in any phase.
- It does not require manual setting.
- C/K is automatically calculated and $\cos\phi$ **FIX** and pre-set to 1.
- Check every step
- A microprocessor control offers optimum steps operation.
- Proper performance, even if incorrect connections in voltage and current are done.
- Automatic detection of every step
- Digital display of $\cos\phi$

By pressing the **Up and DOWN button** we may visualise the following parameters:

- Current.
- Voltage L1, L2 and L3.
- Frequency.
- Active power, reactive and apparent.
- CT correct connection.
- Programming -automatic calculated-.
- Connected steps.
- Alarms

To achieve an automatic power factor correction, the controller shall measure the reactive power and the phase shift of the cosine, in order to proceed with the steps connections.

In a conventional PFC you need extra information such as:

Smallest step power
Required power factor,
Connection sequence,
Primary of current transformer,
And C/K must be calculated.

From all these, only the required power factor and the type of connections were generally known by the user, while the other data must be defined by means of calculations or tables which on many occasions leads to errors, determining an anomalous performance. The REG144 is equipped with a complex system that has been developed to conduct these calculations automatically, being able to carry out a compensation of the reactive energy in an ideal way.

In addition, the philosophy adopted allows distinguishing the current direction in the four quadrants, in consequence making possible to distinguish between the current coming from the net or coming from the generator. Therefore, it is possible to operate with the reverse current.

These are the **programs** that is able to manage the REG144

<i>Pr.01</i>	<i>11.....1</i>
<i>Pr.02</i>	<i>112.....2</i>
<i>Pr.03</i>	<i>12.....2</i>
<i>Pr.04</i>	<i>11224.....4</i>
<i>Pr.05</i>	<i>124.....4</i>
<i>Pr.06</i>	<i>1122448...8</i>
<i>Pr.07</i>	<i>122448....8</i>
<i>Pr.08</i>	<i>12448.....8</i>
<i>Pr.09</i>	<i>1248.....8</i>

2.-SET-UP

Before the unit is connected, the network must be working in a usual way, with enough load.

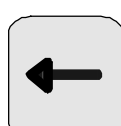
Requirements before installing the unit:

- The network must have an **Inductive load 0,5...1.PF**
- The current must be up to **10%** of nominal value.
- Less the 10% **unbalanced voltage**

KEYBOARD

DOWN UP LEFT ENTER PROGRAM

RESET



After the set up , if the device does not find some characteristics, as steps , programs , ... consult your provider.

PROGRAM

MODE 1: AUTOMATIC.
MODE 2: MANUAL.

2.1.- MODE 1: AUTOMATIC

START RESET: Push **P + RESET** to start the process:

F.e: 200/5 A.
 A Pr
 0000
 0200 A

Manually you have to write the primary current (**A Pr.**)

The right digit of the lower display starts flickering waiting for the primary current.

The "**Up**" and "**Down**" keys must be pressed to change the flickering digit. The change of the numbers will be rotative.

The "**LEFT**" key, to change to the next left digit

The key **ENTER** validates the value and start the set up.

If you don want to set up at this point, push **P+DOWN**, (before **ENTER.**).

After checking the connections, the REG144 will calculate the value of each step. By connecting each step one by one every 2 seconds, and repeating this process several times. During this 1-minute process, the indication is:

Pr.
SCAn

- The unit will calculate the sequence.
- Check connections
- Check each step load.

The unit will check proper functioning and will establish compensation program 1.1.1. or 1.2.2. etc....

During this process in the screen "n ESC" (number steps) is shown:

nESC
nULL

When this process is finished, the unit will be programmed as shown in the display 1.1.1., 1.2.2 This program will be used unless re-starting the set-up process by pushing P+RESET.

If is found a 1:2:2... program, the display will show:

PR.03

1222

222-

If is not possible to find the correct program, it will try for 3 times, consult your distributor to do it correctly, or try manually.

2.2.- MODE 2: MANUAL.

Push simultaneously **P+UP**.

Write your password....."0010" is the standard from factory.

The "**Up**" and "**Down**" keys must be pressed to change the flickering digit. The change of the numbers will be rotative.

The "**LEFT**" key, to change to the next left digit

The key **ENTER** or accept, validates the value and start the set up.

The regulator could work without programming the primary current, but the parameters will be refereed to secondary.

1) Program (select one of the 9 type).

Pr.03

1222

222- Select with UP or DOWN keys, and ACCEPT.

