Power analyser

line-CVM-D32

INSTRUCTION MANUAL

(M237B01-03-19A)

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 unit may result in injury to personnel as well as damage to the unit. 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 unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.
	**Refer to the instruction manual before using the unit** 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 unit and /or installations.

CIRCUTOR, SA reserves the right to modify features or the product manual without prior notification.

DISCLAIMER

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

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

www.circutor.com

	**CIRCUTOR,** 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
03/20	M237B01-03-19A	First Version

SYMBOLS

Table 2: Symbols.

Symbol	Description
CE	In accordance with the relevant European directive.
	In accordance with the CMiM directive.
	Device covered by European Directive 2012/19/EC. At the end of its useful life, do not leave the device in a household refuse bin. 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 **line-CVM-D32** is a device that measures, calculates and displays the main electrical parameters in single-phase mains, two-phase mains with and without neutral, and balanced three-phase mains with ARON measurement or unbalanced. Measurement is performed at true RMS value, using three AC voltage inputs and three current inputs.

Current measurement is performed indirectly through /5A, /1A transformers or efficient MC1 and MC3 series transformers (/0.250A).

The device features:

- **Display** to display parameters.
- **3 keys** to browse through the different screens and program the equipment.
- **2 digital transistor** outputs.
- **RS-485** communications, with **MODBUS RTU©** protocol.

The **line-CVM-D32** can be expanded with the following expansion modules:

- ✓ **line-M-4IO-R**, expansion module with 4 digital inputs and 4 relay outputs.
- ✓ **line-M-4IO-T** expansion module with 4 digital inputs and 4 transistor outputs.
- ✓ **line-M-4IO-A**, expansion module with 4 analogue inputs and outputs.
- ✓ **line-M-4IO-RV**, expansion module with 4 digital inputs (230 V~) and 4 relay outputs.
- ✓ **line-M-EXT-PS**, power adapter module.

3.- INSTALLATION OF THE DEVICE

3.1.- PRELIMINARY RECOMMENDATIONS

	In order to use the device safely, personnel operating it must follow the safety measures that comply with the standards of the country where it is to be installed; operators must wear the required personal protective equipment (rubber gloves, approved facial protection and flame-resistant clothing) to prevent injuries from electric shock or arcs caused by exposure to current-carrying conductors, and they must heed the various warnings indicated in this instruction manual.

The **line-CVM-D32** device must be installed by authorised, qualified personnel.

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.

Cables must always be kept in perfect condition to avoid accidents or injury to personnel or installations.

Restrict the operation of the device to the specified measurement category, voltage or current 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 any measurements if an anomaly or malfunction is detected.

Check the surrounding environment before starting to take measurements. Do not take any measurements in hazardous or explosive environments.

	Before carrying out maintenance, repair or handling of any of the device's connections, the device must be disconnected from all power sources, both from the device's own power supply and the measurement's. Contact the after-sales service if you detect that the device is not working properly.

3.2.- INSTALLATION

⚠	When the device is on, its terminals, opening covers or removing elements may expose the user to parts that are hazardous to touch. Do not use the device until it is fully installed.

The device must be installed inside a medium or low voltage electric panel or enclosure, with DIN rail mounting (IEC 60715).

The minimum recommended distance between rails to install the **line-CVM-D32** devices is 150 mm.

The device must be connected to a power supply circuit protected by gl type (IEC 269) or M type fuses, between 0.5 and 2A. It must be fitted with a circuit-breaker or equivalent device to disconnect the device from the mains supply.

The power supply and voltage measurement circuits must be connected with a 1mm² minimum cross-section cable.

The current transformer's secondary line must have a 2.5 mm² minimum cross-section.

The insulation temperature of the cables connected to the device must be at least 62°C.

3.3.- 72 x 72 mm PANEL ADAPTER

Note: *The 72 x 72 mm panel adapter is a separately sold accessory.*

CIRCUTOR has a panel adapter for the **line-CVM-D32** devices and their expansion modules for their installation in 72 x 72 mm panels.

Figure 1 illustrates how the panel adapter connects to a **line-CVM-D32**.

⚠	Before installing the adapter, the device must be disconnected from all power and measurement supplies.

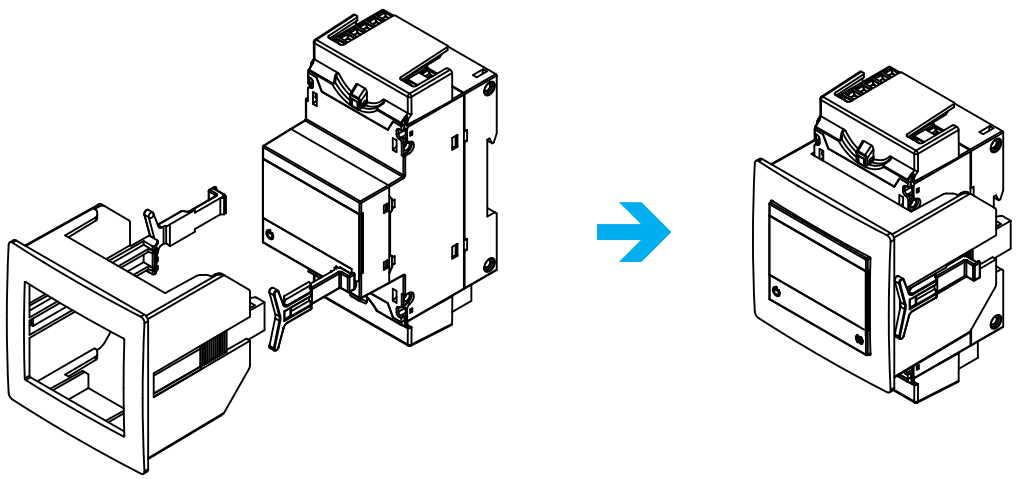


Figure 1: Installation of the panel adapter.

Table 3: Technical characteristics of the Panel Adapter.

Technical Specifications	
Protection degree	IP40
Casing	Self-extinguishing V0 plastic

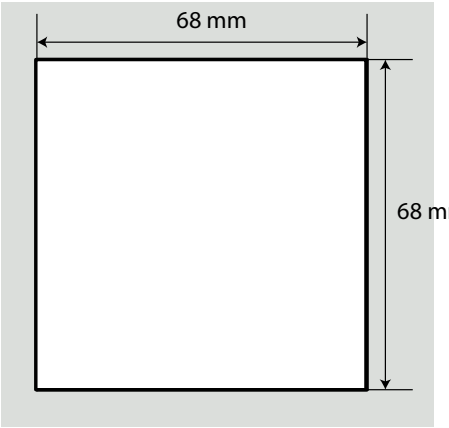


Figure 2: Cut in the panel.

3.4.- DEVICE TERMINALS

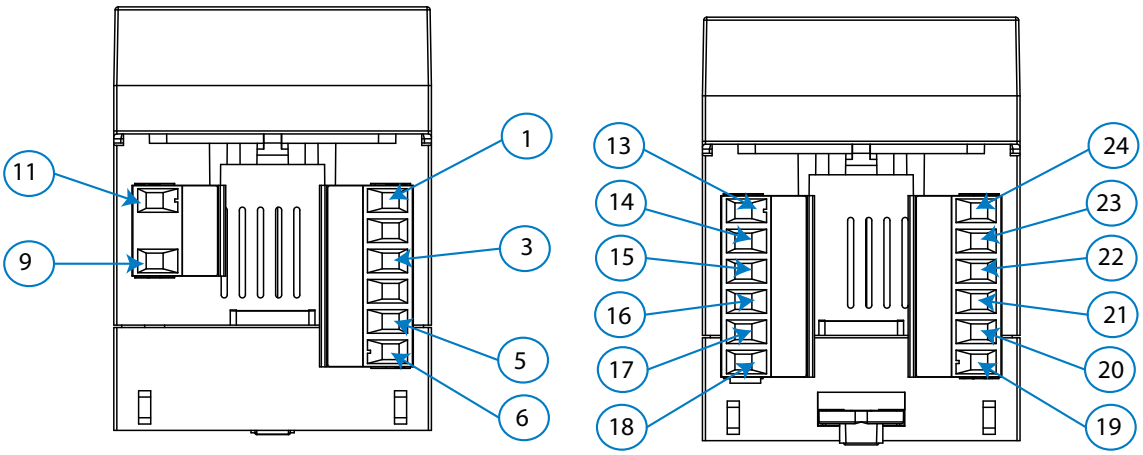


Figure 3: Line-CVM-D32 terminals: Upper - Lower.

Table 4: List of line-CVM-D32 terminals.

Device terminals	
1: U1, voltage input L1	**16: s2**, current input L2
3: U2, voltage input L2	**17: s1**, current input L3
5: U3, voltage input L3	**18: s2**, current input L3
6: N, neutral input	**19: C**, common digital outputs
9: A1 ~/+, Auxiliary power supply	**20: 2**, digital output 2
11: A2 ~/-, Auxiliary power supply	**21: 1**, digital output 1
13: s1, current input L1	**22: B-**, RS-485
14: s2, current input L1	**23: S**, **GND** for RS-485
15: s1, current input L2	**24: A+**, RS-485

3.5.- EXPANSION WITH OTHER DEVICES

The **line-CVM-D32** devices can be expanded with other devices in the Line range, and with the **line-EDS** and **line-M** expansion modules .

The **line-EDS** and **line-CVM** devices enable up to 2 expansion modules to be directly connected to their right-hand side(1).

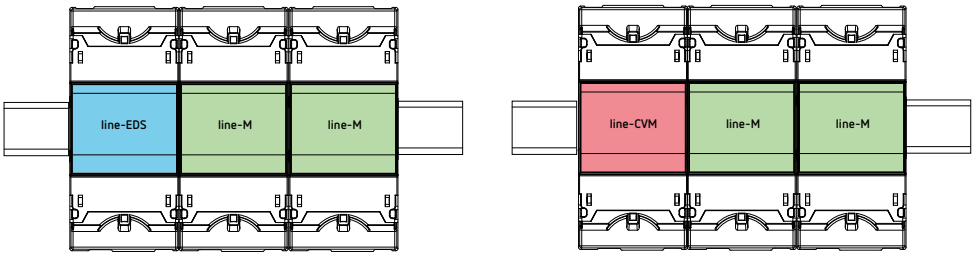


Figure 4: Line-EDS and line CVM expansion module connection.

(1) Expansion module types: **line-M-4IO-R**, **line-M-4IO-T, line-M-4IO-RV** and **line-M-4IO-A.**

In installations with **line-EDS** devices**,** a total of up to seven devices may be connected to their right-hand side.

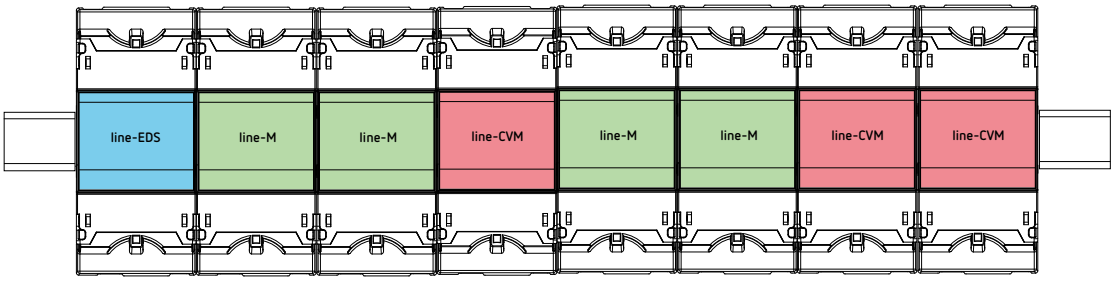


Figure 5: Typical installation of a line-EDS with 7 devices.

Note: *An installation may only be fitted with one* ***line-EDS*** *device.*
Note: *In installations without* ***line-EDS*** *devices, only one* ***line-CVM*** *device may ne installed.*
Note: *All* ***line-EDS*** *and* ***line-CVM*** *devices* must be connected to the auxiliary power supply.

3.5.1.- Line-M-EXT-PS POWER ADAPTER

Line-M-EXT-PS is a power adapter belonging to the Line family of devices. The module connects to the left-hand side of the devices to be fed. It can supply up to 10 VA, allowing it to power a limited number of devices.

The maximum set it can supply is: 1 **line-EDS** + 1 **line-CVM** + 1 **line-M** (**Figure 6**).

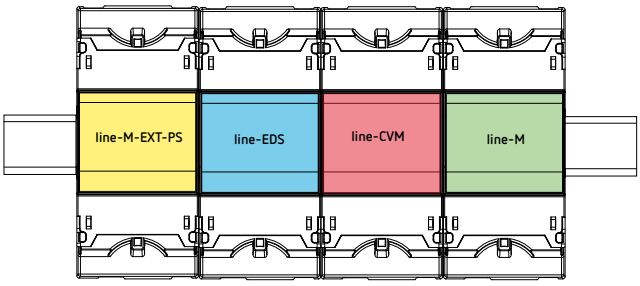


Figure 6: Maximum set a line-M-EXT-PS can supply.

Multiple **line-M-EXT-PS** devices can be connected to supply sets with power above 10VA. Each **line-M-EXT-PS** will power the devices connected to its right-hand side (**Figure 7**).

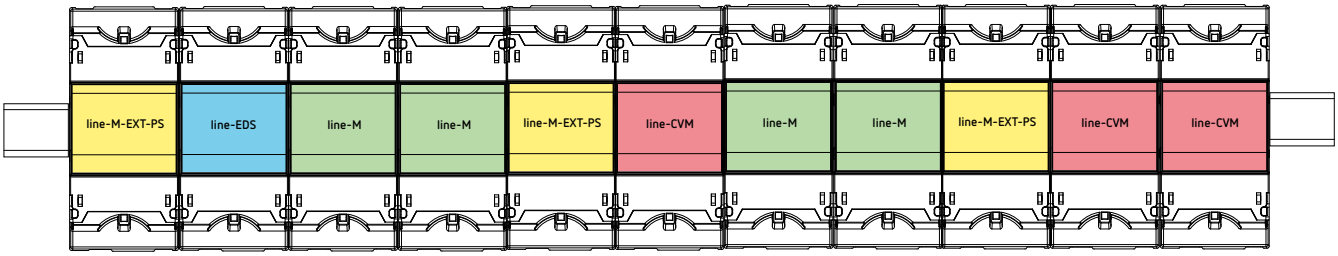


Figure 7: Multiple line-M-EXT-PS connection.

Note: *None of the* ***line-EDS*** *or* ***line-CVM*** *devices should be connected to the auxiliary power supply.*

3.5.2.- INSTALLATION

⚠	Before installing a new device, it must be disconnected from all power supplies.

The correct steps to connect the devices are:

1.- Using a flat head screwdriver, remove the expansion connector's protective covers located on the side of the devices, (**Figure 8**).

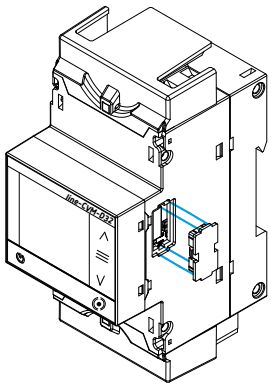


Figure 8: Installation step 1.

2.- Insert the expansion connector and fastening clips into one of the devices (**Figure 9**).

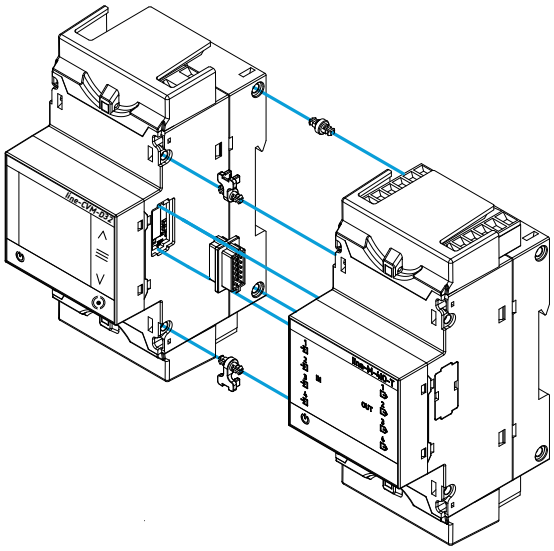


Figure 9: Installation step 2.

3 .- Connect both devices and fasten them by pushing the front clips down (**Figure 10**).

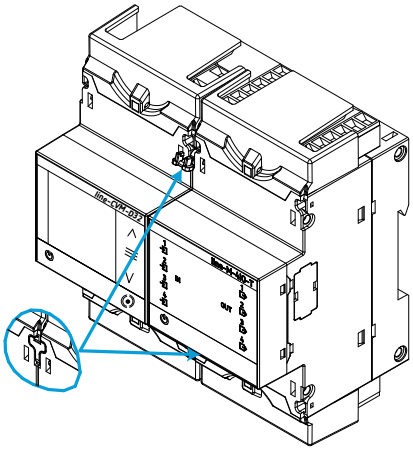


Figure 10: Installation step 3.

	For correct installation of all devices, please refer to the instruction manual for the different models: **M231B01-03-xxx** : Instruction Manual for **line-EDS** devices. **M239B01-03-xxx** : Instruction Manual for **line-M** expansion modules.

3.6.- CONNECTION DIAGRAMS

3.6.1.- 3-PHASE MAINS MEASUREMENT WITH 4-WIRE CONNECTION

Installation type: **4W-3Ph**

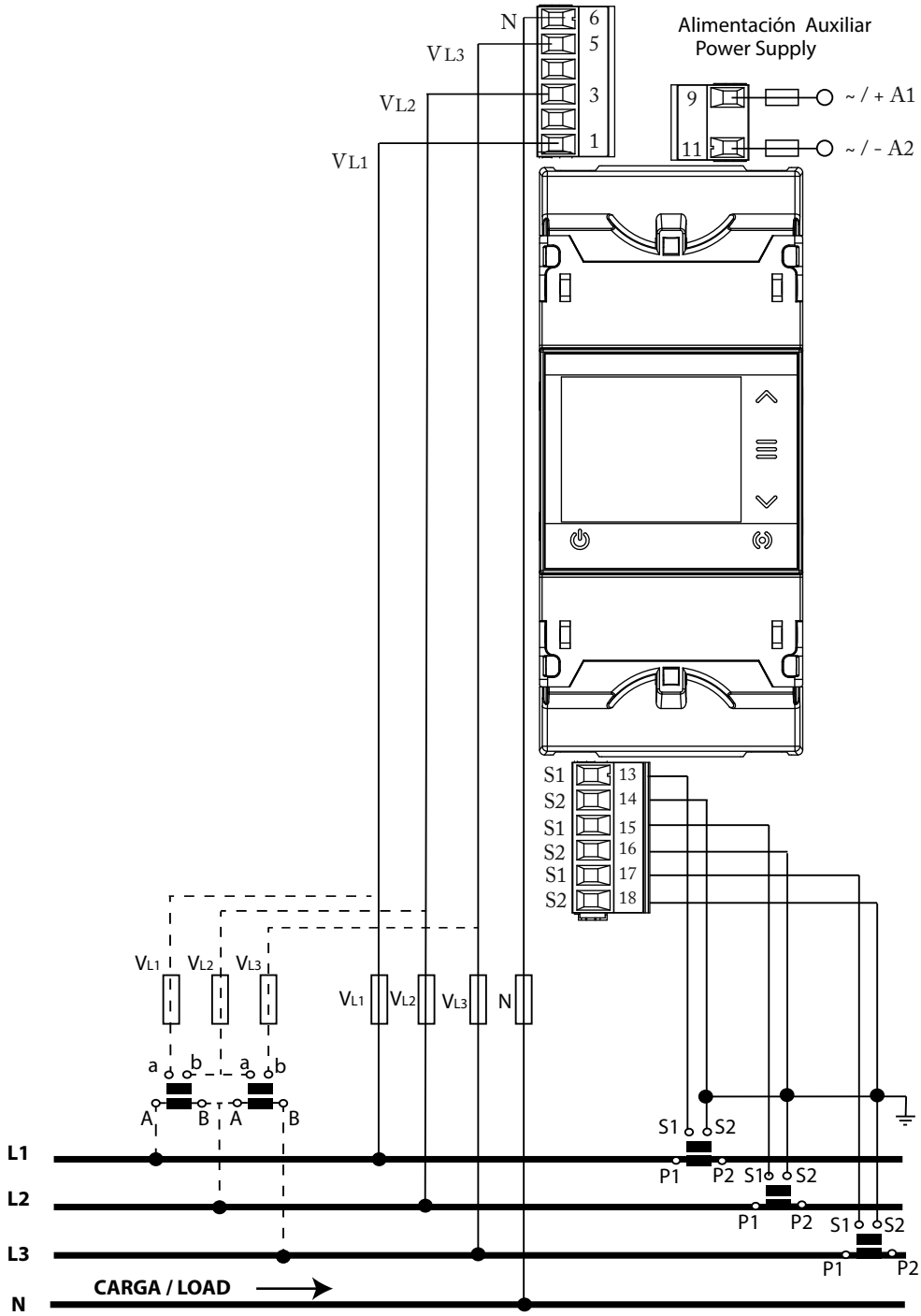


Figure 11: 3-phase mains measurement with 4-wire connection: Current transformers.../5A , .../1A o MC1 (.../0.250A).

Note: *Do not connect the MC current transformers to earth.*

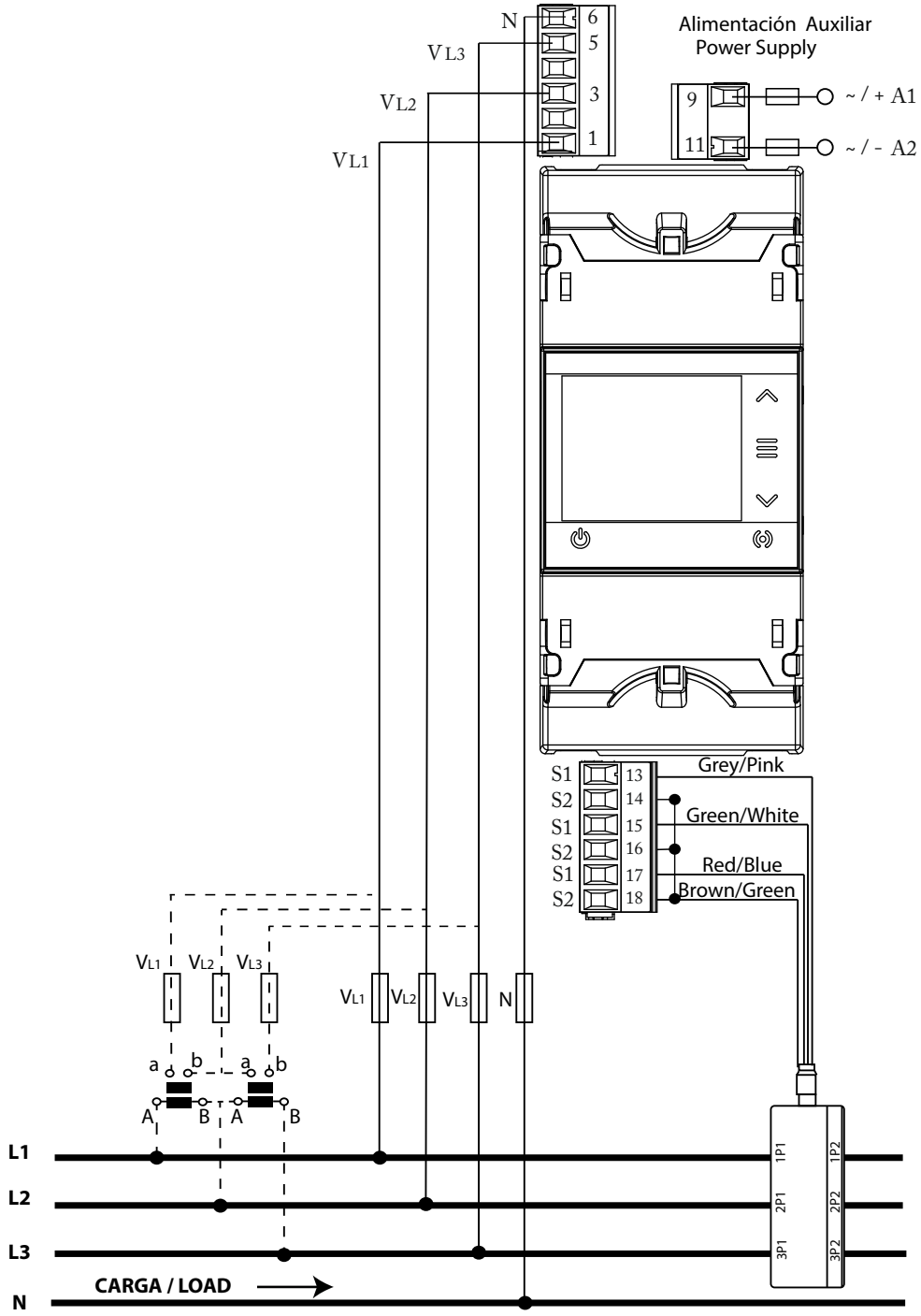


Figure 12: 3-phase mains measurement with 4-wire connection: MC3 series current transformers (.../0.250A).

3.6.2.- 3-PHASE MAINS MEASUREMENT WITH 3-WIRE CONNECTION

Installation type: **3W-3Ph**

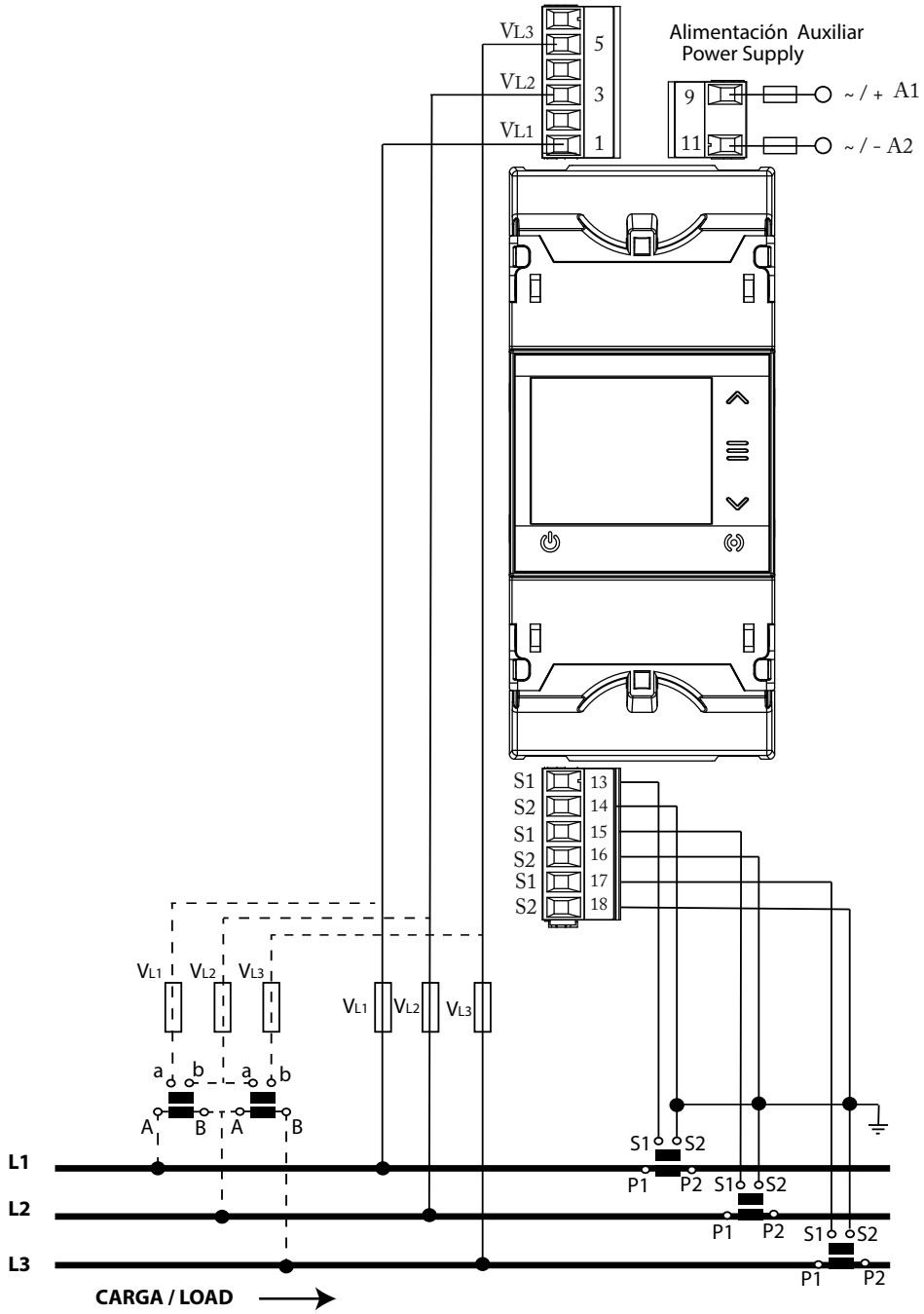


Figure 13: 3-phase mains measurement with 3-wire connection: Current transformers.../5A , .../1A o MC1 (.../0.250A).

