

Circutor

Power analyzer

CVM-C4



INSTRUCTION MANUAL

(M267B01-03-23A)

CE

SAFETY PRECAUTIONS

Follow the warnings described in this manual with the symbols shown below.



DANGER

Warns of a risk, which could result in personal injury or material damage.



ATTENTION

Indicates that special attention should be paid to a specific point.

If you must handle the unit for its installation, start-up or maintenance, the following should be taken into consideration:



Incorrect handling or installation of the device may result in injury to personnel as well as damage to the device. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire.

Read the manual carefully prior to connecting the device. Follow all installation and maintenance instructions throughout the device's working life. Pay special attention to the installation standards of the National Electrical Code.



Refer to the instruction manual before using the device

In this manual, if the instructions marked with this symbol are not respected or carried out correctly, it can result in injury or damage to the device and /or installations.

CIRCUTOR S.A.U. reserves the right to modify features or the product manual without prior notification.

DISCLAIMER

CIRCUTOR S.A.U. reserves the right to make modifications to the device or the unit specifications set out in this instruction manual without prior notice.

CIRCUTOR S.A.U. on its web site, supplies its customers with the latest versions of the device specifications and the most updated manuals.



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CIRCUTOR S.A.U. recommends using the original cables and accessories that are supplied with the device.

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REVISION LOG

Table 1: Revision log

Date	Revision	Description
11/19	M267B01-03-19A	First Version
02/20	M267B01-03-20A	Changes in the following sections: 3.4.- 8.
07/20	M267B01-03-20B	Changes in the following sections: 3.4.2.- 7.1
09/20	M267B01-03-20C	Changes in the following sections: 4.1.- 5.1.- 5.2.- 5.3.- 6.1.3.- 7.3.1.- 7.3.5.3.
02/21	M267B01-03-21A	Changes in the following sections: Symbols - 8.
05/21	M267B01-03-21B	Changes in the following sections: 8.
07/21	M267B01-03-21C	Changes in the following sections: 4.2.
02/22	M267B01-03-22A	Changes in the following sections: 4.2.
03/22	M267B01-03-22B	Changes in the following sections: 3.4.- 5.- 6.1.1.- 6.1.3.- 7.3.5.1.- 8.- Annex A
06/22	M267B01-03-22C	Changes in the following sections: 4.1.- 4.5.
06/22	M267B01-03-22D	Changes in the following sections: 3.4.1.- 3.4.2.- 3.4.3.- 3.4.4.- 3.4.5.- 4.1.- 5.- 6.1.1.- 7.3.5.1.- 9.- Anexo A
08/22	M267B01-03-22E	Changes in the following sections: 4.2.
01/23	M267B01-03-23A	Changes in the following sections: 4.2.- 7.3.1.- 8.

SYMBOLS

Table 2: Symbols.

Symbol	Description
	In accordance with the relevant European directive.
	Device covered by European Directive 2012/19/EC. At the end of its useful life, do not leave the unit in a household waste container. Follow local regulations on electronic equipment recycling.
	Direct current.
	Alternating current.

Note: The images on the devices are for illustrative use only and may differ from the original device.

1 .- VERIFICATION UPON RECEPTION

Upon reception of the device check the following points:

- a) The device meets the specifications described in your order
- b) The device has not suffered any damage during transport
- c) Perform an external visual inspection of the device prior to switching it on
- d) Check that it has been delivered with the following:
 - An installation guide



If any problem is noticed upon reception, immediately contact the transport company and/or **CIRCUTOR's** after-sales service

2 .- PRODUCT DESCRIPTION

The **CVM-C4** is a device that measures, calculates and displays the main electrical parameters in single-phase and three-phase networks.

The device has RS-485 communications, relay outputs, impulse outputs and digital inputs. Current measurement is indirectly carried out by /5A or /1A transformers.



The device features:

- **3 keys** that allow you to browse between the various screens and program the device
- **LED Display** to display all the parameters
- **2 relay outputs**, fully programmable
- **2 digital inputs**
- **2 impulse outputs**, programmable
- **RS-485** communications.

Table 3: List of CVM-C4 models

Model	CVM-C4		
	Auxiliary power supply		
	80... 270 V ~	80... 270 V ___	18.. 36 V ___
M52706	✓	✓	-
M527060030000	-	-	✓

3 .- DEVICE INSTALLATION

3.1.- PRIOR RECOMMENDATIONS



In order to use the device safely, it is critical that individuals who handle it follow the safety measures set out in the standards of the country where it is being used, using the personal protective equipment necessary (rubber gloves, face protection and approved flame-resistant clothing) to prevent injuries due to electric shock or electric arc as a consequence of exposure to current-carrying conductors and paying attention to the various warnings indicated in this instruction manual.

The CVM-C4 device must be installed by authorised and qualified staff.

The power supply plug must be disconnected and measurement systems switched off before handling, altering the connections or replacing the device. It is dangerous to handle the device while it is powered.

It is critical to keep wires in perfect condition to avoid accidents, personal injury or damage to installations.

Limit the operation of the device to measuring the specified current or voltage values.

The manufacturer of the device is not responsible for any damage resulting from failure by the user or installer to heed the warnings and/or recommendations set out in this manual, nor for damage resulting from the use of non-original products or accessories or those made by other manufacturers.

Do not use the device to take measurements if you detect an anomaly or malfunction.



Disconnect the device from the mains and from the power supply (both the device and its measuring system) before performing any maintenance work, repairs or handling any of the connections of the device.
Contact the after-sales service if you detect that the device is not working properly.

3.2.- INSTALLATION



Terminals, opening covers or removing elements can expose parts that are hazardous to the touch while the device is powered. Do not use the device until it is fully installed.

The device should be installed inside an electric panel or enclosure, and panel-mounted.

The following steps must be taken for correct installation:

- 1.- Make a cut in the panel, according to the dimensions in **Figure 1**

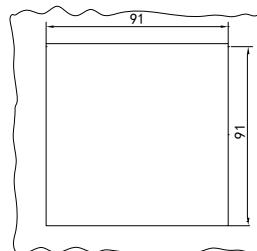


Figure 1: Cut in the panel

- 2.- From outside, insert the device into the panel cut-out (**Figure 2**)

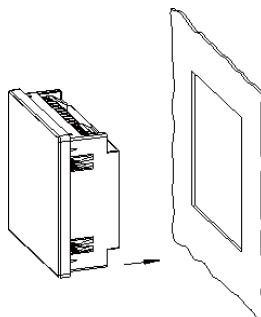


Figure 2: Insert the device

- 3 .- Fully insert the device and fasten it by using the spring (**Figure 3**)

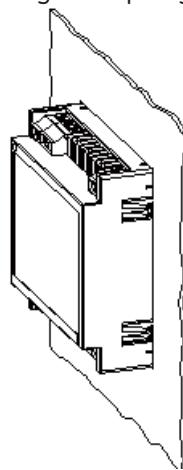


Figure 3: Fully insert the device

The device must be connected to a power circuit protected by a fuse with a maximum nominal current

of 0.25 A.

If the voltage to be measured is higher than the nominal input voltage, a voltage transformer must be connected to the device.

If more than one device is connected to the current transformer, they must be connected in series.

Before disconnecting the current measurement connection cables, be sure to disconnect the transformer's primary cables and bridge the secondary.

The device can operate in three-wire, three-phase mode or four-wire, three-phase mode, the user selecting the corresponding connection mode according to the installation. An incorrect type of connection or an error in phase sequence may cause measurement errors.

3.3.- DEVICE TERMINALS

Table 4: List of CVM-C4 terminals

Device terminals	
1: L / +, Power supply	15: R01, Relay Output 1 (Common)
2: N / -, Power supply	16: Relay Output 1 (NO) / Relay Output 2 (Common)
4: I1 S1, Current input L1	17: R02: Relay output 2 (NO)
5: I1 S2, Current input L1	47: +, Impulse output 1
6: I2 S1, Current input L2	48: -, Impulse output 1
7: I2 S2, Current input L2	49: +, Impulse output 2
8: I3 S1, Current input L3	50: -, Impulse output 2
9: I3 S2, Current input L3	58: A, RS-485
11: U1, Voltage input L1	59: B, RS-485
12: U2, Voltage input L2	70: Common digital inputs
13: U3, Voltage input L3	71: DI1, Digital input 1
14: UN / U2, Voltage input N / L2	72: DI2, Digital input 2

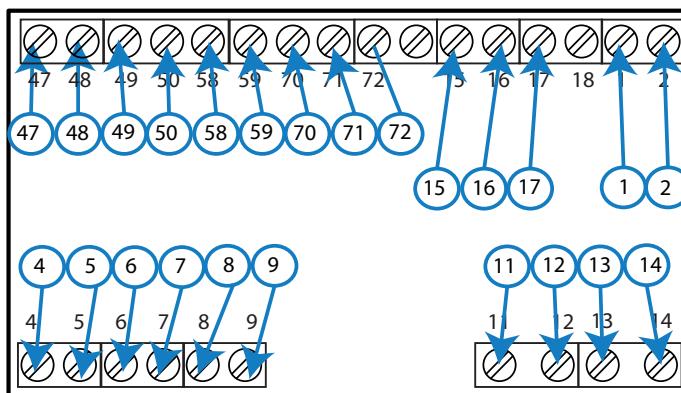


Figure 4: CVM-C4 terminals

3.4.- CONNECTION DIAGRAM

3.4.1.- THREE-PHASE NETWORK MEASURING WITH 4-WIRE CONNECTION

Measurement system: n 34

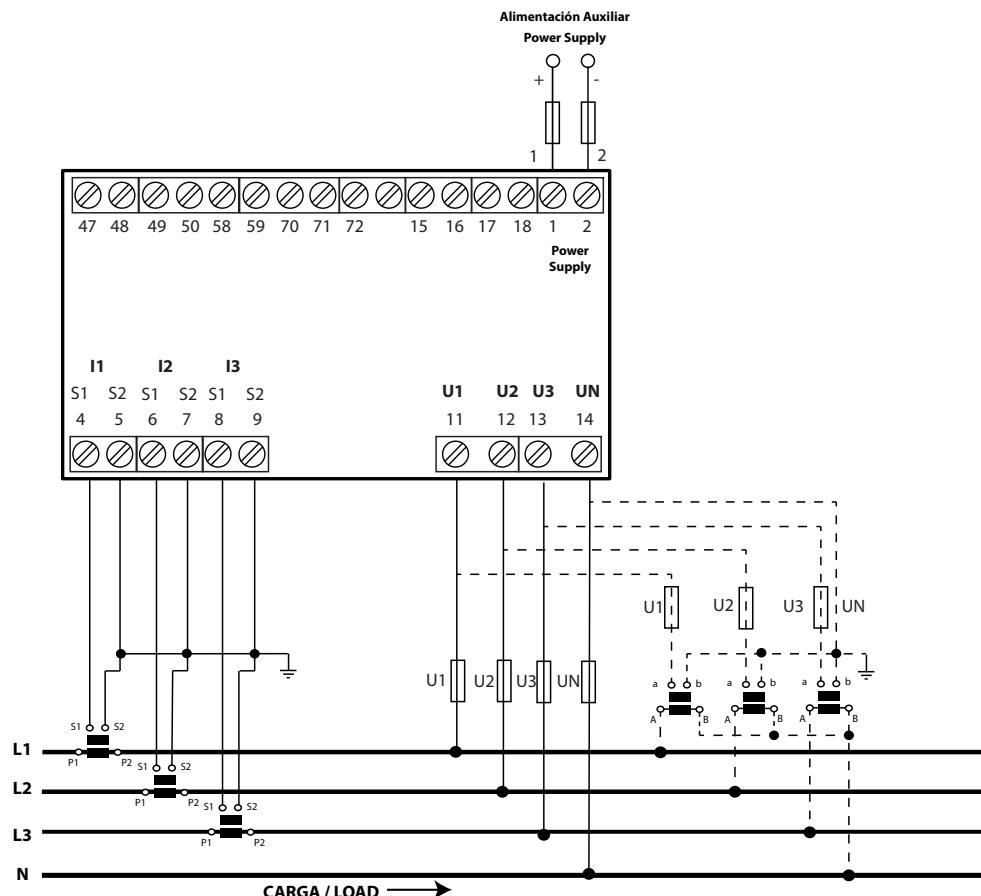


Figure 5: Three-phase network measuring with 4-wire connection.

3.4.2.- THREE-PHASE NETWORK MEASURING WITH 3-WIRE CONNECTION

Measurement system: n 33

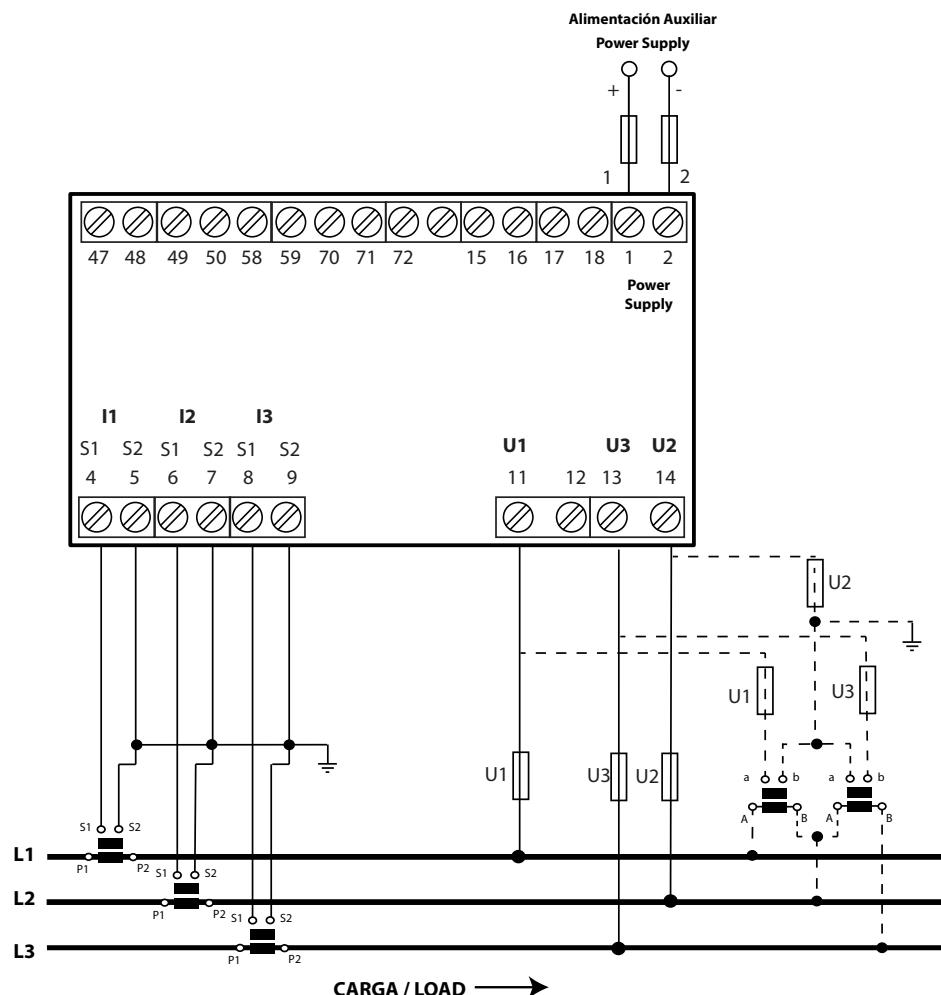


Figure 6: Three-phase network measuring with 3-wire connection.

3.4.3.- THREE-PHASE NETWORK MEASURING WITH 3-WIRE CONNECTION AND TRANSFORMERS IN ARON CONNECTION

Note: This connection is available from version 100J of the device.

Measurement system: Aron

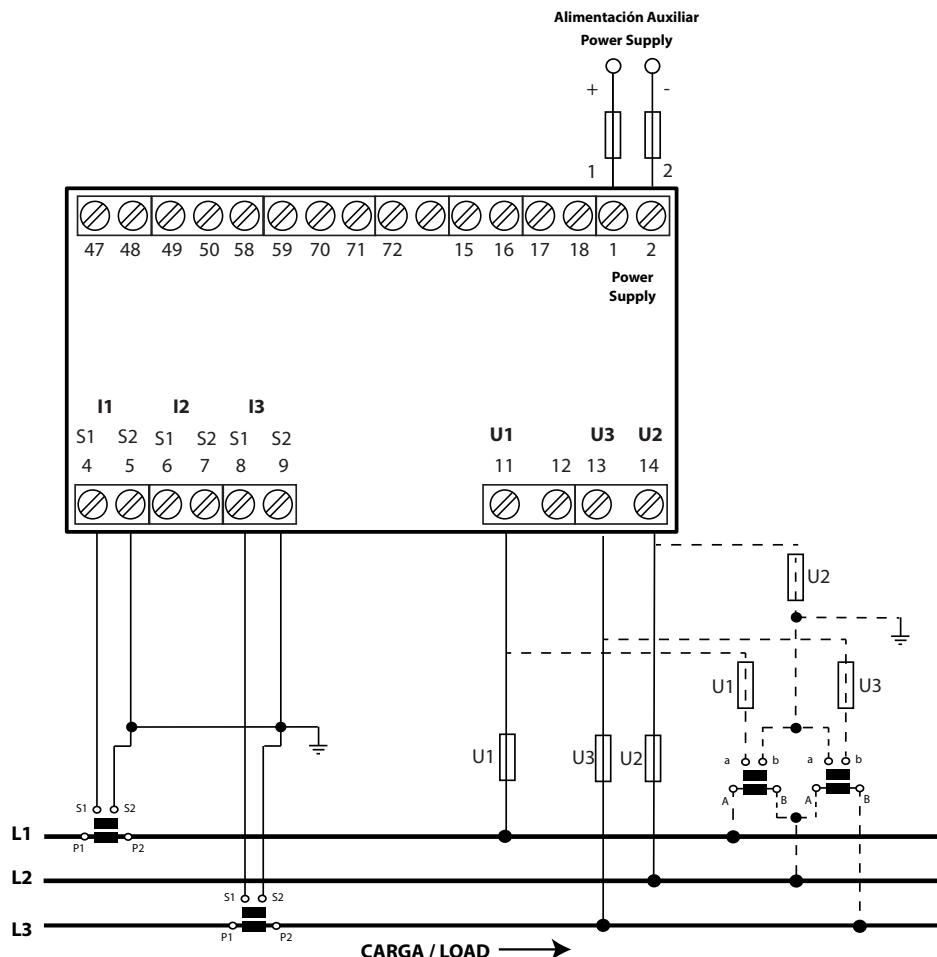


Figure 7: Three-phase network measuring with 3-wire connection and transformers in aron connection.