2) Steps connected: from 6 to 14.

3) Sequence

SEC

L1 positive L1 means CT connected in phase L1 and correct sequence.

Pos

Negative L2 . E.g. the CT will be find in L2 and incorrect polarity.

But you do not need to change the wires, so the regulator will consider and correct this mistake.

To get next screen press the **ACCEPT** key.

4) First step power. (Kvar)

Ban1 and ACCEPT.

F.E. With a battery 10+20+40+...40kVar. Write 10.1

5) Primary current. (A)

F.e: 200/5 A. Write and accept.

A Pr

0000

0200 A

6) Password

You can change the standard password, but please don't forget it for future.

*Push **P+DOWN** to go out of the programming process.*

PRIMARY CURRENT PROGRAMMING.

Push simultaneously **P+DOWN**.

F.e: CT=200/5 A.

A Pr

0000

0200 A

Then you have to write the primary current (**A Pr**.)

The right digit of the lower display starts flickering waiting for the primary current.

The "**Up**" and "**Down**" keys must be pressed to change the flickering digit. The change of the numbers will be rotative.

The "**LEFT**" key, to change to the next left digit

The key **ENTER** validates the value and start the set up.

The regulator could work without programming the primary, but the parameters will be referred to secondary.

SEQUENCE SEARCH ONLY.

When you are not sure if the detection of sequence is according to the scheme, then you can try to find automatically the correct one. The REG144 try to find the phase and the polarity. If find not according to the scheme, it will show for example -L2, that means, CT in L2 phase and inverted. But in that case the instrument will work properly.

Push **P+ENTER** and wait for some minutes, the device manages the firsts 6 steps.

(Remember the 3 condition for starting the automatic programming, page 4)

3.- DISPLAYS

With the keyboard **UP** and **DOWN** you can consult all the parameter are established,

Steps connected: from 1 to 8 and PF-power factor-.

1234

¹ 0.997 PF

To view next screen, press the **UP** key.

Connected steps: from 9....14 and PF.

²-Abc In hexadecimal language: A=10.....

dE---

0.997

To view next screen press the **UP** key.

Program (found or saved).

Pr.03

1222

222-

To view next screen press the **UP** key.

Number Steps.

nESC

0014

To view next screens press the **UP** key.

Sequence (found or saved)

SEC

L1 Positive L1 means CT connected in phase L1 and correct sequence.

Pos

Negative L2 . E.g. the CT will be find in L2 and incorrect polarity.

But you do not need to change the wires, so the regulator will consider and correct this mistake.

To view next screen presses the UP key.

Voltage Ph-N

L₁ 228.0

L₂ 229.2

L₃ 228.7 v

To view next screen presses the UP key.

Voltage Ph-Ph

L₁₂ 399.0

L₂₃ 398.2

L₃₁ 399.7 v

To view next screen press the **UP** key.

Active power, reactive and aparent.(P,Q and S)

To view next screen press the **UP** key.

Phase found for the CT and current.

L1

091.2_A

To view next screen press the **UP** key.

Faults screen: (Only is there is someone.)

E-I Not enough current.

E-U Not voltage.

To view next screen press the **UP** key.

Frequency and Pf.

_{Hz}

49.99

0.998_{PF}

and so on in a cyclic way....

4.- SWITCH OFF

In order to switch off the battery the **RESET** button must be pressed, and all the steps will be consecutively disconnected each one in 4 seconds.

They remain disconnected for 1 minute, in order to switch off the battery. Further to this minute and if the battery has not been disconnected, the REG144 will continue working normally

5.- TWO OR MORE CURRENT TRANSFORMERS

In case of Addition Current Transformers from 2 or more lines, we must take care that all are in the same phase.

And the primary must be summed up.

Example:

First CT = 500/5 A.