Note: *Do not connect the MC current transformers to earth.*

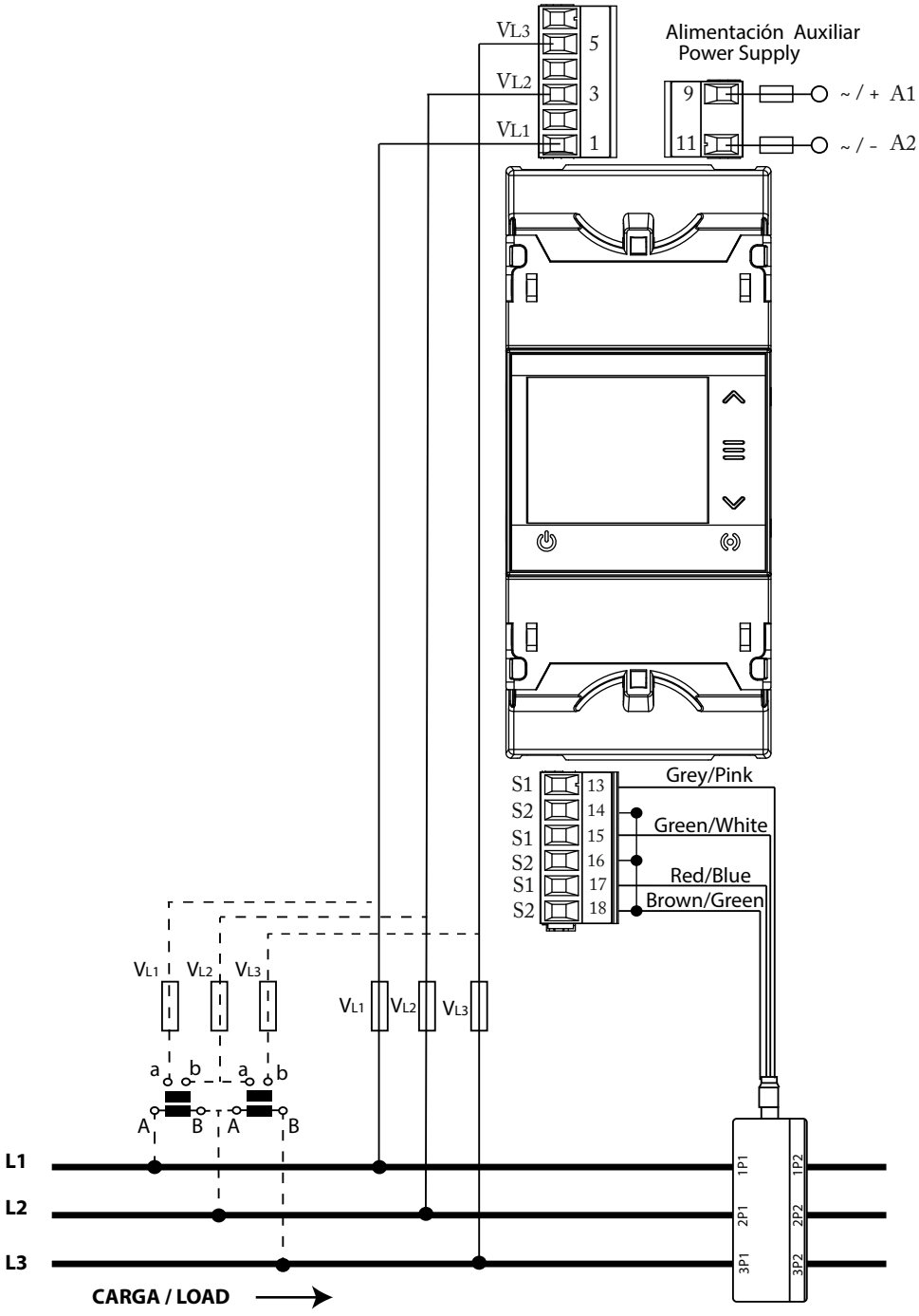


Figure 14: 3-phase mains measurement with 3-wire connection: MC3 series current transformers (.../0.250A).

3.6.3.- 3-PHASE MAINS MEASUREMENT WITH 3-WIRE CONNECTION AND TRANSFORMERS WITH ARON CONNECTION

Installation type: **ARON**

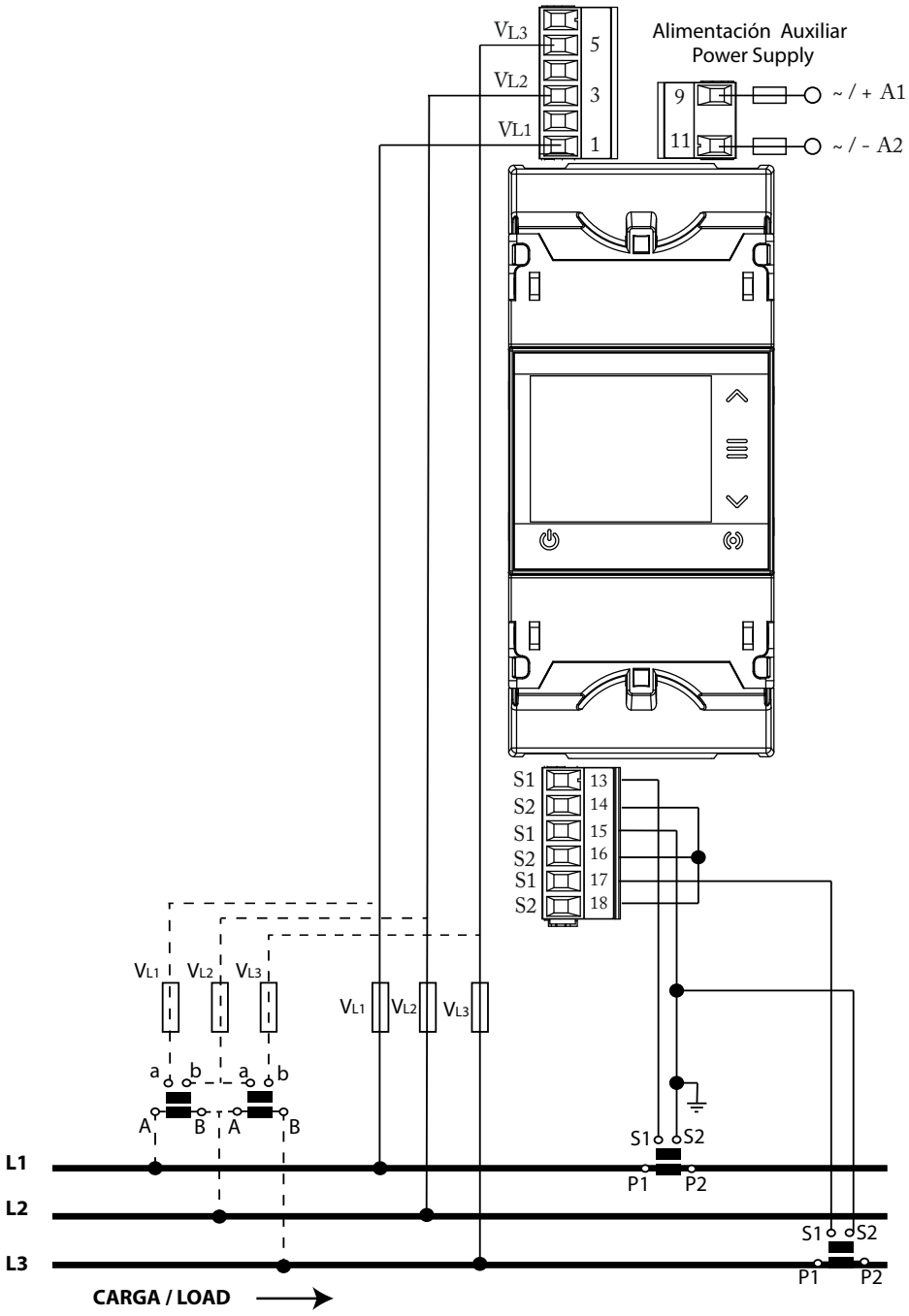


Figure 15: 3-phase mains measurement with 3-wire connection and transformers with ARON connection

Note: *Do not connect the MC current transformers to earth.*

3.6.4.- 2-PHASE MAINS MEASUREMENT WITH 3-WIRE CONNECTION

Installation type: **3W-2Ph**

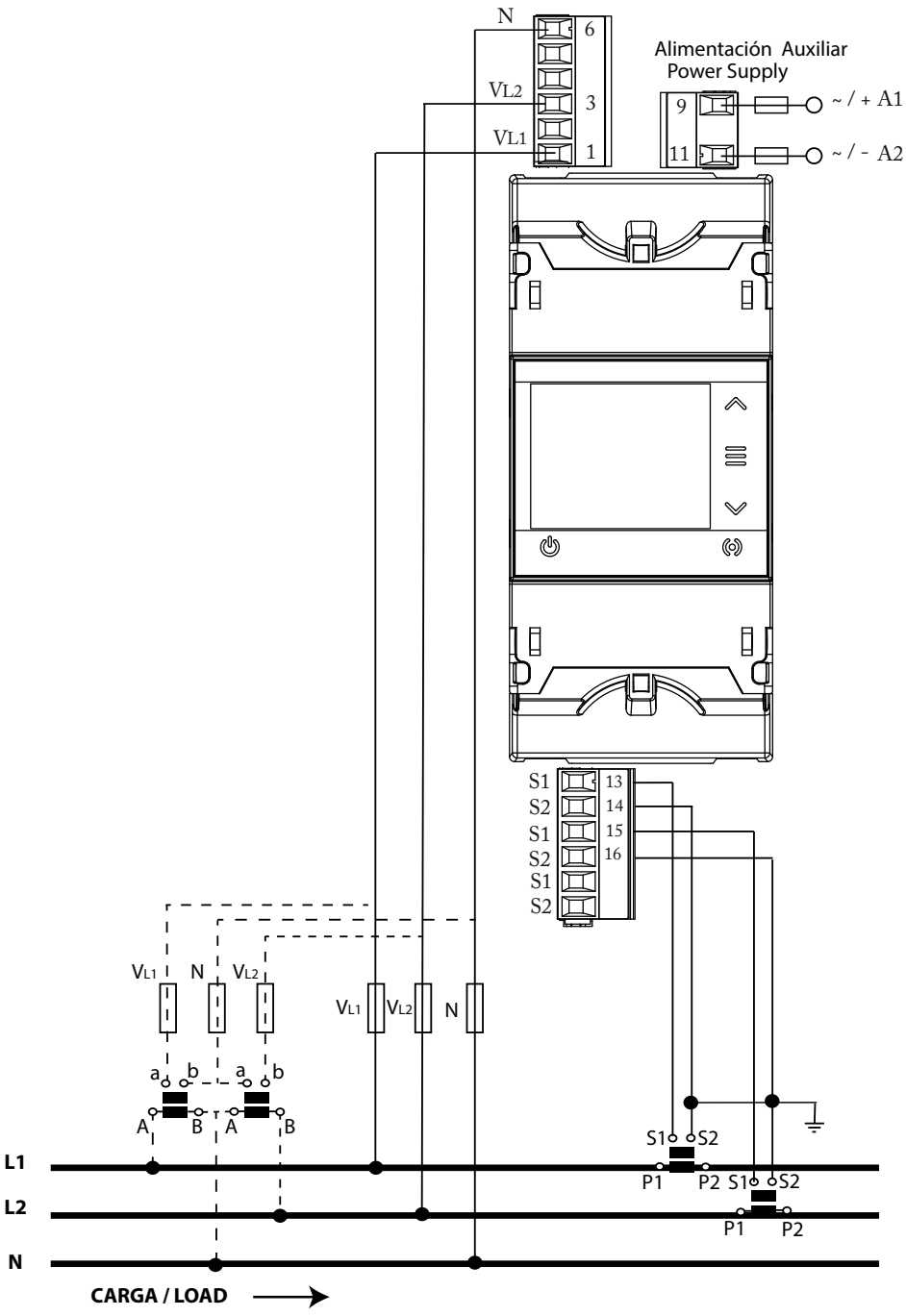


Figure 16: 2-phase mains measurement with 3-wire connection

Note: *Do not connect the MC current transformers to earth.*

3.6.5.- SINGLE PHASE MAINS MEASUREMENT WITH 2-WIRE PHASE-TO-PHASE CONNECTION

Installation type: **2W-2Ph**

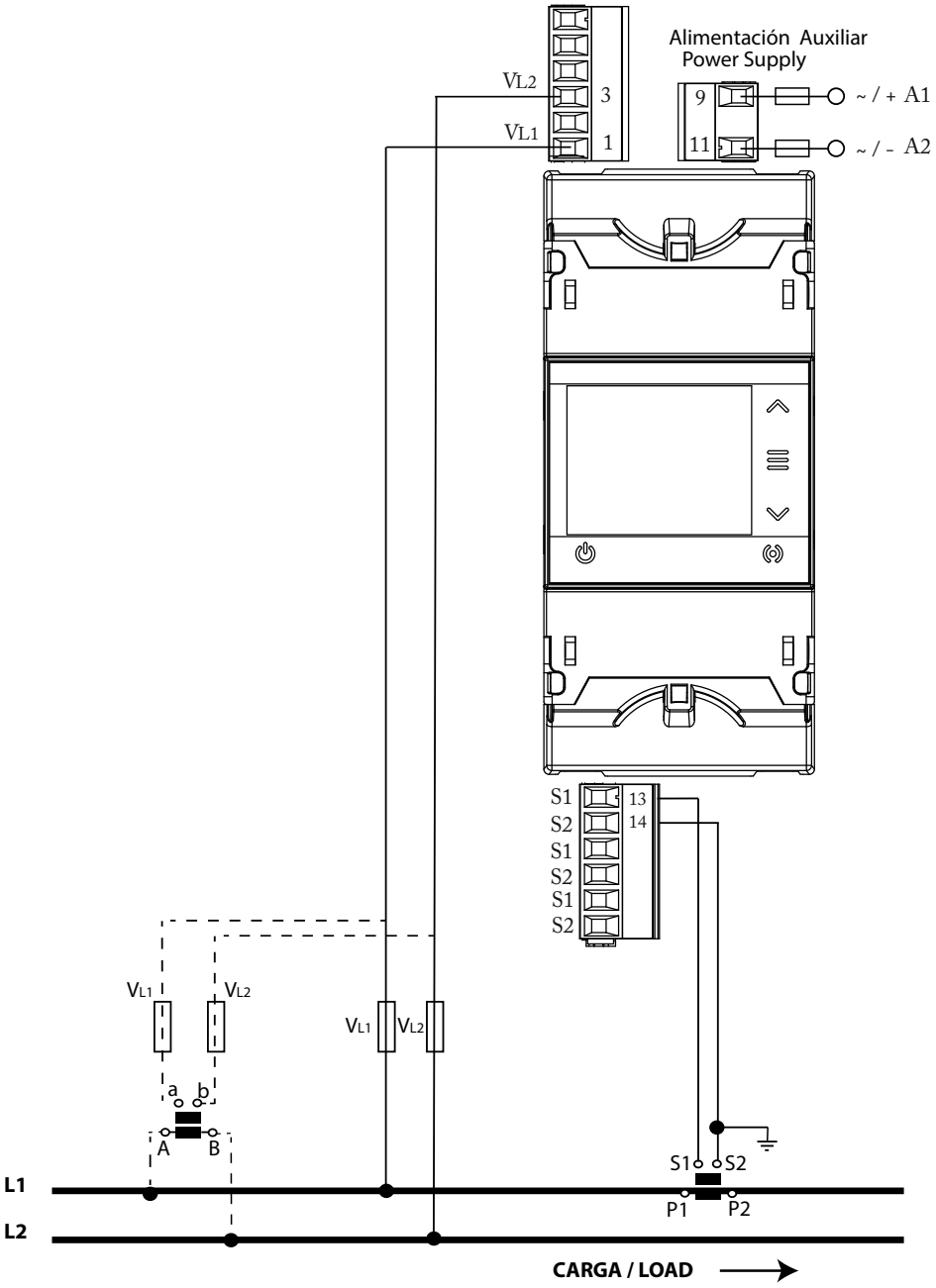


Figure 17: Single phase mains measurement with 2-wire phase-to-phase connection

Note: *Do not connect the MC current transformers to earth.*

3.6.6.- SINGLE PHASE MAINS MEASUREMENT WITH 2-WIRE PHASE-TO-NEUTRAL CONNECTION

Installation type: **2W-1Ph**

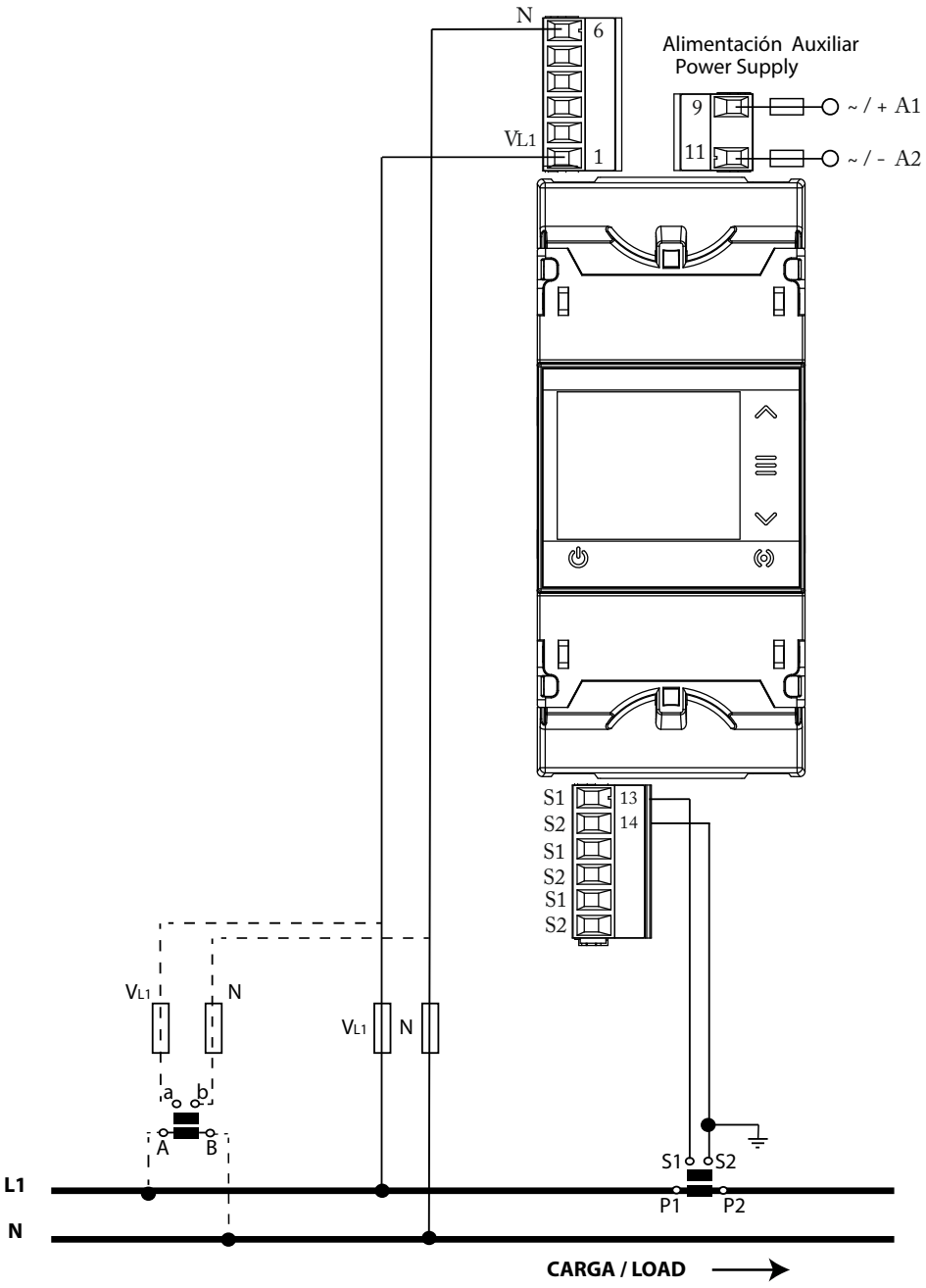


Figure 18: Single phase mains measurement with 2-wire phase-to-neutral connection

Note: *Do not connect the MC current transformers to earth.*

4.- OPERATION

The **line-CVM-D32** device is a power analyser for all four quadrants (consumption and generation).
The device can operate under three different measurement conventions:

- ✓ Measurement convention **CIRCUTOR**.
- ✓ Measurement convention **IEC**.
- ✓ Measurement convention **IEEE**.

The measurement convention is configured using the configuration menu, see ***"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION".***

✓ Measurement convention **CIRCUTOR** :

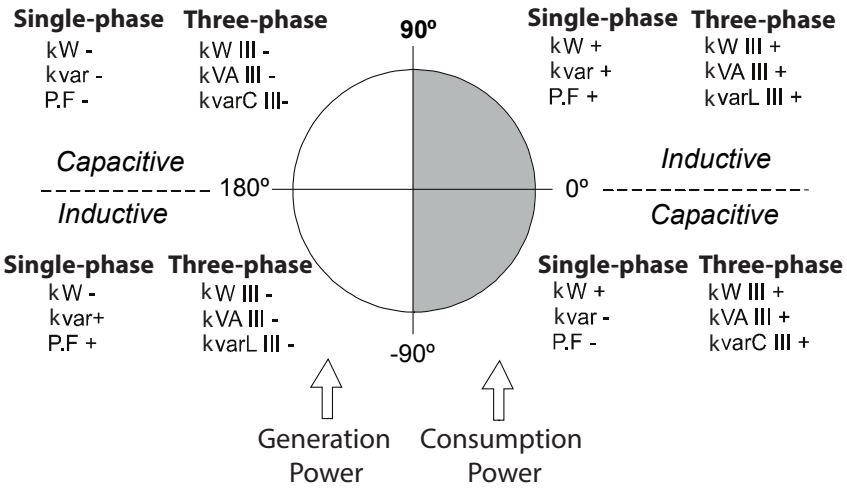


Figure 19: Measurement convention CIRCUTOR.

✓ Measurement convention **IEC**:

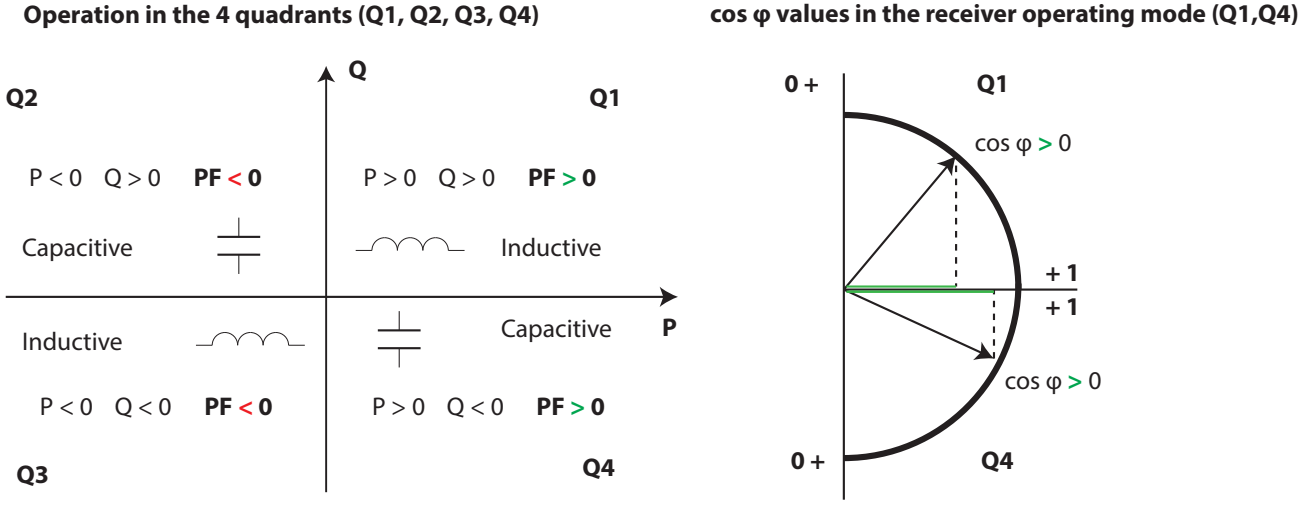


Figure 20: Measurement convention IEC.

✓ Measurement convention **IEEE**:

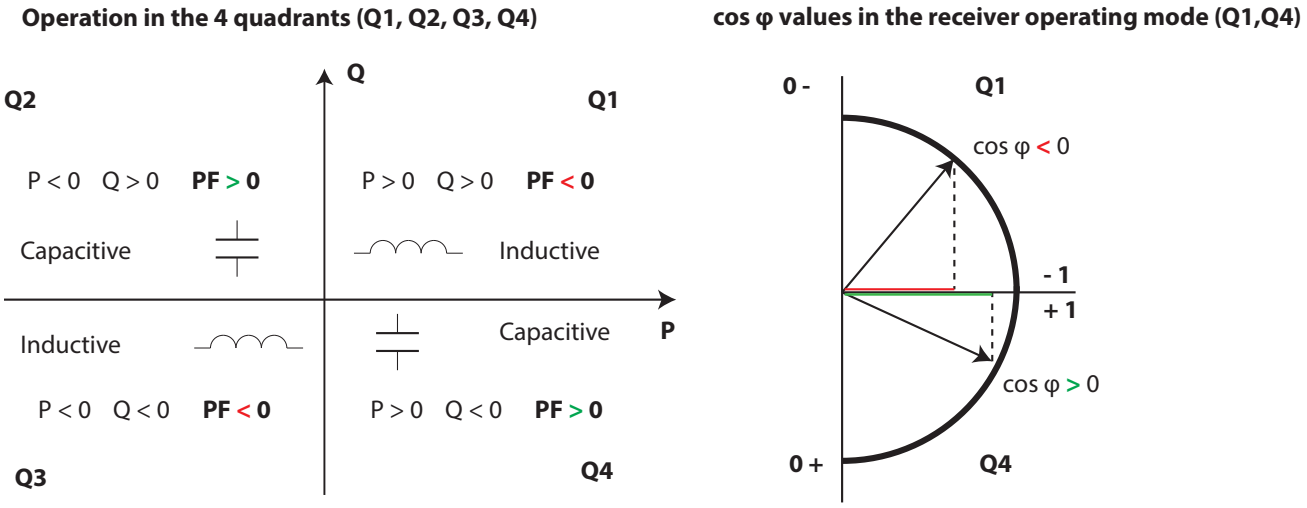


Figure 21: Measurement convention IEEE.

4.1.- MEASUREMENT PARAMETERS

The device measures and displays different types of parameters:

✓Electrical parameters,
✓Quality parameters, such as overvoltages, dips and interruptions according to EN50160.