3.4.4.- TWO-PHASE NETWORK MEASURING WITH 3-WIRE CONNECTION

Note: This connection is available from version 100H of the device.

Measurement system: n²³

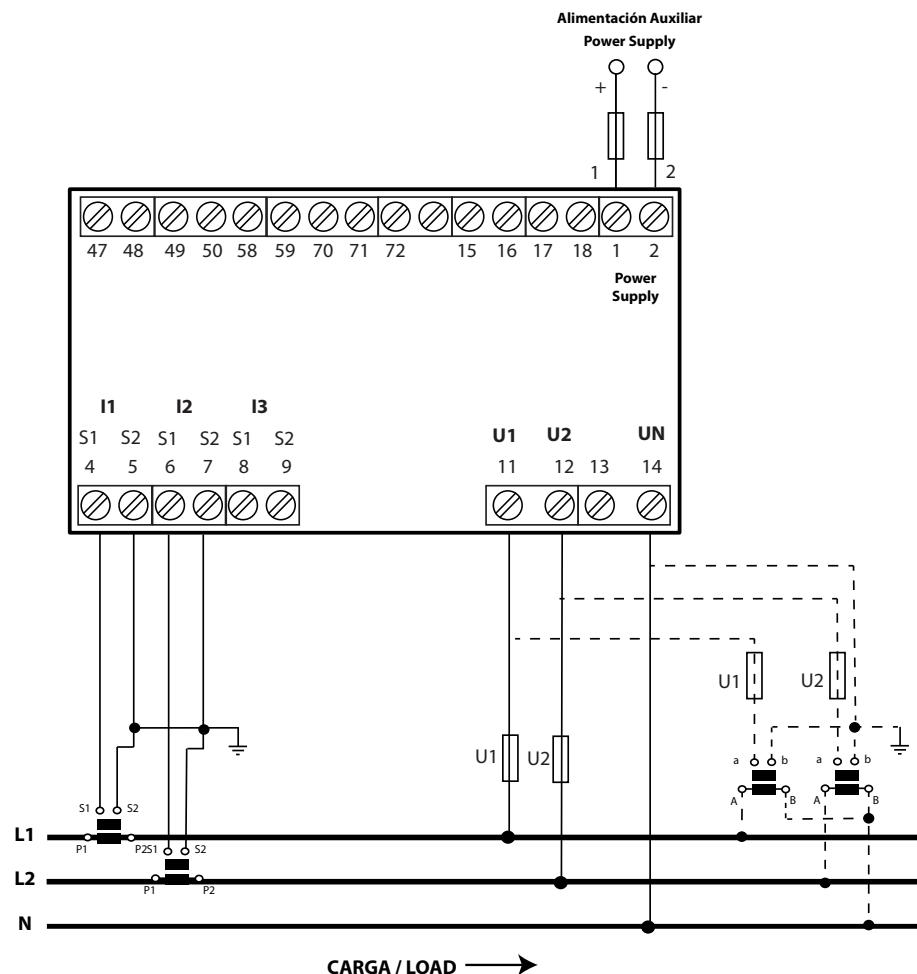


Figure 8: Two-phase network measuring with 3-wire connection

3.4.5.- SINGLE-PHASE NETWORK MEASURING

Measurement system: $\text{m } \text{I}^2\text{U}$

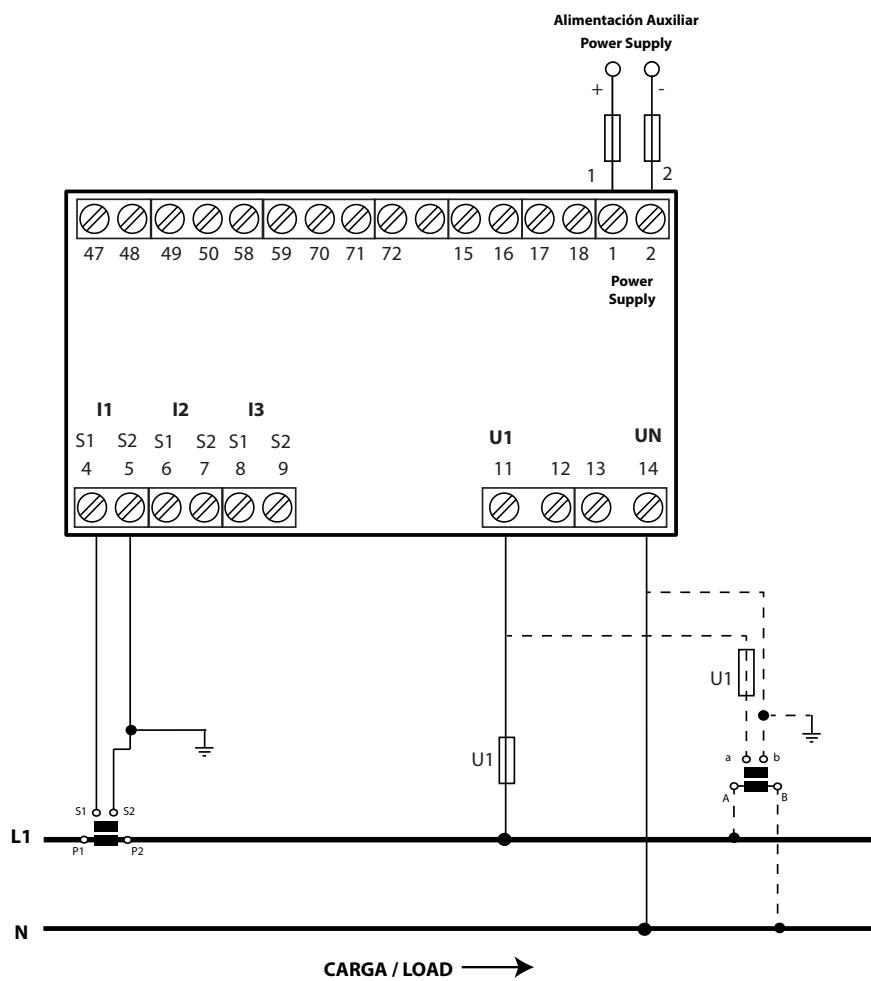


Figure 9: Single-phase network measuring.

4.- OPERATION

4.1.- MEASURING PARAMETERS

The CVM-C4 is a four-quadrant power analyzer (consumption and generation) that operates according to the IEC measurement convention (Figure 10).

Operation in the 4 quadrants (Q1, Q2, Q3, Q4)

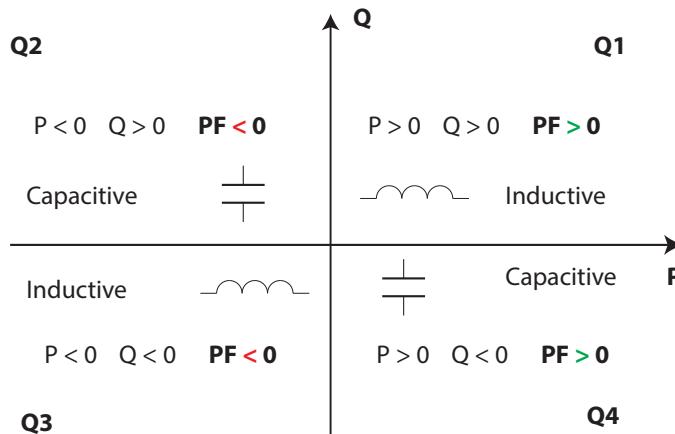


Figure 10: IEC measurement convention.

The device displays the electrical parameters shown in the following tables.

Where: III = Three-phase, Σ = Total, M = Measured value, C = Calculated value.

Table 5: Measuring parameters CVM-C4 (Measurement system: n34).

Parameter	n34				
	L1	L2	L3	III	Σ
Phase-Neutral Voltage	M	M	M	-	-
Phase-Phase Voltage	C	C	C	-	-
Current	M	M	M	-	-
Frequency	M	-	-	-	-
THD Voltage	C	C	C	-	-
THD Current	C	C	C	-	-
Active Power	C	C	C	-	C
Apparent Power	C	C	C	-	C
Reactive Power	C	C	C	-	C
Power factor	C	C	C	C	-
Active energy (consumption and generation) ⁽¹⁾	-	-	-	-	C
Active energy Tariff 1 and 2 ⁽¹⁾	-	-	-	-	C
Reactive energy (consumption and generation)	-	-	-	-	C
Reactive energy Tariff 1 and 2	-	-	-	-	C

⁽¹⁾ Maximum display value: by display = 99999999 MWh, by communications = 3.402×10^{38} kWh.

Table 6: Measuring parameters CVM-C4 (Measurement system: n33).

Parameter	n33				
	L1	L2	L3	III	Σ
Phase-Neutral Voltage	-	-	-	-	-
Phase-Phase Voltage	M	M	C	-	-
Current	M	M	M	-	-
Frequency	M	-	-	-	-
THD Voltage	C	-	C	-	-
THD Current	C	C	C	-	-
Active Power	-	-	-	-	C
Apparent Power	-	-	-	-	C
Reactive Power	-	-	-	-	C
Power factor	-	-	-	C	-
Active energy (consumption and generation) ⁽²⁾	-	-	-	-	C
Active energy Tariff 1 and 2 ⁽²⁾	-	-	-	-	C
Reactive energy (consumption and generation)	-	-	-	-	C
Reactive energy Tariff 1 and 2	-	-	-	-	C

⁽²⁾ Maximum display value: by display = 99999999 MWh, by communications = 3.402×10^{38} kWh.

Table 7: Measuring parameters CVM-C4 (Measurement system: Aron).

Parameter	Aron				
	L1	L2	L3	III	Σ
Phase-Neutral Voltage	-	-	-	-	-
Phase-Phase Voltage	M	M	C	-	-
Current	M	C	M	-	-
Frequency	M	-	-	-	-
THD Voltage	C	-	C	-	-
THD Current	C	-	C	-	-
Active Power	-	-	-	-	C
Apparent Power	-	-	-	-	C
Reactive Power	-	-	-	-	C
Power factor	-	-	-	C	-
Active energy (consumption and generation) ⁽³⁾	-	-	-	-	C
Active energy Tariff 1 and 2 ⁽³⁾	-	-	-	-	C
Reactive energy (consumption and generation)	-	-	-	-	C
Reactive energy Tariff 1 and 2	-	-	-	-	C

⁽³⁾ Maximum display value: by display = 99999999 MWh, by communications = 3.402×10^{38} kWh.

Table 8: Measuring parameters CVM-C4 (Measurement system: n23).

Parameter	n23			
	L1	L2	III	Σ
Phase-Neutral Voltage	M	M	-	-
Phase-Phase Voltage	C	-	-	-
Current	M	M	-	-

Table 8 (Cont.): Measuring parameters CVM-C4 (Measurement system: n23).

Parameter	n23			
	L1	L2	III	Σ
Frequency	M	-	-	-
THD Voltage	C	C	-	-
THD Current	C	C	-	-
Active Power	C	C	-	C
Apparent Power	C	C	-	C
Reactive Power	C	C	-	C
Power factor	C	C	C	-
Active energy (consumption and generation) ⁽⁴⁾	-	-	-	C
Active energy Tariff 1 and 2 ⁽⁴⁾	-	-	-	C
Reactive energy (consumption and generation)	-	-	-	C
Reactive energy Tariff 1 and 2	-	-	-	C

⁽⁴⁾ Maximum display value: by display = 99999999 MWh, by communications = 3.402×10^{38} kWh.

Table 9: Measuring parameters CVM-C4 (Measurement system: n12).

Parameter	n12		
	L1	III	Σ
Phase-Neutral Voltage	M	-	-
Phase-Phase Voltage	-	-	-
Current	M	-	-
Frequency	M	-	-
THD Voltage	C	-	-
THD Current	C	-	-
Active Power	C	-	C
Apparent Power	C	-	C
Reactive Power	C	-	C
Power factor	C	C	-
Active energy (consumption and generation) ⁽⁵⁾	-	-	C
Active energy Tariff 1 and 2 ⁽⁵⁾	-	-	C
Reactive energy (consumption and generation)	-	-	C
Reactive energy Tariff 1 and 2	-	-	C

⁽⁵⁾ Maximum display value: by display = 99999999 MWh, by communications = 3.402×10^{38} kWh.

Harmonic distortion rate (THD) is defined as the ratio between the RMS value of the harmonic content of the voltage and/or current and the value of the fundamental component:

$$THD(V) = \frac{U_H}{U_1} \times 100(\%) \quad U_H = \sqrt{\sum_{h=2}^{\infty} (U_h)^2}$$

Equation 1: Voltage THD.

$$THD(I) = \frac{I_H}{I_1} \times 100(\%) \quad I_H = \sqrt{\sum_{h=2}^{\infty} (I_h)^2}$$

Equation 2: Current THD.

4.2.- DISPLAY

The device has a 3-line, 4-digit LCD display divided into 2 zones:

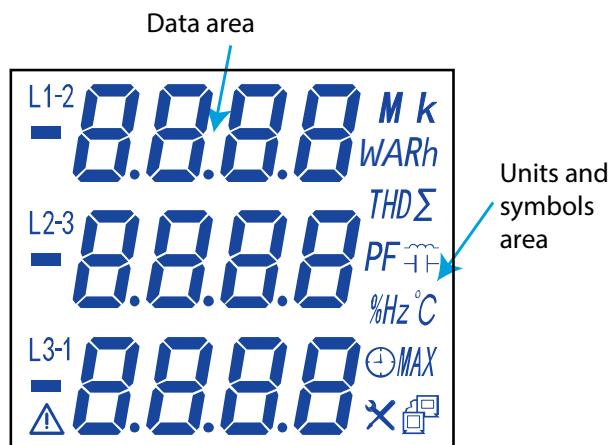


Figure 11: Display CVM-C4.

- ✓ The **data area**, which displays all the values measured by the device.
- ✓ The **units and symbols area**, which displays the different statuses, units and device information (**Table 10**).

Table 10: Display icons.

Icon	Description	Icon	Description
	Inductive		Configuration screen
	Capacitive		RS-485 communications: - Flashing: RS-485 communications OK - Not flashing: RS-485 communications error
	Indicates that the value is total for the Active Power, Reactive Power, Apparent Power and Power Factor parameters.		
	The voltage in the measurement system is unbalanced, see Table 11 .		

Table 11: Unbalanced system alarm.

Measurement system		Description
n_{34}	✓	The phase angle between U_1 and U_2 is $< 110^\circ$ or $> 130^\circ$ The phase angle between U_2 and U_3 is $< 110^\circ$ or $> 130^\circ$ Note: The phase angle is 120° when the voltages are balanced.
n_{33}	✓	The phase angle between U_{12} and U_{32} is $< 290^\circ$ or $> 310^\circ$. Note: The phase angle is 300° when the voltages are balanced.
R_{ron}	✓	The phase angle between U_{12} and U_{32} is $< 290^\circ$ or $> 310^\circ$. Note: The phase angle is 300° when the voltages are balanced.
n_{23}	✓	The phase angle between U_1 and U_2 is $< 170^\circ$ or $> 190^\circ$. Note: The phase angle is 180° when the voltages are balanced.
n_{12}	-	-

4.3.- KEYBOARD FUNCTIONS

The CVM-C4 has 3 keys that allow you to browse through and program the device, **Table 12** and **Table 13**.

- ✓ Display screens:

Table 12: Keyboard function: Display screens.

Key	Keystroke
	Previous screen.
	Next screen.
	Long keystroke (> 3s): Accesses the configuration menu

- ✓ Configuration screens:

Table 13: Keyboard function: Configuration screens.

Key	Keystroke
	Browses through the different menu screens. Browses through the different options.
	Browses through the different menu screens. Browses through the different options.
	Skips to the next configuration menu. Changes the digit's value. Long keystroke (> 3s): Enables the value's configuration Validates the configuration parameter

4.4.- RELAY OUTPUTS

The device features two programmable relay outputs (terminals 15, 16 and 17 in **Figure 12**) that can be programmed as remote control signals or alarms in the configuration menu ("6.3.- RELAY OUTPUT 1" and "6.4.- RELAY OUTPUT 2").

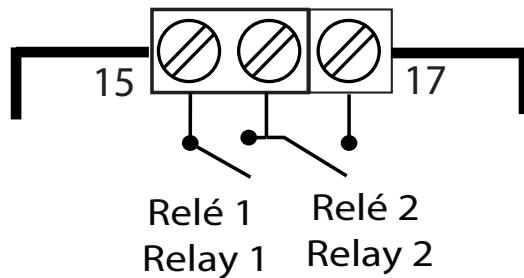


Figure 12: Relay outputs

4.5.- ENERGY IMPULSE OUTPUTS

The device features energy impulse outputs (terminals 47, 48, 49 and 50 in **Figure 13**).

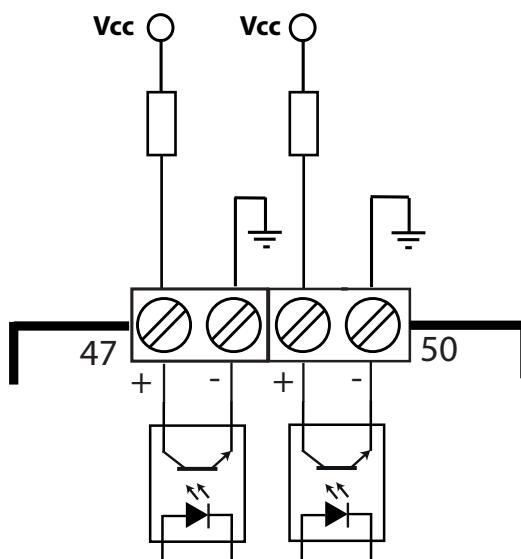


Figure 13: Energy impulse outputs

The type of energy impulses is selected in section "6.5.1.- ENERGY ACCUMULATION MODE".