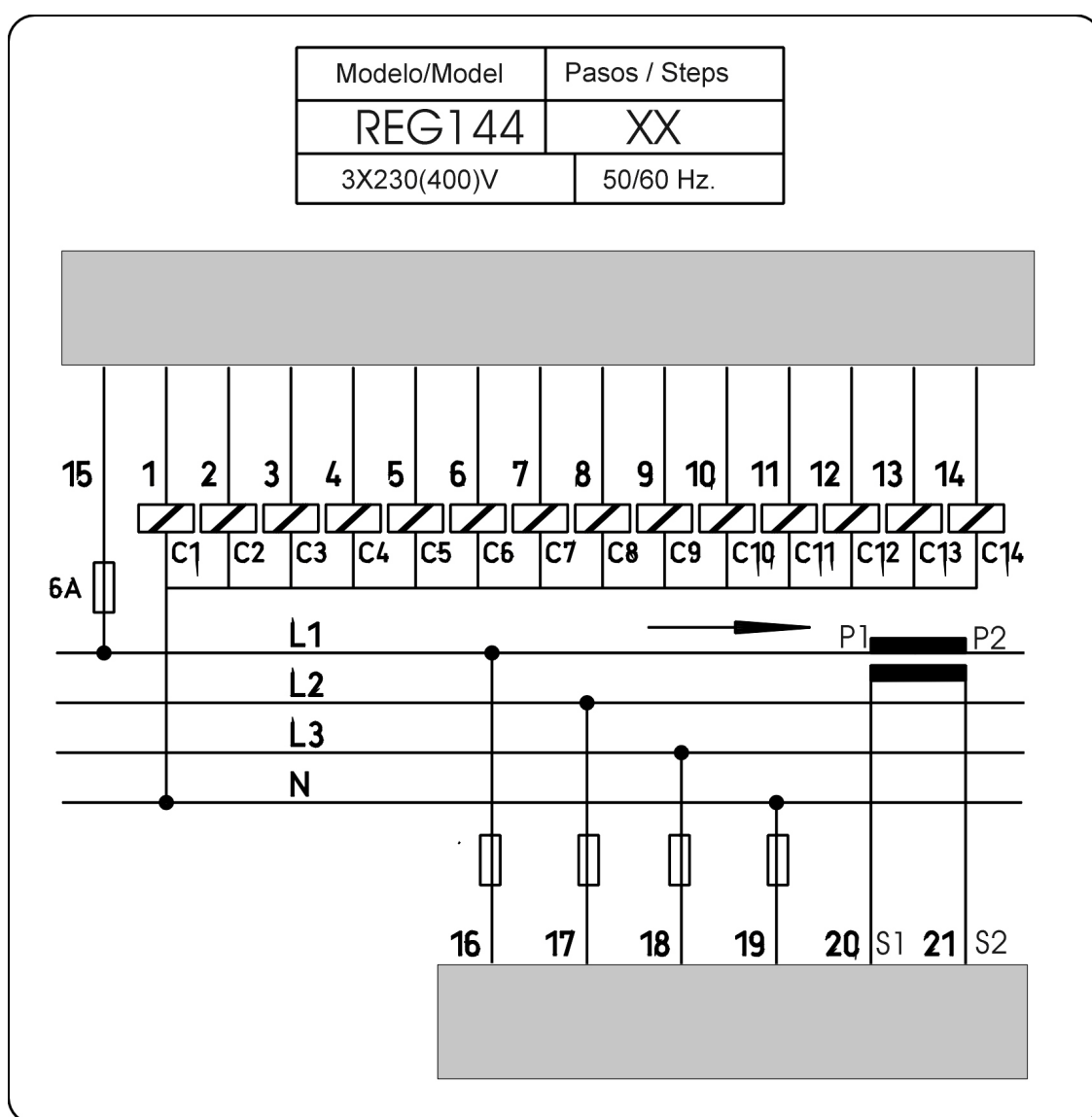
Second CT = 500/5 A.

Then the ratio is: 500/5 A + 500/5 A.= 1000/5 A. And 1000 A has to be programmed.

6.- CONEXIONS:

The REG144 is a three-phase balanced controller, and needs 3 voltage and 1 current, the neutral wire is not compulsory.

We recommend connecting it according the scheme. This connection will display L1 positive in the screen.