Table 5: Line-CVM-D32 measurement parameters

Parameter	Units	Phases L1-L2-L3	Total III	Value Max.	Value Min.
Phase-Neutral voltage	V	✓	✓	✓	✓
Phase-to-Phase Voltage	V	✓	✓	✓	✓
Current	A	✓	✓	✓	✓
Frequency	Hz	-	✓	✓	✓
Active Power	W	✓	✓	✓	✓
Consumed Active Power (2)	W	✓	✓	✓	✓
Generated Active Power (2)	W	✓	✓	✓	✓
Apparent Power	VA	✓	✓	✓	✓
Reactive Power	var	✓(2)	✓	✓	✓
Consumed Reactive Power (2)	var	✓	✓	✓	✓
Generated Reactive Power (2)	var	✓	✓	✓	✓
Inductive Reactive Power	varL	✓	✓	✓	✓
Consumed Inductive Reactive Power (2)	varL	✓	✓	✓	✓
Generated Inductive Reactive Power (2)	varL	✓	✓	✓	✓
Capacitive Reactive Power	varC	✓	✓	✓	✓
Consumed Capacitive Reactive Power (2)	varC	✓	✓	✓	✓
Generated Capacitive Reactive Power (2)	varC	✓	✓	✓	✓
Power factor	PF	✓	✓	✓	✓
Consumed Power Factor (2)	PF	✓	✓	✓	✓

Table 5 (Continued): Line-CVM-D32 measurement parameters.

Parameter	Units	Phases L1-L2-L3	Total III	Value Max.	Value Mini.
Generated Power Factor (2)	PF	✓	✓	✓	✓
Cos φ	φ	✓	✓	✓	✓
Cos φ Consumed (2)	φ	✓	✓	✓	✓
Cos φ Generated (2)	φ	✓	✓	✓	✓
Voltage THD	%	✓	-	✓(2)	✓(2)
Current THD	%	✓	-	✓(2)	✓(2)
Harmonic Voltage Decomposition (2) (up to 40th harmonic)	V - %	✓	-	-	-
Harmonic Current Decomposition (2) (up to 40th harmonic)	A - %	✓	-	-	-
Consumed Active Energy	kWh	✓(2)	✓	-	-
Generated Active Energy	kWh	✓(2)	✓	-	-
Consumed Active Energy Tariffs 1-2-3-4	kWh	✓	✓	-	-
Generated Active Energy Tariffs 1-2-3-4	kWh	✓	✓	-	-
Consumed Inductive Reactive Energy	kvarLh	✓(2)	✓	-	-
Generated Inductive Reactive Energy	kvarLh	✓(2)	✓	-	-
Consumed Inductive Reactive Energy Tariffs 1-2-3-4	kvarLh	✓	✓	-	-
Generated Inductive Reactive Energy Tariffs 1-2-3-4	kvarLh	✓	✓	-	-
Consumed Capacitive Reactive Energy	kvarCh	✓(2)	✓	-	-
Generated Capacitive Reactive Energy	kvarCh	✓(2)	✓	-	-
Consumed Capacitive Reactive Energy Tariffs 1-2-3-4	kvarCh	✓	✓	-	-
Generated Capacitive Reactive Energy Tariffs 1-2-3-4	kvarCh	✓	✓	-	-
Consumed Reactive Energy (2)	kvarh	✓	✓	-	-
Generated Reactive Energy (2)	kvarh	✓	✓	-	-
Consumed Reactive Energy Tariffs 1-2-3-4 (2)	kvarh	✓	✓	-	-
Generated Reactive Energy Tariffs 1-2-3-4 (2)	kvarh	✓	✓	-	-
Consumed Apparent Energy	kVAh	✓(2)	✓	-	-
Generated Apparent energy	kVAh	✓(2)	✓	-	-
Consumed Apparent Energy Tariffs 1-2-3-4	kVAh	✓	✓	-	-
Generated Apparent Energy Tariffs 1-2-3-4	kVAh	✓	✓	-	-
Maximum Current Demand Tariffs 1-2-3-4	A	✓	✓	✓	-
Maximum Active Power Demand Tariffs 1-2-3-4	W	✓	✓	✓	-
Maximum Apparent Power Demand Tariffs 1-2-3-4	VA	✓	✓	✓	-
Maximum Inductive Reactive Power Demand Tariffs 1-2-3-4 (2)	varL	✓	✓	✓	-
Maximum Capacitive Reactive Power Demand Tariffs 1-2-3-4 (2)	varC	✓	✓	✓	-
Maximum Reactive Power Demand Tariffs 1-2-3-4 (2)	var	✓	✓	✓	-
Angle θ (2)	º	✓	-	-	-
Angle θ V-I (2)	º	✓	-	-	-
Overvoltage meter (2)		✓	-	-	-

Table 5 (Continued): Line-CVM-D32 measurement parameters.

Parameter	Units	Phases L1-L2-L3	Total III	Value Max.	Value Mini.
Gap meter (2)		✓	-	-	-
Voltage interruption meter (2)		✓	-	-	-
Parameter	**Units**	**T1-T2-T3-T4**		**Total**	
Nº of hours of active energy consumed	hours	✓		✓	
Nº of hours of Active Energy generated	hours	✓		✓	
Cost of consumed Active Energy	EUR	✓		✓	
Cost of generated Active Energy	EUR	✓		✓	
CO_2 emissions from consumed Active Energy	$kgCO_2$	✓		✓	
CO_2 emissions from generated Active Energy	$kgCO_2$	✓		✓	

(2) Variables only displayed via communications, see ***"7.3.- MODBUS MEMORY MAP"***.

4.1.1.- QUALITY PARAMETERS

For power supply quality control, the voltage levels to be used by the device to log an event must be defined at true RMS value. According to the **EN-61000-4-30** Standard, the RMS value for all AC magnitudes must be calculated in each cycle, being refreshed every ½ cycle. If the RMS value exceeds certain programmed thresholds, an **event** is said to have occurred.

The device detects quality events such as overvoltages, gaps and voltage interruptions. **Figure 22** shows an example of these events.

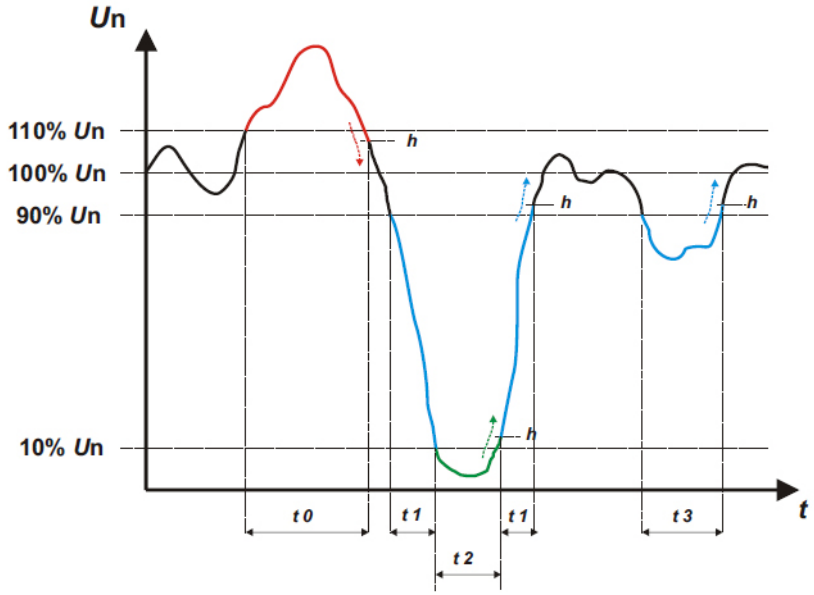


Figure 22: Example of Quality Events.

✓ **Overvoltage**

In the time interval **t0** in **Figure 22** an overvoltage event is illustrated. The duration of the event matches the time the signal is above the set threshold value (***"6.2.2.- OVERVOLTAGES AND GAPS"***), in this example it is 110% of the nominal voltage, plus the time it takes for the signal to decrease from the value, including a 2% hysteresis.

✓ **Voltage gap**

In time intervals **t1** and **t3** in **Figure 22**, two voltage gaps are illustrated. The duration of the event matches the time the signal is below the set threshold value (***"6.2.2.- OVERVOLTAGES AND GAPS"***), in this example it is 90% of the nominal voltage.

✓ **Voltage interruption**

In the time interval **t2** in **Figure 22** , an outage or interruption event is shown. The duration of the event matches the time the signal is below the set threshold value (***"6.2.3.- INTERRUPTION AND HYSTERESIS VALUE"***), in this example it is 10% of the nominal voltage, plus the time it takes for the signal to increase from the value, including a 2% hysteresis.

4.2. - LED INDICATORS

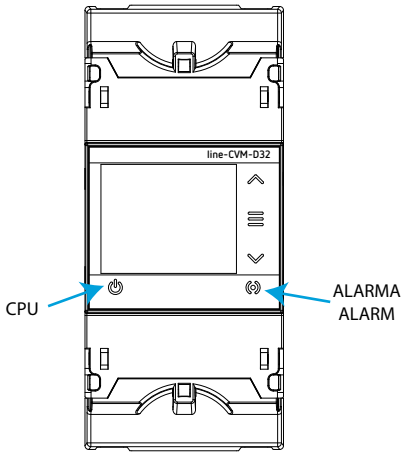


Figure 23: LEDs: Line-CVM-D32 device

The **line-CVM-D32** devices have 2 indicating LEDs:

✓ **CPU**, Indicates device status:

Table 6: CPU LED.

LED	Description
CPU	**Flashing:**
	White: Indicates that the device is powered.

✓ **ALARM**, Indicates whether an alarm has been activated:

Table 7: ALARM LED.

LED	Description
ALARM	**On:**
	Red: Indicates that an alarm has been activated.

4.3.- DISPLAY

The device has a 4-row TFT display to show the measured parameters and enable configuration.

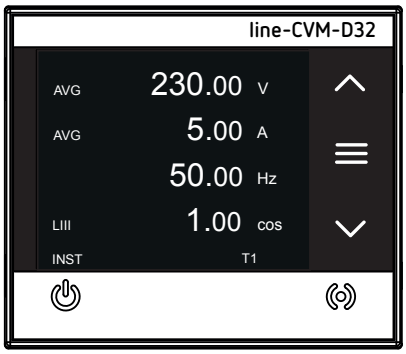


Figure 24: Line-CVM-D32 display.

In the lower right area of the display, the **Tx** literal flashes to indicate current tariff.

4.4.- KEYBOARD FUNCTIONS

The **line-CVM-D32** model has 3 keys for device display and configuration

✓ Display menu:

Table 8: Keyboard function: Display menu.

Key	Keystroke
	Previous screen **Long keystroke (> 2s):** Displays maximum values or generated values.
	Skips to the next display menu **Long keystroke (> 2s):** Accesses or Exits the configuration menu
	Next screen **Long keystroke (> 2s):** Displays minimum values or generated values.

✓ Configuration menu:

Table 9: Keyboard function: Configuration menu.

Key	Keystroke
	Previous screen / Modifies the digit's value **Long keystroke (> 2s):** Programming of the first on-screen parameter is accessed.
	Skips to the next display menu. Scrolls between digits. **Long keystroke (> 2s):** Validate the programmed value
	Next screen / Modifies the digit's value. **Long keystroke (> 2s):** Programming of the second on-screen parameter is accessed.

4.5.- DIGITAL OUTPUTS

The device has two digital transistor outputs (terminals 19, 20 and 21 in **Table 4**). The digital outputs can be configured as alarms, pulse outputs or can be manually activated via the configuration menu, see ***"6.6.- CONFIGURATION OF DIGITAL OUTPUTS 1 and 2".***

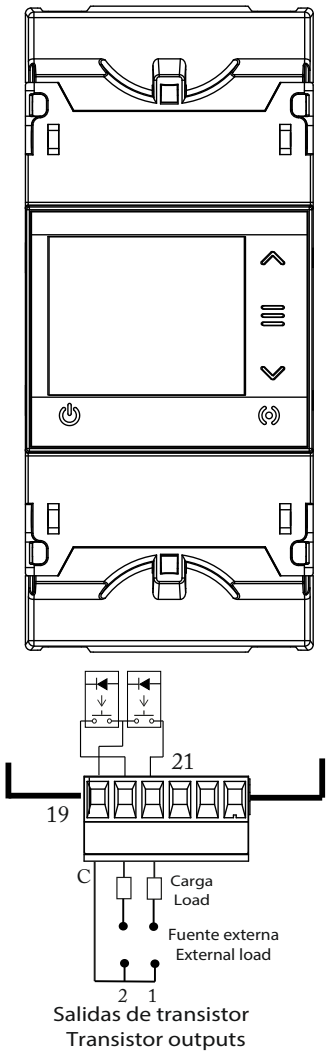


Figure 25: Digital transistor outputs.

5.- DISPLAY

The **line-CVM-D32** device arranges all display screens in 8 menus, **Figure 26.**

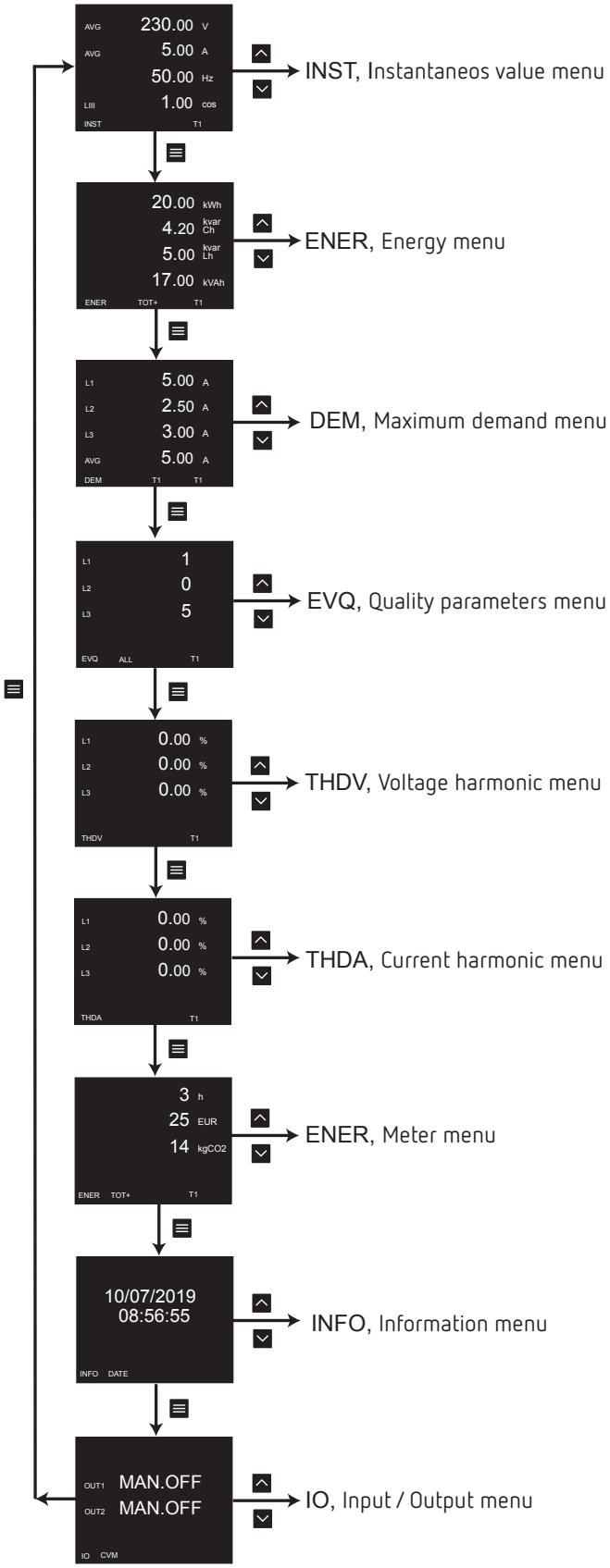


Figure 26: Display menu.

5.1.- INSTANTANEOUS VALUE MENU

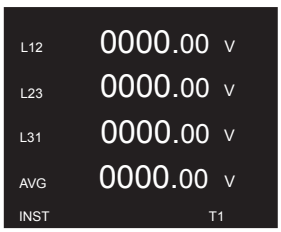
The menu showing instant values is identified by the literal **INST** in the bottom left area of the display.

Use keys ^ and v to browse through the different screens.

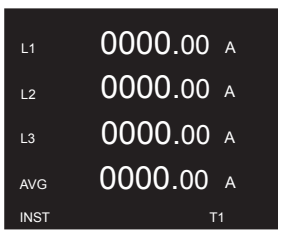
Average Phase-Neutral Voltage (V)
Average current (A)
Frequency (Hz)
Cos φ three-phase

Total active power (W)
Total reactive power (var)
Total apparent power (VA)
Three-phase power factor

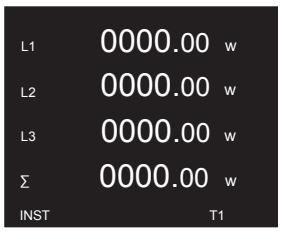
Phase-Neutral Voltage L1 (V)
Phase-Neutral Voltage L2 (V)
Phase-Neutral Voltage L3 (V)
Average Phase-Neutral Voltage (V)



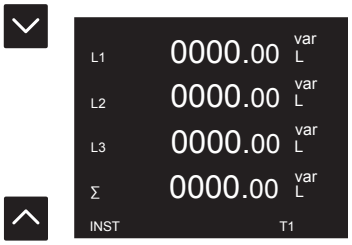
Phase L1 - Phase L2 Voltage (V)
Phase L2 - Phase L3 Voltage (V)
Phase L3 - Phase L1 Voltage (V)
Average Phase-Phase Voltage (V)



Current L1 (A)
Current L2 (A)
Current L3 (A)
Average current (A)

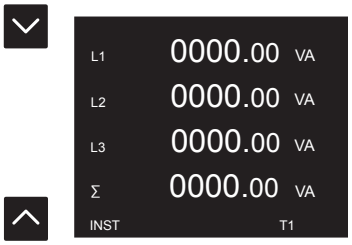


Active Power L1 (W)
Active Power L2 (W)
Active Power L3 (W)
Total Active Power (W)

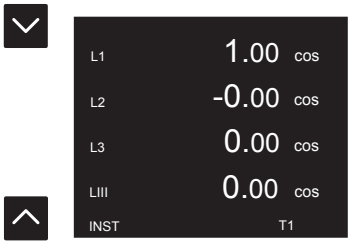


Inductive reactive power L1 (varL)
Inductive reactive power L2 (varL)
Inductive reactive power L3 (varL)
Total inductive reactive power (varL)

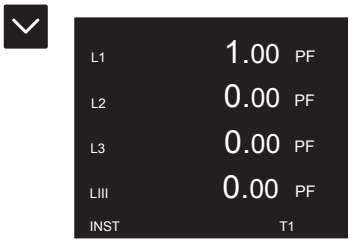
Capacitive reactive power L1 (varC)
Capacitive reactive power L2 (varC)
Capacitive reactive power L3 (varC)
Total capacitive reactive power (varC)



Apparent Power L1 (VA)
Apparent Power L2 (VA)
Apparent Power L3 (VA)
Total apparent power (VA)



Cos φ L1
Cos φ L2
Cos φ L3
Cos φ three-phase



Power factor L1
Power factor L2
Power factor L3
Three-phase power factor

5.1.1.- MAXIMUM AND MINIMUM VALUES

A long keystroke (>2 seconds) on key , while an instantaneous value screen is being displayed, will access the maximum values.
Maximum values are displayed on two alternating screens, where the maximum values and date and time they occurred are displayed, **Figure 27.**

Figure 27: Maximum value displays.

A long keystroke (>2 seconds) on key displays the minimum values. Minimum values are displayed in the same way as maximum values.

Maximum and minimum values can be deleted in the configuration menu (***"6.1.6.- CLEAR MAXIMUMS, MINIMUMS AND MAXIMUM DEMAND"***) or via communications.

5.2.- ENERGY MENU

The energy parameter menu is identified by the literal **ENER** in the bottom left area of the display.

Use keys ^ and v to browse through the different screens:

Total consumed active energy (kWh / MWh)(3)
Total consumed capacitive reactive energy (kvarCh / MvarCh)(3)
Total consumed inductive reactive energy (kvarLh / MvarLh)(3)
Total consumed apparent energy (kVAh / MVAh)(3)

Consumed active energy Tariff 1(kWh / MWh)(3)
Consumed capacitive reactive energy Tariff 1 (kvarCh / MvarCh)(3)
Consumed inductive reactive energy Tariff 1 (kvarLh / MvarLh)(3)
Consumed apparent energy Tariff 1 (kVAh / MVAh)(3)

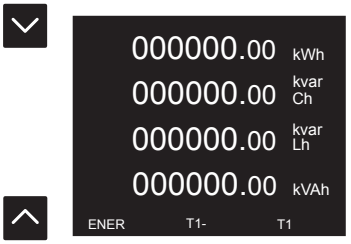
Consumed active energy Tariff 2 (kWh / MWh)(3)
Consumed capacitive reactive energy Tariff 2 (kvarCh / MvarCh)(3)
Consumed inductive reactive energy Tariff 2 (kvarLh / MvarLh)(3)
Consumed apparent energy Tariff 2 (kVAh / MVAh)(3)

Consumed active energy Tariff 3 (kWh / MWh)(3)
Consumed capacitive reactive energy Tariff 3 (kvarCh / MvarCh)(3)
Consumed inductive reactive energy Tariff 3 (kvarLh / MvarLh)(3)
Consumed apparent energy Tariff 3 (kVAh / MVAh)(3)

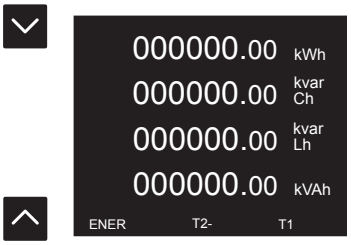
Consumed active energy Tariff 4 (kWh / MWh)(3)
Consumed capacitive reactive energy Tariff 4 (kvarCh / MvarCh)(3)
Consumed inductive reactive energy Tariff 4 (kvarLh / MvarLh)(3)
Consumed apparent energy Tariff 4 (kVAh / MVAh)(3)

If the device has been configured to operate in the 4 quadrants (***"6.1.3.- MEASUREMENT QUADRANTS AND CONVENTION"***), when keys ^ or v are kept pressed (> 2 seconds) , the screens showing Generated Energies are displayed:

Total generated active energy (kWh / MWh)(3)
Total generated capacitive reactive energy (kvarCh / MvarCh)(3)
Total generated inductive reactive energy (kvarLh / MvarLh)(3)
Total generated apparent energy (kVAh / MVAh)(3)

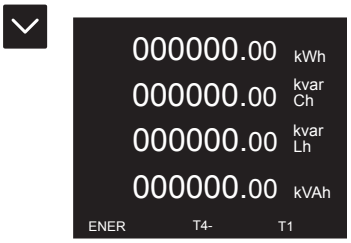


Generated active energy Tariff 1 (kWh / MWh)(3)
Generated capacitive reactive energy Tariff 1 (kvarCh / MvarCh)(3)
Generated inductive reactive energy Tariff 1 (kvarLh / MvarLh)(3)
Generated apparent energy Tariff 1 (kVAh / MVAh)(3)



Generated active energy Tariff 2 (kWh / MWh)(3)
Generated capacitive reactive energy Tariff 2 (kvarCh / MvarCh)(3)
Generated inductive reactive energy Tariff 2 (kvarLh / MvarLh)(3)
Generated apparent energy Tariff 2 (kVAh / MVAh)(3)

Generated active energy Tariff 3 (kWh / MWh)(3)
Generated capacitive reactive energy Tariff 3 (kvarCh / MvarCh)(3)
Generated inductive reactive energy Tariff 3 (kvarLh / MvarLh)(3)
Generated apparent energy Tariff 3 (kVAh / MVAh)(3)



Generated active energy Tariff 4 (kWh / MWh)(3)
Generated capacitive reactive energy Tariff 4 (kvarCh / MvarCh)(3)
Generated inductive reactive energy Tariff 4 (kvarLh / MvarLh)(3)
Generated apparent energy Tariff 4 (kVAh / MVAh)(3)

(3) The displayed energy unit depends on the programmed transformation ratios:
(**Primary Voltage** x **Primary Current**) / (**Secondary Voltage** x **Secondary Current**) < 1000 → **k**
(**Primary Voltage** x **Primary Current**) / (**Secondary Voltage** x **Secondary Current**) ≥ 1000 → **M**

If the energy value exceeds the displayed digits, an arrow appears on the left side of the value to indicate so. Total value may be displayed via communications.

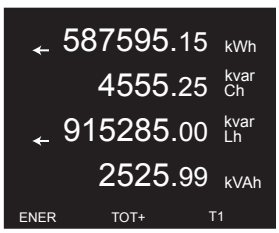


Figure 28: Energy values higher than the displayed digits.

Keep keys ^ or v pressed to display Consumed Energies again.

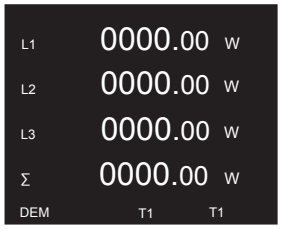
5.3.- MAXIMUM DEMAND MENU

The maximum demand parameter menu is identified by the literal **DEM** in the bottom left area of the display.

The maximum demand calculation period can be configured in section ***"6.1.5.- CALCULATION PERIODS"*** or via communications.

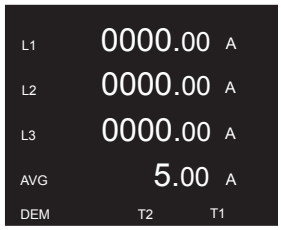
Use keys ^ and v to browse through the different screens:

Maximum L1 Current Demand, Tariff 1 (A)
Maximum L2 Current Demand, Tariff 1 (A)
Maximum L3 Current Demand, Tariff 1 (A)
Total Maximum Current Demand, Tariff 1 (A)

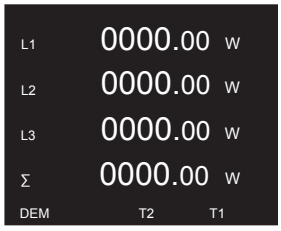


Maximum L1 Active Power Demand, Tariff 1 (W)
Maximum L2 Active Power Demand, Tariff 1 (W)
Maximum L3 Active Power Demand, Tariff 1 (W)
Maximum Total Active Power Demand, Tariff 1 (W)

Maximum L1 Apparent Power Demand, Tariff 1 (VA)
Maximum L2 Apparent Power Demand, Tariff 1 (VA)
Maximum L3 Apparent Power Demand, Tariff 1 (VA)
Total Maximum Apparent Power Demand, Tariff 1 (VA)



Maximum L1 Current Demand, Tariff 2 (A)
Maximum L2 Current Demand, Tariff 2 (A)
Maximum L3 Current Demand, Tariff 2 (A)
Total Maximum Current Demand, Tariff 2 (A)



Maximum L1 Active Power Demand, Tariff 2 (W)
Maximum L2 Active Power Demand, Tariff 2 (W)
Maximum L3 Active Power Demand, Tariff 2 (W)
Total Maximum Active Power Demand, Tariff 2 (W)

Maximum L1 Apparent Power Demand, Tariff 2 (VA)
Maximum L2 Apparent Power Demand, Tariff 2 (VA)
Maximum L3 Apparent Power Demand, Tariff 2 (VA)
Total Maximum Apparent Power Demand, Tariff 2 (VA)

Maximum L1 Current Demand, Tariff 3 (A)
Maximum L2 Current Demand, Tariff 3 (A)
Maximum L3 Current Demand, Tariff 3 (A)
Total Maximum Current Demand, Tariff 3 (A)

Maximum L1 Active Power Demand, Tariff 3 (W)
Maximum L2 Active Power Demand, Tariff 3 (W)
Maximum L3 Active Power Demand, Tariff 3 (W)
Total Maximum Active Power Demand, Tariff 3 (W)

Maximum L1 Apparent Power Demand, Tariff 3 (VA)
Maximum L2 Apparent Power Demand, Tariff 3 (VA)
Maximum L3 Apparent Power Demand, Tariff 3 (VA)
Total Maximum Apparent Power Demand, Tariff 3 (VA)

Maximum L1 Current Demand, Tariff 4 (A)
Maximum L2 Current Demand, Tariff 4 (A)
Maximum L3 Current Demand, Tariff 4 (A)
Total Maximum Current Demand, Tariff 4 (A)

Maximum L1 Active Power Demand, Tariff 4 (W)
Maximum L2 Active Power Demand, Tariff 4 (W)
Maximum L3 Active Power Demand, Tariff 4 (W)
Total Maximum Active Power Demand, Tariff 4 (W)

Maximum L1 Apparent Power Demand, Tariff 4 (VA)
Maximum L2 Apparent Power Demand, Tariff 4 (VA)
Maximum L3 Apparent Power Demand, Tariff 4 (VA)
Total Maximum Apparent Power Demand, Tariff 4 (VA)

5.3.1.- MAXIMUM VALUES

A long keystroke (>2 seconds) on key , while a maximum demand screen is being displayed, will access maximum values.
Maximum values are displayed on two alternating screens, where the maximum values and date and time they occurred are displayed, **Figure 25.**

Maximum values can be deleted in the configuration menu (***"6.1.6.- CLEAR MAXIMUMS, MINIMUMS AND MAXIMUM DEMAND"***) or via communications.