If option 49 is selected, the device generates:

- ✓ Impulse output 1 (terminals 47 and 48): Active energy impulses consumed (positive).
- ✓ Impulse output 2 (terminals 49 and 50): Active energy impulses generated (negative).

If option 2E is selected, the device generates:

- ✓ Impulse output 1 (terminals 47 and 48): Active energy impulses consumed (positive) in tariff 1.
- ✓ Impulse output 2 (terminals 49 and 50): Active energy impulses consumed (positive) in tariff 2.

The impulse output ratio is set to **5000 imp / kWh**, that is, when the device accumulates an energy of

1 kWh, 5000 impulses exit the impulse output.

We have to consider that in relation to this ratio the energy is calculated by the device, taking into account the programmed voltage and current transformation ratios.

Thus, the actual energy can be calculated as:

$$\text{Actual Energy} = N * \frac{1\text{kWh}}{5000 \text{ impulses}} * R_V * R_c$$

Where:

N: No. of impulses.

R_V: Voltage ratio, ratio between primary and secondary voltage.

$$R_V = \frac{Pt1}{Pt2}$$

R_c: Current ratio, ratio between primary and secondary current.

$$R_c = \frac{Ct1}{Ct2}$$

Note: The device calculates and displays the active and reactive energy, but the energy impulse output is only active energy.

4.6.- DIGITAL INPUTS

The device has two digital inputs (terminals 70, 71 and 72 in Figure 14). The relay outputs can be activated depending on the value of the digital inputs (see "6.3.- RELAY OUTPUT 1" and "6.4.- RELAY OUTPUT 2").

If the energy accumulation mode programmed is **2E** ("6.5.1.- ENERGY ACCUMULATION MODE") digital input 1,DI1, is used to change the tariff:

- ✓ DI1 open: tariff 1.
- ✓ DI1 closed: tariff 2.

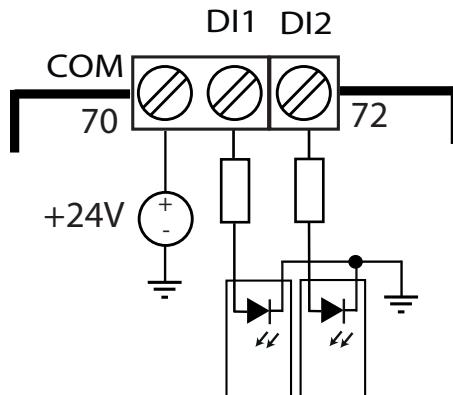


Figure 14: Digital inputs.

5.- DISPLAY

The CVM-C4 has up to 24 display screens depending on the measurement system, see "6.1.1.- MEASUREMENT SYSTEM".

5.1.- SINGLE-PHASE NETWORK MEASURING (Measurement system: □ 12)

The CVM-C4 has 15 display screens in the single-phase network measurement system, **Table 14**.

Use the keys < and > to browse through the different screens.

The display screens can change automatically depending on the time programmed in the section "6.5.2.- CYCLIC DISPLAY".

The initial display screen, i.e. the first screen displayed when feeding the device or when exiting the configuration menu, can be programmed in section "6.5.4.- INITIAL DISPLAY SCREEN".

Table 14: Display menu: Single-phase network measuring

Display menu: Single-phase network measuring	
Voltage (V / kV) ⁽⁶⁾	 220.0 V
Current (A / kA) ⁽⁷⁾	 5.0 10 A
Frequency (Hz)	 50.00 Hz

⁽⁶⁾ For values of V ≥ 9000, the device automatically switches the units to kV.

⁽⁷⁾ For values of A ≥ 9000, the device automatically switches the units to kA.

Table 14 (Continued). Display menu: Single-phase network measuring

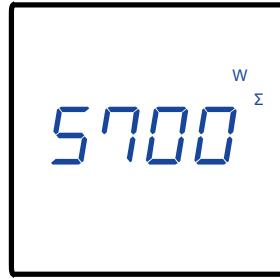
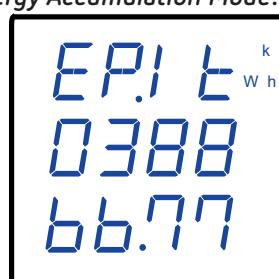
Display menu: Single-phase network measuring	
	
Active Power (W)	
	
Reactive power (var)	
	
Apparent power (VA)	
	
Power factor	
Energy Accumulation Mode: 49	
Total positive active energy (kWh)	
Energy Accumulation Mode: 2L	
Total positive active energy, Tariff 1(kWh)	

Table 14 (Continued). Display menu: Single-phase network measuring

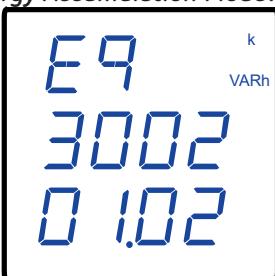
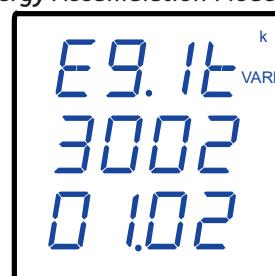
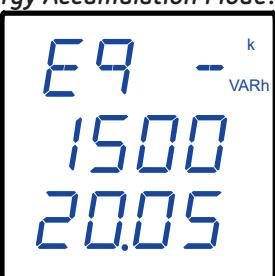
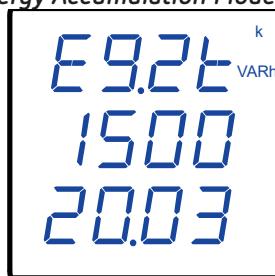
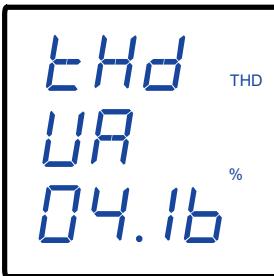
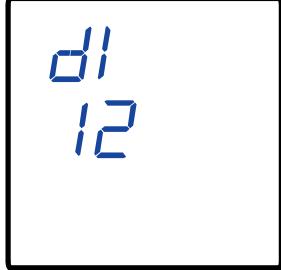
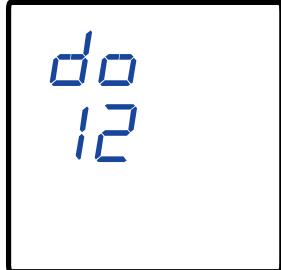
Display menu: Single-phase network measuring	
<p>Energy Accumulation Mode: 4₉</p> 	<p>Energy Accumulation Mode: 2_L</p> 
Total negative active energy (kWh)	Total positive active energy, Tariff 2 (kWh)
<p>Energy Accumulation Mode: 4₉</p> 	<p>Energy Accumulation Mode: 2_L</p> 
Total positive reactive energy (kvarh)	Total positive reactive energy, Tariff 1 (kvarh)
<p>Energy Accumulation Mode: 4₉</p> 	<p>Energy Accumulation Mode: 2_L</p> 
Total negative reactive energy (kvarh)	Total positive reactive energy, Tariff 2 (kvarh)
Voltage THD	
Current THD	

Table 14 (Continued). Display menu: Single-phase network measuring

Display menu: Single-phase network measuring	
	<p>Status of digital inputs 1, status of digital input 1: flashes when the input has been activated. 2, status of digital input 2: flashes when the input has been activated.</p>
	<p>Status of relay outputs 1, status of relay output 1: flashes when the relay has been activated. 2, status of relay output 2: flashes when the relay has been activated.</p>

If the input voltage or current value higher than a % of the nominal value, the device can make the digits on the display start flashing, in the form of a light alarm. See "**6.5.6.- LIGHT ALARM**"

Note: If a display screen shows **FFFF**, check the programming of the transformation ratios.

5.2.- THREE-PHASE NETWORK MEASURING WITH 4-WIRE (Measurement system: n34)

The CVM-C4 has 24 display screens in the three-phase network measurement system with a 4-wire connection, **Table 15**.

Use the keys **<** and **>** to browse through the different screens.

The display screens can change automatically depending on the time programmed in the section "**6.5.2.- CYCLIC DISPLAY**".

The initial display screen, i.e. the first screen displayed when feeding the device or when exiting the configuration menu, can be programmed in section "**6.5.4.- INITIAL DISPLAY SCREEN**".

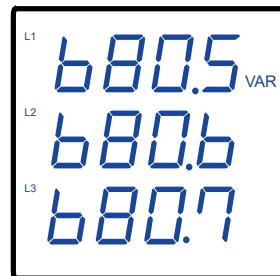
Table 15: Display menu: Three-phase network measuring with 4-wire connection.

Display menu: Three-phase network measuring with 4-wire connection.	
L1	220.6 V
L2	220.7
L3	220.8
Phase-Neutral Voltage (V / kV) ⁽⁸⁾	
L1-2	380.0 V
L2-3	380.1
L3-1	380.3
Phase-Phase Voltage (V / kV) ⁽⁸⁾	
L1	5.0 11 A
L2	5.0 12
L3	5.0 13
Current (A / kA) ⁽⁹⁾	
50.00 Hz	
Frequency (Hz)	
L1	570.1 W
L2	570.3
L3	570.4
Active power per phase (W)	

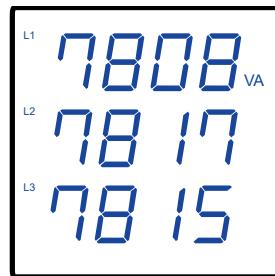
⁽⁸⁾ For values of $V \geq 9000$, the device automatically switches the units to kV.⁽⁹⁾ For values of $A \geq 9000$, the device automatically switches the units to kA.

Table 15 (Cont.). Display menu: Three-phase network measuring with 4-wire connection.

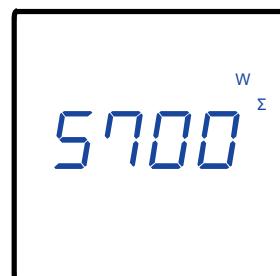
Display menu: Three-phase network measuring with 4-wire connection.



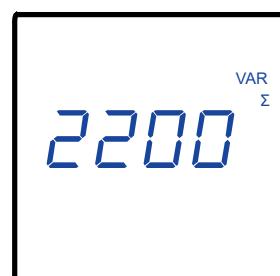
Reactive power per phase (var)



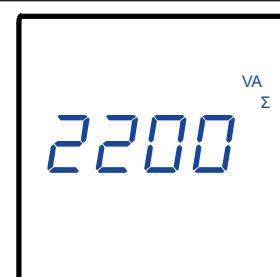
Apparent power per phase (VA)



Total Active Power (W)



Total Reactive Power (var)



Total Apparent Power (VA)

Table 15 (Cont.). Display menu: Three-phase network measuring with 4-wire connection.

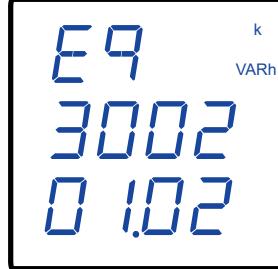
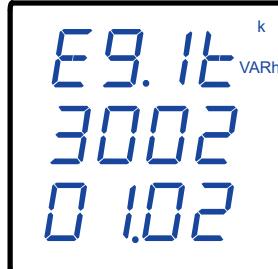
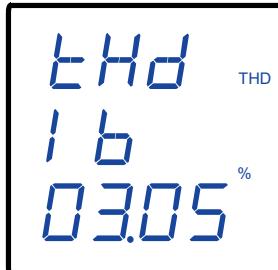
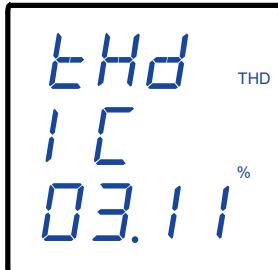
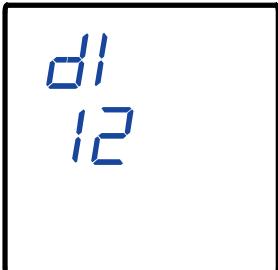
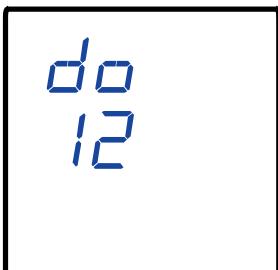
Display menu: Three-phase network measuring with 4-wire connection.	
 <p>L1 0.932 L2 0.931 L3 0.930</p> <p>Power factor per phase</p>	
 <p>Σ 0.980 PF</p> <p>Total Power Factor</p>	
<p>Energy Accumulation Mode: 49</p>  <p>EP 0388 66.77</p> <p>Total positive active energy (kWh)</p>	<p>Energy Accumulation Mode: 2E</p>  <p>EP1 E 0388 66.77</p> <p>Total positive active energy, Tariff 1 (kWh)</p>
<p>Energy Accumulation Mode: 49</p>  <p>EP - 1620 03.00</p> <p>Total negative active energy (kWh)</p>	<p>Energy Accumulation Mode: 2E</p>  <p>EP.2E 1620 03.00</p> <p>Total positive active energy, Tariff 2 (kWh)</p>
<p>Energy Accumulation Mode : 49</p>  <p>E9 3002 0.102</p> <p>Total positive reactive energy (kvarh)</p>	<p>Energy Accumulation Mode : 2E</p>  <p>E9.1E 3002 0.102</p> <p>Total positive reactive energy, Tariff 1 (kvarh)</p>

Table 15 (Continued). Display menu: Three-phase network measuring with 4-wire connection.

Display menu: Three-phase network measuring with 4-wire connection.	
Energy Accumulation Mode: 4 φ	Energy Accumulation Mode: 2 φ
<p>Total negative reactive energy (kvarh)</p>	<p>Total positive reactive energy, Tariff 2 (kvarh)</p>
<p>THD Voltage L1</p>	
<p>THD Voltage L2</p>	
<p>THD Voltage L3</p>	
<p>THD Current L1</p>	

Table 15 (Cont.). Display menu: Three-phase network measuring with 4-wire connection.

Display menu: Three-phase network measuring with 4-wire connection.	
	
THD Current L2	
	
THD Current L3	
	
Status of digital inputs	
	1, status of digital input 1: flashes when the input has been activated. 2, status of digital input 2: flashes when the input has been activated.
	
Status of relay outputs:	
	1, status of relay output 1: flashes when the relay has been activated. 2, status of relay output 2: flashes when the relay has been activated.

If the input voltage or current value is higher than a % of the nominal value, the device can make the digits on the display start flashing, in the form of a light alarm. See "6.5.6.- LIGHT ALARM"

Note: If a display screen shows **FFFF**, check the programming of the transformation ratios.

5.3 THREE-PHASE NETWORK MEASURING WITH A 3-WIRE (Measurement system: n33,Ron)

The CVM-C4 has 18 display screens in the three-phase network measurement system with a 3-wire connection, **Table 16**.

Use the keys **<** and **>** to browse through the different screens.

The display screens can change automatically depending on the time programmed in the section "**6.5.2.- CYCLIC DISPLAY**".

The initial display screen, i.e. the first screen displayed when feeding the device or when exiting the configuration menu, can be programmed in section "**6.5.4.- INITIAL DISPLAY SCREEN**".

Table 16: Display menu: Three-phase network measuring with 3-wire connection.

Display menu: Three-phase network measuring with 3-wire connection.	
	<p>L1-2 380.0 V L2-3 380.1 L3-1 380.3</p>
Phase-Phase Voltage (V / kV) ⁽¹⁰⁾	
	<p>L1 5.0 11 A L2 5.0 12 L3 5.0 13</p>
Current (A / kA) ⁽¹¹⁾	
	<p>50.00 Hz</p>
Frequency (Hz)	
	<p>5700 W Σ</p>
Total Active Power (W)	

⁽¹⁰⁾ For values of V \geq 9000, the device automatically switches the units to kV.

⁽¹¹⁾ For values of A \geq 9000, the device automatically switches the units to kA.

Table 16 (Cont.): Display menu: Three-phase network measuring with 3-wire connection.

Display menu: Three-phase network measuring with 3-wire connection.	
	<p>2200 VAR Σ</p>
Total Reactive Power. (var)	
	<p>2200 VA Σ</p>
Total Apparent Power (VA)	
	<p>0.980 PF Σ</p>
Total Power Factor	
Energy Accumulation Mode: 49	Energy Accumulation Mode: 2E
<p>EP 0388 bb.77</p>	<p>EPI. E 0388 bb.77</p>
Total positive active energy (kWh)	Total positive active energy, Tariff 1 (kWh)
Energy Accumulation Mode: 49	Energy Accumulation Mode: 2E
<p>EP - 1620 03.00</p>	<p>EP.2E 1620 03.00</p>
Total negative active energy (kWh)	Total positive active energy, Tariff 2 (kWh)

Table 16 (Continued): Display menu: Three-phase network measuring with 3-wire connection.