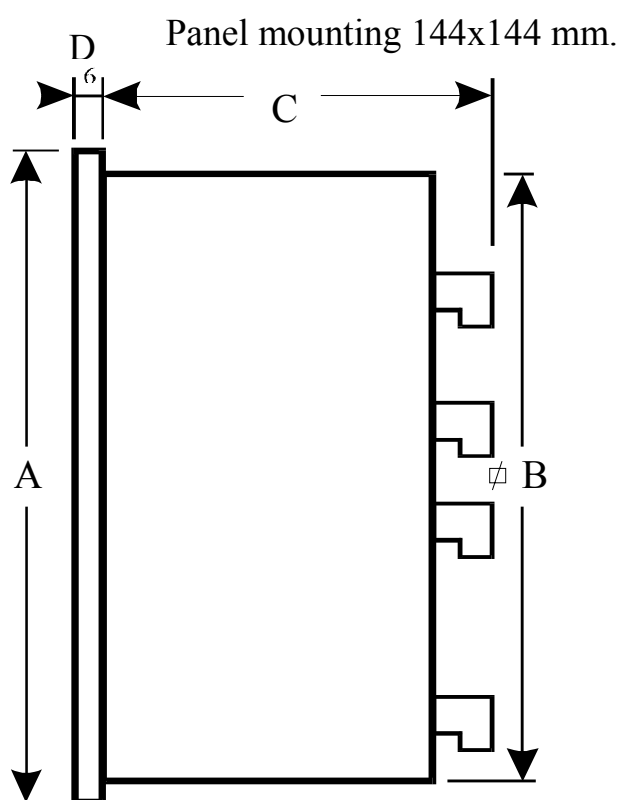
8.- SAFETY REQUIREMENTS

A protection device must be included both in supply lines and measuring inputs. This device can be the one used in the installation, if the rated current does not exceed 5 Amps. In the case of using a specific protection device, 2 Amp fuses is recommended.

The instrument must not be open but by qualified personnel, as dangerous voltages can be found inside the equipment.

Preventive maintenance is not required. In the case of failure, the instrument must be sent to our factory.

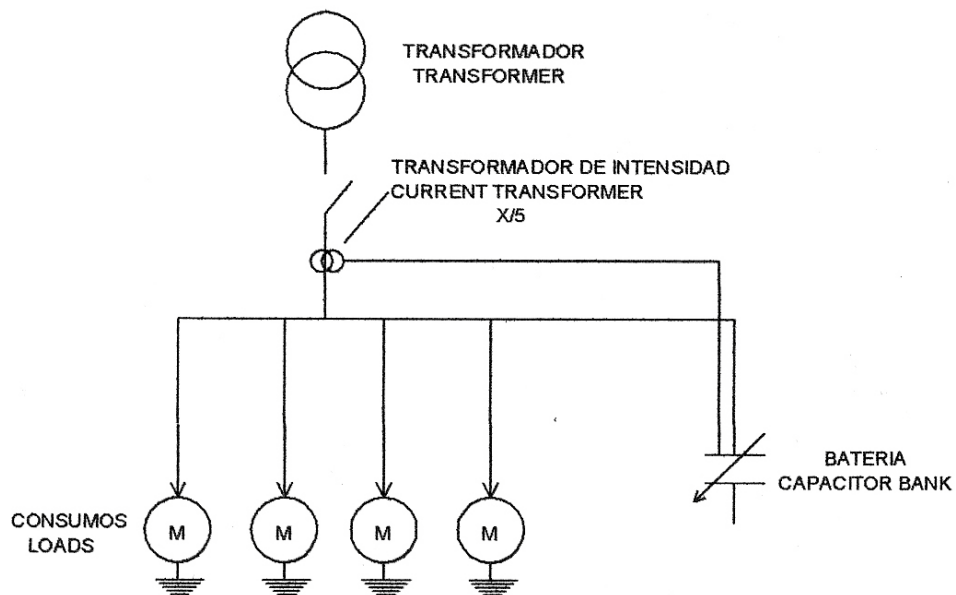
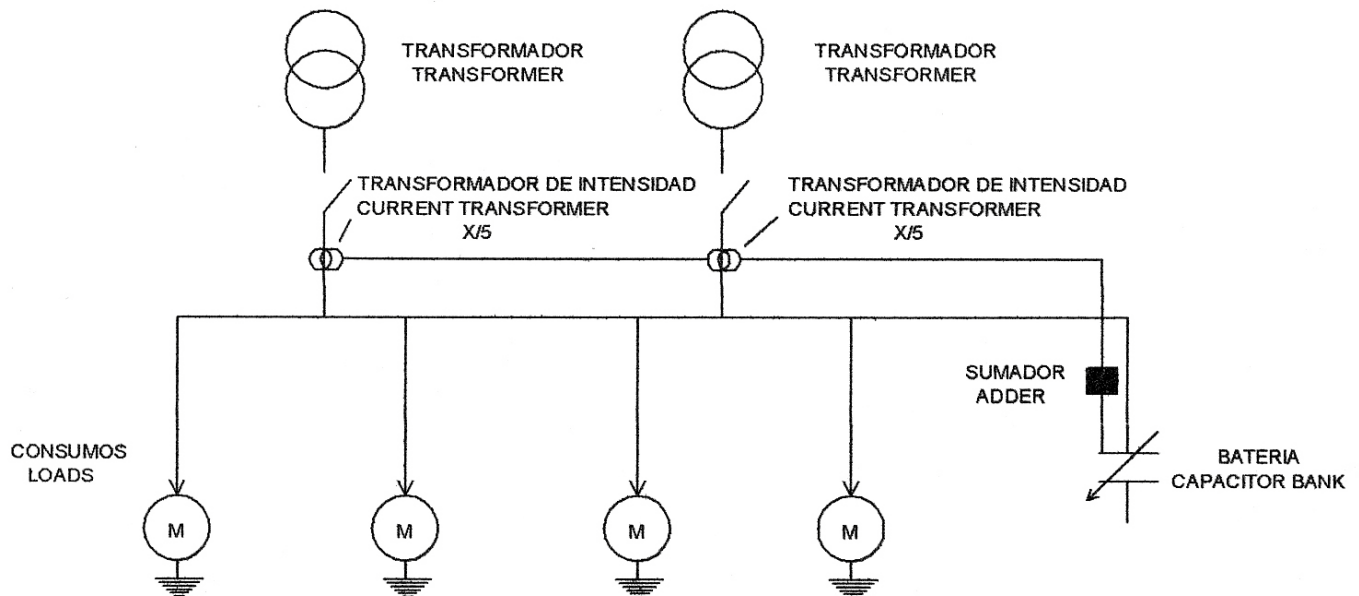
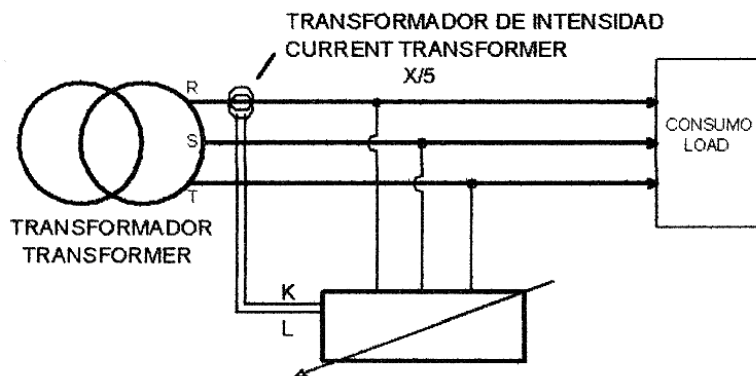
9.- MOUNTING - DIMENSIONS.