5.4.- QUALITY PARAMETERS MENU

The quality parameter menu is identified by the literal **EVQ** in the bottom left area of the display. Use keys ^ and v to browse through the different screens:

No. of quality events detected in L1
No. of quality events detected in L2
No. of quality events detected in L3

No. of overvoltages (SWELL) detected in L1
No. of overvoltages (SWELL) detected in L2
No. of overvoltages (SWELL) detected in L3

No. of voltage gaps (DIP) detected in L1
No. of voltage gaps (DIP) detected in L2
No. of voltage gaps (DIP) detected in L3

No. of outages (INTERRUPTION) detected in L1
No. of outages (INTERRUPTION) detected in L2
No. of outages (INTERRUPTION) detected in L3

The quality parameter meters can be deleted in the configuration menu (***"6.1.6.- CLEAR QUALITY PARAMETERS"***) or via communications.

5.5.- VOLTAGE HARMONIC MENU

Note: *Menu visible if its display has been configured, see "**6.1.8.- HARMONICS AND CURRENCY DISPLAY"***

Use keys ^ and v to browse through the different screens:

THD Voltage L1 (%)
THD Voltage L2 (%)
THD Voltage L3 (%)

Fundamental Voltage Harmonic L1 (V)
Fundamental Voltage Harmonic L2 (V)
Fundamental Voltage Harmonic L3 (V)

Odd voltage harmonic display, up to 39th, is identified by the literal **HVx** in the bottom left area of the display:
X: *Harmonic No.*

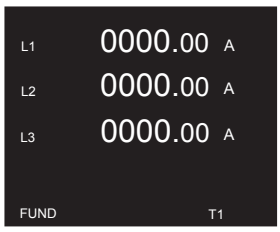
3rd voltage harmonic L1 (%)
3rd voltage harmonic L2 (%)
3rd voltage harmonic L3 (%)

5.6.- CURRENT HARMONIC DISPLAY

Note: *Menu visible if its display has been configured, see "**6.1.8.- HARMONICS AND CURRENCY DISPLAY"***

Use keys ^ and v to browse through the different screens:

THD Current L1 (%)
THD Current L2 (%)
THD Current L3 (%)



Fundamental Current Harmonic L1 (A)
Fundamental Current Harmonic L2 (A)
Fundamental Current Harmonic L3 (A)

Odd current harmonic display, up to 39th, is identified by the literal **HAx** in the bottom left area of the display:
x: *Harmonic No.*

3rd current harmonic L1 (%)
3rd current harmonic L2 (%)
3rd current harmonic L3 (%)

5.7.- METER MENU

The menu displaying meters is identified by the literal **COUNT** in the bottom left area of the display.

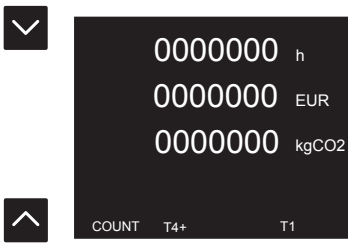
Use keys ^ and v to browse through the different screens:

Nº of hours of total active energy consumed (h)
Cost of total active energy consumed (EUR)
CO_2 emissions from total active energy consumed ($kgCO_2$)

Nº of hours of active energy consumed, Tariff 1 (h)
Cost of active energy consumed, Tariff 1 (EUR)
CO_2 emissions from active energy consumed, Tariff 1 ($kgCO_2$)

Nº of hours of active energy consumed, Tariff 2 (h)
Cost of active energy consumed, Tariff 2 (EUR)
CO_2 emissions from active energy consumed, Tariff 2 ($kgCO_2$)

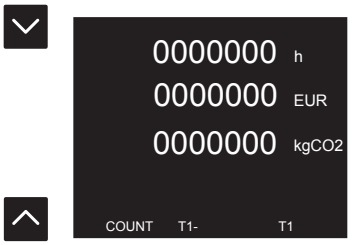
Nº of hours of active energy consumed, Tariff 3 (h)
Cost of active energy consumed, Tariff 3 (EUR)
CO_2 emissions from active energy consumed, Tariff 3 ($kgCO_2$)



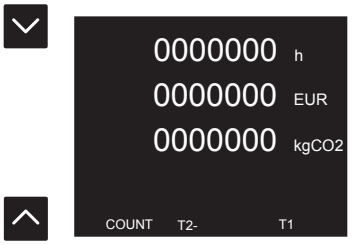
Nº of hours of active energy consumed, Tariff 4 (h)
Cost of active energy consumed, Tariff 4 (EUR)
CO_2 emissions from active energy consumed, Tariff 4 ($kgCO_2$)

If the device has been configured to operate in the 4 quadrants (***"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION"***), if keys ^ or v are kept pressed (> 2 seconds), the screens showing generated consumption are displayed:

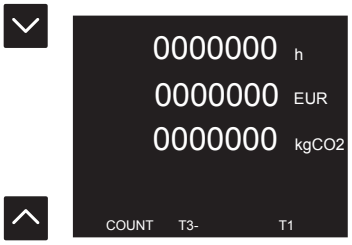
Nº of hours of total active energy generated (h)
Cost of total generated active energy (EUR)
CO_2 emissions from total generated active energy ($kgCO_2$)



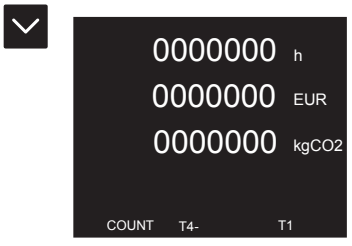
Nº of hours of active energy generated, Tariff 1 (h)
Cost of active energy generated, Tariff 1 (EUR)
CO_2 emissions from active energy generated, Tariff 1 ($kgCO_2$)



Nº of hours of active energy generated, Tariff 2 (h)
Cost of active energy generated, Tariff 2 (EUR)
CO_2 emissions from active energy generated, Tariff 2 ($kgCO_2$)



Nº of hours of active energy generated, Tariff 3 (h)
Cost of active energy generated, Tariff 3 (EUR)
CO_2 emissions from active energy generated, Tariff 3 ($kgCO_2$)



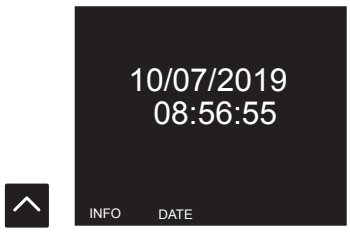
Nº of hours of active energy generated, Tariff 4 (h)
Cost of active energy generated, Tariff 4 (EUR)
CO_2 emissions from active energy generated, Tariff 4 ($kgCO_2$)

Meters can be deleted in the configuration menu (***"6.1.7.- CLEAR ENERGIES AND DELETE ALL"***) or via communications.

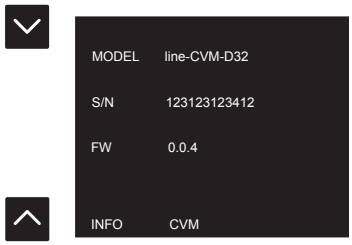
5.8.- INFORMATION MENU

The information menu is identified by the literal **INFO** in the bottom left area of the display.

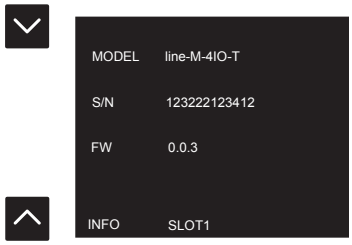
Use keys ^ and v to browse through the different screens:



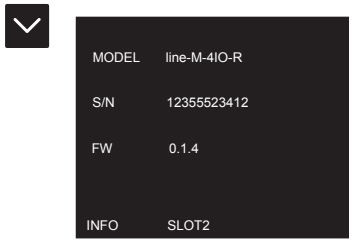
Current Date and Time



Device Model
Serial number
Firmware version of the device



Note: *Displayed if an expansion module is connected.*
Expansion module **model** connected to **line-CVM-D32** in SLOT1[4]
Serial number of the expansion module
Firmware version of the expansion module



Note: *Displayed if an expansion module is connected.*
Expansion module **model** connected to **line-CVM-D32** in SLOT2[5]
Serial number of the expansion module
Firmware version of the expansion module

[4] SLOT1 corresponds to the first device connected to the right-hand side of the **line-CVM-D32** device.

[5] SLOT2 corresponds to the second device connected to the right-hand side of the **line-CVM-D32** device.

Note: *If a line-EDS has been connected to the left-hand side of the* ***line-CVM-D32*** device*, the information screens for the connected expansion modules will not be displayed on the* ***line-CVM-D32*** *device.*

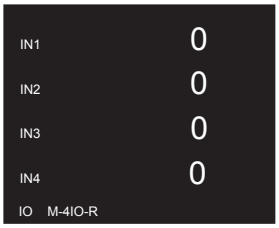
5.9.- INPUT / OUTPUT MENU

The input / output menu is identified by the literal **IO** in the bottom left area of the display.

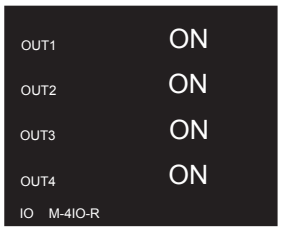
Use keys ^ and v to browse through the different screens:

OUT1, Status of digital output 1 for line-CVM-D32
OUT2, Status of digital output 2 for line-CVM-D32

Input and Output status or value display for the connected expansion modules:
Note: *Displayed if an expansion module is connected.*



Input status/value of the connected expansion module.[6]



Output Status/Value of the connected expansion module.

[6] If the value of the analog input or digital input (pulse input mode) exceeds the displayed digits, an arrow appears on the left side of the value to indicate so (**Figure 28**). Total value may be displayed via communications.

Note: *If a **line-EDS** has been connected to the left-hand side of the **line-CVM-D32** device, the Inputs / Outputs screens for the connected expansion modules will not be displayed on the **line-CVM-D32** device.*

6.- CONFIGURATION

The **line-CVM-D32** device is configured using 8 menus, **Figure 29.**

To access the configuration menu, hold down (>2s) key .

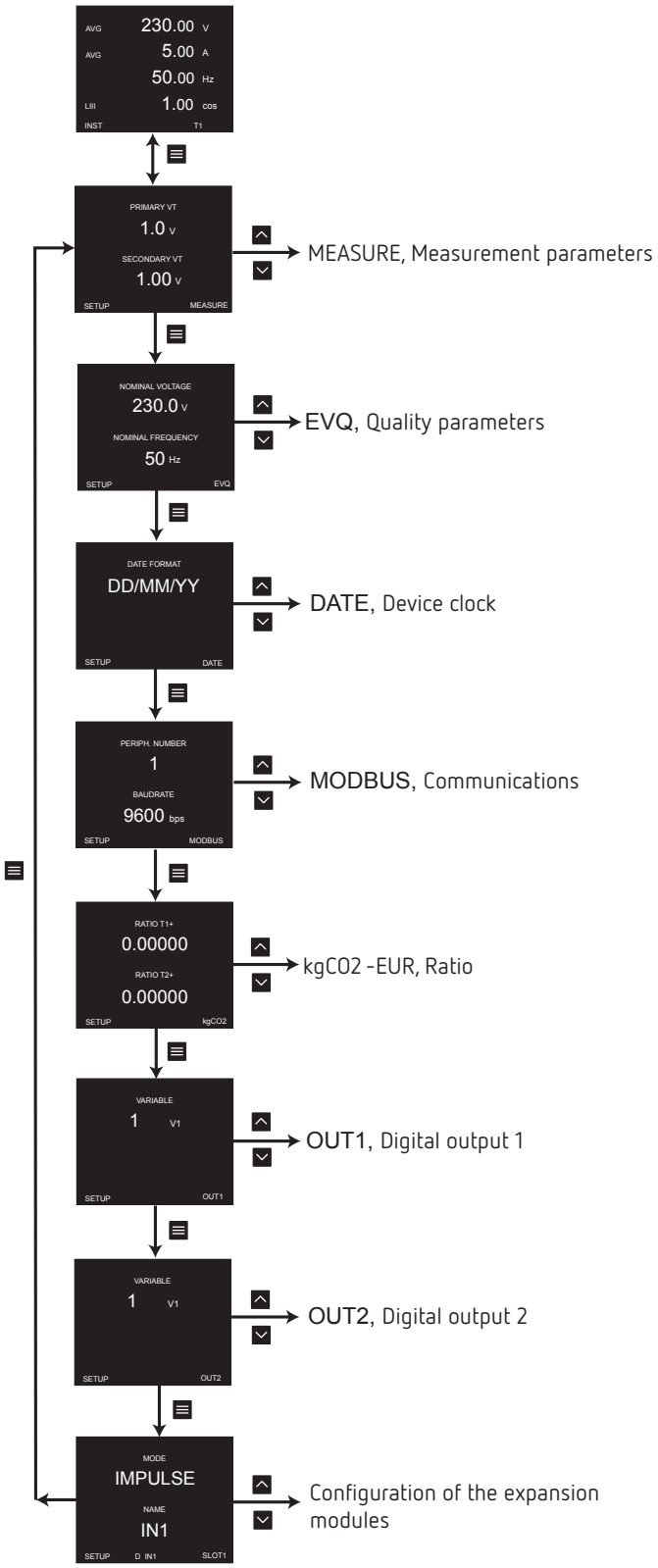


Figure 29: Configuration menu.

If expansion modules are connected to the device, after configuring digital output 2, module configuration is accessed, see the Expansion Module Instruction Manual for correct module configuration (**M239B01-03-xxx**).

The device configuration menu is protected by password; when accessing configuration of one of the device's parameters for the first time, the password screen is displayed, **Figure 30**.

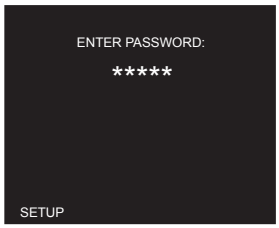


Figure 30: Configuration password.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

Default password: 97531.

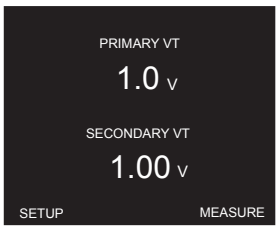
Note: *The password can be modified, see* ***"6.1.9.- DISPLAY BACKLIGHT AND PASSWORD".***

Note: *In* ***"ANNEX A.- CONFIGURATION MENU"*** *, the entire configuration tree is displayed.*

6.1.- MEASUREMENT CONFIGURATION

6.1.1.- PRIMARY AND SECONDARY VOLTAGE

This screen enables Primary and Secondary Voltage value configuration.



Hold down key ^ to set the **Primary Voltage (PRIMARY VT)**.
Hold down key v to set the **Secondary Voltage (SECONDARY VT)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Primary voltage:**

Minimum value: 1.0 V
Maximum value: 2000000.0 V

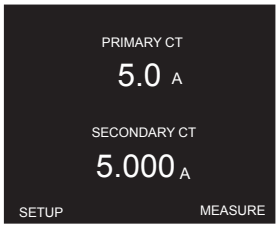
✓ **Secondary voltage:**

Minimum value: 1.00 V
Maximum value: 2000000.00 V

Use key to skip to the next programming point.

6.1.2.- PRIMARY AND SECONDARY CURRENT

This screen enables Primary and Secondary Current value configuration.



Hold down key to set the **Primary Current (PRIMARY CT)**.
Hold down key to set the **Secondary Current (SECONDARY CT)**.

Use keys and to modify the digit's value.
Press key to skip through the digits.
Hold down key to validate the value.

✓ **Primary current:**

Minimum value: 1.0 A
Maximum value: 2000000.0 A

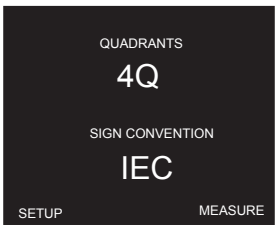
✓ **Secondary current:**

Minimum value: 0.25 A
Maximum value: 5.00 A

Use key to skip to the next programming point.

6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION

This screen enables configuration of the device's working quadrants and measurement convention.



Hold down key ^ to set the **quadrant (QUADRANTS)**.
Hold down key v to set the **measurement convention (SIGN CONVENTION)**.

Use keys ^ and v to skip through the different options:

✓ **Quadrants:**

2Q, The device operates in 2 quadrants.
4Q, The device operates in all 4 quadrants.

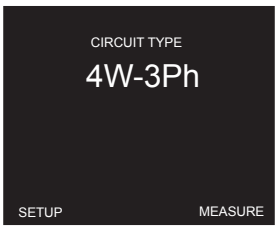
✓ **Measurement convention:**

IEC, Measurement convention IEC.
CIRC, Measurement convention **Circutor**.
IEEE, Measurement convention IEEE.

To validate the option, hold down key ≡.
Use key v to skip to the next programming point.

6.1.4.- INSTALLATION TYPE

This screen enables type of installation to be configured **(CIRCUIT TYPE)**.



Hold down key ^ to enter programming mode.
Use keys ^ and v to skip through the different options:

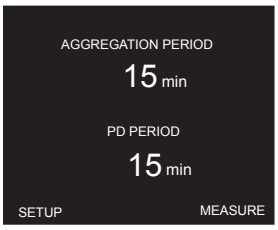
4W-3Ph, Three-phase mains measuring with 4-wire connection.
3W-3Ph, Three-phase mains measuring with 3-wire connection
3W-2Ph, Two-phase mains measuring with 3-wire connection
2W-1Ph, Single-phase mains measuring with 2-wire phase-to-phase connection

2W-1Ph, Single-phase mains measuring with 2-wire phase-to-neutral connection
ARON, Three-phase mains measuring with 3-wire connection and transformers with ARON connection.

To validate the option, hold down key .
Use key to skip to the next programming point.

6.1.5.- CALCULATION PERIODS

This screen enables configuration of device calculation periods.



Hold down key to set the **aggregation period,** i.e. measurement integration period **(AGGREGATION PERIOD)**.
Hold down key to set the **integration period for maximum demand calculation (PD PERIOD)**.

Use keys and to modify the digit's value.
Press key to skip through the digits.

Hold down key to validate the value.

✓ **Aggregation period:**

Minimum value: 1 minute.
Maximum value: 60 minutes.

Note: *The programmed value must be divisible by 60, i.e. the division **60 / Aggregation period** must be exact.*

✓ **Maximum demand integration period:**

Minimum value: 1 minute.
Maximum value: 60 minutes.

Use key to skip to the next programming point.

6.1.6.- CLEAR MAXIMUMS, MINIMUMS AND MAXIMUM DEMAND

This screen enables the maximum demand's maximum, minimum and calculation values to be cleared.

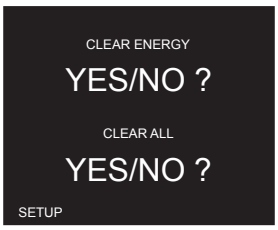
Hold down key ^ to **clear the maximum and minimum values** for all measurement variables **(CLEAR MAX/MIN)**.
Hold down key v to **clear** the maximum calculation and value of the **maximum demand (CLEAR PD)**.
Use keys ^ and v to skip through the different options:

YES, values are cleared.
NO, values are not cleared.

To validate the option, hold down key ≡.
Use key v to skip to the next programming point.

6.1.7.- CLEAR ENERGIES AND DELETE ALL

This screen enables the energy meters to be cleared and data to be entirely deleted.



Hold down key ^ to **clear energy, hour, cost and CO_2 emission meters (CLEAR ENERGY)**.
Hold down key v to **clear all (CLEAR ALL)**. Delete all clears maximum and minimum values, maximum demand calculation, maximum demand of the maximum value, and quality parameter meters.

Use keys ^ and v to skip through the different options:

YES, values are cleared.
NO, values are not cleared.

To validate the option, hold down key ≡.
Use key v to skip to the next programming point.

6.1.8.- HARMONICS AND CURRENCY DISPLAY

This screen enables harmonics and calculation currency to be displayed or not.

Hold down key ^ to set the **harmonics display (SHOW HARMONICS).**
Use keys ^ and v to skip through the different options:

YES, Voltage and current harmonics are displayed.
NO, Harmonics are not displayed.

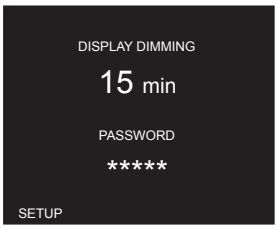
Hold down key v to set the **currency (COIN)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

To validate the option, hold down key ≡.
Use key v to skip to the next programming point.

6.1.9.- DISPLAY BACKLIGHT AND PASSWORD

This screen enables configuration of the display's maximum brightness time from the last time the device was operated using the keypad. After the set time, display dims.
The parameter configuration access password is also displayed.



Hold down key ^ to set **display backlight (DISPLAY DIMMING)**.
Hold down key v to set **the password (PASSWORD)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

✓ **Display backlight:**

Minimum value: 1 minute.
Maximum value: 99 minutes.

✓ **Password:**

Minimum value: 00000.
Maximum value: 99999.

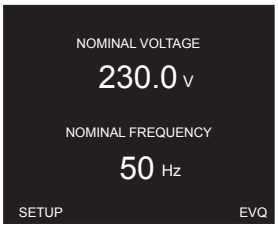
Note: *If value 0000 is set, the password is disabled.*

Hold down key to validate the value.
Use key to skip to the next programming point.

6.2.- QUALITY PARAMETER CONFIGURATION

6.2.1.- NOMINAL VOLTAGE AND FREQUENCY

This screen enables configuration of the nominal voltage and frequency in order to detect the quality parameters.



Hold down key to set the **nominal voltage (NOMINAL VOLTAGE)**.

Use keys and to modify the digit's value.
Press key to skip through the digits.

✓ **Nominal voltage:**

Minimum value: 50.0 V
Maximum value: 2000000.0 V

Hold down key to set **nominal frequency (NOMINAL FREQUENCY)**.

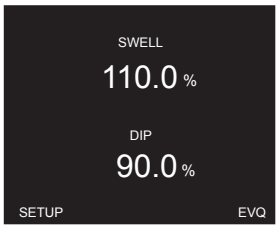
Use keys for to skip through the different options:

50 Hz, 60 Hz,

Hold down key to validate the value.
Use key to skip to the next programming point.

6.2.2.- OVERVOLTAGE AND GAPS

This screen enables threshold values for detecting overvoltage and gaps.



Hold down key ^ to set the threshold value for the detection of an **overvoltage,** in % of nominal voltage value **(SWELL)**.
Hold down key v to set the threshold value for the detection of a **gap,** in % of nominal voltage value **(DIP)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Overvoltage:**

Minimum value: 100.0 %
Maximum value: 150.0 %

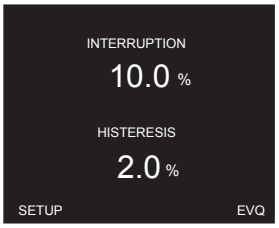
✓ **Gap:**

Minimum value: 50.0 %
Maximum value: 97.0 %

Use key v to skip to the next programming point.

6.2.3.- INTERRUPTION AND HYSTERESIS VALUE

This screen enables configuration of threshold values for the detection of quality parameter interruptions and hysteresis values.



Hold down key ^ to set the threshold value for the detection of an **interruption,** in % of nominal voltage value **(INTERRUPTION)**.
Hold down key v to set the hysteresis value for each of the quality parameters **(HYSTERESIS)**.
Use keys ^ and v to modify the digit's value.

Press key ☰ to skip through the digits.
Hold down key ☰ to validate the value.

✓ **interruption:**

Minimum value: 1.0 %
Maximum value: 20.0 %

✓ **Hysteresis:**

Minimum value: 0.0 %
Maximum value: 10.0 %

Use key ⌄ to skip to the next programming point.

6.2.4.- CLEAR QUALITY PARAMETERS

This screen enables the quality parameter meters to be cleared.

Hold down key ⌃ to clear the **quality parameter** meters **(RESET EVQ)**.

Use keys ⌃ and ⌄ to skip through the different options:

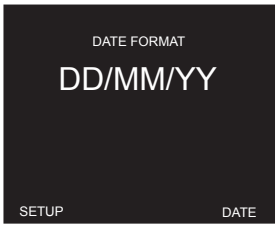
YES, values are cleared.
NO, values are not cleared.

To validate the option, hold down key ☰.
Use key ⌄ to skip to the next programming point.

6.3.- DEVICE CLOCK SETTING

6.3.1.- DATE FORMAT

This screen is to display date format.



Hold down key ^ to set the **date format (DATE FORMAT)**.

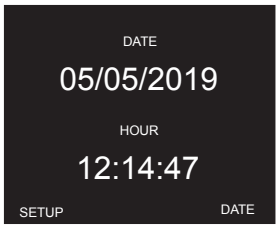
Use keys ^ and v to skip through the different options:

DD/MM/YY, Day/Month/Year.
MM/DD/YY, Month/Day/Year

To validate the option, hold down key ≡.
Use key v to skip to the next programming point.

6.3.2.- DATE AND TIME

This screen enables current date and time configuration.



Hold down key ^ to set **current date (DATE)**.
Hold down key v to set **current time (HOUR)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

Use key v to skip to the next programming point.

6.4.- COMMUNICATIONS CONFIGURATION

6.4.1.- PERIPHERAL NUMBER AND TRANSMISSION SPEED

This screen enables configuration of the peripheral number and transmission speed for RS-485 communications.

Hold down key ^ to set the **peripheral number** **(PERIPH. NUMBER)**.
Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

✓ **Peripheral number:**

Minimum value: 1.
Maximum value: 255.

Hold down key ≡ to validate the value.

Hold down key v to set the **transmission speed** **(BAUDRATE)**.

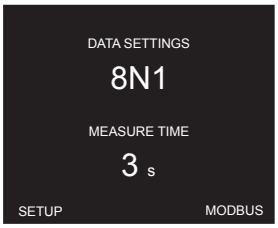
Use keys ^ and v to skip through the different options:

4800, 9600, 19200, 38400, 57600, 115200 bps

Hold down key ≡ to validate the value.
Use key v to skip to the next programming point.

6.4.2.- DATA FORMAT AND MEASURE TIME

This screen enables data format and calculation time configuration.



Hold down key ^ to configure **data format** **(DATA SETTINGS)** for RS-485 Communications.

Use keys ^ and v to skip through the different options:

8N1, no parity, 8 data bits, 1 stop bit
8O2, odd parity, 8 data bits, 2 stop bits
8E2, even parity, 8 data bits, 2 stop bits
8N2, no parity, 8 data bits, 2 stop bit
8O1, odd parity, 8 data bits, 1 stop bit
8E1, even parity, 8 data bits, 1 stop bit

To validate the option, hold down key ≡.

Hold down key v to configure parameter display **refresh time** via modbus **(MEASURE TIME)**.

Use keys ^ and v to skip through the different options:

200 ms**,**
3 s,
User: x min, value set in the **aggregation period** parameter, (**"*6.1.5.- CALCULATION PERIODS*"**).

Hold down key ≡ to validate the value.

Use key v to skip to the next programming point.

6.5.- RATIO CONFIGURATION

6.5.1.- CO_2 EMISSIONS IN CONSUMPTION, TARIFFS 1 AND 2

This screen enables carbon emission ratio configuration in consumption.
Carbon emission ratio is the amount of carbon released into the atmosphere to produce one unit of electricity (1 kWh).
The European mix ratio is approximately 0.65 $kgCO_2$ per kWh.

Hold down key ^ to set **the emission ratio for Tariff 1 in consumption (RATIO T1+)**.
Hold down key v to set **the emission ratio for Tariff 2 in consumption (RATIO T2+)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Tariff 1 and 2 emission ratio in consumption:**

Minimum value: 0.00000 $kgCO_2$
Maximum value: 99.99999 $kgCO_2$

Use key ⌄ to skip to the next programming point.

6.5.2.- CO_2 EMISSIONS IN CONSUMPTION, TARIFFS 3 AND 4

This screen enables carbon emission ratio configuration in consumption.
Carbon emission ratio is the amount of carbon released into the atmosphere to produce one unit of electricity (1 kWh).
The European mix ratio is approximately 0.65 $kgCo_2$ per kWh.