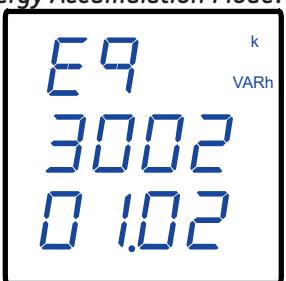
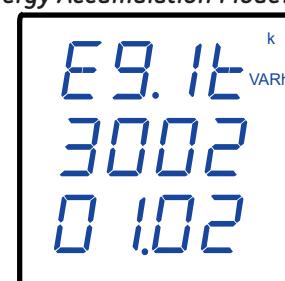
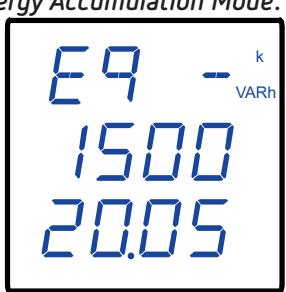
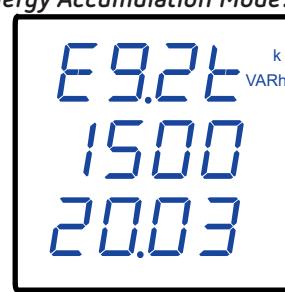
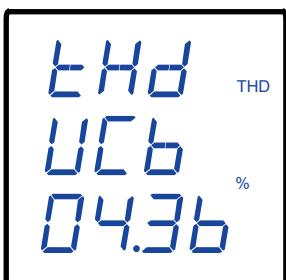
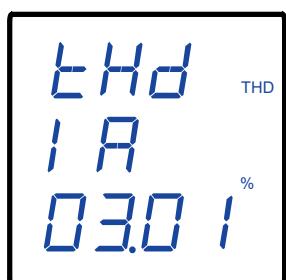
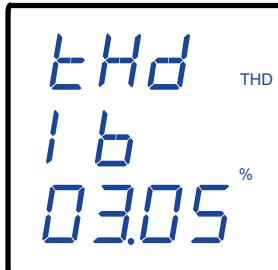
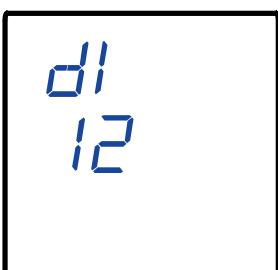
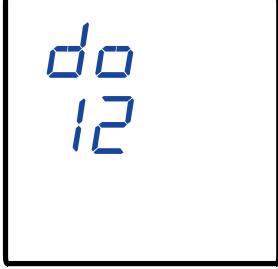
Display menu: Three-phase network measuring with 3-wire connection.	
Energy Accumulation Mode: 4 ^q 	Energy Accumulation Mode: 2 ^L 
Total positive reactive energy (kvarh)	Total positive reactive energy, Tariff 1 (kvarh)
Energy Accumulation Mode: 4 ^q 	Energy Accumulation Mode: 2 ^L 
Total negative reactive energy (kvarh)	Total positive reactive energy, Tariff 2 (kvarh)
THD Voltage L1-L2 	THD Voltage L3-L1 
THD Current L1 	

Table 16 (Cont.). Display menu: Three-phase network measuring with 3-wire connection.

Display menu: Three-phase network measuring with 3-wire connection.	
	
THD Current L2	
	
THD Current L3	
	
Status of digital inputs	
	
Status of relay outputs	

If the input voltage or current value is higher than a % of the nominal value, the device can make the digits on the display start flashing, in the form of a light alarm. See "**6.5.6.- LIGHT ALARM**"

Note: If a display screen shows **FFFF**, check the programming of the transformation ratios.

5.4.- TWO-PHASE NETWORK MEASURING WITH A 3-WIRE (Measurement system: n23)

Note: This connection is available from version 100H of the device.

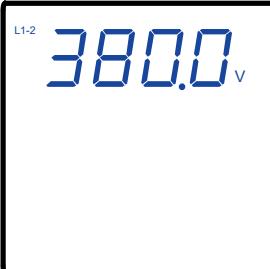
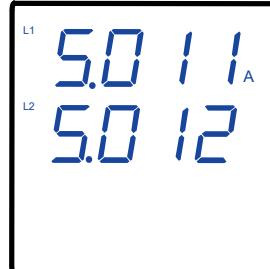
The CVM-C4 has 22 display screens in the two-phase network measurement system with a 3-wire connection, Table 17.

Use the keys **<** and **>** to browse through the different screens.

The display screens can change automatically depending on the time programmed in the section "6.5.2.- CYCLIC DISPLAY".

The initial display screen, i.e. the first screen displayed when feeding the device or when exiting the configuration menu, can be programmed in section "6.5.4.- INITIAL DISPLAY SCREEN".

Table 17: Display menu: Two-phase network measuring with 3-wire connection.

Display menu: Two-phase network measuring with 3-wire connection.
 <p>Phase-Neutral Voltage (V / kV)⁽¹²⁾</p>
 <p>Phase-Phase Voltage (V / kV)⁽¹²⁾</p>
 <p>Current (A / kA)⁽¹³⁾</p>

⁽¹²⁾ For values of V ≥ 9000, the device automatically switches the units to kV.

⁽¹³⁾ For values of A ≥ 9000, the device automatically switches the units to kA.

Table 17 (Cont.). Display menu: Two-phase network measuring with 3-wire connection.

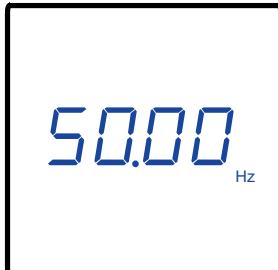
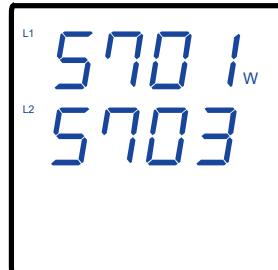
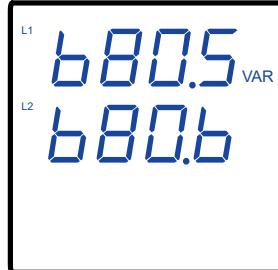
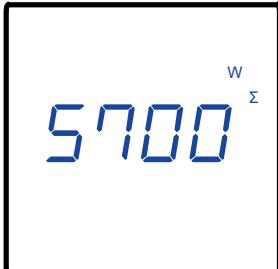
Display menu: Two-phase network measuring with 3-wire connection.	
Frequency (Hz)	 50.00 Hz
Active power per phase (W)	 L1 5701 W L2 5703
Reactive power per phase (var)	 L1 680.5 VAR L2 680.6
Apparent power per phase (VA)	 L1 7808 VA L2 7817
Total Active Power (W)	 5700 W Σ

Table 17 (Cont.). Display menu: Two-phase network measuring with 3-wire connection.

Display menu: Two-phase network measuring with 3-wire connection.



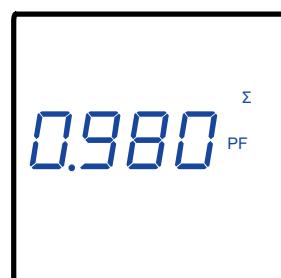
Total Reactive Power. (var)



Total Apparent Power (VA)



Power factor per phase



Total Power Factor

Energy Accumulation Mode: 49



Total positive active energy (kWh)

Energy Accumulation Mode: 2L



Total positive active energy, Tariff 1 (kWh)

Table 17 (Continued). Display menu: Two-phase network measuring with 3-wire connection.

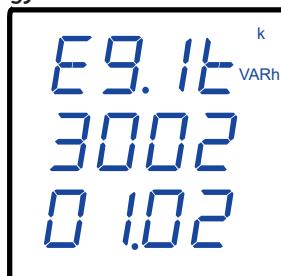
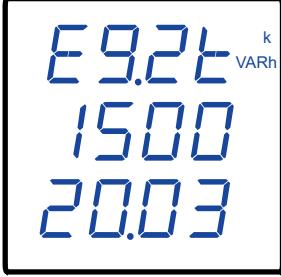
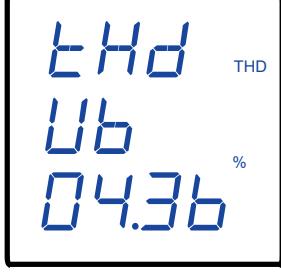
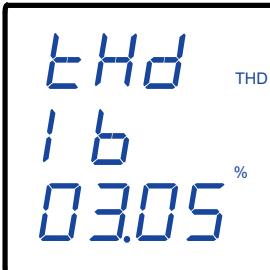
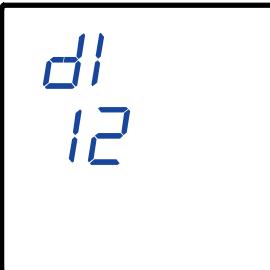
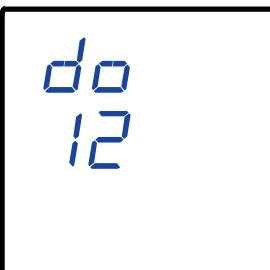
Display menu: Two-phase network measuring with 3-wire connection.	
Energy Accumulation Mode: 49 	Energy Accumulation Mode: 2E 
Total negative active energy (kWh)	Total positive active energy, Tariff 2 (kWh)
Energy Accumulation Mode : 49 	Energy Accumulation Mode : 2E 
Total positive reactive energy (kvarh)	Total positive reactive energy, Tariff 1 (kvarh)
Energy Accumulation Mode: 49 	Energy Accumulation Mode: 2E 
Total negative reactive energy (kvarh)	Total positive reactive energy, Tariff 2 (kvarh)
THD Voltage L1 	THD Voltage L2 

Table 17 (Cont.). Display menu: Two-phase network measuring with 3-wire connection.

Display menu: Two-phase network measuring with 3-wire connection.	
	
THD Current L1	
	
THD Current L2	
Status of digital inputs	
<i>1</i> , status of digital input 1: flashes when the input has been activated. <i>2</i> , status of digital input 2: flashes when the input has been activated.	
Status of relay outputs:	
<i>1</i> , status of relay output 1: flashes when the relay has been activated. <i>2</i> , status of relay output 2: flashes when the relay has been activated.	

If the input voltage or current value is higher than a % of the nominal value, the device can make the digits on the display start flashing, in the form of a light alarm. See "**6.5.6.- LIGHT ALARM**"

Note: If a display screen shows **FFFF**, check the programming of the transformation ratios.

6.- CONFIGURATION

Press and hold the  key for more than 3 seconds to enter the device's configuration menu. The device's configuration is organised in different menus, **Figure 15**.

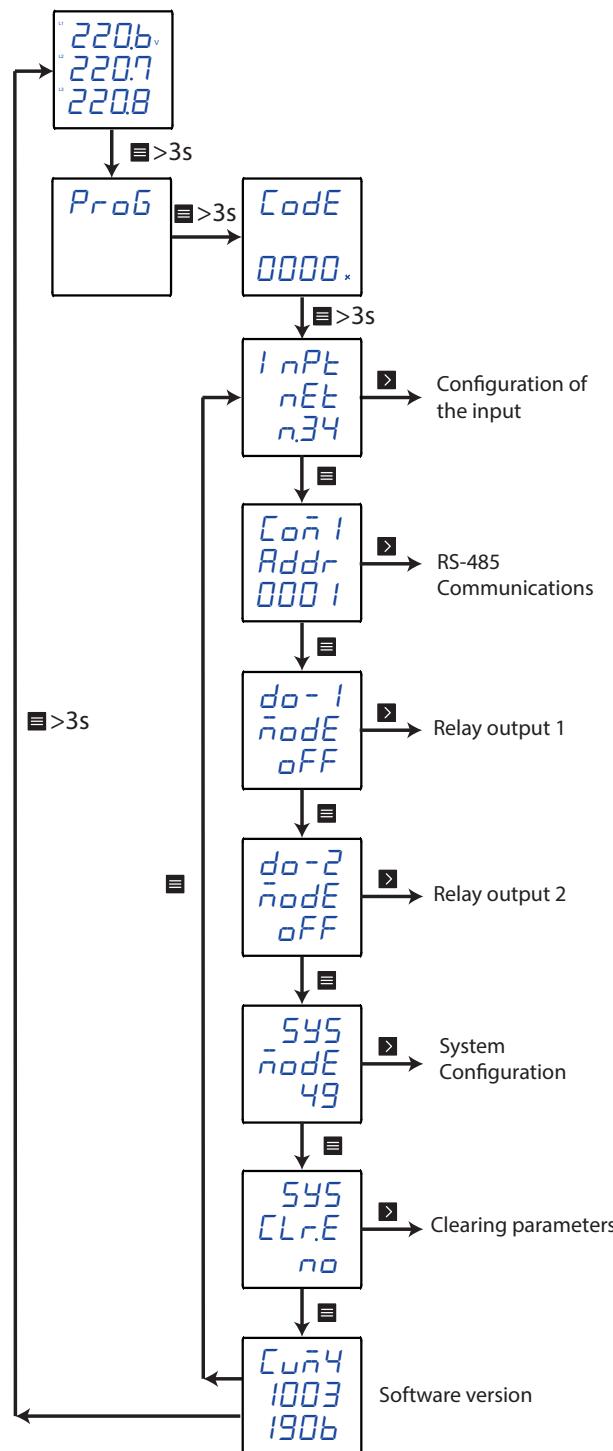


Figure 15: CVM-C4 configuration menu.

From any screen of the configuration menus, if no key is pressed for 1 minute, the device leaves the configuration menu and returns to the display screen.

Note: In "ANNEX A.- CONFIGURATION MENU" you can see the complete configuration menu.

Before accessing the configuration menu, it is necessary to enter the access password.

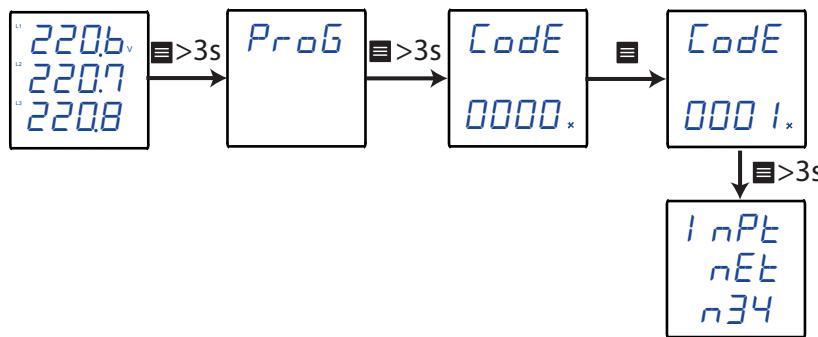


Figure 16: Access to the configuration menu in the programming mode.

Use the key to modify the value of the flashing digit.

When the desired value is shown on the screen, press the and keys to skip the digit.

Default password: 0001

Note: The password can be modified, see "6.5.5.- ACCESS PASSWORD".

With a long keystroke (>3s), press to validate the data.

If the password entered is incorrect, the message will appear for a few seconds and the device will return to the password configuration screen, Figure 16.

6.1.- CONFIGURATION OF THE INPUT

Figure 17 shows the input configuration menu from which the measurement system and the primary and secondary current and voltage are configured.

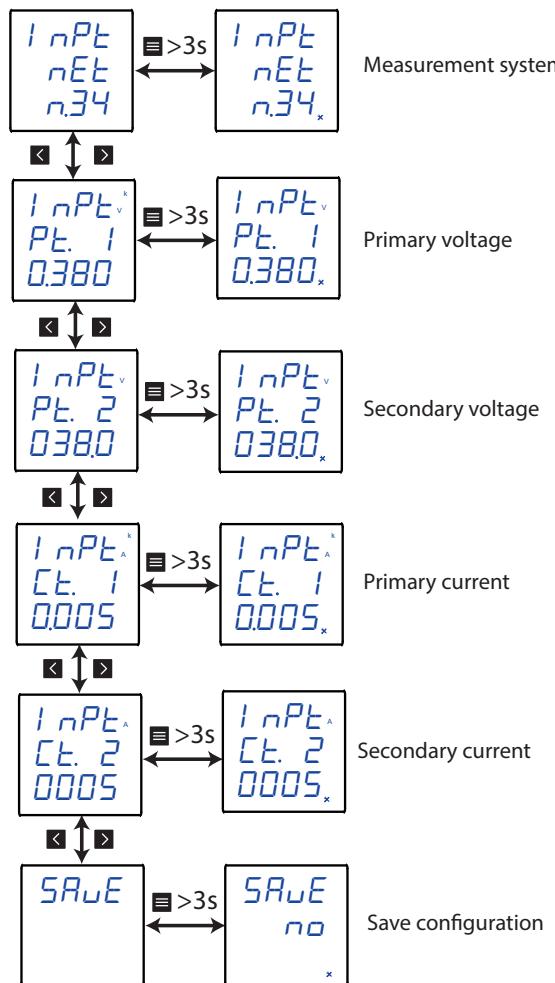
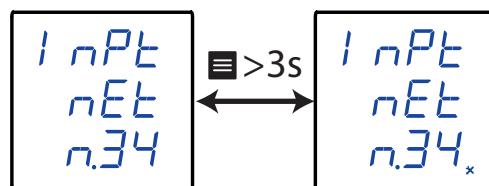


Figure 17: Input configuration menu

6.1.1.- MEASUREMENT SYSTEM

In this screen we can configure the measurement system used in the installation.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

n.34, three-phase network measuring with 4-wire connection.

n.33, three-phase network measuring with 3-wire connection.

Aron, three-phase network measuring with 3-wire connection and transformers in Aron

connection. (This connection is available from version 100J of the device.).

▫. **I₂**, single-phase measuring.

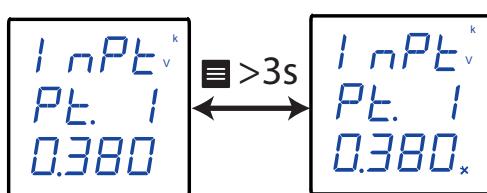
▫. **I₂₃**, two-phase network measuring with 3-wire connection. (This connection is available from version 100H of the device.)

With a long keystroke, press  to validate the option.

Use the keys  and  to browse through the menu screens.

6.1.2.- PRIMARY VOLTAGE

This screen is used to configure the value of the primary voltage.



With a long keystroke (>3s), press  to access the value's configuration.

Use the key  to modify the value of the flashing digit.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

When you reach the last digit and press the  key, you select the position of the decimal point. Use the key  to modify the decimal point.

Minimum configuration value: 0.001 kV

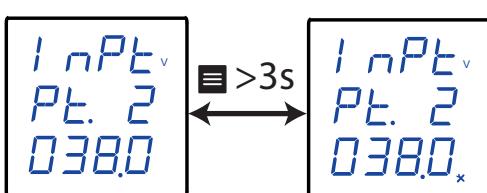
Maximum configuration value: 100 kV

With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.1.3.- SECONDARY VOLTAGE

This screen is used to configure the value of the secondary voltage.



With a long keystroke (>3s), press  to access the value's configuration.

Use the key  to modify the value of the flashing digit.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

Minimum configuration value: 0.1 V

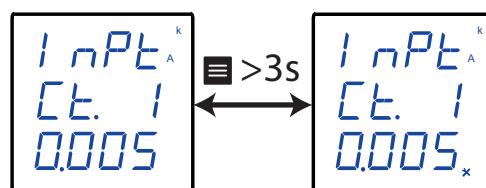
Maximum configuration value: 699.0 V

With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.1.4.- PRIMARY CURRENT

This screen is used to configure the value of the primary current.



With a long keystroke (>3s), press  to access the value's configuration.

Use the key  to modify the value of the flashing digit.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

When you reach the last digit and press the  key, you select the position of the decimal point. Use the key  to modify the decimal point.