mm	REG144
A	144x144
B	135 +0,6
C	88
D	6

10.- TECHNICAL FEATURES		
MODELO	Trifásico equilibrado / 3 phase balanced	MODEL
Caja	Empotrable / Panel mounting	Box
Tamaño	144 x144 mm	Size type
ENTRADA V _n (Un) (In)	3x 230(400) Vc.a x/5 A.	(Un) INPUTS (In)
Alcance	10....120%In , 80..120%Un	Range
Margen de frecuencia	45 ... 65 Hz	Frequency range
Sobrecarga permanente	2 In	Permanent overload
Sobrecarga 10s	5 In	10 s overload
Consumo de intensidad	0,2 VA	Current burden
Consumo de tensión	5 VA	Voltage burden
CONTACTOS DE SALIDA		DIGITAL OUTPUTS
Tipo	Relé 250Vca, 3A, libre de tensión./free voltage.	Type
Número	6, 9,12 & 14	Number
Vida mecánica	20 x10 ⁶	Mechanical endurance
Vida eléctrica	100 x10 ³	Electrical endurance
Máxima tensión.	250Vc.a. / 125V c.c.	Max. Voltage
Retardo a la conexión	4s.	Steps delay
Tiempo de seguridad	10s	Security time
Máxima corriente	5 A.	Max. Current
Aislamiento	2.kV	Isolation
TENSIÓN AUXILIAR	Autoalimentado / Selfsupplied	AUXILIARY VOLTAGE
Conexión	Regleta enchufable / plug-in connection terminal	Connections
Grado de protección trasera	IP31	Frontal protection degree
Grado de protección frontal	IP54	Side and rear plates IP
NORMAS:	EN 61010-1 EN 50081-2 EN 50082-2	:STANDARDS

11.- CAPACITOR BANK CONNECTION SCHEME



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Specifications subject to change without any notice.