Hold down key ⌃ to set **the emission ratio for Tariff 3 in consumption (RATIO T3+)**.
Hold down key ⌄ to set **emission ratio for Tariff 4 in consumption (RATIO T4+)**.

Use keys ⌃ and ⌄ to modify the digit's value.
Press key ☰ to skip through the digits.
Hold down key ☰ to validate the value.

✓ **Tariff 3 and 4 emission ratio in consumption:**

Minimum value: 0.00000 $kgCO_2$
Maximum value: 99.99999 $kgCO_2$

Use key ⌄ to skip to the next programming point.

6.5.3.- COST OF CONSUMED ENERGY IN CONSUMPTION, TARIFFS 1 AND 2

This screen enables configuration of the costs per kWh of electricity for tariffs 1 and 2 in consumption.

Hold down key ^ to set **the ratio per kWh for Tariff 1 in consumption (RATIO T1+)**.
Hold down key v to set **the ratio per kWh for Tariff 2 in consumption (RATIO T2+)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Tariff 1 and 2 ratio per kWh in consumption:**

Minimum value: 0.00000 EUR
Maximum value: 99.99999 EUR

Use key v to skip to the next programming point.

6.5.4.- ENERGY COST IN CONSUMPTION, TARIFFS 3 AND 4

This screen enables configuration of the costs per kWh of electricity for tariffs 3 and 4 in consumption.

Hold down key ^ to set **the ratio per kWh for Tariff 3 in consumption (RATIO T3+)**
Hold down key v to set **the ratio per kWh for Tariff 4 in consumption (RATIO T4+)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Tariff 3 and 4 ratio per kWh in consumption:**

Minimum value: 0.00000 EUR
Maximum value: 99.99999 EUR

Use key ⌄ to skip to the next programming point.

6.5.5.- CO_2 EMISSIONS IN GENERATION, TARIFFS 1 AND 2

Note: *Display visible if the device has been configured to operate in all 4 quadrants (**"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION"**)*

This screen enables carbon emission ratio configuration in generation.
Carbon emission ratio is the amount of carbon released into the atmosphere to produce one unit of electricity (1 kWh).
The European mix ratio is approximately 0.65 $kgCO_2$ per kWh.

Hold down key ⌃ to set **the emission ratio for Tariff 1 in generation (RATIO T1-)**.
Hold down key ⌄ to set **the emission ratio for Tariff 2 in generation (RATIO T2-)**.

Use keys ⌃ and ⌄ to modify the digit's value.
Press key ☰ to skip through the digits.
Hold down key ☰ to validate the value.

✓ **Tariff 1 and 2 emission ratio in generation:**

Minimum value: 0.00000 $kgCO_2$
Maximum value: 99.99999 $kgCO_2$

Use key ⌄ to skip to the next programming point.

6.5.6.- CO_2 EMISSIONS IN GENERATION, TARIFFS 3 AND 4

Note: *Screen displayed if the device has been configured to operate in all 4 quadrants (**"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION"**).*

This screen enables carbon emission ratio configuration in generation.
Carbon emission ratio is the amount of carbon released into the atmosphere to produce one unit of electricity (1 kWh).
The European mix ratio is approximately 0.65 $kgCO_2$ per kWh.

Hold down key ^ to set **the emission ratio for Tariff 3 in generation (RATIO T3-)**.
Hold down key v to set **emission ratio for Tariff 4 in generation (RATIO T4-)**.

Use keys ^ and v to modify the digit's value.
Press key ☰ to skip through the digits.
Hold down key ☰ to validate the value.

✓ **Tariff 3 and 4 emission ratio in generation:**

Minimum value: 0.00000 $kgCO_2$
Maximum value: 99.99999 $kgCO_2$

Use key v to skip to the next programming point.

6.5.7.- ENERGY COST IN GENERATION, TARIFFS 1 AND 2

Note: *Display visible if the device has been configured to operate in all 4 quadrants (**"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION"**).*

This screen enables configuration of the costs per kWh of electricity for tariffs 1 and 2 in generation.

Hold down key ^ to set **the ratio per kWh for Tariff 1 in generation (RATIO T1-)**
Hold down key v to set **the ratio per kWh for Tariff 2 in generation (RATIO T2-)**.

Use keys ^ and v to modify the digit's value.
Press key ☰ to skip through the digits.
Hold down key ☰ to validate the value.

✓ **Tariff 1 and 2 ratio per kWh in generation:**

Minimum value: 0.00000 EUR
Maximum value: 99.99999 EUR

Use key v to skip to the next programming point.

6.5.8.- ENERGY COST IN GENERATION, TARIFFS 3 AND 4

Note: *Display visible if the device has been configured to operate in all 4 quadrants (**"6.1.3.- QUADRANTS AND MEASUREMENT CONVENTION"**).*

This screen enables configuration of the costs per kWh of electricity for tariffs 3 and 4 in generation

Hold down key ^ to set **the ratio per kWh for Tariff 3 in generation (RATIO T3-)**.
Hold down key v to set **the ratio per kWh for Tariff 4 in generation (RATIO T4-)**.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.
Hold down key ≡ to validate the value.

✓ **Tariff 3 and 4 ratio per kWh in generation**

Minimum value: 0.00000 EUR
Maximum value: 99.99999 EUR

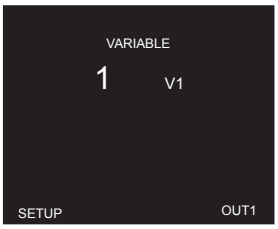
Use key v to skip to the next programming point.

6.6.- CONFIGURATION OF DIGITAL OUTPUTS 1 AND 2

Note: *Digital output 1 configuration is identified by the literal* ***OUT1*** *at the bottom right-hand side of the display. Literal* ***OUT2*** *corresponds to digital output 2.*

6.6.1.- VARIABLE

This screen enables configuration of the **digital output variable** (**VARIABLE**).



Hold down key to enter programming mode.

Use keys and to modify the digit's value.
Press key to skip through the digits.

The codes for the variables are shown in **Table 10, Table 11, Table 12** and **Table 13.**

To validate the option, hold down key .
Use key to skip to the next programming point.

Table 10: Variable codes for Digital Output programming (Table 1).

Parameter	Phase	Code	Phase	Code	Phase	Code	Phase	Code
Phase-Neutral voltage	L1	***1***	L2	***9***	L3	***17***	III	***31***
Phase-Phase voltage	L12	***28***	L23	***29***	L31	***30***	III	***32***
Current	L1	***2***	L2	***10***	L3	***18***	III	***33***
Frequency	-	***27***	-	-	-	-	-	-
Total Active Power	L1	***3***	L2	***11***	L3	***19***	III	***34***
Consumed Active Power	L1	***700***	L2	***707***	L3	***714***	III	***721***
Generated Active Power	L1	***728***	L2	***735***	L3	***742***	III	***749***
Total Apparent Power	L1	***6***	L2	***14***	L3	***22***	III	***37***
Consumed Apparent Power	L1	***704***	L2	***711***	L3	***718***	III	***725***
Generated Apparent Power	L1	***732***	L2	***739***	L3	***746***	III	***753***
Total Reactive Power	L1	***69***	L2	***70***	L3	***71***	III	***72***
Total Consumed Reactive Power	L1	***703***	L2	***710***	L3	***717***	III	***724***
Total Generated Reactive Power	L1	***731***	L2	***738***	L3	***745***	III	***752***
Total Inductive Reactive Power	L1	***4***	L2	***12***	L3	***20***	III	***35***
Consumed Inductive Reactive Power	L1	***701***	L2	***708***	L3	***715***	III	***722***
Generated Inductive Reactive Power	L1	***729***	L2	***736***	L3	***743***	III	***750***

Table 10 (Continued): Variable codes for Digital Output programming (Table 1).

Parameter	Phase	Code	Phase	Code	Phase	Code	Phase	Code
Total Capacitive Reactive Power	L1	***5***	L2	***13***	L3	***21***	III	***36***
Consumed Capacitive Reactive Power	L1	***702***	L2	***709***	L3	***716***	III	***723***
Generated Capacitive Reactive Power	L1	***730***	L2	***737***	L3	***744***	III	***751***
Total Power Factor	L1	***7***	L2	***15***	L3	***23***	III	***38***
Generated Power Factor	L1	***705***	L2	***712***	L3	***719***	III	***726***
Consumed Power Factor	L1	***733***	L2	***740***	L3	***747***	III	***754***
Cos φ Total	L1	***8***	L2	***16***	L3	***24***	III	***39***
Cos φ Generated	L1	***706***	L2	***713***	L3	***720***	III	***727***
Cos φ Consumed	L1	***734***	L2	***741***	L3	***748***	III	***755***
THD% Voltage	L1	***40***	L2	***41***	L3	***42***	-	-
THD % Current	L1	***44***	L2	***45***	L3	***46***	-	-
Quality Parameter (7)	L1	***109***	L2	***110***	L3	***111***	III	***112***

(7) The output is activated when any of the quality parameters (overvoltage, gap or interruption) meet the programmed parameters.

Outputs are also configurable depending on the digital or analogue inputs of the connected expansion modules (**Table 11**).

Note: *SLOT1 is the expansion module nearest* **line-CVM-D32** *device, SLOT2 is the following expansion module.*

The code **MANUAL**(8) is used to manually activate the digital output, see ***"6.6.8.- DIGITAL OUTPUT MANUAL OPERATION. "***

Table 11: Variable codes for Digital Output programming (Table 2).

Parameter	IN	Code	IN	Code	IN	Code	IN	Code
Digital input SLOT1	1	***902***	2	***903***	3	***904***	4	***905***
Digital input SLOT2	1	***910***	2	***911***	3	***912***	4	***913***
Analogue input SLOT1	1	***934***	2	***935***	3	***936***	4	***937***
Analogue input SLOT1	1	***942***	2	***943***	3	***944***	4	***945***
MANUAL (8)		***0***						

Table 12: Variable codes for Digital Output programming (Table 3).

Parameter	Tariff	Code	Tariff	Code	Tariff	Code
Maximum Current Demand L1	T1	***600***	T2	***612***	T3	***624***
	T4	***636***	-	-	-	-
Maximum Current Demand L2	T1	***601***	T2	***613***	T3	***625***
	T4	***637***	-	-	-	-
Maximum Current Demand L3	T1	***602***	T2	***614***	T3	***626***
	T4	***638***	-	-	-	-
Maximum Current Demand III	T1	***603***	T2	***615***	T3	***627***
	T4	***639***	-	-	-	-

Table 12 (Continued): Variable codes for Digital Output programming (Table 3).

Parameter	Tariff	Code	Tariff	Code	Tariff	Code
Maximum Active Power Demand L1	T1	***604***	T2	***616***	T3	***628***
	T4	***640***	-	-	-	-
Maximum Active Power Demand L2	T1	***605***	T2	***617***	T3	***629***
	T4	***641***	-	-	-	-
Maximum Active Power Demand L3	T1	***606***	T2	***618***	T3	***630***
	T4	***642***	-	-	-	-
Maximum Active Power Demand III	T1	***607***	T2	***619***	T3	***631***
	T4	***643***	-	-	-	-
Maximum Apparent Power Demand L1	T1	***608***	T2	***620***	T3	***632***
	T4	***644***	-	-	-	-
Maximum Apparent Power Demand L2	T1	***609***	T2	***621***	T3	***633***
	T4	***645***	-	-	-	-
Maximum Apparent Power Demand L3	T1	***610***	T2	***622***	T3	***634***
	T4	***646***	-	-	-	-
Maximum Apparent Power Demand III	T1	***611***	T2	***623***	T3	***635***
	T4	***647***	-	-	-	-
Consumption hour no.	T1	***531***	T2	***537***	T3	***543***
	T4	***549***	Total	***585***	-	-
Generation hour no.	T1	***534***	T2	***540***	T3	***546***
	T4	***552***	Total	***588***	-	-
Consumption cost	T1	***529***	T2	***535***	T3	***541***
	T4	***547***	Total	***583***	-	-
Generation cost	T1	***532***	T2	***538***	T3	***544***
	T4	***550***	Total	***586***	-	-
CO_2 emissions from consumption	T1	***530***	T2	***536***	T3	***542***
	T4	***548***	Total	***584***	-	-
CO_2 emissions from generation	T1	***533***	T2	***539***	T3	***545***
	T4	***551***	Total	***587***	-	-

Table 13: Variable codes for Digital Output programming (Energy pulses).

Parameter	L1		L2		L3		III	
	Tariff	Code	Tariff	Code	Tariff	Code	Tariff	Code
Consumed Active Energy	T1	***129***	T1	***134***	T1	***139***	T1	***144***
	T2	***169***	T2	***174***	T2	***179***	T2	***184***
	T3	***209***	T3	***214***	T3	***219***	T3	***224***
	T4	***249***	T4	***254***	T4	***259***	T4	***264***
	Total	***489***	Total	***494***	Total	***499***	Total	***504***
Generated Active Energy	T1	***149***	T1	***154***	T1	***159***	T1	***164***
	T2	***189***	T2	***194***	T2	***199***	T2	***204***
	T3	***229***	T3	***234***	T3	***239***	T3	***244***
	T4	***269***	T4	***274***	T4	***279***	T4	***284***
	Total	***509***	Total	***514***	Total	***519***	Total	***524***

Table 13 (Continued): Variable codes for Digital Output programming (Energy pulses).

Parameter	L1		L2		L3		III	
	Tariff	Code	Tariff	Code	Tariff	Code	Tariff	Code
Consumed Reactive Energy	T1	***132***	T1	***137***	T1	***142***	T1	***147***
	T2	***172***	T2	***177***	T2	***182***	T2	***187***
	T3	***212***	T3	***217***	T3	***222***	T3	***227***
	T4	***252***	T4	***257***	T4	***262***	T4	***267***
	Total	***492***	Total	***497***	Total	***502***	Total	***507***
Generated Reactive Energy	T1	***152***	T1	***157***	T1	***162***	T1	***167***
	T2	***192***	T2	***197***	T2	***202***	T2	***207***
	T3	***232***	T3	***237***	T3	***242***	T3	***247***
	T4	***272***	T4	***277***	T4	***282***	T4	***287***
	Total	***512***	Total	***517***	Total	***522***	Total	***527***
Consumed Inductive Reactive Energy	T1	***130***	T1	***135***	T1	***140***	T1	***145***
	T2	***170***	T2	***175***	T2	***180***	T2	***185***
	T3	***210***	T3	***215***	T3	***220***	T3	***225***
	T4	***250***	T4	***255***	T4	***260***	T4	***265***
	Total	***490***	Total	***495***	Total	***500***	Total	***505***
Generated Inductive Reactive Energy	T1	***150***	T1	***155***	T1	***160***	T1	***165***
	T2	***190***	T2	***195***	T2	***200***	T2	***205***
	T3	***230***	T3	***235***	T3	***240***	T3	***245***
	T4	***270***	T4	***275***	T4	***280***	T4	***285***
	Total	***510***	Total	***515***	Total	***520***	Total	***525***
Consumed Capacitive Reactive Energy	T1	***131***	T1	***136***	T1	***141***	T1	***146***
	T2	***171***	T2	***176***	T2	***181***	T2	***186***
	T3	***211***	T3	***216***	T3	***221***	T3	***226***
	T4	***251***	T4	***256***	T4	***261***	T4	***266***
	Total	***491***	Total	***496***	Total	***501***	Total	***506***
Generated Capacitive Reactive Energy	T1	***151***	T1	***156***	T1	***161***	T1	***166***
	T2	***191***	T2	***196***	T2	***201***	T2	***206***
	T3	***231***	T3	***236***	T3	***241***	T3	***246***
	T4	***271***	T4	***276***	T4	***281***	T4	***286***
	Total	***511***	Total	***516***	Total	***521***	Total	***526***
Consumed Apparent Energy	T1	***133***	T1	***138***	T1	***143***	T1	***148***
	T2	***173***	T2	***178***	T2	***183***	T2	***188***
	T3	***213***	T3	***218***	T3	***223***	T3	***228***
	T4	***253***	T4	***258***	T4	***263***	T4	***268***
	Total	***493***	Total	***498***	Total	***503***	Total	***508***
Generated Apparent Energy	T1	***153***	T1	***158***	T1	***163***	T1	***168***
	T2	***193***	T2	***198***	T2	***203***	T2	***208***
	T3	***233***	T3	***238***	T3	***243***	T3	***248***
	T4	***273***	T4	***278***	T4	***283***	T4	***288***
	Total	***513***	Total	***518***	Total	***523***	Total	***528***

6.6.2.- MAXIMUM AND MINIMUM VALUE

Note: *Screen visible if the selected digital output variable is in* ***Table 10, Table 11*** *or* ***Table 12.***

This screen enables maximum and minimum alarm variable configuration.

Hold down key ^ to set **maximum value (HIGH VALUE)**, i.e. the value above which the alarm is activated.
Hold down key v to set **minimum value (LOW VALUE)**, i.e. the value below which the alarm is activated.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

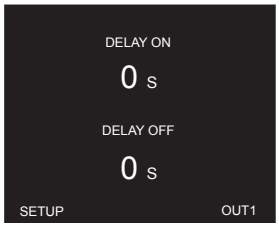
Note: *Maximum and minimum programming value depends on the selected variable.*

Hold down key ≡ to validate the value.
Use key v to skip to the next programming point.

6.6.3.- CONNECTION AND DISCONNECTION DELAY

Note: *Screen visible if the selected digital output variable is in* ***Table 10, Table 11*** *or* ***Table 12.***

This screen enables alarm connection and disconnection delay configuration in seconds.



Hold down key ^ to set **connection delay (DELAY ON)**to validate the value.
Hold down key v to set **disconnection delay (DELAY OFF)**to validate the value.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

✓ **Connection and Disconnection Delay.**

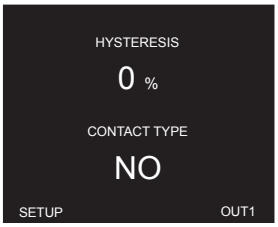
Minimum value: 0 s.
Maximum value: 65499 s.

Hold down key to validate the value.
Use key to skip to the next programming point.

6.6.4.- HYSTERESIS AND STATUS OF CONTACTS

Note: *Screen visible if the selected digital output variable is in* ***Table 10, Table 11*** *or* ***Table 12.***

This screen enables hysteresis value and contact status configuration.



Hold down key to set **hysteresis value (HYSTERESIS)**, the difference between the alarm on and off value in %.
Use keys and to modify the digit's value.
Press key to skip through the digits.

✓ **Hysteresis:**

Minimum value: 0%.
Maximum value: 99%.

Hold down key to set **contact status (CONTACT TYPE)**.

Use keys and to skip through the different options:

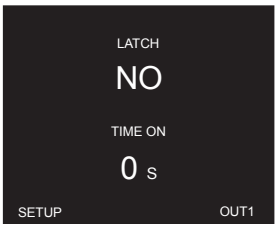
NC, Contact normally closed.
NO, Contact normally open.

Hold down key to validate the value.
Use key to skip to the next programming point.

6.6.5.- LATCH

Note: *Screen visible if the selected digital output variable is in* ***Table 10, Table 11*** *or* ***Table 12.***

This screen enables alarm latching configuration.



Hold down key ^ to set **latching (LATCH)**, i.e. if it remains interlocked after the alarm is triggered, even if the event that triggered it disappears.

Use keys ^ and v to skip through the different options:

NO, Latching is not activated.
YES, Latching is activated.
TIME, Alarm latching is activated for a set time, **Latching time**.

Hold down key v to set **Latching time (TIME ON)**. The time in seconds that the alarm is interlocked is displayed. After such time, if the alarm status no longer applies, disconnection delay is activated.

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

✓ **Latching time:**

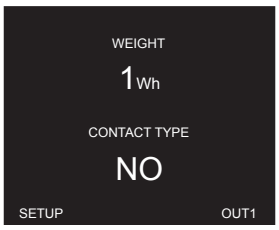
Minimum value: 0 s.
Maximum value: 65499 s.

Hold down key ≡ to validate the value.
Use key v to skip to the next programming point.

6.6.6.- ENERGY PER PULSE AND CONTACT STATUS

Note: *Screen visible if the selected digital output variable is an energy, see* ***Table 13.***

This screen enables energy per pulse and contact status configuration.



Hold down key ^ to set the **energy per pulse (WEIGHT).**

Use keys ^ and v to modify the digit's value.
Press key ≡ to skip through the digits.

✓ **Energy per pulse:**

Minimum value: 1 wh / varLh / varCh / varh / VAh.
Maximum value: 1999999 wh / varLh / varCh / varh / VAh.

Hold down key ⌄ to set **contact status (CONTACT TYPE)**.

Use keys ⌃ and ⌄ to skip through the different options:

NC, Contact normally closed.
NO, Contact normally open.

Hold down key ☰ to validate the value.
Use key ⌄ to skip to the next programming point.

6.6.7.- PULSE

Note: *Screen visible if the selected digital output variable is an energy, see* ***Table 13.***

This screen enables pulse width configuration

Hold down key ⌃ to set **pulse width** to a high level **(HIGH PERIOD)**.
Hold down key ⌄ to set **pulse width** to a low level **(LOW PERIOD)**.

Use keys ⌃ and ⌄ to modify the digit's value.
Press key ☰ to skip through the digits.

✓ **Pulse width:**

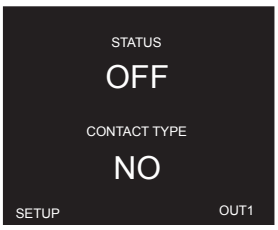
Minimum value: 0 x10 ms.
Maximum value: 999 x10 ms.

Hold down key ☰ to validate the value.
Use key ⌄ to skip to the next programming point.

6.6.8.- DIGITAL OUTPUT MANUAL OPERATION

Note: *Screen displayed if the selected digital output variable is* **MANUAL**, *see* ***Table 11.***

This screen enables manual digital output activation.



Hold down key ^ to set **output status (STATUS).**
Use keys ^ and v to skip through the different options:

OFF, Disconnected output.
ON, Connected output.

Hold down key v to set **contact status (CONTACT TYPE).**

Use keys ^ and v to skip through the different options:

NC, Contact normally closed.
NO, Contact normally open.

Hold down key ≡ to validate the value.
Use key v to skip to the next programming point.

7.- RS-485 COMMUNICATIONS

The **line-CVM-D32** devices have RS-485 communications with **MODBUS RTU ®** communications protocol.

7.1.- CONNECTIONS

The RS-485 cable must be a twisted pair cable with shielding mesh (minimum 3 wires), and maximum distance between the **line-CVM-D32** device and the master unit must not exceed 12m. in length.
A maximum of 32 **line-CVM-D32** devices can be connected to the bus.

For communication with the master unit, a smart **RS-232** to **RS-485** network protocol converter must be used.

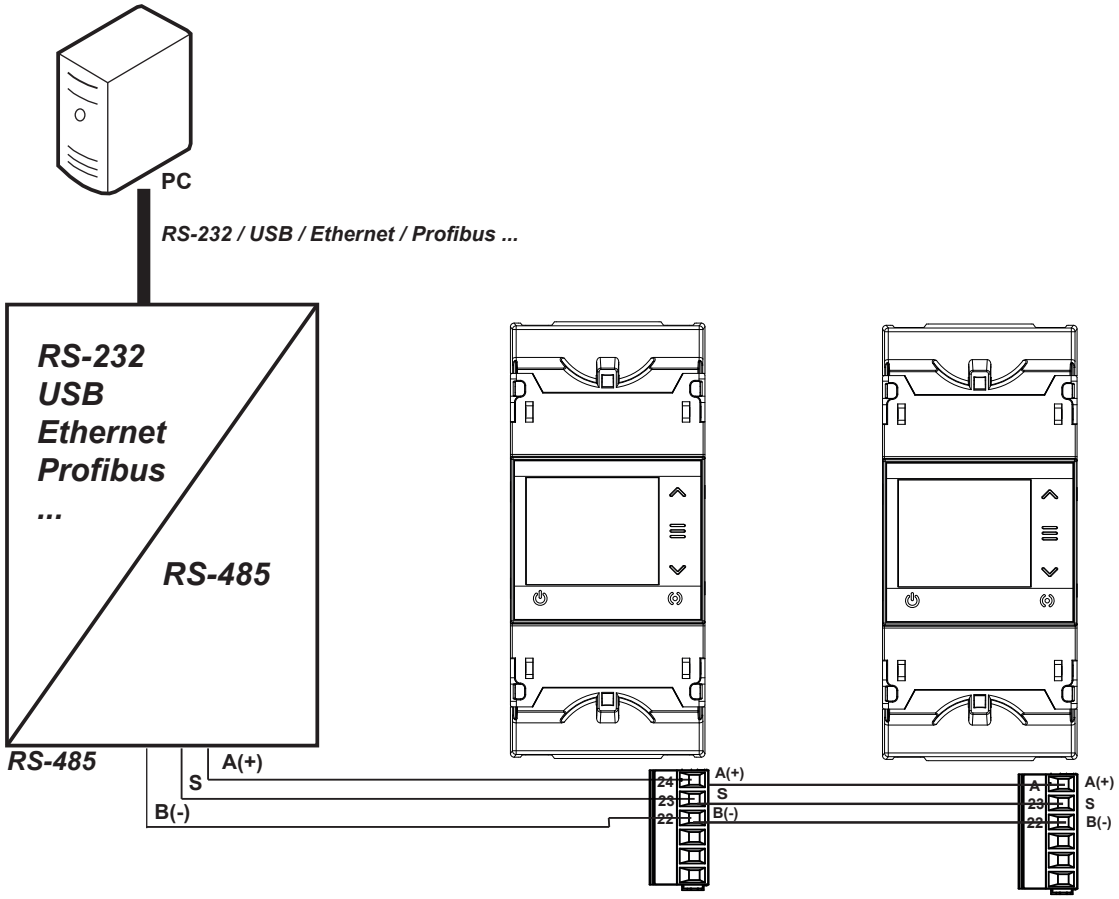


Figure 31: RS-485 connection diagram.

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

7.2.- MODBUS PROTOCOL

The **MODBUS** protocol is a standard communications protocol in industry enabling networking of multiple devices, involving a master and multiple slaves. It enables individual master-slave dialogue and also allows commands in broadcast format.
The **MODBUS** protocol used by the **line-CVM-D32** device implements the RTU (Remote Terminal Unit) mode.

In RTU mode, message start and end are detected with a 3.5 minimum character silence and the 16-bit CRC error detection method is used.

The **MODBUS** functions implemented in the device are:

Function 0x04 and **0x03**: Register readout.
Function 0x02: Input status readout.
Function 0x10: Writing multiple registers.
Function 0x01: Relay status readout
Function 0x05: Writing a relay status.

7.2.1.- MODBUS QUERY EXAMPLE

Question: Instantaneous value of L1 phase voltage.

Address	Function	Initial register	No. of registers	CRC
0A	04	0000	0002	xxxx

Address: 0A, Peripheral number: 10 en decimal.
Function: 04, Read function.
Initial register: 0000, desired register to start readout.
Nº of registers: 0002, number of registers to read.
CRC: xxxx, CRC character.

Response:

Address	Function	No. of bytes	Register no. 1	Register no. 2	CRC
0A	04	04	0000	084D	xxxx

Address: 0A, Number of peripheral responding: 10 in decimal.
Function: 04, Read function.
No. of bytes: 04, No. of bytes received.
Register: 0000084DL1 phase voltage value: VL1 x 10 : 212.5V
CRC: xxxx, CRC character.

7.3.- MODBUS MEMORY MAP

All **MODBUS** map addresses are in Hexadecimal.

7.3.1.- MEASUREMENT VARIABLES

The **Function 0x04**: register readout, is implemented for these variables.

Table 14: Modbus Memory Map: Measurement variables (Table 1).