Minimum configuration value: 0.001 kA

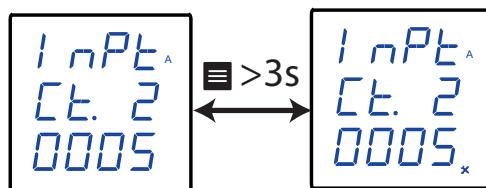
Maximum configuration value: 20 kA

With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.1.5.- SECONDARY CURRENT

This screen is used to configure the value of the secondary current.



With a long keystroke (>3s), press  to access the value's configuration.

Use the key  to modify the value of the flashing digit.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

Minimum configuration value: 1 A

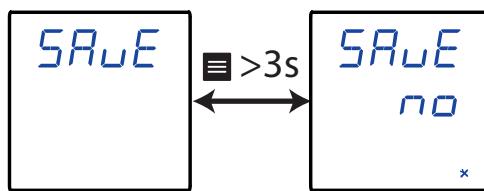
Maximum configuration value: 6 A

With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.1.6.- SAVE CONFIGURATION

This screen is used to save the device's configuration.



With a long keystroke (>3s), press  to access the value's configuration.

Use the keys  and  to browse through the different options:

no, to not save the configuration.

YES, to save the configuration.

With a long keystroke, press  to validate the option. The device skips to the main screen of the next configuration menu.

6.2.- RS-485 COMMUNICATIONS

Figure 18 shows the main screen of the communications menu, where the parameters of the RS-485 communications are configured.

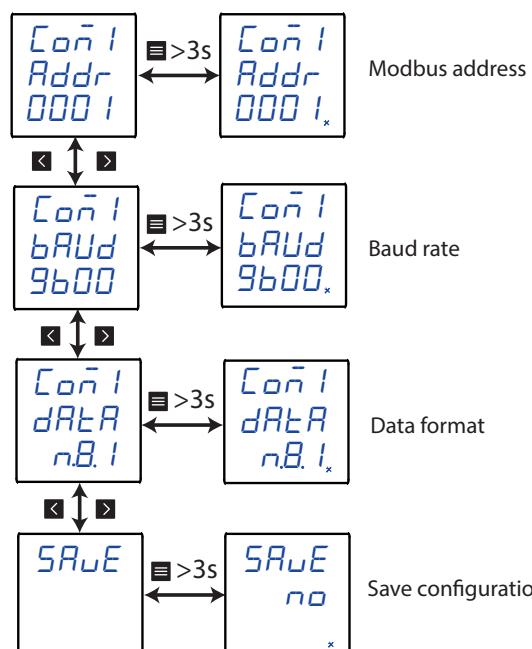
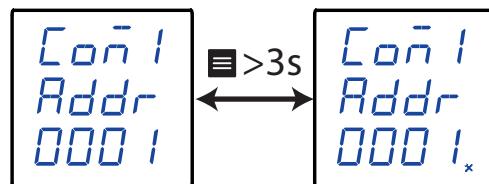


Figure 18: RS-485 communications configuration menu.

6.2.1.- MODBUS ADDRESS

This screen is used to configure the device's modbus address.



With a long keystroke (>3s), press to access the value's configuration.

Use the key to modify the value of the flashing digit.

When the desired value is shown on the screen, press the and keys to skip the digit.

Minimum configuration value: 1

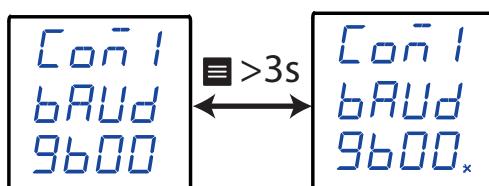
Maximum configuration value: 247

With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.2.2.- BAUD RATE

In this screen, the baud rate of the RS-485 communications is selected.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

1200, 1200 bps.

2400, 2400 bps.

4800, 4800 bps.

9600, 9600 bps.

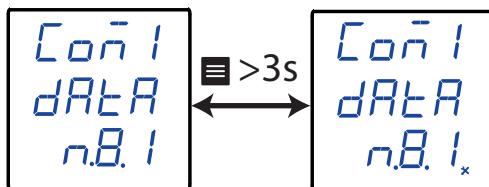
19200, 19200 bps.

With a long keystroke, press to validate the option.

Use the keys and to browse through the menu screens.

6.2.3.- DATA FORMAT

This screen is used to configure the data format.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

n.B. 1, no parity, 8 data bits, 1 stop bit

E.B. 1, even parity, 8 data bits, 1 stop bit

o.B. 1 odd parity, 8 data bits, 1 stop bit

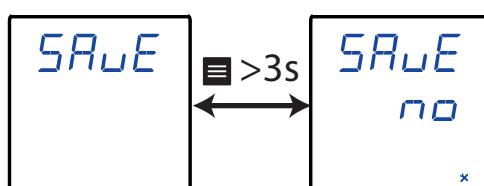
n.B. 2, no parity, 8 data bits, 2 stop bit

With a long keystroke, press to validate the option.

Use the keys and to browse through the menu screens.

6.2.4.- SAVE CONFIGURATION

This screen is used to save the device's configuration.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

no, to not save the configuration.

YES, to save the configuration.

With a long keystroke, press to validate the option. The device skips to the main screen of the next configuration menu.

6.3.- RELAY OUTPUT 1

Figure 19 shows the configuration menu of relay output 1.

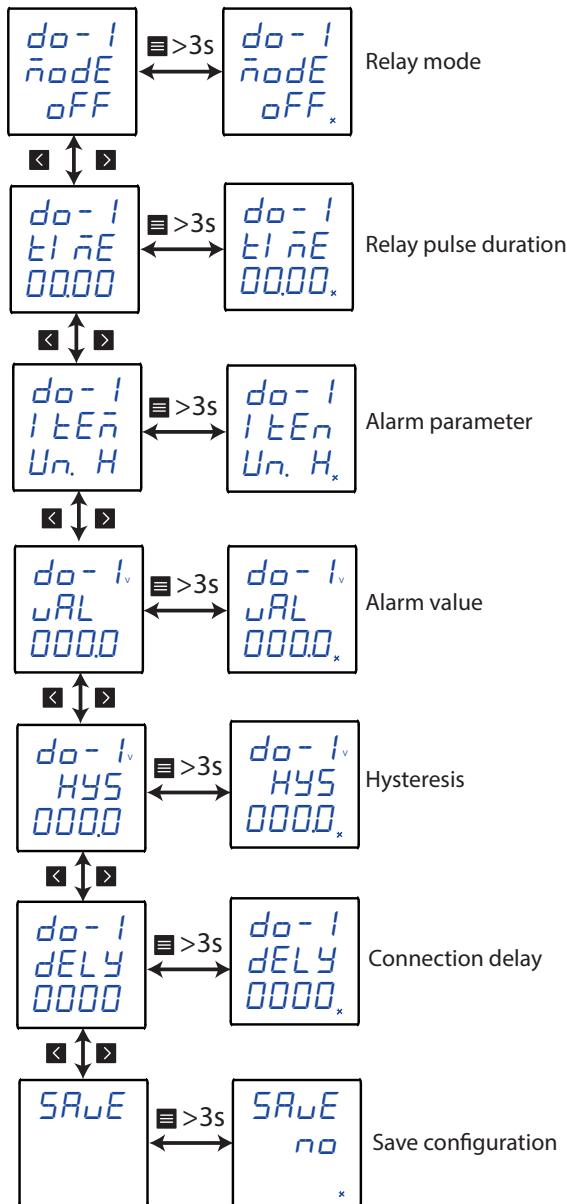
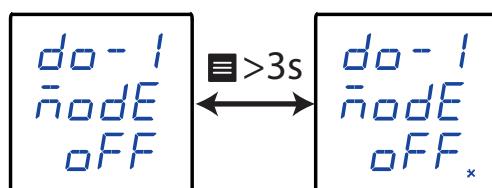


Figure 19: Configuration menu of relay output 1.

6.3.1.- RELAY MODE

This screen is used to configure the operating mode of relay 1.



With a long keystroke (>3s), press to access the value's configuration.
Use the keys **<** and **>** to browse through the different options:

OFF, relay output 1 is disabled.

rEn, remote control output.

ALr, alarm output.

With a long keystroke, press  to validate the option.

Use the keys  and  to browse through the menu screens.

6.3.2.- RELAY PULSE DURATION

Note: Visible variable if the relay operating mode has been configured as a remote control output or alarm output.

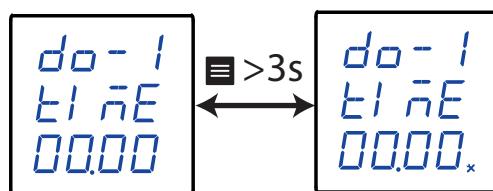
The alarm relay can behave in 2 different ways:

1 .- The relay is activated when the alarm is triggered and is deactivated when the alarm is deactivated.

2 .- The relay is activated when the alarm is triggered and is deactivated after a programmed period of time, even though the alarm condition has not been cancelled.

This screen is used to configure the programmed time, i.e., the relay pulse duration.

To make the relay operate in mode **No. 1**, program the value to **0**.



With a long keystroke (>3s), press  to access the value's configuration.

Use the key  to modify the value of the flashing digit.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

Minimum configuration value: 00.00 s

Maximum configuration value: 99.99 s

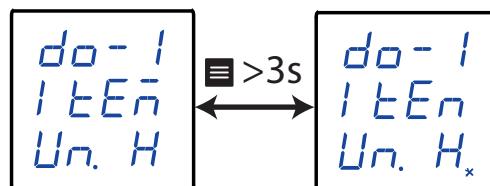
With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.3.3.- ALARM PARAMETER

Note: Visible variable if the relay operating mode has been configured as an alarm output.

This screen is used to configure the parameter on which the alarm will be activated.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

- Un. H*, Active alarm when the Phase - Neutral voltage is higher than the alarm value
- Un. L*, Active alarm when the Phase - Neutral voltage is lower than the alarm value
- UL. H*, Active alarm when the Phase - Phase voltage is higher than the alarm value
- UL. L*, Active alarm when the Phase - Phase voltage is lower than the alarm value
- I . H*, Active alarm when the current is higher than the alarm value
- I . L*, Active alarm when the current is lower than the alarm value
- P. H*, Active alarm when the total active power is higher than the alarm value.
- P. L*, Active alarm when the total active power is lower than the alarm value
- Q. H*, Active alarm when the total reactive power is higher than the alarm value.
- Q. L*, Active alarm when the total reactive power is lower than the alarm value.
- S. H*, Active alarm when the total apparent power is higher than the alarm value.
- S. L*, Active alarm when the total apparent power is lower than the alarm value.
- PF. H*, Active alarm when the power factor is higher than the alarm value.
- PF. L*, Active alarm when the power factor is lower than the alarm value.
- F. H*, Active alarm when the frequency is higher than the alarm value.
- F. L*, Active alarm when the frequency is lower than the alarm value.
- UETH.H*, Active alarm when the THD voltage is higher than the alarm value.
- UETH.L*, Active alarm when the THD voltage is lower than the alarm value.
- IETH.H*, Active alarm when the THD current is higher than the alarm value.
- IETH.L*, Active alarm when the THD current is lower than the alarm value.
- d1 - 1*, Active alarm when digital input 1 is connected.
- d1 - 0*, Active alarm when digital input 1 is disconnected.
- d2 - 1*, Active alarm when digital input 2 is connected.
- d2 - 0*, Active alarm when digital input 2 is disconnected.

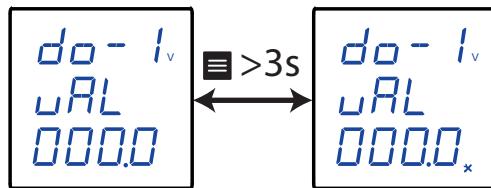
With a long keystroke, press to validate the option.

Use the keys and to browse through the menu screens.

6.3.4.- ALARM VALUE

Note: Visible variable if the relay operating mode has been configured as an alarm output. Not visible if the alarm parameter is the digital inputs ($d1 = 1, d1 = 0, d2 = 1, d2 = 0$).

The display value after which the alarm will be activated is configured on this screen.



With a long keystroke (>3s), press to access the value's configuration.

When the desired value is shown on the screen, press the and keys to skip the digit.

When you reach the last digit and press the key, you select the position of the decimal point. Use the key to modify the decimal point.

If you press again the key, the following units are selected: V, KV, MV

Minimum configuration value:

0.000 V, For alarm parameters: $U_n. H, U_n. L, UL. H$ and $UL. L$

0.000 A, For alarm parameters: $I. H$ and $I. L$

0.000 W, For alarm parameters: $P. H$ and $P. L$

0.000 var, For alarm parameters: $Q. H$ and $Q. L$

0.000 VA, For alarm parameters: $S. H$ and $S. L$

-1.000, For alarm parameters: $PF. H$ and $PF. L$

00.00 Hz, For alarm parameters: $F. H$ and $F. L$

00.00%, For alarm parameters: $UEH.H, UEH.L, IEH.H$ and $IEH.L$

Maximum configuration value:

9999 MV, For alarm parameters: $U_n. H, U_n. L, UL. H$ and $UL. L$

9999 MA, For alarm parameters: $I. H$ and $I. L$

9999 MW, For alarm parameters: $P. H$ and $P. L$

9999 Mvar, For alarm parameters: $Q. H$ and $Q. L$

9999 MVA, For alarm parameters: $S. H$ and $S. L$

1.000, For alarm parameters: $PF. H$ and $PF. L$

99.99 Hz, For alarm parameters: $F. H$ and $F. L$

99.99%, For alarm parameters: $UEH.H, UEH.L, IEH.H$ and $IEH.L$

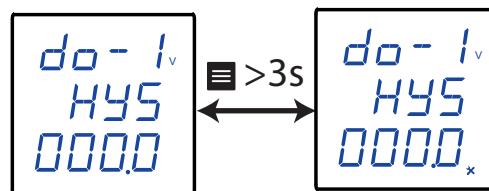
With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.3.5.- HYSTERESIS

Note: Visible variable if the relay operating mode has been configured as an alarm output. Not visible if the alarm parameter is the digital inputs ($d1 - I$, $d1 - 0$, $d2 - I$, $d2 - 0$).

This screen is used to configure the hysteresis value, i.e., the difference between the alarm connection and disconnection value.



With a long keystroke (>3s), press to access the value's configuration.

When the desired value is shown on the screen, press the and keys to skip the digit.

When you reach the last digit and press the key, you select the position of the decimal point. Use the key to modify the decimal point.

If you press again the key, the following units are selected: V, kV, MV

Minimum configuration value:

0.000 V, For alarm parameters: $U_{n.} . H$, $U_{n.} . L$, $UL . H$ and $UL . L$

0.000 A, For alarm parameters: $I . H$ and $I . L$

0.000 W, For alarm parameters: $P . H$ and $P . L$

0.000 var, For alarm parameters: $Q . H$ and $Q . L$

0.000 VA, For alarm parameters: $S . H$ and $S . L$

-1.000, For alarm parameters: $PF . H$ and $PF . L$

00.00 Hz, For alarm parameters: $F . H$ and $F . L$

00.00%, For alarm parameters: $UEH.H$, $UEH.L$, $IEH.H$ and $IEH.L$

Maximum configuration value:

9999 MV, For alarm parameters: $U_{n.} . H$, $U_{n.} . L$, $UL . H$ and $UL . L$

9999 MA, For alarm parameters: $I . H$ and $I . L$

9999 MW, For alarm parameters: $P . H$ and $P . L$

9999 Mvar, For alarm parameters: $Q . H$ and $Q . L$

9999 MVA, For alarm parameters: $S . H$ and $S . L$

1.000, For alarm parameters: $PF . H$ and $PF . L$

99.99 Hz, For alarm parameters: $F . H$ and $F . L$

99.99%, For alarm parameters: $UEH.H$, $UEH.L$, $IEH.H$ and $IEH.L$

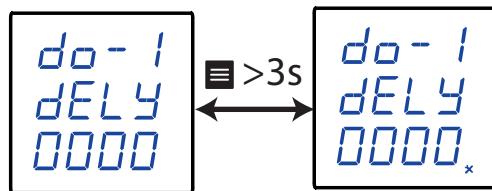
With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.3.6.- CONNECTION DELAY

Note: Visible variable if the relay operating mode has been configured as an alarm output.

This screen is used to configure the alarm connection delay



With a long keystroke (>3s), press to access the value's configuration.

When the desired value is shown on the screen, press the and keys to skip the digit.

Minimum configuration value: 00.00 s

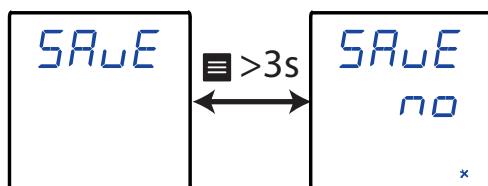
Maximum configuration value: 99.99 s

With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.3.7.- SAVE CONFIGURATION

This screen is used to save the device's configuration.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

no, to not save the configuration.

YES, to save the configuration.

With a long keystroke, press to validate the option. The device skips to the main screen of the next configuration menu.

6.4.- RELAY OUTPUT 2

The configuration of relay output 2 is the same as for alarm relay 1, see "6.3.- RELAY OUTPUT 1".

6.5.- SYSTEM CONFIGURATION

Figure 20 shows the system configuration menu.