Instantaneous Value			
Parameter	**Format**	**Address**	**Units**
Voltage phase L1	Float [32]	00-01	V
Current L1	Float [32]	02-03	A
Active Power L1	Float [32]	04-05	W
Inductive reactive power L1	Float [32]	06-07	varL
Capacitive reactive power L1	Float [32]	08-09	varC
Apparent Power L1	Float [32]	0A-0B	VA
Power factor L1	Float [32]	0C-0D	-
Cos φ L1	Float [32]	0E-0F	-
Voltage phase L2	Float [32]	10-11	V
Current L2	Float [32]	12-13	A
Active Power L2	Float [32]	14-15	W
Inductive reactive power L2	Float [32]	16-17	varL
Capacitive reactive power L2	Float [32]	18-19	varC
Apparent Power L2	Float [32]	1A-1B	VA
Power factor L2	Float [32]	1C-1D	-
Cos φ L2	Float [32]	1E-1F	-
Voltage phase L3	Float [32]	20-21	V
Current L3	Float [32]	22-23	A
Active Power L3	Float [32]	24-25	W
Inductive reactive power L3	Float [32]	26-27	varL
Capacitive reactive power L3	Float [32]	28-29	varC
Apparent Power L3	Float [32]	2A-2B	VA
Power factor L3	Float [32]	2C-2D	-
Cos φ L3	Float [32]	2E-2F	-
Frequency	Float [32]	34-35	Hz
Voltage L1-L2	Float [32]	36-37	V
Voltage L2-L3	Float [32]	38-39	V
Voltage L3-L1	Float [32]	3A-3B	V
Average phase-phase voltage	Float [32]	3C-3D	V
Average phase-neutral voltage	Float [32]	3E-3F	V
Average current	Float [32]	40-41	A
Total Active Power	Float [32]	42-43	W
Total inductive reactive power	Float [32]	44-45	varL
Total capacitive reactive power	Float [32]	46-47	varC
Total apparent power	Float [32]	48-49	VA
Three-phase power factor	Float [32]	4A-4B	-
Cos φ three-phase	Float [32]	4C-4D	-

Table 14 (Continued): Modbus Memory Map: Measurement variables (Table 1).

Instantaneous Value			
Parameter	**Format**	**Address**	**Units**
THD % voltage L1	Float [32]	4E-4F	%
THD % voltage L2	Float [32]	50-51	%
THD % voltage L3	Float [32]	52-53	%
THD % Current L1	Float [32]	56-57	%
THD % Current L2	Float [32]	58-59	%
THD % Current L3	Float [32]	5A-5B	%
Reactive Power L1	Float [32]	5E-5F	var
Reactive Power L2	Float [32]	60-61	var
Reactive Power L3	Float [32]	62-63	var
Total Reactive Power	Float [32]	64-65	var
Consumed Reactive Power L1	Float [32]	66-67	var
Consumed Reactive Power L2	Float [32]	68-69	var
Consumed Reactive Power L3	Float [32]	6A-6B	var
Total consumed reactive power	Float [32]	6C-6D	var
Generated Reactive Power L1	Float [32]	6E-6F	var
Generated Reactive Power L2	Float [32]	70-71	var
Generated Reactive Power L3	Float [32]	72-73	var
Total generated reactive power	Float [32]	74-75	var
Quadrant L1	Uint [16]	76	-
Quadrant L2	Uint [16]	77	-
Quadrant L3	Uint [16]	78	-
Three-phase quadrant	Uint [16]	79	-
Consumed Active Power L1	Float [32]	7A - 7B	W
Consumed Active Power L2	Float [32]	7C - 7D	W
Consumed Active Power L3	Float [32]	7E - 7F	W
Total Active Power Consumed	Float [32]	80 - 81	W
Generated Active Power L1	Float [32]	82 - 83	W
Generated Active Power L2	Float [32]	84-85	W
Generated Active Power L3	Float [32]	86-87	W
Total Active Power Generated	Float [32]	88-89	W
Consumed Inductive Reactive Power L1	Float [32]	8A-8B	varL
Consumed Inductive Reactive Power L2	Float [32]	8C-8D	varL
Consumed Inductive Reactive Power L3	Float [32]	8E-8F	varL
Total Inductive Reactive Power Consumed	Float [32]	90-91	varL
Generated Inductive Reactive Power L1	Float [32]	92-93	varL
Generated Inductive Reactive Power L2	Float [32]	94-95	varL
Generated Inductive Reactive Power L3	Float [32]	96-97	varL
Total Inductive Reactive Power Generated	Float [32]	98-99	varL
Consumed Capacitive Reactive Power L1	Float [32]	9A-9B	varC
Consumed Capacitive Reactive Power L2	Float [32]	9C-9D	varC
Consumed Capacitive Reactive Power L3	Float [32]	9E - 9F	varC
Total Capacitive Reactive Power Consumed	Float [32]	A0-A1	varC
Generated Capacitive Reactive Power L1	Float [32]	A2-A3	varC
Generated Capacitive Reactive Power L2	Float [32]	A4-A5	varC
Generated Capacitive Reactive Power L3	Float [32]	A6-A7	varC

Table 14 (Continued): Modbus Memory Map: Measurement variables (Table 1).

Instantaneous Value			
Parameter	**Format**	**Address**	**Units**
Total Capacitive Reactive Power Generated	Float [32]	A8-A9	varC
Consumed Power Factor L1	Float [32]	AA-AB	-
Consumed Power Factor L2	Float [32]	AC-AD	-
Consumed Power Factor L3	Float [32]	AE-AF	-
Three-phase Power Factor consumed	Float [32]	B0-B1	-
Generated Power Factor L1	Float [32]	B2-B3	-
Generated Power Factor L2	Float [32]	B4-B5	-
Generated Power Factor L3	Float [32]	B6-B7	-
Three-phase Power Factor generated	Float [32]	B8-B9	-
Cos φ Power consumed L1	Float [32]	BA-BB	-
Cos φ Power consumed L2	Float [32]	BC-BD	-
Cos φ Power consumed L3	Float [32]	BE - BF	-
Cos φ Three-phase Power consumed	Float [32]	C0-C1	-
Cos φ Power generated L1	Float [32]	C2-C3	-
Cos φ Power generated L2	Float [32]	C4-C5	-
Cos φ Power generated L3	Float [32]	C6-C7	-
Cos φ Three-phase Power generated	Float [32]	C8-C9	-

Table 15: Modbus Memory Map: Measurement Variables (Table 2).

Maximum Value						
Parameter	**Value**			**Date**		
	Format	**Address**	**Units**	**Format**	**Address**	**Units** [9]
Voltage phase L1	Float [32]	100-101	V	Uint [32]	102-103	Epoch
Current L1	Float [32]	104-105	A	Uint [32]	106-107	Epoch
Active Power L1	Float [32]	108-109	W	Uint [32]	10A-10B	Epoch
Inductive reactive power L1	Float [32]	10C-10D	varL	Uint [32]	10E-10F	Epoch
Capacitive reactive power L1	Float [32]	110-111	varC	Uint [32]	112-113	Epoch
Apparent Power L1	Float [32]	114-115	VA	Uint [32]	116-117	Epoch
Power factor L1	Float [32]	118-119	-	Uint [32]	11A-11B	Epoch
Cos φ L1	Float [32]	11C-11D	-	Uint [32]	11E-11F	Epoch
Voltage phase L2	Float [32]	120-121	V	Uint [32]	122-123	Epoch
Current L2	Float [32]	124-125	A	Uint [32]	126-127	Epoch
Active Power L2	Float [32]	128-129	W	Uint [32]	12A-12B	Epoch
Inductive reactive power L2	Float [32]	12C-12D	varL	Uint [32]	12E-12F	Epoch
Capacitive reactive power L2	Float [32]	130-131	varC	Uint [32]	132-133	Epoch
Apparent Power L2	Float [32]	134-135	VA	Uint [32]	136-137	Epoch
Power factor L2	Float [32]	138-139	-	Uint [32]	13A-13B	Epoch
Cos φ L2	Float [32]	13C-13D	-	Uint [32]	13E-13F	Epoch
Voltage phase L3	Float [32]	140-141	V	Uint [32]	142-143	Epoch
Current L3	Float [32]	144-145	A	Uint [32]	146-147	Epoch
Active Power L3	Float [32]	148-149	W	Uint [32]	14A-14B	Epoch
Inductive reactive power L3	Float [32]	14C-14D	varL	Uint [32]	14E-14F	Epoch
Capacitive reactive power L3	Float [32]	150-151	varC	Uint [32]	152-153	Epoch
Apparent Power L3	Float [32]	154-155	VA	Uint [32]	156-157	Epoch
Power factor L3	Float [32]	158-159	-	Uint [32]	15A-15B	Epoch

Table 15 (Continued): Modbus Memory Map: Measurement variables (Table 2).

Maximum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units (9)
Cos φ L3	Float [32]	15C-15D	-	Uint [32]	15E-15F	Epoch
Frequency	Float [32]	168-169	Hz	Uint [32]	16A-16B	Epoch
Voltage L1-L2	Float [32]	16C-16D	V	Uint [32]	16E-16F	Epoch
Voltage L2-L3	Float [32]	170-171	V	Uint [32]	172-173	Epoch
Voltage L3-L1	Float [32]	174-175	V	Uint [32]	176-177	Epoch
Average phase-phase voltage	Float [32]	178-179	V	Uint [32]	17A-17B	Epoch
Average phase-neutral voltage	Float [32]	17C-17D	V	Uint [32]	17E-17F	Epoch
Average current	Float [32]	180-181	A	Uint [32]	182-183	Epoch
Total Active Power	Float [32]	184-185	W	Uint [32]	186-187	Epoch
Total inductive reactive power	Float [32]	188-189	varL	Uint [32]	18A-18B	Epoch
Total capacitive reactive power	Float [32]	18C-18D	varC	Uint [32]	18E-18F	Epoch
Total apparent power	Float [32]	190-191	VA	Uint [32]	192-193	Epoch
Three-phase power factor	Float [32]	194-195	-	Uint [32]	196-197	Epoch
Cos φ three-phase	Float [32]	198-199	-	Uint [32]	19A-19B	Epoch
THD % voltage L1	Float [32]	19C-19D	%	Uint [32]	19E-19F	Epoch
THD % voltage L2	Float [32]	1A0-1A1	%	Uint [32]	1A2-1A3	Epoch
THD % voltage L3	Float [32]	1A4-1A5	%	Uint [32]	1A6-1A7	Epoch
THD % Current L1	Float [32]	1AC-1AD	%	Uint [32]	1AE-1AF	Epoch
THD % Current L2	Float [32]	1B0-1B1	%	Uint [32]	1B2-1B3	Epoch
THD % Current L3	Float [32]	1B4-1B5	%	Uint [32]	1B6-1B6	Epoch
Reactive Power L1	Float [32]	1BC-1BD	var	Uint [32]	1BE-1BF	Epoch
Reactive Power L2	Float [32]	1C0-1C1	var	Uint [32]	1C2-1C3	Epoch
Reactive Power L3	Float [32]	1C4-1C5	var	Uint [32]	1C6-1C7	Epoch
Total Reactive Power	Float [32]	1C8-1C9	var	Uint [32]	1CA-1CB	Epoch
Consumed Reactive Power L1	Float [32]	1CC-1CD	var	Uint [32]	1CE-1CF	Epoch
Consumed Reactive Power L2	Float [32]	1D0-1D1	var	Uint [32]	1D2-1D3	Epoch
Consumed Reactive Power L3	Float [32]	1D4-1D5	var	Uint [32]	1D6-1D7	Epoch
Total consumed reactive power	Float [32]	1D8-1D9	var	Uint [32]	1DA-1DB	Epoch
Generated Reactive Power L1	Float [32]	1DC-1DD	var	Uint [32]	1DE-1DF	Epoch
Generated Reactive Power L2	Float [32]	1E0-1E1	var	Uint [32]	1E2-1E3	Epoch
Generated Reactive Power L3	Float [32]	1E4-1E5	var	Uint [32]	1E6-1E7	Epoch
Total generated reactive power	Float [32]	1E8-1E9	var	Uint [32]	1EA-1EB	Epoch
Consumed Active Power L1	Float [32]	1EC-1ED	W	Uint [32]	1EE-1EF	Epoch
Consumed Active Power L2	Float [32]	1F0-1F1	W	Uint [32]	1F2-1F3	Epoch
Consumed Active Power L3	Float [32]	1F4-1F5	W	Uint [32]	1F6-1F7	Epoch
Total Active Power Consumed	Float [32]	1F8-1F9	W	Uint [32]	1FA-1FB	Epoch
Generated Active Power L1	Float [32]	1FC-1FD	W	Uint [32]	1FE-1FF	Epoch
Generated Active Power L2	Float [32]	200-201	W	Uint [32]	202-203	Epoch
Generated Active Power L3	Float [32]	204-205	W	Uint [32]	206-207	Epoch
Total Active Power Generated	Float [32]	208-209	W	Uint [32]	20A-20B	Epoch
Inductive Reactive Power consumed L1	Float [32]	20C-20D	varL	Uint [32]	20E-20F	Epoch
Inductive Reactive Power consumed L2	Float [32]	210-211	varL	Uint [32]	212-213	Epoch
Inductive Reactive Power consumed L3	Float [32]	214-215	varL	Uint [32]	216-217	Epoch
Total Inductive Reactive Power consumed	Float [32]	218-219	varL	Uint [32]	21A-21B	Epoch

Table 15 (Continued): Modbus Memory Map: Measurement variables (Table 2).

Maximum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units [9]
Inductive Reactive Power generated L1	Float [32]	21C-21D	varL	Uint [32]	21E-21F	Epoch
Inductive Reactive Power generated L2	Float [32]	220-221	varL	Uint [32]	222-223	Epoch
Inductive Reactive Power generated L3	Float [32]	224-225	varL	Uint [32]	226-227	Epoch
Total Inductive Reactive Power Generated	Float [32]	228-229	varL	Uint [32]	22A-22B	Epoch
Capacitive Reactive Power consumed L1	Float [32]	22C-22D	varC	Uint [32]	22E-22F	Epoch
Capacitive Reactive Power consumed L2	Float [32]	230-231	varC	Uint [32]	232-233	Epoch
Capacitive Reactive Power consumed L3	Float [32]	234-235	varC	Uint [32]	236-237	Epoch
Total Capacitive Reactive Power consumed	Float [32]	238-239	varC	Uint [32]	23A-23B	Epoch
Capacitive Reactive Power generated L1	Float [32]	23C-23D	varC	Uint [32]	23E-23F	Epoch
Capacitive Reactive Power generated L2	Float [32]	240-241	varC	Uint [32]	242-243	Epoch
Capacitive Reactive Power generated L3	Float [32]	244-245	varC	Uint [32]	246-247	Epoch
Total Capacitive Reactive Power generated	Float [32]	248-249	varC	Uint [32]	24A-24B	Epoch
Consumed Power Factor L1	Float [32]	24C-24D	-	Uint [32]	24E-24F	Epoch
Consumed Power Factor L2	Float [32]	250-251	-	Uint [32]	252-253	Epoch
Consumed Power Factor L3	Float [32]	254-255	-	Uint [32]	256-257	Epoch
Three-phase Power Factor consumed	Float [32]	258-259	-	Uint [32]	25A-25B	Epoch
Generated Power Factor L1	Float [32]	25C-25D	-	Uint [32]	25E-25F	Epoch
Generated Power Factor L2	Float [32]	260-261	-	Uint [32]	262-263	Epoch
Generated Power Factor L3	Float [32]	264-265	-	Uint [32]	266-267	Epoch
Three-phase Power Factor generated	Float [32]	268-269	-	Uint [32]	26A-26B	Epoch
Cos φ Power consumed L1	Float [32]	26C-26D	-	Uint [32]	26E-26F	Epoch
Cos φ Power consumed L2	Float [32]	270-271	-	Uint [32]	272-273	Epoch
Cos φ Power consumed L3	Float [32]	274-275	-	Uint [32]	276-277	Epoch
Cos φ Three-phase Power consumed	Float [32]	278-279	-	Uint [32]	27A-27B	Epoch
Cos φ Power generated L1	Float [32]	27C-27D	-	Uint [32]	27E-27F	Epoch
Cos φ Power generated L2	Float [32]	280-281	-	Uint [32]	282-283	Epoch
Cos φ Power generated L3	Float [32]	284-285	-	Uint [32]	286-287	Epoch
Cos φ Three-phase Power generated	Float [32]	288-289	-	Uint [32]	28A-28B	Epoch

[9] Date and time are given in Epoch format.

Table 16: Modbus Memory Map: Measurement Variables (Table 3).

Minimum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units[10]
Voltage phase L1	Float [32]	300-301	V	Uint [32]	302-303	Epoch
Current L1	Float [32]	304-305	A	Uint [32]	306-307	Epoch
Active Power L1	Float [32]	308-309	W	Uint [32]	30A-30B	Epoch
Inductive reactive power L1	Float [32]	30C-30D	varL	Uint [32]	30E-30F	Epoch
Capacitive reactive power L1	Float [32]	310-311	varC	Uint [32]	312-313	Epoch
Apparent Power L1	Float [32]	314-315	VA	Uint [32]	316-317	Epoch
Power factor L1	Float [32]	318-319	-	Uint [32]	31A-31B	Epoch
Cos φ L1	Float [32]	31C-31D	-	Uint [32]	31E-31F	Epoch
Voltage phase L2	Float [32]	320-321	V	Uint [32]	322-323	Epoch
Current L2	Float [32]	324-325	A	Uint [32]	326-327	Epoch

Table 16 (Continued): Modbus Memory Map: Measurement variables (Table 3).

Minimum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units(10)
Active Power L2	Float [32]	328-329	W	Uint [32]	32A-32B	Epoch
Inductive reactive power L2	Float [32]	32C-32D	varL	Uint [32]	32E-32F	Epoch
Capacitive reactive power L2	Float [32]	330-331	varC	Uint [32]	332-333	Epoch
Apparent Power L2	Float [32]	334-335	VA	Uint [32]	336-337	Epoch
Power factor L2	Float [32]	338-339	-	Uint [32]	33A-33B	Epoch
Cos φ L2	Float [32]	33C-33D	-	Uint [32]	33E-33F	Epoch
Voltage phase L3	Float [32]	340-341	V	Uint [32]	342-343	Epoch
Current L3	Float [32]	344-345	A	Uint [32]	346-347	Epoch
Active Power L3	Float [32]	348-349	W	Uint [32]	34A-34B	Epoch
Inductive reactive power L3	Float [32]	34C-34D	varL	Uint [32]	34E-34F	Epoch
Capacitive reactive power L3	Float [32]	350-351	varC	Uint [32]	352-353	Epoch
Apparent Power L3	Float [32]	354-355	VA	Uint [32]	356-357	Epoch
Power factor L3	Float [32]	358-359	-	Uint [32]	35A-35B	Epoch
Cos φ L3	Float [32]	35C-35D	-	Uint [32]	35E-35F	Epoch
Frequency	Float [32]	368-369	Hz	Uint [32]	36A-36B	Epoch
Voltage L1-L2	Float [32]	36C-36D	V	Uint [32]	36E-36F	Epoch
Voltage L2-L3	Float [32]	370-371	V	Uint [32]	372-373	Epoch
Voltage L3-L1	Float [32]	374-375	V	Uint [32]	376-377	Epoch
Average phase-phase voltage	Float [32]	378-379	V	Uint [32]	37A-37B	Epoch
Average phase-neutral voltage	Float [32]	37C-37D	V	Uint [32]	37E-37F	Epoch
Average current	Float [32]	380-381	A	Uint [32]	382-383	Epoch
Total Active Power	Float [32]	384-385	W	Uint [32]	386-387	Epoch
Total Inductive Reactive power	Float [32]	388-389	varL	Uint [32]	38A-38B	Epoch
Total Capacitive Reactive power	Float [32]	38C-38D	varC	Uint [32]	38E-38F	Epoch
Total Apparent Power	Float [32]	390-391	VA	Uint [32]	392-393	Epoch
Three-phase power factor	Float [32]	394-395	-	Uint [32]	396-397	Epoch
Cos φ three-phase	Float [32]	398-399	-	Uint [32]	39A-39B	Epoch
THD % voltage L1	Float [32]	39C-39D	%	Uint [32]	39E-39F	Epoch
THD % voltage L2	Float [32]	3A0-3A1	%	Uint [32]	3A2-3A3	Epoch
THD % voltage L3	Float [32]	3A4-3A5	%	Uint [32]	3A6-3A7	Epoch
THD % Current L1	Float [32]	3AC-3AD	%	Uint [32]	3AE-3AF	Epoch
THD % Current L2	Float [32]	3B0-3B1	%	Uint [32]	3B2-3B3	Epoch
THD % Current L3	Float [32]	3B4-3B5	%	Uint [32]	3B6-3B7	Epoch
Reactive Power L1	Float [32]	3BC-3BD	var	Uint [32]	3BE-3BF	Epoch
Reactive Power L2	Float [32]	3C0-3C1	var	Uint [32]	3C2-3C3	Epoch
Reactive Power L3	Float [32]	3C4-3C5	var	Uint [32]	3C6-3C7	Epoch
Total Reactive Power	Float [32]	3C8-3C9	var	Uint [32]	3CA-3CB	Epoch
Consumed Reactive Power L1	Float [32]	3CC-3CD	var	Uint [32]	3CE-3CF	Epoch
Consumed Reactive Power L2	Float [32]	3D0-3D1	var	Uint [32]	3D2-3D3	Epoch
Consumed Reactive Power L3	Float [32]	3D4-3D5	var	Uint [32]	3D6-3D7	Epoch
Total Reactive Power consumed	Float [32]	3D8-3D9	var	Uint [32]	3DA-3DB	Epoch
Generated Reactive Power L1	Float [32]	3DC-3DD	var	Uint [32]	3DE-3DF	Epoch
Generated Reactive Power L2	Float [32]	3E0-3E1	var	Uint [32]	3E2-3E3	Epoch
Generated Reactive Power L3	Float [32]	3E4-3E5	var	Uint [32]	3E6-3E7	Epoch

Table 16 (Continued): Modbus Memory Map: Measurement variables (Table 3).

Minimum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units[10]
Total Reactive Power generated	Float [32]	3E8-3E9	var	Uint [32]	3EA-3EB	Epoch
Consumed Active Power L1	Float [32]	3EC-3ED	W	Uint [32]	3EE-3EF	Epoch
Consumed Active Power L2	Float [32]	3F0-3F1	W	Uint [32]	3F2-3F3	Epoch
Consumed Active Power L3	Float [32]	3F4-3F5	W	Uint [32]	3F6-3F7	Epoch
Total Active Power consumed	Float [32]	3F8-3F9	W	Uint [32]	3FA-3FB	Epoch
Generated Active Power L1	Float [32]	3FC-3FD	W	Uint [32]	3FE-3FF	Epoch
Generated Active Power L2	Float [32]	400-401	W	Uint [32]	402-403	Epoch
Generated Active Power L3	Float [32]	404-405	W	Uint [32]	406-407	Epoch
Total Active Power generated	Float [32]	408-409	W	Uint [32]	40A-40B	Epoch
Inductive Reactive Power consumed L1	Float [32]	40C-40D	varL	Uint [32]	40E-40F	Epoch
Inductive Reactive Power consumed L2	Float [32]	410-411	varL	Uint [32]	412-413	Epoch
Inductive Reactive Power consumed L3	Float [32]	414-415	varL	Uint [32]	416-417	Epoch
Total Inductive Reactive Power consumed	Float [32]	418-419	varL	Uint [32]	41A-41B	Epoch
Inductive Reactive Power generated L1	Float [32]	41C-41D	varL	Uint [32]	41E-41F	Epoch
Inductive Reactive Power generated L2	Float [32]	420-421	varL	Uint [32]	422-423	Epoch
Inductive Reactive Power generated L3	Float [32]	424-425	varL	Uint [32]	426-427	Epoch
Total Inductive Reactive Power generated	Float [32]	428-429	varL	Uint [32]	42A-42B	Epoch
Capacitive Reactive Power consumed L1	Float [32]	42C-42D	varC	Uint [32]	42E-42F	Epoch
Capacitive Reactive Power consumed L2	Float [32]	430-431	varC	Uint [32]	432-433	Epoch
Capacitive Reactive Power consumed L3	Float [32]	434-435	varC	Uint [32]	436-437	Epoch
Total Capacitive Reactive Power consumed	Float [32]	438-439	varC	Uint [32]	43A-43B	Epoch
Capacitive Reactive Power generated L1	Float [32]	43C-43D	varC	Uint [32]	43E-43F	Epoch
Capacitive Reactive Power generated L2	Float [32]	440-441	varC	Uint [32]	442-443	Epoch
Capacitive Reactive Power generated L3	Float [32]	444-445	varC	Uint [32]	446-447	Epoch
Total Capacitive Reactive Power generated	Float [32]	448-449	varC	Uint [32]	44A-44B	Epoch
Consumed Power Factor L1	Float [32]	44C-44D	-	Uint [32]	44E-44F	Epoch
Consumed Power Factor L2	Float [32]	450-451	-	Uint [32]	452-453	Epoch
Consumed Power Factor L3	Float [32]	454-455	-	Uint [32]	456-457	Epoch
Three-phase Power Factor consumed	Float [32]	458-459	-	Uint [32]	45A-45B	Epoch
Generated Power Factor L1	Float [32]	45C-45D	-	Uint [32]	45E-45F	Epoch
Generated Power Factor L2	Float [32]	460-461	-	Uint [32]	462-463	Epoch
Generated Power Factor L3	Float [32]	464-465	-	Uint [32]	466-467	Epoch
Three-phase Power Factor generated	Float [32]	468-469	-	Uint [32]	46A-46B	Epoch
Cos φ Power consumed L1	Float [32]	46C-46D	-	Uint [32]	46E-46F	Epoch
Cos φ Power consumed L2	Float [32]	470-471	-	Uint [32]	472-473	Epoch
Cos φ Power consumed L3	Float [32]	474-475	-	Uint [32]	476 - 477	Epoch
Cos φ Three-phase Power consumed	Float [32]	478-479	-	Uint [32]	47A-47B	Epoch
Cos φ Power generated L1	Float [32]	47C-47D	-	Uint [32]	47E-47F	Epoch
Cos φ Power generated L2	Float [32]	480-481	-	Uint [32]	482-483	Epoch
Cos φ Power generated L3	Float [32]	484-485	-	Uint [32]	486-487	Epoch
Cos φ Three-phase Power generated	Float [32]	488-489	-	Uint [32]	48A-48B	Epoch

[10] Date and time are given in Epoch format.

7.3.2 .- ENERGY VARIABLES

Function 0x04: register readout, is used for these variables.

Table 17: Modbus Memory Map: Energy variables (Table 1).

Total Energies			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L1	Uint [64]	514 - 515 - 516 - 517	Wh
Consumed Active Energy L2	Uint [64]	518 - 519 - 51A - 51B	Wh
Consumed Active Energy L3	Uint [64]	51C - 51D - 51E - 51F	Wh
Total Active Energy consumed	Uint [64]	520 - 521 - 522 - 523	Wh
Consumed Inductive Reactive Energy L1	Uint [64]	524 - 525 - 526 - 527	varhL
Consumed Inductive Reactive Energy L2	Uint [64]	528 - 529 - 52A - 52B	varhL
Consumed Inductive Reactive Energy L3	Uint [64]	52C - 52D - 52E - 52F	varhL
Total Inductive Reactive Energy consumed	Uint [64]	530 - 531 - 532 - 533	varhL
Consumed Capacitive Reactive Energy L1	Uint [64]	534 - 535 - 536 - 537	varhC
Consumed Capacitive Reactive Energy L2	Uint [64]	538 - 539 - 53A - 53B	varhC
Consumed Capacitive Reactive Energy L3	Uint [64]	53C - 53D - 53E - 53F	varhC
Total Capacitive Reactive Energy consumed	Uint [64]	540 - 541 - 542 - 543	varhC
Consumed Reactive Energy L1	Uint [64]	544 - 545 - 546 - 547	varh
Consumed Reactive Energy L2	Uint [64]	548 - 549 - 54A - 54B	varh
Consumed Reactive Energy L3	Uint [64]	54C - 54D - 54E - 54F	varh
Total Reactive Energy Consumed	Uint [64]	550 - 551 - 552 - 553	varh
Consumed Apparent Energy L1	Uint [64]	554 - 555 - 556 - 557	VAh
Consumed Apparent Energy L2	Uint [64]	558 - 559 - 55A - 55B	VAh
Consumed Apparent Energy L3	Uint [64]	55C - 55D - 55E - 55F	VAh
Total Apparent Energy consumed	Uint [64]	560 - 561 - 562 - 563	VAh
Generated Active Energy L1	Uint [64]	564 - 565 - 566 - 567	Wh
Generated Active Energy L2	Uint [64]	568 - 569 - 56A - 56B	Wh
Generated Active Energy L3	Uint [64]	56C - 56D - 56E - 56F	Wh
Total Active Energy generated	Uint [64]	570 - 571 - 572 - 573	Wh
Generated Inductive Reactive Energy L1	Uint [64]	574 - 575 - 576 - 577	varhL
Generated Inductive Reactive Energy L2	Uint [64]	578 - 579 - 57A - 57B	varhL
Generated Inductive Reactive Energy L3	Uint [64]	57C - 57D - 57E - 57F	varhL
Total Inductive Reactive Energy Generated	Uint [64]	580 - 581 - 582 - 583	varhL
Generated Capacitive Reactive Energy L1	Uint [64]	584 - 585 - 586 - 587	varhC
Generated Capacitive Reactive Energy L2	Uint [64]	588 - 589 - 58A - 58B	varhC
Generated Capacitive Reactive Energy L3	Uint [64]	58C - 58D - 58E - 58F	varhC
Total Capacitive Reactive Energy generated	Uint [64]	590 - 591 - 592 - 593	varhC
Generated Reactive Energy L1	Uint [64]	594 - 595 -596 - 597	varh
Generated Reactive Energy L2	Uint [64]	598 - 599 - 59A - 59B	varh
Generated Reactive Energy L3	Uint [64]	59C - 59D - 59E - 59F	varh
Total Reactive Energy generated	Uint [64]	5A0 - 5A1 - 5A2 - 5A3	varh
Generated Apparent Energy L1	Uint [64]	5A4 - 5A5 - 5A6 - 5A7	VAh
Generated Apparent Energy L2	Uint [64]	5A8 - 5A9 - 5AA - 5AB	VAh
Generated Apparent Energy L3	Uint [64]	5AC - 5AD - 5AE - 5AF	VAh
Total Apparent Energy generated	Uint [64]	5B0 - 5B1 - 5B2 - 5B3	VAh

Table 18: Modbus Memory Map: Energy variables (Table 2).

Energies per Tariffs			
Tariff 1			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L1	Uint [64]	5B4 - 5B5 - 5B6 - 5B7	Wh
Consumed Active Energy L2	Uint [64]	5B8 - 5B9 - 5BA - 5BB	Wh
Consumed Active Energy L3	Uint [64]	5BC - 5BD - 5BE - 5BF	Wh
Total Active Energy Consumed	Uint [64]	5C0 - 5C1 - 5C2 - 5C3	Wh
Consumed Inductive Reactive Energy L1	Uint [64]	5C4 - 5C5 - 5C6 - 5C7	varhL
Consumed Inductive Reactive Energy L2	Uint [64]	5C8 - 5C9 - 5CA - 5CB	varhL
Consumed Inductive Reactive Energy L3	Uint [64]	5CC - 5CD - 5CE - 5CF	varhL
Total Inductive Reactive Energy consumed	Uint [64]	5D0 - 5D1 - 5D2 - 5D3	varhL
Consumed Capacitive Reactive Energy L1	Uint [64]	5D4 - 5D5 - 5D6 - 5D7	varhC
Consumed Capacitive Reactive Energy L2	Uint [64]	5D8 - 5D9 - 5DA - 5DB	varhC
Consumed Capacitive Reactive Energy L3	Uint [64]	5DC - 5DD - 5DE - 5DF	varhC
Total Capacitive Reactive Energy consumed	Uint [64]	5E0 - 5E1 - 5E2 - 5E3	varhC
Consumed Reactive Energy L1	Uint [64]	5E4 - 5E5 - 5E6 - 5E7	varh
Consumed Reactive Energy L2	Uint [64]	5E8 - 5E9 - 5EA - 5EB	varh
Consumed Reactive Energy L3	Uint [64]	5EC - 5ED - 5EE - 5EF	varh
Total Reactive Energy consumed	Uint [64]	5F0 - 5F1 - 5F2 - 5F3	varh
Consumed Apparent Energy L1	Uint [64]	5F4 - 5F5 - 5F6 - 5F7	VAh
Consumed Apparent Energy L2	Uint [64]	5F8 - 5F9 - 5FA - 5FB	VAh
Consumed Apparent Energy L3	Uint [64]	5FC - 5FD - 5FE - 5FF	VAh
Total Apparent Energy consumed	Uint [64]	600 - 601 - 602 - 603	VAh
Generated Active Energy L1	Uint [64]	604 - 605 - 606 - 607	Wh
Generated Active Energy L2	Uint [64]	608 - 609 - 60A - 60B	Wh
Generated Active Energy L3	Uint [64]	60C - 60D - 60E - 60F	Wh
Total Active Energy generated	Uint [64]	610 - 611 - 612 - 613	Wh
Generated Inductive Reactive Energy L1	Uint [64]	614 - 615 - 616 - 617	varhL
Generated Inductive Reactive Energy L2	Uint [64]	618 - 619 - 61A - 61B	varhL
Generated Inductive Reactive Energy L3	Uint [64]	61C - 61D - 61E - 61F	varhL
Total Inductive Reactive Energy generated	Uint [64]	620 - 621 - 622 - 623	varhL
Generated Capacitive Reactive Energy L1	Uint [64]	624 - 625 - 626 - 627	varhC
Generated Capacitive Reactive Energy L2	Uint [64]	628 - 629 - 62A - 62B	varhC
Generated Capacitive Reactive Energy L3	Uint [64]	62C - 62D - 62E - 62F	varhC
Total Capacitive Reactive Energy generated	Uint [64]	630 - 631 - 632 - 633	varhC
Generated Reactive Energy L1	Uint [64]	634 - 635 - 636 - 637	varh
Generated Reactive Energy L2	Uint [64]	638 - 639 - 63A - 63B	varh
Generated Reactive Energy L3	Uint [64]	63C - 63D -63E - 63F	varh
Total Reactive Energy generated	Uint [64]	640 - 641 - 642 - 643	varh
Generated Apparent Energy L1	Uint [64]	644 - 645 - 646 - 647	VAh
Generated Apparent Energy L2	Uint [64]	648 - 649 - 64A - 64B	VAh
Generated Apparent Energy L3	Uint [64]	64C - 64D - 64E - 64F	VAh
Total Apparent Energy generated	Uint [64]	650 - 651 - 652 - 653	VAh
Tariff 2			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L1	Uint [64]	654 - 655 - 656 - 657	Wh
Consumed Active Energy L2	Uint [64]	658 - 659 - 65A - 65B	Wh

Table 18 (Continued): Modbus Memory Map: Energy variables (Table 2).

Energies per Tariffs			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L3	Uint [64]	65C - 65D - 65E - 65F	Wh
Total Active Energy consumed	Uint [64]	660 - 661 - 662 - 663	Wh
Consumed Inductive Reactive Energy L1	Uint [64]	664 - 665 - 666 - 667	varhL
Consumed Inductive Reactive Energy L2	Uint [64]	668 - 669 - 66A - 66B	varhL
Consumed Inductive Reactive Energy L3	Uint [64]	66C - 66D - 66E - 66F	varhL
Total Inductive Reactive Energy consumed	Uint [64]	670 - 671 - 672 - 673	varhL
Consumed Capacitive Reactive Energy L1	Uint [64]	674 - 675 - 676 - 677	varhC
Consumed Capacitive Reactive Energy L2	Uint [64]	678 - 679 - 67A - 67B	varhC
Consumed Capacitive Reactive Energy L3	Uint [64]	67C - 67D - 67E - 67F	varhC
Total Capacitive Reactive Energy consumed	Uint [64]	680 - 681 - 682 - 683	varhC
Consumed Reactive Energy L1	Uint [64]	684 - 685 - 686 - 687	varh
Consumed Reactive Energy L2	Uint [64]	688 - 689 - 68A - 68B	varh
Consumed Reactive Energy L3	Uint [64]	68C - 68D - 68E - 68F	varh
Total Reactive Energy consumed	Uint [64]	690 - 691 - 692 - 693	varh
Consumed Apparent Energy L1	Uint [64]	694 - 695 - 696 - 697	VAh
Consumed Apparent Energy L2	Uint [64]	698 - 699 - 69A - 69B	VAh
Consumed Apparent Energy L3	Uint [64]	69C - 69D - 69E - 69F	VAh
Total Apparent Energy consumed	Uint [64]	6A0 - 6A1 - 6A2 - 6A3	VAh
Generated Active Energy L1	Uint [64]	6A4 - 6A5 - 6A6 - 6A7	Wh
Generated Active Energy L2	Uint [64]	6A8 - 6A9 - 6AA - 6AB	Wh
Generated Active Energy L3	Uint [64]	6AC - 6AD - 6AE -6AF	Wh
Total Active Energy generated	Uint [64]	6B0 - 6B1 - 6B2 - 6B3	Wh
Generated Inductive Reactive Energy L1	Uint [64]	6B4 - 6B5 - 6B6 - 6B7	varhL
Generated Inductive Reactive Energy L2	Uint [64]	6B8 - 6B9 - 6BA - 6BB	varhL
Generated Inductive Reactive Energy L3	Uint [64]	6BC - 6BD - 6BE - 6BF	varhL
Total Inductive Reactive Energy generated	Uint [64]	6C0 - 6C1 - 6C2 - 6C3	varhL
Generated Capacitive Reactive Energy L1	Uint [64]	6C4 - 6C5 - 6C6 - 6C7	varhC
Generated Capacitive Reactive Energy L2	Uint [64]	6C8 - 6C9 - 6CA - 6CB	varhC
Generated Capacitive Reactive Energy L3	Uint [64]	6CC - 6CD - 6CE - 6CF	varhC
Total Capacitive Reactive Energy generated	Uint [64]	6D0 - 6D1 - 6D2 - 6D3	varhC
Generated Reactive Energy L1	Uint [64]	6D4 - 6D5 - 6D6 - 6D7	varh
Generated Reactive Energy L2	Uint [64]	6D8 - 6D9 - 6DA - 6DB	varh
Generated Reactive Energy L3	Uint [64]	6DC - 6DD - 6DE - 6DF	varh
Total Reactive Energy generated	Uint [64]	6E0 - 6E1 - 6E2 - 6E3	varh
Generated Apparent Energy L1	Uint [64]	6E4 - 6E5 - 6E6 - 6E7	VAh
Generated Apparent Energy L2	Uint [64]	6E8 - 6E9 - 6EA - 6EB	VAh
Generated Apparent Energy L3	Uint [64]	6EC - 6ED - 6EE - 6EF	VAh
Total Apparent Energy Generated	Uint [64]	6F0 - 6F1 - 6F2 - 6F3	VAh
Tariff 3			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L1	Uint [64]	6F4 - 6F5 - 6F6 - 6F7	Wh
Consumed Active Energy L2	Uint [64]	6F8 - 6F9 - 6FA - 6FB	Wh
Consumed Active Energy L3	Uint [64]	6FC - 6FD - 6FE - 6FF	Wh
Total Active Energy consumed	Uint [64]	700 - 701 - 702 - 703	Wh
Consumed Inductive Reactive Energy L1	Uint [64]	704 - 705 - 706 - 707	varhL

Table 18 (Continued): Modbus Memory Map: Energy variables (Table 2).

Energies per Tariffs			
Parameter	**Format**	**Address**	**Units**
Consumed Inductive Reactive Energy L2	Uint [64]	708 - 709 - 70A - 70B	varhL
Consumed Inductive Reactive Energy L3	Uint [64]	70C - 70D - 70E - 70F	varhL
Total Inductive Reactive Energy consumed	Uint [64]	710 - 711 - 712 - 713	varhL
Consumed Capacitive Reactive Energy L1	Uint [64]	714 - 715 - 716 - 717	varhC
Consumed Capacitive Reactive Energy L2	Uint [64]	718 - 719 - 71A - 71B	varhC
Consumed Capacitive Reactive Energy L3	Uint [64]	71C - 71D - 71E - 71F	varhC
Total Capacitive Reactive Energy consumed	Uint [64]	720 - 721 - 722 - 723	varhC
Consumed Reactive Energy L1	Uint [64]	724 - 725 - 726 - 727	varh
Consumed Reactive Energy L2	Uint [64]	728 - 729 - 72A - 72B	varh
Consumed Reactive Energy L3	Uint [64]	72C - 72D - 72E - 72F	varh
Total Reactive Energy consumed	Uint [64]	730 - 731 - 732 - 733	varh
Consumed Apparent Energy L1	Uint [64]	734-735-736-737	VAh
Consumed Apparent Energy L2	Uint [64]	738 - 739 - 73A - 73B	VAh
Consumed Apparent Energy L3	Uint [64]	73C - 73D - 73E - 73F	VAh
Total Apparent Energy consumed	Uint [64]	740 - 741 - 742 - 743	VAh
Generated Active Energy L1	Uint [64]	744 - 745 - 746 - 747	Wh
Generated Active Energy L2	Uint [64]	748 - 749 - 74A - 74B	Wh
Generated Active Energy L3	Uint [64]	74C - 74D - 74E - 74F	Wh
Total Active Energy generated	Uint [64]	750 - 751 - 752 - 753	Wh
Generated Inductive Reactive Energy L1	Uint [64]	754 - 755 - 756 - 757	varhL
Generated Inductive Reactive Energy L2	Uint [64]	758 - 759 - 75A - 75B	varhL
Generated Inductive Reactive Energy L3	Uint [64]	75C - 75D - 75E - 75F	varhL
Total Inductive Reactive Energy generated	Uint [64]	760 - 761 - 762 - 763	varhL
Generated Capacitive Reactive Energy L1	Uint [64]	764 - 765 - 766 - 767	varhC
Generated Capacitive Reactive Energy L2	Uint [64]	768 - 769 - 76A - 76B	varhC
Generated Capacitive Reactive Energy L3	Uint [64]	76C - 76D - 76E - 76F	varhC
Total Capacitive Reactive Energy generated	Uint [64]	770 - 771 - 772 - 773	varhC
Generated Reactive Energy L1	Uint [64]	774 - 775 - 776 - 777	varh
Generated Reactive Energy L2	Uint [64]	778 - 779 - 77A - 77B	varh
Generated Reactive Energy L3	Uint [64]	77C - 77D - 77E - 77F	varh
Total Reactive Energy generated	Uint [64]	780 - 781 - 782 - 783	varh
Generated Apparent Energy L1	Uint [64]	784 - 785 - 786 - 787	VAh
Generated Apparent Energy L2	Uint [64]	788 - 789 - 78A - 78B	VAh
Generated Apparent Energy L3	Uint [64]	78C - 78D - 78E - 78F	VAh
Total Apparent Energy generated	Uint [64]	790 - 791 - 792 - 793	VAh
Tariff 4			
Parameter	**Format**	**Address**	**Units**
Consumed Active Energy L1	Uint [64]	794 - 795 - 796 - 797	Wh
Consumed Active Energy L2	Uint [64]	798 - 799 - 79A - 79B	Wh
Consumed Active Energy L3	Uint [64]	79C - 79D - 79E - 79F	Wh
Total Active Energy consumed	Uint [64]	7A0 - 7A1 - 7A2 - 7A3	Wh
Consumed Inductive Reactive Energy L1	Uint [64]	7A4 - 7A5 - 7A6 - 7A7	varhL
Consumed Inductive Reactive Energy L2	Uint [64]	7A8 - 7A9 - 7AA - 7AB	varhL
Consumed Inductive Reactive Energy L3	Uint [64]	7AC - 7AD - 7AE - 7AE	varhL
Total Inductive Reactive Energy consumed	Uint [64]	7B0 -7B1 - 7B2 - 7B3	varhL

Table 18 (Continued): Modbus Memory Map: Energy variables (Table 2).

Energies per Tariffs			
Parameter	**Format**	**Address**	**Units**
Consumed Capacitive Reactive Energy L1	Uint [64]	7B4 - 7B5 - 7B6 - 7B7	varhC
Consumed Capacitive Reactive Energy L2	Uint [64]	7B8 - 7B9 - 7BA - 7BB	varhC
Consumed Capacitive Reactive Energy L3	Uint [64]	7BC - 7BD - 7BE - 7BF	varhC
Total Capacitive Reactive Energy consumed	Uint [64]	7C0 - 7C1 - 7C2 - 7C3	varhC
Consumed Reactive Energy L1	Uint [64]	7C4 - 7C5 - 7C6 - 7C7	varh
Consumed Reactive Energy L2	Uint [64]	7C8 - 7C9 - 7CA - 7CB	varh
Consumed Reactive Energy L3	Uint [64]	7CC - 7CD - 7CE - 7CF	varh
Total Reactive Energy consumed	Uint [64]	7D0 - 7D1 - 7D2 - 7D3	varh
Consumed Apparent Energy L1	Uint [64]	7D4 - 7D5 - 7D6 - 7D7	VAh
Consumed Apparent Energy L2	Uint [64]	7D8 - 7D9 - 7DA - 7DB	VAh
Consumed Apparent Energy L3	Uint [64]	7DC - 7DD - 7DE - 7DF	VAh
Total Apparent Energy consumed	Uint [64]	7E0 - 7E1 - 7E2 - 7E3	VAh
Generated Active Energy L1	Uint [64]	7E4 - 7E5 - 7E6 - 7E7	Wh
Generated Active Energy L2	Uint [64]	7E8 - 7E9 - 7EA - 7EB	Wh
Generated Active Energy L3	Uint [64]	7EC - 7ED - 7EE - 7EF	Wh
Total Active Energy generated	Uint [64]	7F0 - 7F1 - 7F2 - 7F3	Wh
Generated Inductive Reactive Energy L1	Uint [64]	7F4 - 7F5 - 7F6 - 7F7	varhL
Generated Inductive Reactive Energy L2	Uint [64]	7F8 - 7F9 - 7FA - 7FB	varhL
Generated Inductive Reactive Energy L3	Uint [64]	7FC - 7FD - 7FE -7FF	varhL
Total Inductive Reactive Energy generated	Uint [64]	800-801-802-803	varhL
Generated Capacitive Reactive Energy L1	Uint [64]	804-805-806-807	varhC
Generated Capacitive Reactive Energy L2	Uint [64]	808 - 809 - 80A - 80B	varhC
Generated Capacitive Reactive Energy L3	Uint [64]	80C - 80D - 80E - 80F	varhC
Total Capacitive Reactive Energy generated	Uint [64]	810 - 811 - 812 - 813	varhC
Generated Reactive Energy L1	Uint [64]	814 - 815 - 816 - 817	varh
Generated Reactive Energy L2	Uint [64]	818 - 819 - 81A - 81B	varh
Generated Reactive Energy L3	Uint [64]	81C - 81D - 81E - 81F	varh
Total Reactive Energy generated	Uint [64]	820 - 821 - 822 - 823	varh
Generated Apparent Energy L1	Uint [64]	824 - 825 - 826 - 827	VAh
Generated Apparent Energy L2	Uint [64]	828 - 829 - 82A - 82B	VAh
Generated Apparent Energy L3	Uint [64]	82C - 82D - 82E - 82F	VAh
Total Apparent Energy Generated	Uint [64]	830 - 831 - 832 - 833	VAh

7.3.3.- MAXIMUM DEMAND VARIABLES

Function 0x04: register readout, is used for these variables.

Table 19: Modbus Memory Map: Maximum Demand Variables (Table 1).

Parameter	Format	Tariff 1	Tariff 2	Tariff 3	Tariff 4	Units
Current L1	Float [32]	B54-B55	B84-B85	BB4-BB5	BE4-BE5	A
Current L2	Float [32]	B56-B57	B86-B87	BB6-BB7	BE6-BE7	A
Current L3	Float [32]	B58-B59	B88-B89	BB8-BB9	BE8-BE9	A
Total Current	Float [32]	B5A-B5B	B8A-B8B	BBA-BBB	BEA -BEB	A
Active Power L1	Float [32]	B5C-B5D	B8C-B8D	BBC-BBD	BEC-BED	W

Table 19 (Continued): Modbus Memory Map: Maximum Demand Variables (Table 1).

Parameter	Format	Tariff 1	Tariff 2	Tariff 3	Tariff 4	Units
Active Power L2	Float [32]	B5E-B5F	B8E-B8F	BBE-BBF	Bee-BEF	W
Active Power L3	Float [32]	B60-B61	B90-B91	BC0-BC1	BF0-BF1	W
Total Active Power	Float [32]	B62-B63	B92-B93	BC2-BC3	BF2-BF3	W
Inductive Reactive Power L1	Float [32]	B64-B65	B94-B95	BC4-BC5	BF4-BF5	varL
Inductive Reactive Power L2	Float [32]	B66-B67	B96-B97	BC6-BC7	BF6-BF7	varL
Inductive Reactive Power L3	Float [32]	B68-B69	B98-B99	BC8-BC9	BF8-BF9	varL
Total Inductive Reactive Power	Float [32]	B6A-B6B	B9A-B9B	BCA-BCB	BFA-BFB	varL
Capacitive Reactive Power L1	Float [32]	B6C-B6D	B9C-B9D	BCC-BCD	BFC-BFD	varC
Capacitive Reactive Power L2	Float [32]	B6E-B6F	B9E-B9F	BCE- BCF	Bfe-BFF	varC
Capacitive Reactive Power L3	Float [32]	B70-B71	BA0-BA1	BD0-BD1	C00-C01	varC
Total Capacitive Reactive Power	Float [32]	B72-B73	BA2-BA3	BD2-BD3	C02-C03	varC
Reactive Power L1	Float [32]	B74-B75	BA4-BA5	BD4-BD5	C04-C05	var
Reactive Power L2	Float [32]	B76-B77	BA6-BA7	BD6-BD7	C06-C07	var
Reactive Power L3	Float [32]	B78-B79	BA8-BA9	BD8-BD9	C08-C09	var
Total Reactive Power	Float [32]	B7A-B7B	BAA-BAB	Bda-BDB	C0A-C0B	var
Apparent Power L1	Float [32]	B7C-B7D	BAC-BAD	BDC-BDD	C0C-C0D	VA
Apparent Power L2	Float [32]	B7E-B7F	BAE-BAF	BdE-BDF	C0E-C0F	VA
Apparent Power L3	Float [32]	B80-B81	BB0-BB1	BE0-BE1	C10-C11	VA
Total Apparent Power	Float [32]	B82-B83	BB2-BB3	BE2-BE3	C12-C13	VA

Table 20: Modbus Memory Map: Maximum Demand Variables (Table 2).

Maximum Value						
Tariff 1						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units (11)
Current L1	Float [32]	D48-D49	A	Uint [32]	D4A-D4B	Epoch
Current L2	Float [32]	D4C-D4D	A	Uint [32]	D4E-D4F	Epoch
Current L3	Float [32]	D50-D51	A	Uint [32]	D52-D53	Epoch
Total current	Float [32]	D54-D55	A	Uint [32]	D56-D57	Epoch
Active Power L1	Float [32]	D58-D59	W	Uint [32]	D5A-D5B	Epoch
Active Power L2	Float [32]	D5C-D5D	W	Uint [32]	D5E-D5F	Epoch
Active Power L3	Float [32]	D60-D61	W	Uint [32]	D62-D63	Epoch
Total Active Power	Float [32]	D64-D65	W	Uint [32]	D66-D67	Epoch
Inductive Reactive Power L1	Float [32]	D68-D69	varL	Uint [32]	D6A-D6B	Epoch
Inductive Reactive Power L2	Float [32]	D6C-D6D	varL	Uint [32]	D6E-D6F	Epoch
Inductive Reactive Power L3	Float [32]	D70-D71	varL	Uint [32]	D72-D73	Epoch
Total Inductive Reactive Power	Float [32]	D74-D75	varL	Uint [32]	D76-D77	Epoch
Capacitive Reactive Power L1	Float [32]	D78-D79	varC	Uint [32]	D7A-D7B	Epoch
Capacitive Reactive Power L2	Float [32]	D7C-D7D	varC	Uint [32]	D7E-D7F	Epoch
Capacitive Reactive Power L3	Float [32]	D80-D81	varC	Uint [32]	D82-D83	Epoch
Total Capacitive Reactive Power	Float [32]	D84-D85	varC	Uint [32]	D86-D87	Epoch
Reactive Power L1	Float [32]	D88-D89	var	Uint [32]	D8A-D8B	Epoch
Reactive Power L2	Float [32]	D8C-D8D	var	Uint [32]	D8E-D8F	Epoch
Reactive Power L3	Float [32]	D90-D91	var	Uint [32]	D92-D93	Epoch
Total Reactive Power	Float [32]	D94-D95	var	Uint [32]	D96-D97	Epoch
Apparent Power L1	Float [32]	D98-D99	VA	Uint [32]	D9A-D9B	Epoch

Table 20 (Continued): Modbus Memory Map: Maximum Demand Variables (Table 2).

Maximum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units (11)
Apparent Power L2	Float [32]	D9C-D9D	VA	Uint [32]	D9E-D9F	Epoch
Apparent Power L3	Float [32]	DA0-DA1	VA	Uint [32]	DA2-DA3	Epoch
Total Apparent Power	Float [32]	DA4-DA5	VA	Uint [32]	DA6-DA7	Epoch
Tariff 2						
Current L1	Float [32]	DA8-DA9	A	Uint [32]	DAA-DAB	Epoch
Current L2	Float [32]	DAC-DAD	A	Uint [32]	DAE-DAF	Epoch
Current L3	Float [32]	DB0-DB1	A	Uint [32]	DB2-DB3	Epoch
Total Current	Float [32]	DB4-DB5	A	Uint [32]	DB6-DB7	Epoch
Active Power L1	Float [32]	DB8-DB9	W	Uint [32]	DBA-DBB	Epoch
Active Power L2	Float [32]	DBC-DBD	W	Uint [32]	DBE-DBF	Epoch
Active Power L3	Float [32]	DC0-DC1	W	Uint [32]	DC2-DC3	Epoch
Total Active Power	Float [32]	DC4-DC5	W	Uint [32]	DC6-DC7	Epoch
Inductive Reactive Power L1	Float [32]	DC8-DC9	varL	Uint [32]	DCA-DCB	Epoch
Inductive Reactive Power L2	Float [32]	DCC-DCD	varL	Uint [32]	DCE-DCF	Epoch
Inductive Reactive Power L3	Float [32]	DD0-DD1	varL	Uint [32]	DD2-DD3	Epoch
Total Inductive Reactive Power	Float [32]	DD4-DD5	varL	Uint [32]	DD6-DD7	Epoch
Capacitive Reactive Power L1	Float [32]	DD8-DD9	varC	Uint [32]	DDA-DDB	Epoch
Capacitive Reactive Power L2	Float [32]	DDC-DDD	varC	Uint [32]	DDE-DDF	Epoch
Capacitive Reactive Power L3	Float [32]	DE0-DE1	varC	Uint [32]	DE2-DE3	Epoch
Total Capacitive Reactive Power	Float [32]	DE4-DE5	varC	Uint [32]	DE6-DE7	Epoch
Reactive Power L1	Float [32]	DE8-DE9	var	Uint [32]	DEA-DEB	Epoch
Reactive Power L2	Float [32]	DEC-DED	var	Uint [32]	DEE - DEF	Epoch
Reactive Power L3	Float [32]	DF0-DF1	var	Uint [32]	DF2-DF3	Epoch
Total Reactive Power	Float [32]	DF4-DF5	var	Uint [32]	DF6-DF7	Epoch
Apparent Power L1	Float [32]	DF8-DF9	VA	Uint [32]	DFA - DFB	Epoch
Apparent Power L2	Float [32]	DFC - DFD	VA	Uint [32]	DFE-DFF	Epoch
Apparent Power L3	Float [32]	E00-E01	VA	Uint [32]	E02-E03	Epoch
Total Apparent Power	Float [32]	E04-E05	VA	Uint [32]	E06-E07	Epoch
Tariff 3						
Current L1	Float [32]	E08-E09	A	Uint [32]	E0A-E0B	Epoch
Current L2	Float [32]	E0C-E0D	A	Uint [32]	E0E-E0F	Epoch
Current L3	Float [32]	E10-E11	A	Uint [32]	E12-E13	Epoch
Total current	Float [32]	E14-E15	A	Uint [32]	E16-E17	Epoch
Active Power L1	Float [32]	E18-E19	W	Uint [32]	E1A-E1B	Epoch
Active Power L2	Float [32]	E1C-E1D	W	Uint [32]	E1E-E1F	Epoch
Active Power L3	Float [32]	E20-E21	W	Uint [32]	E22-E23	Epoch
Total Active Power	Float [32]	E24-E25	W	Uint [32]	E26-E27	Epoch
Inductive Reactive Power L1	Float [32]	E28-E29	varL	Uint [32]	E2A-E2B	Epoch
Inductive Reactive Power L2	Float [32]	E2C-E2D	varL	Uint [32]	E2E-E2F	Epoch
Inductive Reactive Power L3	Float [32]	E30-E31	varL	Uint [32]	E32-E33	Epoch
Total Inductive Reactive Power	Float [32]	E34-E35	varL	Uint [32]	E36-E37	Epoch
Capacitive Reactive Power L1	Float [32]	E38-E39	varC	Uint [32]	E3A-E3B	Epoch
Capacitive Reactive Power L2	Float [32]	E3C-E3D	varC	Uint [32]	E3E-E3F	Epoch
Capacitive Reactive Power L3	Float [32]	E40-E41	varC	Uint [32]	E42-E43	Epoch

Table 20 (Continued): Modbus Memory Map: Maximum Demand Variables (Table 2).