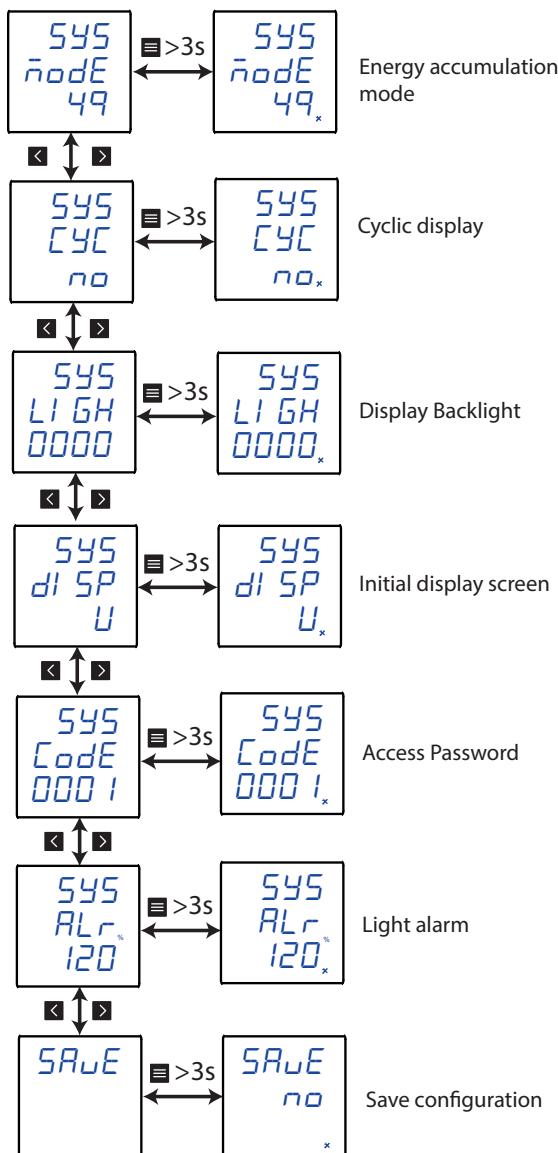
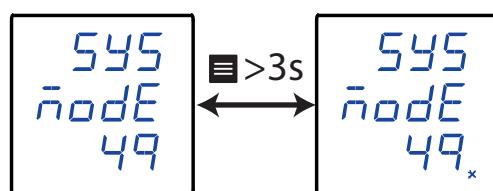


Figure 20: System configuration menu.

6.5.1.- ENERGY ACCUMULATION MODE

This screen is used to configure the type of energy accumulation performed by the device.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

49, the active and reactive energy accumulate in consumption and generation.

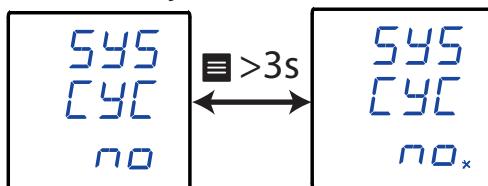
2E, the active and reactive energy accumulate in consumption (positive). Tariffs 1 and 2 are displayed for each of them.

With a long keystroke, press  to validate the option.

Use the keys  and  to browse through the menu screens.

6.5.2.- CYCLIC DISPLAY

The display screens can change automatically or not.



With a long keystroke (>3s), press  to access the value's configuration.

Use the keys  and  to browse through the different options:

no, the cyclic display is not activated.

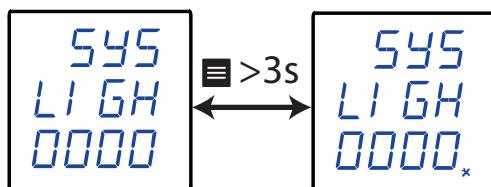
YES, the cyclic display is activated; the display screen changes every 3 s.

With a long keystroke, press  to validate the option.

Use the keys  and  to browse through the menu screens.

6.5.3.- DISPLAY BACKLIGHT

The time that the display backlight will stay lit in seconds if no key is pressed is programmed on this screen.



With a long keystroke (>3s), press  to access the value's configuration.

When the desired value is shown on the screen, press the  and  keys to skip the digit.

Minimum configuration value: 0 s.

Maximum configuration value: 255 s.

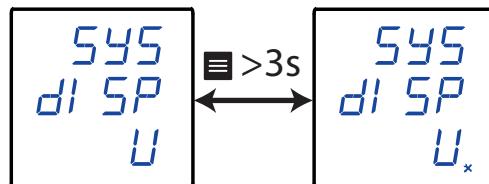
Note: If the value 0 is programmed, the display backlight is not turned off.

With a long keystroke, press  to validate the data.

Use the keys  and  to browse through the menu screens.

6.5.4.- INITIAL DISPLAY SCREEN

In this section the initial display screen is configured.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

U, voltage screen.

I, current screen.

F, frequency screen.

P, power screen.

PF, power factor screen.

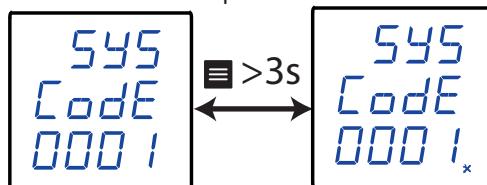
EP, energy screen.

With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.5.5.- ACCESS PASSWORD

This screen is used to configure the value of the password used to access the configuration menu.



With a long keystroke (>3s), press to access the value's configuration.

When the desired value is shown on the screen, press the and keys to skip the digit.

Minimum configuration value: 0

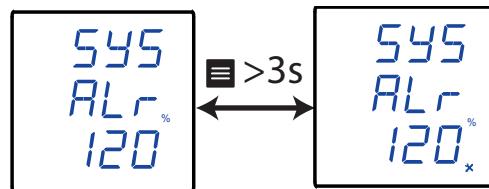
Maximum configuration value: 9999

With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.5.6.- LIGHT ALARM

If the device's input voltage or current value is higher than a % of the nominal value, the device can make the digits on the display start flashing, in the form of a light alarm.



With a long keystroke (>3s), press to access the value's configuration.

When the desired value is shown on the screen, press the and keys to skip the digit.

Minimum configuration value: 1%

Maximum configuration value: 180%

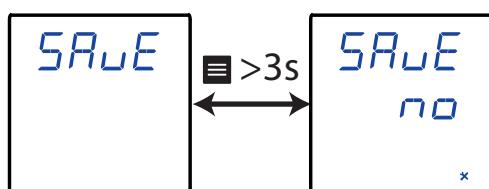
Note: If the value 0 is programmed, the light alarm will be deactivated.

With a long keystroke, press to validate the data.

Use the keys and to browse through the menu screens.

6.5.7.- SAVE CONFIGURATION

This screen is used to save the device's configuration.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

, to not save the configuration.

, to save the configuration.

With a long keystroke, press to validate the option. The device skips to the main screen of the next configuration menu.

6.6.- CLEARING PARAMETERS

Figure 21 shows the configuration menu for clearing parameters.

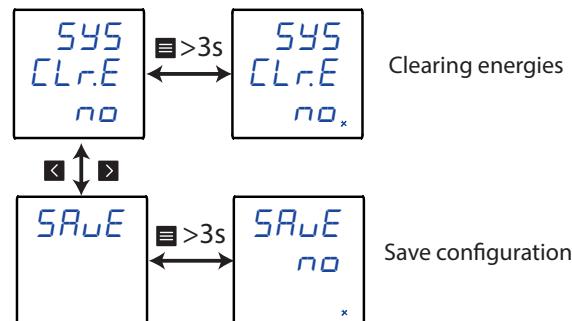
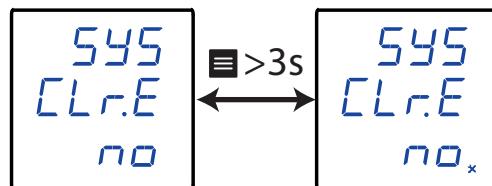


Figure 21: Configuration menu for clearing parameters.

6.6.1.- CLEARING ENERGIES

This screen is used to configure clearing or not energy parameters.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

no, the energy parameters are not deleted.

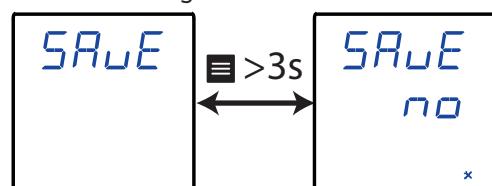
YES, the energy parameters are deleted.

With a long keystroke, press to validate the option.

Use the keys and to browse through the menu screens.

6.6.2.- SAVE CONFIGURATION

This screen is used to save the device's configuration.



With a long keystroke (>3s), press to access the value's configuration.

Use the keys and to browse through the different options:

no, to not save the configuration.

YES, to save the configuration.

With a long keystroke, press to validate the option. The device skips to the main screen of the next configuration menu.

7.- RS-485 COMMUNICATIONS

The CVM-C4 devices have an RS-485 communications port, with communications protocol: MODBUS RTU®.

7.1.- CONNECTIONS

The RS-485 cable must be wired using twisted pair cable with mesh shield, leaving a maximum distance between the CVM-C4 and the master device of 1200 metres .
A maximum of 32 CVM-C4 devices can be connected to this bus.

To establish the communications with the master device, we must use a smart RS-232 to RS-485 network protocol converter.

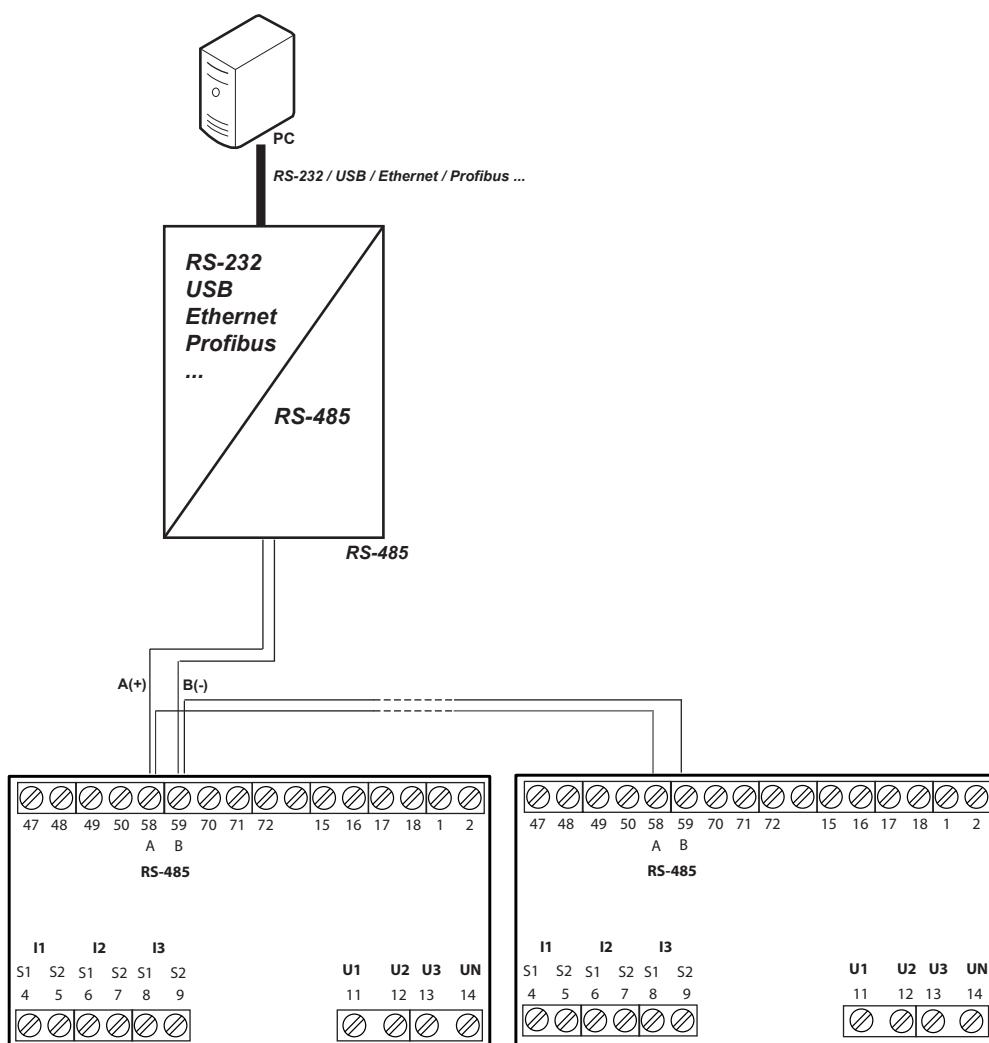


Figure 22: RS-485 connection diagram.

Note: Default values of the RS-485 communication: 19200 bps, No parity, 8 data bits and 1 stop bit.

7.2.- MODBUS PROTOCOL

In the Modbus protocol, the **CVM-C4** device uses the RTU (Remote Terminal Unit) mode. The Modbus functions implemented in the device are as follows:

Function 0x01: Reading a relay.

Function 0x02: Reading input status.

Function 0x03 and 0x04: Reading integer registers.

Function 0x05: Writing a relay.

Function 0x0F: Writing multiple relays.

Function 0x10: Writing multiple registers.

7.2.1. READING EXAMPLE: FUNCTION 0x01.

Question: Status of output relays

Address	Function	Initial register	No. of registers	CRC
01	01	0000	0002	BDCB

Address: 01, Peripheral number 1 in decimal.

Function: 01, Read function.

Initial Register: 0000, register on which you want the reading to start.

Nº of registers: 0002, number of registers to read.

CRC: BDCB, CRC character.

Response:

Address	Function	No. of bytes	Register no. 1:	CRC
01	01	01	03	1189

Address: 01, Responding peripheral number: 1 in decimal.

Function: 01, Read function.

No. of Bytes: 01, No. of bytes received.

Register: 03, in binary it is: 0000 0011, output relays 1 and 2 closed.

CRC: 1189, CRC character.

7.2.2. EXAMPLE OF OPERATION OF THE REMOTE CONTROL: FUNCTION 0x05.

Question: Activate the output of relay 1, programmed to work in remote control mode.

Address	Function	Initial Register	Relay action	CRC
01	05	0000	FF00	8C3A

Address: 01, Peripheral number: 1 in decimal.

Function: 05, Writing a relay

Initial Register: 0000, relay 1 address.

Relay action: FF00, We indicate that we want to close the relay.

CRC: 8C3A, CRC Character.

Response:

Address	Function	Initial Register	Relay action	CRC
01	05	0000	FF00	8C3A

7.3.- MODBUS COMMANDS

7.3.1 .- MEASUREMENT VARIABLES AND DEVICE STATUS

All Modbus map addresses are in Hexadecimal format.

Function 0x03 and **0x04** are implemented for these variables.

Table 18: Modbus Memory Map (Table 1)

Measurement Variables			
Parameter	Format	Address	Units
Phase-Neutral Voltage L1	float	06 - 07	V
Phase-Neutral Voltage L2	float	08 - 09	V
Phase-Neutral Voltage L3	float	0A - 0B	V
Phase L1 - Phase L2 Voltage	float	0C - 0D	V
Phase L2 - Phase L3 Voltage	float	0E - 0F	V
Phase L3 - Phase L1 Voltage	float	10 - 11	V
Current L1	float	12 - 13	A
Current L2	float	14 - 15	A
Current L3	float	16 - 17	A
Active Power L1	float	18 - 19	kW
Active Power L2	float	1A - 1B	kW
Active Power L3	float	1C - 1D	kW
Total Active Power	float	1E - 1F	kW
Reactive Power L1	float	20 - 21	kvar
Reactive Power L2	float	22 - 23	kvar
Reactive Power L3	float	24 - 25	kvar
Total Reactive Power	float	26 - 27	kvar
Apparent Power L1	float	28 - 29	kVA
Apparent Power L2	float	2A - 2B	kVA
Apparent Power L3	float	2C - 2D	kVA
Total Apparent Power	float	2E - 2F	kVA
Power factor L1	float	30 - 31	-
Power factor L2	float	32 - 33	-
Power factor L3	float	34-35	-
Total Power Factor	float	36 - 37	-
Frequency	float	38 - 39	Hz
Positive active energy ⁽¹⁴⁾	float	3A - 3B	kWh
Negative active energy ⁽¹⁴⁾	float	3C - 3D	kWh
Positive reactive energy ⁽¹⁴⁾	float	3E - 3F	kvarh
Negative reactive energy ⁽¹⁴⁾	float	40 - 41	kvarh
Positive active energy Tariff 1 ⁽¹⁵⁾	float	42 - 43	kWh

Table 18 (Continued). Modbus Memory Map (Table 1)

Parameter	Format	Address	Units
Positive active energy Tariff 2 ⁽¹⁵⁾	float	44 - 45	kWh
Positive reactive energy, Tariff 1 ⁽¹⁵⁾	float	46 - 47	kvarh
Positive reactive energy, Tariff 2 ⁽¹⁵⁾	float	48 - 49	kvarh

⁽¹⁴⁾ Parameters available for the 49 Energy Accumulation Mode.

⁽¹⁵⁾ Parameters available for the 2E Energy Accumulation Mode.

Table 19: Modbus Memory Map (Table 2)

Measurement Variables			
Parameter	Format	Address	Units
Phase-Neutral Voltage L1	int	4E	0.1 V
Phase-Neutral Voltage L2	int	4F	0.1 V
Phase-Neutral Voltage L3	int	50	0.1 V
Phase L1 - Phase L2 Voltage	int	51	0.1 V
Phase L2 - Phase L3 Voltage	int	52	0.1 V
Phase L3 - Phase L1 Voltage	int	53	0.1 V
Current L1	int	54	0.001 A
Current L2	int	55	0.001 A
Current L3	int	56	0.001 A
Active Power L1	int	57	W
Active Power L2	int	58	W
Active Power L3	int	59	W
Total Active Power	int	5A	W
Reactive Power L1	int	5B	var
Reactive Power L2	int	5C	var
Reactive Power L3	int	5D	var
Total Reactive Power	int	5E	var
Apparent Power L1	int	5F	VA
Apparent Power L2	int	60	VA
Apparent Power L3	int	61	VA
Total Apparent Power	int	62	VA
Power factor L1	int	63	0,001
Power factor L2	int	64	0,001
Power factor L3	int	65	0,001
Total Power Factor	int	66	0,001
Frequency	int	67	0.01 Hz
Positive active energy ⁽¹⁶⁾	long	6A - 6B	Wh
Negative active energy ⁽¹⁶⁾	long	6C - 6D	Wh
Inductive reactive energy ⁽¹⁶⁾	long	6E - 6F	varh
Capacitive reactive energy ⁽¹⁶⁾	long	70 - 71	varh
Apparent energy ⁽¹⁶⁾	long	72 - 73	VAh
First quadrant of Reactive energy ⁽¹⁶⁾	long	74 - 75	varh
Second quadrant of Reactive energy ⁽¹⁶⁾	long	76 - 77	varh
Third quadrant of Reactive energy ⁽¹⁶⁾	long	78 - 79	varh
Fourth quadrant of Reactive energy ⁽¹⁶⁾	long	7A - 7B	varh
Positive active energy Tariff 1 ⁽¹⁷⁾	long	7C - 7D	Wh

Table 19 (Continued). Modbus Memory Map (Table 2)

Parameter	Format	Address	Units
Positive active energy Tariff 2 ⁽¹⁶⁾	long	7E - 7F	Wh
Positive reactive energy, Tariff 1 ⁽¹⁷⁾	long	80 - 81	Wh
Positive reactive energy, Tariff 2 ⁽¹⁷⁾	long	82 - 83	Wh

⁽¹⁶⁾ Parameters available for the 49 Energy Accumulation Mode.

⁽¹⁷⁾ Parameters available for the 2E Energy Accumulation Mode.

Note: The values in Table 19 correspond to the values measured by the device with no transformation ratios applied.

Table 20: Modbus Memory Map (Table 3)

THD values			
Parameter	Format	Address	Units
THD Voltage L1	int	244	0.01 %
THD Voltage L2	int	245	0.01 %
THD Voltage L3	int	246	0.01 %
THD Current L1	int	247	0.01 %
THD Current L2	int	248	0.01 %
THD Current L3	int	249	0.01 %

Table 21: Modbus Memory Map (Table 4)

Status of outputs and inputs		
Parameter	Format	Address
Status of relay outputs	int	4A
Status of digital inputs	int	4B

The parameter format **Status of relay outputs and Digital inputs** is shown in Table 22:

Table 22: Variable format: Status of relay outputs and digital inputs.

Bit 15 ... 2	Bit 1	Bit 0
0	Relay 2 / Digital input 2 1: Closed 0: Open	Relay 1 / Digital input 1 1: Closed 0: Open

7.3.2.- OUTPUT RELAYS

All the addresses of Modbus memory are in Hexadecimal.

For these variables is implemented the **Function 0x01, 0x05 and 0x0F**.

Table 23: Modbus Memory Map (Table 5)

Parameter	Format	Address
Output relays	bit	0000

The format of the parameter is shown in Table 24:

Table 24: Variable format: Output relays.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	0	0	0	Relay 2 1: Closed 0: Open	Relay 1 1: Closed 0: Open

7.3.3.- DIGITAL INPUTS

All the addresses of Modbus memory are in Hexadecimal.
For these variables is implemented the **Function 0x02**.

Table 25: Modbus Memory Map (Table 6)

Parameter	Format	Address
Digital inputs	bit	0000

The format of the parameter is shown in **Table 26**:

Table 26: Variable format: Digital inputs.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	0	0	0	Digital input 2 1: Closed 0: Open	Digital input 1 1: Closed 0: Open

7.3.4.- REMOTE CONTROL OUTPUT (Relay output)

All the addresses of Modbus memory are in Hexadecimal.
For these variables is implemented the **Function 0x05**:

Table 27: Modbus Memory Map (Table 7)

Parameter	Format	Address	Value
Remote control, Relay output 1	bit	0000	0000: Open FF00: Closed
Remote control, Relay output 2	bit	0001	0000: Open FF00: Closed

Function 0x0F, multiple relay control:

Table 28: Modbus Memory Map (Table 8)

Parameter	Format	Address
Remote control	bit	0000

The format of the parameter is shown in **Table 29**:

Table 29: Variable format: Remote control.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	0	0	0	Relay 2 1: Closed 0: Open	Relay 1 1: Closed 0: Open

7.3.5.- DEVICE CONFIGURATION VARIABLES

All Modbus map addresses are in Hexadecimal format. **Function 0x10** is implemented for this variable.

7.3.5.1. Input configuration

Table 30: Modbus Memory Map: Input configuration

Input configuration			
Variable	Format	Address	Valid data range
Measurement system	int	808	0: n.34, three-phase network measuring with 4-wire. 1: n.33, three-phase network measuring with 3-wire. 2: Aron, three-phase network measuring with 3-wire connection and transformers in Aron connection ⁽¹⁸⁾ 3: n.12, single-phase measuring 4: n.23, two-phase network measuring with 3-wire ⁽¹⁹⁾
Primary voltage	long	80E - 80F	0.001 ... 100 kV
Secondary voltage	int	80A	1... 6660 V (0.1V units)
Primary current	long	810 - 811	0.001 ... 20 kA
Secondary current	int	80B	1... 6 A

⁽¹⁸⁾ This connection is available from version 100J of the device.

⁽¹⁹⁾ This connection is available from version 100H of the device.

7.3.5.2. RS-485 Communications

Table 31: Modbus Memory Map: RS-485 Communications

RS-485 Communications			
Variable	Format	Address	Valid data range
Modbus address	int	804	Byte 1: 1... 247
Baud rate			Byte 0: 0: 1200 bps - 1: 2400 bps - 2: 4800 bps - 3: 9600 bps - 4: 19200 bps
Data format	int	805	Byte 1: 0: n,8,1 : no parity, 8 data bits, 1 stop bit 1: e,8,1 : even parity, 8 data bits, 1 stop bit 2: o,8,1 : odd parity, 8 data bits, 1 stop bit 3: n,8,2 : no parity, 8 data bits, 2 stop bit

7.3.5.3. Relay Outputs

Table 32: Modbus Memory Map: Relay Outputs

Relay outputs			
Variable	Format	Address	Valid data range
Relay 1 mode	int	81A	0: Output is disabled 1: Alarm output 2: Remote control output
Relay 2 mode	int	822	
Relay 1 pulse duration	int	81B	00,00 ⁽²⁰⁾ ... 99.99 s
Relay 2 pulse duration	int	823	

Table 32 (Continued): Modbus Memory Map: Relay Outputs.

Relay outputs			
Variable	Format	Address	Valid data range
Relay 1 alarm parameter	int	81C	<p>0: Active alarm when the Phase - Neutral voltage is higher than the alarm value ($U_n . H$).</p> <p>1: Active alarm when the Phase - Neutral voltage is lower than the alarm value ($U_n . L$).</p> <p>2: Active alarm when the Phase - Phase voltage is higher than the alarm value ($U_L . H$).</p> <p>3: Active alarm when the Phase - Phase voltage is lower than the alarm value ($U_L . L$).</p> <p>4: Active alarm when the current is higher than the alarm value ($I . H$).</p> <p>5: Active alarm when the current is lower than the alarm value ($I . L$).</p> <p>6: Active alarm when the active power is higher than the alarm value ($P . H$).</p> <p>7: Active alarm when the active power is lower than the alarm value ($P . L$).</p> <p>8: Active alarm when the reactive power is higher than the alarm value ($Q . H$).</p> <p>9: Active alarm when the reactive power is lower than the alarm value ($Q . L$).</p> <p>10: Active alarm when the apparent power is higher than the alarm value ($S . H$).</p> <p>11: Active alarm when the apparent power is lower than the alarm value ($S . L$).</p> <p>12: Active alarm when the power factor is higher than the alarm value ($PF . H$).</p> <p>13: Active alarm when the power factor is lower than the alarm value ($PF . L$).</p> <p>14: Active alarm when the frequency is higher than the alarm value ($F . H$).</p> <p>15: Active alarm when the frequency is lower than the alarm value ($F . L$).</p> <p>16: Active alarm when the THD voltage is higher than the alarm value ($U_{TH} . H$).</p> <p>17: Active alarm when the THD voltage is lower than the alarm value ($U_{TH} . L$).</p> <p>18: Active alarm when the THD current is higher than the alarm value ($I_{TH} . H$).</p> <p>19: Active alarm when the THD current is lower than the alarm value ($I_{TH} . L$).</p> <p>20: Active alarm when digital input 1 is connected ($d1 - I$).</p> <p>21: Active alarm when digital input 1 is disconnected ($d1 - D$)</p> <p>22: Active alarm when digital input 2 is connected ($d2 - I$).</p> <p>23: Active alarm when digital input 2 is disconnected ($d2 - D$)</p>
Relay 1 alarm value	float	81D - 81E	See valid data ranges in section "6.3.4.- ALARM VALUE"
Relay 2 alarm value	float	825 - 826	
Relay 1 hysteresis	float	81F - 820	See valid data ranges in section "6.3.5.- HYSTERESIS"
Relay 2 hysteresis	float	827 - 828	

Table 32 (Continued): Modbus Memory Map: Relay Outputs.

Relay outputs			
Variable	Format	Address	Valid data range
Relay 1 connection delay	int	821	
Relay 2 connection delay	int	829	00,00 ... 99.99 s

⁽²⁰⁾ If 00.00 is programmed, the relay is activated when the alarm is triggered and is deactivated when the alarm is deactivated.

7.3.5.4. System configuration

Table 33: Modbus Memory Map: System configuration

System configuration			
Variable	Format	Address	Valid data range
Energy accumulation mode	int	801	0: 49, The active and reactive energy accumulate in consumption and generation 1: 2E, The active and reactive energy accumulate in consumption (positive). Tariffs 1 and 2 are displayed for each of them.
Cyclic display	int	802	Byte 1: 0: Cyclic display activated; the display screen changes every 3 s. 1: Cyclic display deactivated.
Light alarm			Byte 0: 1... 180% ⁽²¹⁾
Initial display screen	int	803	Byte 1: 0: Voltage - 1: Current - 2: Frequency, 3: Power - 4: Power factor 5: Energy - 6: THD
Backlight			Byte 0: 0... 255 s ⁽²²⁾

⁽²¹⁾ If the value 0 is programmed, the light alarm will be deactivated.

⁽²²⁾ If the value 0 is programmed, the display backlight is not turned off.

7.3.5.5. Deleting energy parameters

The energy parameters are deleted using **Función 0x0E**.

The deletion frame is:

Address	Function	Relay address	Password	Reset Outputs	Value	CRC
Address Modbus	0E	AACC	1111	01	FF	xxxx

8.- TECHNICAL FEATURES

AC Power supply ⁽²³⁾		
Rated voltage		80... 270 V ~
Frequency		50 / 60 Hz
Consumption		6... 18 VA
Installation category		CAT III 300V
DC Power supply ⁽²³⁾		
Rated voltage		80... 270 V ___
Consumption		1.5 ... 1.8 W
Installation category		CAT III 300V

⁽²³⁾ Depending on model:

CVM-C4			
Model	Power supply		
	80... 270 V ~	80... 270 V ___	18... 36 V ___
M52706	✓	✓	-
M527060030000	-	-	✓

Voltage measurement circuit	
Rated voltage (Un)	100 ... 277 V _{Ph-N} ~ ± 8 %
Voltage measurement margin	5 ... 120% Un
Frequency measuring margin	45... 65 Hz
Input Impedance	> 1.7 MΩ
Min. voltage measurement (Vstart)	10 V
Overvoltage	1.2 Un continuous, 2 Un Instantaneous (1 min)
Consumption	< 0.2 VA (per phase)
Installation category	Cat III 300V

Current measurement circuit	
Rated current (In)	1 A / 5 A ~
Current measurement margin	1 ... 120% In
Frequency measuring margin	45... 65 Hz
Maximum current, impulse < 1s	100 A
Min. current measurement (Istart)	1 mA
Overcurrent	1.2 In continuous, 10 In Instantaneous (5s)
Consumption	< 0.2 VA (per phase)
Input Impedance	< 20 mΩ
Installation category	Cat III 300V

Accuracy	
Voltage measurement	0.2 %
Current measurement	0.2 %
Frequency measurement	0.1 %
Active and reactive power measurement	0.5 %
Active energy measurement	Class 0.5s (IEC 62053-22)
Reactive energy measurement	Class 2 (IEC 62053-23)

Relay outputs			
Quantity	2		
Contact capacity (resistive)	AC: 5A / 250 V~, DC: 5A / 30 V ==		
Maximum voltage open contacts	277 V~ / 30 V ==		
Maximum current	5 A		
Maximum switching capacity	1385 VA / 150 W		
Electrical life (250 V~ / 5A)	1×10^5		
Mechanical life	5×10^6		
Digital inputs			
Quantity	2		
Type	Potential free contact		
Insulation	3.5kV rms		
Maximum short-circuit current	4 mA		
Maximum voltage in open circuit	30V		
Impulse outputs			
Type	Passive pulse		
Maximum voltage	27 V		
Maximum current	27 mA		
Maximum frequency	10 Hz		
Minimum pulse width	80 mA		
RS-485 Communications			
Communications protocol	Modbus RTU		
Baud rate	2400 - 4800 - 9600 - 19200 bps		
Data bits	8		
Stop bits	1 - 2		
Parity	without, even, odd		
User interface			
Display	LCD		
Keyboard	3 keys		
Environmental Features			
Operating temperature	-10°C ... +60°C		
Storage temperature	-20°C ... +70°C		
Relative humidity (without condensation)	5... 95%		
Maximum altitude	2000 m		
Protection degree	Front: IP54, Rear: IP20		
Pollution degree	2		
Mechanical characteristics			
Terminals			
1, 2, 4... 9, 11...17, 47...50, 58, 59, 70 ... 72	2.5 mm ²	0.5 Nm	Flat (Szs 0.6x3.5)
Dimensions	Figure 23 (mm)		
Weight	265 g.		
Enclosure	pc + abs		

Standards	
Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques. Electrostatic discharge immunity test.	IEC 61000-4-2
Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques. Radiated, radio-frequency, electromagnetic field immunity test.	IEC 61000-4-3
Electromagnetic compatibility (EMC) Part 4-4: Testing and measurement techniques. Electrical fast transient/burst immunity test.	IEC 61000-4-4
Electromagnetic compatibility (EMC) Part 4-5: Testing and measurement techniques. Surge immunity test.	IEC 61000-4-5
Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques. Immunity to conducted disturbances, induced by radio-frequency fields.	IEC 61000-4-6
Electromagnetic compatibility (EMC) Part 4-8: Testing and measurement techniques. Power frequency magnetic field immunity test.	IEC 61000-4-8
Electromagnetic compatibility (EMC) Part 4-11: Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests	IEC 61000-4-11
Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.	IEC 61010-1

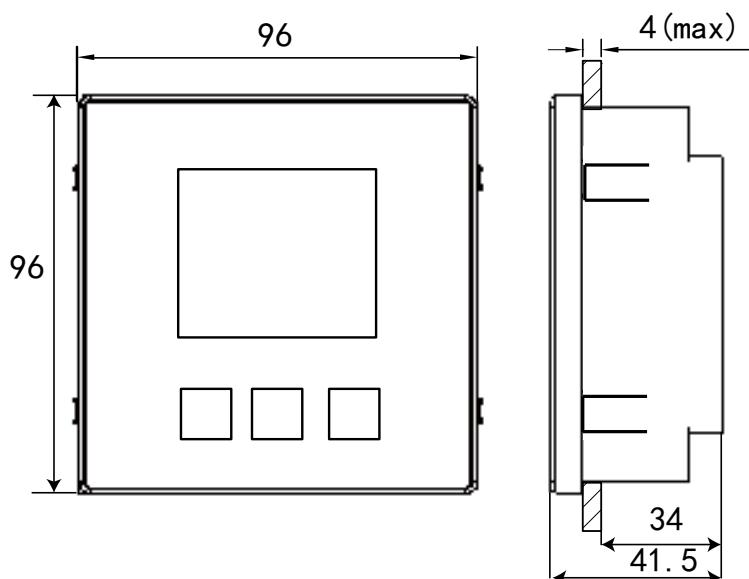


Figure 23: Dimensions of the CVM-C4.

9.- MAINTENANCE AND TECHNICAL SERVICE

In the case of any query in relation to device operation or malfunction, please contact the **CIRCUTOR S.A.U.** Technical Support Service.

Technical Assistance Service

Vial Sant Jordi, s/n, 08232 - Viladecavalls (Barcelona)
Tel: 902 449 459 (Spain) / +34 937 452 919 (outside of Spain)
email: sat@circutor.com

10.- WARRANTY

CIRCUTOR guarantees its products against any manufacturing defect for two years after the delivery of the units.

CIRCUTOR will repair or replace any defective factory product returned during the guarantee period.



- No returns will be accepted and no unit will be repaired or replaced if it is not accompanied by a report indicating the defect detected or the reason for the return.
- The guarantee will be void if the units has been improperly used or the storage, installation and maintenance instructions listed in this manual have not been followed. "Improper usage" is defined as any operating or storage condition contrary to the national electrical code or that surpasses the limits indicated in the technical and environmental features of this manual.
- **CIRCUTOR** accepts no liability due to the possible damage to the unit or other parts of the installation, nor will it cover any possible sanctions derived from a possible failure, improper installation or "improper usage" of the unit. Consequently, this guarantee does not apply to failures occurring in the following cases:
 - Overvoltages and/or electrical disturbances in the supply;
 - Water, if the product does not have the appropriate IP classification;
 - Poor ventilation and/or excessive temperatures;
 - Improper installation and/or lack of maintenance;
 - Buyer repairs or modifications without the manufacturer's authorisation.

11.- EU DECLARATION OF CONFORMITY

CIRCUTOR, SA – Vial Sant Jordi, s/n
08232 Viladecavalls (Barcelona) Spain
(+34) 937 452 900 – info@circutor.com



DECLARACIÓN UE DE CONFORMIDAD

La presente declaración de conformidad se expide bajo la exclusiva responsabilidad de CIRCUTOR con dirección en Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) España

Producto:

Analizadores de redes panel 96x96

Serie:

CVM-C4

Marca:

CIRCUTOR

El objeto de la declaración es conforme con la legislación de armonización pertinente en la UE, siempre que sea instalado, mantenido y usado en la aplicación para la que ha sido fabricado, de acuerdo con las normas de instalación aplicables y las instrucciones del fabricante.

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive
2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Está en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s):

IEC 61010-1:2010+AMD1:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0	IEC 61010-2-030:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0	IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AMD1:2010 Ed 2.1		IEC 61000-6-4:2006+AMD1:2010 Ed 2.1	IEC 61000-6-4:2006+AMD1:2010 Ed 2.1

Año de marcado "CE":

2019



EU DECLARATION OF CONFORMITY

This declaration of conformity is issued under the sole responsibility of CIRCUTOR with registered address at Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Spain

Product:

Power analyzer mounting panel 96 x96

Serie:

CVM-C4

Brand:

CIRCUTOR

The object of the declaration is in conformity with the relevant EU harmonisation legislation, provided that it is installed, maintained and used for the application for which it was manufactured, in accordance with the applicable installation standards and the manufacturer's instructions

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive
2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

It is in conformity with the following standard(s) or other regulatory document(s):

IEC 61010-1:2010+AMD1:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0	IEC 61010-2-030:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0	IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AMD1:2010 Ed 2.1		IEC 61000-6-4:2006+AMD1:2010 Ed 2.1	IEC 61000-6-4:2006+AMD1:2010 Ed 2.1

Il est en conformité avec la(s) suivante(s) norme(s) ou autre(s) document(s) réglementaire(s):

IEC 61010-1:2010+AMD1:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0	IEC 61010-2-030:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0	IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AMD1:2010 Ed 2.1		IEC 61000-6-4:2006+AMD1:2010 Ed 2.1	IEC 61000-6-4:2006+AMD1:2010 Ed 2.1

Year of CE mark:

2019



DÉCLARATION UE DE CONFORMITÉ

La présente déclaration de conformité est délivrée sous la responsabilité exclusive de CIRCUTOR dont l'adresse postale est Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelone) Espagne

Produit:

Analysateurs de réseaux triphasés panneau 96x96

Série:

CVM-C4

Marque:

CIRCUTOR

L'objet de la déclaration est conforme à la législation d'harmonisation pertinente dans l'UE, à condition d'avoir été installé, entreposé et utilisé dans l'application pour laquelle il a été fabriqué, conformément aux normes d'installation applicables et aux instructions du fabricant

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive
2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Il est en conformité avec la(s) suivante(s) norme(s) ou autre(s) document(s) réglementaire(s):

IEC 61010-1:2010+AMD1:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0	IEC 61010-2-030:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0	IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AMD1:2010 Ed 2.1		IEC 61000-6-4:2006+AMD1:2010 Ed 2.1	IEC 61000-6-4:2006+AMD1:2010 Ed 2.1

Année de marquage « CE »: 2019

Viladecavalls (Spain), 18/10/2019
General Manager: Ferran Gil Torné

Circutor

NIF A-08513178
Vial Sant Jordi s/n,
08232 Viladecavalls
Barcelona (Spain)
t. +34 93 745 29 00



KONFORMITÄTSERKLÄRUNG UE

Vorliegende Konformitätserklärung wird unter alleiniger Verantwortung von CIRCUTOR mit der Anschrift, Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Spanien, ausgestellt

Produkt:

Dreiphasen-Leistungsanalyser Schaltfel 96 x96

Serie:

CVM-C4

Markt:

CIRCUTOR

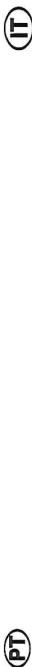
Der Gegenstand der Konformitätserklärung ist konform mit den geltenden Gesetzgebungen zur Harmonisierung der EU, sofern die Installation, Wartung und Verwendung der Anwendung seinem Verwendungszweck entsprechend gemäß den geltenden Installationsstandards und der Vorgaben des „...-VDE-...“-ffl-“

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive 2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Es besteht Konformität mit der/den folgenden Norm/Normen oder sonstigem/sonstiger Regelwerk/Regelwerken

IEC 61010-1:2010+AM01:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AM01:2010 Ed 2.1	

Jahr der CE-Kennzeichnung: 2019



DECLARAÇÃO DA UE DE CONFORMIDADE

A presente declaração de conformidade é expedida sob a exclusiva responsabilidade da CIRCUTOR com morada em Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Espanha

Produto:

Analisadores de redes painel 96 x96

Série:

CVM-C4

Marca:

CIRCUTOR

O objecto da declaração está conforme à legislação de harmonização pertinente na UE, sempre que seja instalado, mantido e utilizado na aplicação para a qual foi fabricado, de acordo com as normas de instalação aplicáveis e as instruções do fabricante.

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive 2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Está em conformidade com as(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s):

IEC 61010-1:2010+AM01:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AM01:2010 Ed 2.1	

Ano de marcação "CE": 2019



DICHIARAZIONE DI CONFORMITÀ UE

La presente dichiarazione di conformità viene rilasciata sotto la responsabilità esclusiva di CIRCUTOR, con sede in Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcellona) Spagna

prodotto:

Analizzatori di reti pannello 96 x96

Serie:

CVM-C4

MARCHIO:

CIRCUTOR

L'oggetto della dichiarazione è conforme alla pertinente normativa di armonizzazione dell'Unione Europea, condizione che venga installato, mantenuto e utilizzato nell'ambito dell'applicazione per cui è stato prodotto, secondo le norme di installazione applicabili e le istruzioni del produttore.

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive 2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

È conforme alle seguenti normative o altri documenti normativi:

IEC 61010-1:2010+AM01:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AM01:2010 Ed 2.1	

Anno di marcatura "CE": 2019

Viladecavalls (Spain), 18/10/2019
General Manager: Ferran Gil Torné



Produkt:

Dreiphasen-Leistungsanalyser Schaltfel 96 x96

Serie:

CVM-C4

Markt:

CIRCUTOR

Der Gegenstand der Konformitätserklärung ist konform mit den geltenden Gesetzgebungen zur Harmonisierung der EU, sofern die Installation, Wartung und Verwendung der Anwendung seinem Verwendungszweck entsprechend gemäß den geltenden Installationsstandards und der Vorgaben des „...-VDE-...“-ffl-“

2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive 2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Es besteht Konformität mit der/den folgenden Norm/Normen oder sonstigem/sonstiger Regelwerk/Regelwerken

IEC 61010-1:2010+AM01:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2006+AM01:2010 Ed 2.1	

Jahr der CE-Kennzeichnung: 2019

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DEKLARACJA ZGODNOŚCI UE

Niniejsza deklaracja zgodności zostaje wydana na wyłączną odpowiedzialność firmy CIRCUTOR z siedzibą pod adresem: Vial Sant Jordi, s/n – 08232 Viladecavalls (Barcelona) Hiszpania

produk:

analityzator sieciowy tablicowy 96x96

Seria:

CVM-C4

marka:

CIRCUTOR

Przedmiot deklaracji jest zgodny z odnośnymi wymaganiami prawodawstwa harmonizacyjnego w Unii Europejskiej pod warunkiem, że będzie instalowany, konserwowany i użytkowany zgodnie z przeznaczeniem, dla którego został wyprodukowany, zgodnie z mającym zastosowanie normami dotyczącymi instalacji oraz instrukcjami producenta
2014/35/UE: Low Voltage Directive 2014/30/UE: EMC Directive 2011/65/UE: RoHS2 Directive 2015/863/UE: RoHS3 Directive

Jest zgodny z następującymi normami(l) lub innymi(l) dokumentem(ami) normatywnym(i):

IEC 60010-1:2010+AMD1:2016 Ed 3.0	IEC 61010-2-030:2010 Ed 1.0
IEC 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 60000-6-4:2006+AMD1:2010 Ed 2.1	

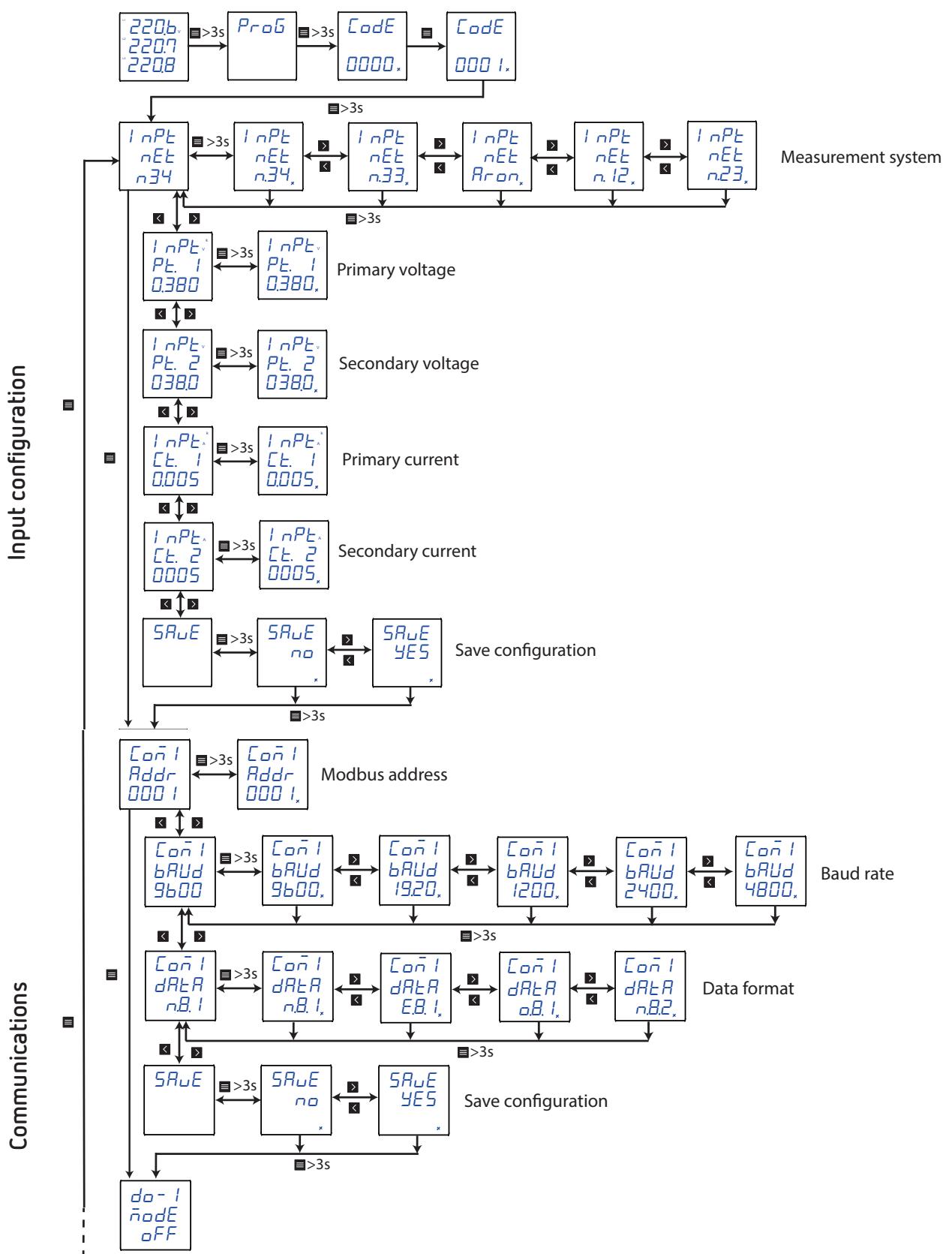
Rok oznakowania "CE":

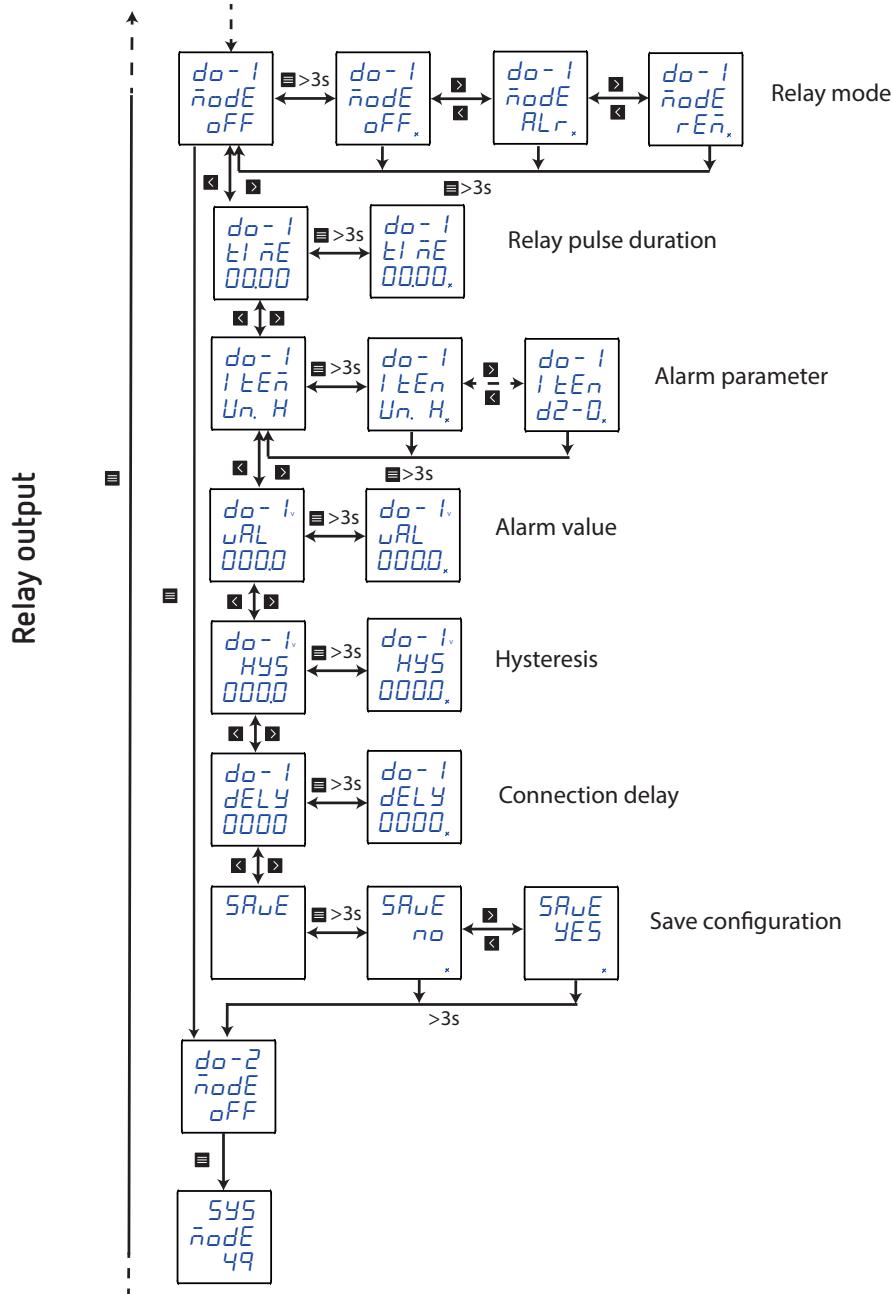
2019

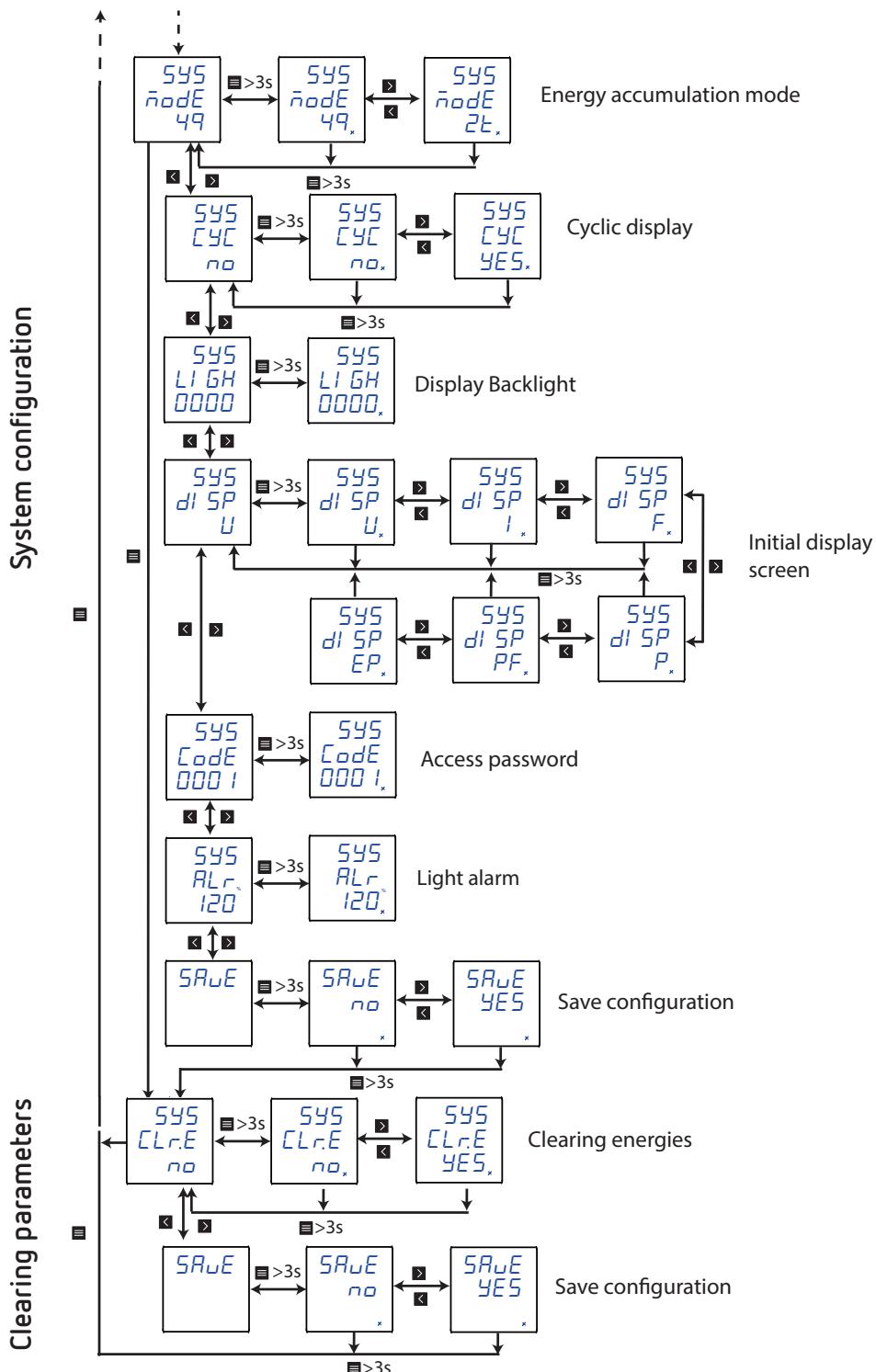


Viladecavalls (Spain), 18/10/2019
General Manager: Ferran Gil Torné

ANNEX A.- CONFIGURATION MENU







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