Maximum Value						
Parameter	Value			Date		
	Format	Address	Units	Format	Address	Units (11)
Total Capacitive Reactive Power	Float [32]	E44-E45	varC	Uint [32]	E46-E47	Epoch
Reactive Power L1	Float [32]	E48-E49	var	Uint [32]	E4A-E4B	Epoch
Reactive Power L2	Float [32]	E4C-E4D	var	Uint [32]	E4E-E4F	Epoch
Reactive Power L3	Float [32]	E50-E51	var	Uint [32]	E52-E53	Epoch
Total Reactive Power	Float [32]	E54-E55	var	Uint [32]	E56-E57	Epoch
Apparent Power L1	Float [32]	E58-E59	VA	Uint [32]	E5A-E5B	Epoch
Apparent Power L2	Float [32]	E5C-E5D	VA	Uint [32]	E5E-E5F	Epoch
Apparent Power L3	Float [32]	E60-E61	VA	Uint [32]	E62-E63	Epoch
Total Apparent Power	Float [32]	E64-E65	VA	Uint [32]	E66-E67	Epoch
Tariff 4						
Current L1	Float [32]	E68-E69	A	Uint [32]	E6A-E6B	Epoch
Current L2	Float [32]	E6C-E6D	A	Uint [32]	E6E-E6F	Epoch
Current L3	Float [32]	E70-E71	A	Uint [32]	E72-E73	Epoch
Total current	Float [32]	E74-E75	A	Uint [32]	E76-E77	Epoch
Active Power L1	Float [32]	E78-E79	W	Uint [32]	E7A-E7B	Epoch
Active Power L2	Float [32]	E7C-E7D	W	Uint [32]	E7E-E7F	Epoch
Active Power L3	Float [32]	E80-E81	W	Uint [32]	E82-E83	Epoch
Total Active Power	Float [32]	E84-E85	W	Uint [32]	E86-E87	Epoch
Inductive Reactive Power L1	Float [32]	E88-E89	varL	Uint [32]	E8A-E8B	Epoch
Inductive Reactive Power L2	Float [32]	E8C-E8D	varL	Uint [32]	E8E-E8F	Epoch
Inductive Reactive Power L3	Float [32]	E90-E91	varL	Uint [32]	E92-E93	Epoch
Total Inductive Reactive Power	Float [32]	E94-E95	varL	Uint [32]	E96-E97	Epoch
Capacitive Reactive Power L1	Float [32]	E98-E99	varC	Uint [32]	E9A-E9B	Epoch
Capacitive Reactive Power L2	Float [32]	E9C-E9D	varC	Uint [32]	E9E-E9F	Epoch
Capacitive Reactive Power L3	Float [32]	EA0-EA1	varC	Uint [32]	EA2-EA3	Epoch
Total Capacitive Reactive Power	Float [32]	EA4-EA5	varC	Uint [32]	EA6-EA7	Epoch
Reactive Power L1	Float [32]	EA8-EA9	var	Uint [32]	EAA-EAB	Epoch
Reactive Power L2	Float [32]	EAC-EAD	var	Uint [32]	EAE-EAF	Epoch
Reactive Power L3	Float [32]	EB0-EB1	var	Uint [32]	EB2-EB3	Epoch
Total Reactive Power	Float [32]	EB4-EB5	var	Uint [32]	EB6-EB7	Epoch
Apparent Power L1	Float [32]	EB8-EB9	VA	Uint [32]	EBA-EBB	Epoch
Apparent Power L2	Float [32]	EBC-EBD	VA	Uint [32]	EBE-EBF	Epoch
Apparent Power L3	Float [32]	EC0-EC1	VA	Uint [32]	EC2-EC3	Epoch
Total Apparent Power	Float [32]	EC4-EC5	VA	Uint [32]	EC6-EC7	Epoch

(11) Date and time are given in Epoch format.

7.3.4.- VOLTAGE AND CURRENT HARMONICS.

Function 0x04: register readout, is used for these variables.

Table 21: Modbus Memory Map: Voltage and current harmonics.

Parameter	Format	Voltage L1	Voltage L2	Voltage L3	Units
Fundamental Harmonic	Float [32]	1B58-1B59	1BEE-1BEF	1C84-1C85	V
2nd Harmonic	Float [32]	1B5A-1B5B	1BF0-1BF1	1C86-1C87	%
3rd Harmonic	Float [32]	1B5C-1B5D	1BF2-1BF3	1C88-1C89	%
4th Harmonic	Float [32]	1B5E-1B5F	1BF4-1BF5	1C8A-1C8B	%
5th Harmonic	Float [32]	1B60-1B61	1BF6-1BF7	1C8C-1C8D	%
6th Harmonic	Float [32]	1B62-1B63	1BF8-1BF9	1C8E-1C8F	%
7th Harmonic	Float [32]	1B64-1B65	1BFA-1BFB	1C90-1C91	%
8th Harmonic	Float [32]	1B66-1B67	1BFC-1BFD	1C92-1C93	%
9th Harmonic	Float [32]	1B68-1B69	1BFE-1BFF	1C94-1C95	%
10th Harmonic	Float [32]	1B6A-1B6B	1C00-1C01	1C96-1C97	%
11th Harmonic	Float [32]	1B6C-1B6D	1C02-1C03	1C98-1C99	%
12th Harmonic	Float [32]	1B6E-1B6F	1C04-1C05	1C9A-1C9B	%
13th Harmonic	Float [32]	1B70-1B71	1C06-1C07	1C9C-1C9D	%
14th Harmonic	Float [32]	1B72-1B73	1C08-1C09	1C9E-1C9F	%
15th Harmonic	Float [32]	1B74-1B75	1C0A-1C0B	1CA0-1CA1	%
16th Harmonic	Float [32]	1B76-1B77	1C0C-1C0D	1CA2-1CA3	%
17th Harmonic	Float [32]	1B78-1B79	1C0E-1C0F	1CA4-1CA5	%
18th Harmonic	Float [32]	1B7A-1B7B	1C10-1C11	1CA6-1CA7	%
19th Harmonic	Float [32]	1B7C-1B7D	1C12-1C13	1CA8-1CA9	%
20th Harmonic	Float [32]	1B7E-1B7F	1C14-1C15	1CAA-1CAB	%
21st Harmonic	Float [32]	1B80-1B81	1C16-1C17	1CAC-1CAD	%
22nd Harmonic	Float [32]	1B82-1B83	1C18-1C19	1CAE-1CAF	%
23rd Harmonic	Float [32]	1B84-1B85	1C1A-1C1B	1CB0-1CB1	%
24th Harmonic	Float [32]	1B86-1B87	1C1C-1C1D	1CB2-1CB3	%
25th Harmonic	Float [32]	1B88-1B89	1C1E-1C1F	1CB4-1CB5	%
26th Harmonic	Float [32]	1B8A-1B8B	1C20-1C21	1CB6-1CB7	%
27th Harmonic	Float [32]	1B8C-1B8D	1C22-1C23	1CB8-1CB9	%
28th Harmonic	Float [32]	1B8E-1B8F	1C24-1C25	1CBA-1CBB	%
29th Harmonic	Float [32]	1B90-1B91	1C26-1C27	1CBC-1CBD	%
30th Harmonic	Float [32]	1B92-1B93	1C28-1C29	1CBE-1CBF	%
31st Harmonic	Float [32]	1B94-1B95	1C2A-1C2B	1CC0-1CC1	%
32nd Harmonic	Float [32]	1B96-1B97	1C2C-1C2D	1CC2-1CC3	%
33rd Harmonic	Float [32]	1B98-1B99	1C2E-1C2F	1CC4-1CC5	%
34th Harmonic	Float [32]	1B9A-1B9B	1C30-1C31	1CC6-1CC7	%
35th Harmonic	Float [32]	1B9C-1B9D	1C32-1C33	1CC8-1CC9	%
36th Harmonic	Float [32]	1B9E-1B9F	1C34-1C35	1CCA-1CCB	%
37th Harmonic	Float [32]	1BA0-1BA1	1C36-1C37	1CCC-1CCD	%
38th Harmonic	Float [32]	1BA2-1BA3	1C38-1C39	1CCE-1CCF	%
39th Harmonic	Float [32]	1BA4-1BA5	1C3A-1C3B	1CD0-1CD1	%
40th Harmonic	Float [32]	1BA6-1BA7	1C3C-1C3D	1CD2-1CD3	%
Parameter	**Format**	**Current L1**	**Current L2**	**Current L3**	**units**
Fundamental Harmonic	Float [32]	1DB0-1DB1	1E46-1E47	1EDC-1EDD	A

Table 21 (Continued): Modbus Memory Map: Voltage and current harmonics.

Parameter	Format	Current L1	Current L2	Current L3	units
2nd Harmonic	Float [32]	1DB2-1DB3	1E48-1E49	1EDE-1EDF	%
3rd Harmonic	Float [32]	1DB4-1DB5	1E4A-1E4B	1EE0-1EE1	%
4th Harmonic	Float [32]	1DB6-1DB7	1E4C-1E4D	1EE2-1EE3	%
5th Harmonic	Float [32]	1DB8-1DB9	1E4E-1E4F	1EE4-1EE5	%
6th Harmonic	Float [32]	1DBA-1DBB	1E50-1E51	1EE6-1EE7	%
7th Harmonic	Float [32]	1DBC-1DBD	1E52-1E53	1EE8-1EE9	%
8th Harmonic	Float [32]	1DBE-1DBF	1E54-1E55	1EEA-1EEB	%
9th Harmonic	Float [32]	1DC0-1DC1	1E56-1E57	1EEC-1EED	%
10th Harmonic	Float [32]	1DC2-1DC3	1E58-1E59	1EEE-1EEF	%
11th Harmonic	Float [32]	1DC4-1DC5	1E5A-1E5B	1EF0-1EF1	%
12th Harmonic	Float [32]	1DC6-1DC7	1E5C-1E5D	1EF2-1EF3	%
13th Harmonic	Float [32]	1DC8-1DC9	1E5E-1E5F	1EF4-1EF5	%
14th Harmonic	Float [32]	1DCA-1DCB	1E60-1E61	1EF6-1EF7	%
15th Harmonic	Float [32]	1DCC-1DCD	1E62-1E63	1EF8-1EF9	%
16th Harmonic	Float [32]	1DCE-1DCF	1E64-1E65	1EFA-1EFB	%
17th Harmonic	Float [32]	1DD0-1DD1	1E66-1E67	1EFC-1EFD	%
18th Harmonic	Float [32]	1DD2-1DD3	1E68-1E69	1EFE-1EFF	%
19th Harmonic	Float [32]	1DD4-1DD5	1E6A-1E6B	1F00-1F01	%
20th Harmonic	Float [32]	1DD6-1DD7	1E6C-1E6D	1F02-1F03	%
21st Harmonic	Float [32]	1DD8-1DD9	1E6E-1E6F	1F04-1F05	%
22nd Harmonic	Float [32]	1DDA-1DDB	1E70-1E71	1F06-1F07	%
23rd Harmonic	Float [32]	1DDC-1DDD	1E72-1E73	1F08-1F09	%
24th Harmonic	Float [32]	1DDE-1DDF	1E74-1E75	1F0A-1F0B	%
25th Harmonic	Float [32]	1DE0-1DE1	1E76-1E77	1F0C-1F0D	%
26th Harmonic	Float [32]	1DE2-1DE3	1E78-1E79	1F0E-1F0F	%
27th Harmonic	Float [32]	1DE4-1DE5	1E7A-1E7B	1F10-1F11	%
28th Harmonic	Float [32]	1DE6-1DE7	1E7C-1E7D	1F12-1F13	%
29th Harmonic	Float [32]	1DE8-1DE9	1E7E-1E7F	1F14-1F15	%
30th Harmonic	Float [32]	1DEA-1DEB	1E80-1E81	1F16-1F17	%
31st Harmonic	Float [32]	1DEC-1DED	1E82-1E83	1F18-1F19	%
32nd Harmonic	Float [32]	1DEE-1DEF	1E84-1E85	1F1A-1F1B	%
33rd Harmonic	Float [32]	1DF0-1DF1	1E86-1E87	1F1C-1F1D	%
34th Harmonic	Float [32]	1DF2-1DF3	1E88-1E89	1F1E-1F1F	%
35th Harmonic	Float [32]	1DF4-1DF5	1E8A-1E8B	1F20-1F21	%
36th Harmonic	Float [32]	1DF6-1DF7	1E8C-1E8D	1F22-1F23	%
37th Harmonic	Float [32]	1DF8-1DF9	1E8E-1E8F	1F24-1F25	%
38th Harmonic	Float [32]	1DFA-1DFB	1E90-1E91	1F26-1F27	%
39th Harmonic	Float [32]	1DFC-1DFD	1E92-1E93	1F28-1F29	%
40th Harmonic	Float [32]	1DFE-1DFF	1E94-1E95	1F2A-1F2B	%

7.3.5.- COST VARIABLES

Function 0x04: register readout, is used for these variables.

Table 22: Modbus Memory Map: Cost variables

Total			
Parameter	**Format**	**Address**	**Units**
Nº of hours of total active energy consumed	Uint [32]	15E0-15E1	hours
Cost of total active energy consumed	Float [32]	15E2-15E3	-
CO_2 emissions from total active energy consumed	Float [32]	15E4-15E5	$kgCO_2$
Nº of hours of total active energy generated	Uint [32]	15E6-15E7	hours
Cost of total generated active energy	Float [32]	15E8-15E9	-
CO_2 emissions from total generated active energy	Float [32]	15EA-15EB	$KgCO_2$
Tariff 1			
Nº of hours of active energy consumed, Tariff 1	Uint [32]	15EC-15ED	hours
Cost of active energy consumed, Tariff 1	Float [32]	15EE-15EF	-
CO_2 emissions from active energy consumed, Tariff 1	Float [32]	15F0-15F1	$kgCO_2$
Nº of hours of active energy generated, Tariff 1	Uint [32]	15F2-15F3	hours
Cost of generated Active Energy	Float [32]	15F4-15F5	-
CO_2 emissions from active energy generated, Tariff 1	Float [32]	15F6-15F7	$kgCO_2$
Tariff 2			
Nº of hours of active energy consumed, Tariff 2	Uint [32]	15F8-15F9	hours
Cost of active energy consumed, Tariff 2	Float [32]	15FA-15FB	-
CO_2 emissions from active energy consumed, Tariff 2	Float [32]	15FC-15FD	$kgCO_2$
Nº of hours of active energy generated, Tariff 2	Uint [32]	15FE-15FF	hours
Cost of active energy generated, Tariff 2	Float [32]	1600-1601	-
CO_2 emissions from active energy generated, Tariff 2	Float [32]	1602-1603	$kgCO_2$
Tariff 3			
Nº of hours of active energy consumed, Tariff 3	Uint [32]	1604-1605	hours
Cost of active energy consumed, Tariff 3	Float [32]	1606-1607	-
CO_2 emissions from active energy consumed, Tariff 3	Float [32]	1608-1609	$kgCO_2$
Nº of hours of active energy generated, Tariff 3	Uint [32]	160A-160B	hours
Cost of active energy generated, Tariff 3	Float [32]	160C-160D	-
CO_2 emissions from active energy generated, Tariff 3	Float [32]	160E-160F	$kgCO_2$
Tariff 4			
Nº of hours of active energy consumed, Tariff 4	Uint [32]	1610-1611	hours
Cost of active energy consumed, Tariff 4	Float [32]	1612-1613	-
CO_2 emissions from active energy consumed, Tariff 4	Float [32]	1614-1615	$kgCO_2$
Nº of hours of active energy generated, Tariff 4	Uint [32]	1616-1617	hours
Cost of active energy generated, Tariff 4	Float [32]	1618-1619	-
CO_2 emissions from active energy generated, Tariff 4	Float [32]	161A-161B	$kgCO_2$

7.3.6.- ANGLE VARIABLES

Function 0x04: register readout, is used for these variables.

Table 23: Modbus Memory Map: Angle variables.

Parameter	Format	Address	Units
Angle θ L1	Float [32]	1770-1771	Degrees
Angle θ L2	Float [32]	1772-1773	Degrees
Angle θ L3	Float [32]	1774-1775	Degrees
Angle φ V-I L1	Float [32]	1776-1777	Degrees
Angle φ V-I L2	Float [32]	1778-1779	Degrees
Angle φ V-I L3	Float [32]	177A-177B	Degrees

7.3.7.- QUALITY EVENT AND DISTURBANCE COUNTERS

Function 0x04: register readout, is used for these variables.

Table 24: Modbus Memory Map: Quality event and disturbance counter.

Parameter	Format	Address	Units
Overvoltage meter L1	Uint [16]	11C6	-
Overvoltage meter L2	Uint [16]	11C7	-
Overvoltage meter L3	Uint [16]	11C8	-
Gap meter L1	Uint [16]	11CB	-
Gap meter L2	Uint [16]	11CC	-
Gap meter L3	Uint [16]	11CD	-
Voltage interruption meter L1	Uint [16]	11D0	-
Voltage interruption meter L2	Uint [16]	11D1	-
Voltage interruption meter L3	Uint [16]	11D2	-

7.3.8.- OTHER DEVICE PARAMETERS

Function 0x04: register readout, is used for these variables.

Table 25: Modbus Memory Map: Other device parameters.

Parameter	Format	Address
Device ID number	Uint [32]	35E8-35E9
ID number of Slot 1 expansion module	Uint [32]	35EA-35EB
ID number of Slot 2 expansion module	Uint [32]	35EC-35ED
Device serial number	String	364C - 364D -364E -364F -3650 -3651 -3652
Serial number of Slot 1 expansion module	String	3653 - 3654 -3655 -3656 -3657 -3658 -3659
Serial number of Slot 2 expansion module	String	365A - 365B -365C -365D -365E -365F -3660
Current tariff	Uint [16]	59EC
Firmware version (part 1)	Uint [16]	C288
Firmware version (part 2)	Uint [16]	C289
Firmware version revision	Uint [16]	C28A
Device Model	String	C28C-C28D
Firmware version (part 1) of Slot 1 expansion module	Uint [16]	C292

Table 25 (Continued): Modbus Memory Map: Other device parameters.

Parameter	Format	Address
Firmware version (part 2) of Slot 1 expansion module	Uint [16]	C293
Revision of Slot 1 expansion module firmware version	Uint [16]	C294
Slot 1 expansion module device model	String	C296-C297
Firmware version (part 1) of Slot 2 expansion module	Uint [16]	C29C
Firmware version (part 2) of Slot 2 expansion module	Uint [16]	C29D
Revision of Slot 2 expansion module firmware version	Uint [16]	C29E
Slot 2 expansion module device model	String	C2A0-C2A1

7.3.9.- DIGITAL OUTPUTS

Function 0x02 is used for these variables.

Table 26: Modbus Memory Map: Digital output status.

Parameter	Format	Address	Value
Digital Output 1 status	bool	7539	**0:** Deactivated **1:** Activated
Digital Output 2 status	bool	754D	**0:** Deactivated **1:** Activated

Function 0x04 is used for these variables.

Table 27: Modbus Memory Map: Alarms.

Parameter	Format	Address	Units
Digital Output 1 alarm activation date	Uint [32]	7537-7538	Seconds
Digital Output 2 alarm activation date	Uint [32]	754B-754C	Seconds

7.3.10.- DEVICE CONFIGURATION VARIABLES

The following functions are used for these variables:
Function 0x03: register readout.
Function 0x10: Writing multiple registers.

7.3.10.1.- Measurement Configuration

Table 28: Modbus Memory Map: Measurement configuration.

Measurement configuration				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Primary voltage	Float [32]	2710-2711	1.0 ... 2000000.0 V	-
Secondary voltage	Float [32]	2712-2713	1.0 ... 2000000.0 V	-
Primary current	Float [32]	2714-2715	1.0 ... 2000000.0 A	-
Secondary current	Float [32]	2716-2717	0.25 ... 5.00 A	-
Quadrants	Uint [16]	2722	**2:** 2Q - **4:** 4Q	**4**
Measurement convention	Uint [16]	1388	**0:** IEC - **1:** IEEE - **2:** Circutor	**0**
Installation type	Uint [16]	2A9D	**0:** 2W-1Ph - **1:** 2W-2Ph - **2:** 3W-2Ph - **3:** 3W-3Ph - **4:** 4W-3Ph - **5:** ARON	**4**

Table 28 (Continued): Modbus Memory Map: Measurement configuration.

Measurement configuration				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Aggregation period (12)	Uint [16]	2ACB	60... 3600 s	600 s
Maximum demand integration period	Uint [16]	274C	60... 3600 s	900 s
Maximum demand calculation type (7)	Uint [16]	274D	**0:** Sliding window **1:**Fixed	**0**
Currency	String	27FC-27FD		EUR
Display backlight	Uint [16]	280D	1... 99 min	15 min
Password	Uint [32]	2A97-2A98	00000... 99999	97531
Current tariff (13)	Uint [16]	59DC	**1:** Tariff 1 - **2:** Tariff 2 - **3:** Tariff 3 - **4:** Tariff 4	**1**
Harmonics display (14)	Bool	1782	**0**: Not displayed **FF00**: Display	**0**

(12) The programmed value must be divisible by 60, i.e. the ***3660 / Aggregation period division*** must be exact. It must also be a multiple of 60, i.e. if the programmed value contains the number 60, an integer of the number.

(13) Parameter not configurable via display.

(14) Functions 0x01 and 0x05 **are used** for **this variable**.

7.3.10.2.- Quality parameters

Table 29: Modbus Memory Map: Quality parameters.

Quality parameters				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Nominal voltage	Float [32]	271C-271D	50.0 .... 2000000.0 V	230.00 V
Nominal frequency	Uint [16]	2720	50-60Hz;	50 Hz
Overvoltage (swell)	Float [32]	2ABC-2ABD	100.0 ... 150.0 %	110.0 %
Gap (Dip)	Float [32]	2ABE-2ABF	50.0 ... 97.0 %	90.0 %
Outage (Interruption)	Float [32]	2AC0-2AC1	1.0 ... 20.0 %	10.0%
Overvoltage hysteresis	Float [32]	2AC4-2AC5	0.0 ... 100.0 %	2.0 %
Gap hysteresis	Float [32]	2AC6-2AC7	0.0 ... 100.0 %	2.0 %
Interruption hysteresis	Float [32]	2AC8-2AC9	0.0 ... 100.0 %	2.0 %

7.3.10.3.- Device clock

Table 30: Modbus Memory Map: Device clock.

Device clock				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Date format	Uint [16]	280F	**0**: mm/dd/yy **1**: dd/mm/yy	**1**
Date and Time	Uint [32]	283C	Date and time are given in Epoch format	

7.3.10.4.- Communications

Table 31: Modbus Memory Map: Communications.

Communications				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Peripheral number	Uint [16]	2739	1... 255	1

Table 31 (Continued): Modbus Memory Map: Communications.

Communications				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Transmission speed	Uint [32]	273A-273B	4800, 9600, 19200, 38400, 57600, 115200	9600
Data format	Uint [16]	273C	**0**: 8N1 - **1**: 8E1 - **2**: 8O1 - **3**: 8N2 - **4**: 8E2 - **5**: 8O2	**0**
Measurement parameter calculation time	Uint [16]	1389	**0**: 200 ms - **1**: 3 s - **2:** Programmed value[16]	**1**
Maximum and Minimum parameter calculation time[15]	Uint [16]	138A	**0**: 200 ms - **1**: 3 s - **2:** Programmed value[16]	**1**

[15] Parameter not configurable via display.

[16] Value programmed in the ***Aggregation Period*** variable.

7.3.10.5.- Ratios

Table 32: Modbus Memory Map: Ratios.

Ratios				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
CO_2 emissions in consumption (Tariff 1)	Float [32]	2774-2775	0,00000... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission ratio in consumption (Tariff 2)	Float [32]	2776-2777	0.00000 ... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission ratio in consumption (Tariff 3)	Float [32]	2778-2779	0,00000... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission rate in consumption (Tariff 4)	Float [32]	277A-277B	0.00000 ... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
Ratio per kWh in consumption (Tariff 1)	Float [32]	27D8-27D9	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in consumption (Tariff 2)	Float [32]	27DA-27DB	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in consumption (Tariff 3)	Float [32]	27DC-27DD	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in consumption (Tariff 4)	Float [32]	27DE-27DF	0.00000 ... 99.99999 EUR	0.00000 EUR
CO_2 emission ratio in generation (Tariff 1)	Float [32]	2786-2787	0.00000 ... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission ratio in generation (Tariff 2)	Float [32]	2788-2789	0.00000... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission ratio in generation (Tariff 3)	Float [32]	278A-278B	0,00000... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
CO_2 emission ratio in generation (Tariff 4)	Float [32]	278C-278D	0.00000 ... 99.99999 $KgCO_2$	0.00000 $KgCO_2$
Ratio per kWh in generation (Tariff 1)	Float [32]	27EA-27EB	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in generation (Tariff 2)	Float [32]	27EC-27ED	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in generation (Tariff 3)	Float [32]	27EE-27EF	0.00000 ... 99.99999 EUR	0.00000 EUR
Ratio per kWh in generation (Tariff 4)	Float [32]	27F0-27F1	0.00000 ... 99.99999 EUR	0.00000 EUR

7.3.10.6.- Digital Output 1

Table 33: Modbus Memory Map: Digital Output 1.

Digital Output 1				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Variable	Uint [16]	4E20	**Table 10** - **Table 11** - **Table 12** - **Table 13**	0
Maximum value / Energy per pulse	Float [32]	4E22-4E23	Depends on the selected variable	-
Minimum value	Float [32]	4E24-4E25	Depends on the selected variable	-
Connection delay	Uint [16]	4E26	0... 65499 s	0 s
High level pulse width			0... 999 ms (x10)	
Disconnection delay	Uint [16]	4E27	0... 65499 s	0 s
Low level pulse width			0... 999 ms (x10)	
Hysteresis	Uint [16]	4E28	0... 99%	0%
Contact status	Uint [16]	4E21	**0:** Normally open - **1:** Normally closed	**0**
Latch	Bool	4E29	**0:** No **- 1:** Yes	
Latching time	Uint [16]	4E2A	0... 65499 s	0 s
Unlatch the output [17]	Bool	7530	0	0
Manual Operation: Output status [17]	Bool	7539	**ON(connected output):** FF00 **OFF (disconnected output):** 0000	0

[17] Functions **0x01** and **0x05** are used for this variable.

7.3.10.7.- Digital Output 2

Table 34: Modbus Memory Map: Digital Output 2.

Digital Output 2				
Configuration variable	**Format**	**Address**	**Valid data range**	**Default value**
Variable	Uint [16]	4E34	**Table 10** - **Table 11** - **Table 12** - **Table 13**	0
Maximum value / Energy per pulse	Float [32]	4E36-4E37	Depends on the selected variable	-
Minimum value	Float [32]	4E38-4E39	Depends on the selected variable	-
Connection delay	Uint [16]	4E3A	0... 65499 s	0 s
High level pulse width			0... 999 ms (x10)	
Disconnection delay	Uint [16]	4E3B	0... 65499 s	0 s
Low level pulse width			0... 999 ms (x10)	
Hysteresis	Uint [16]	4E3C	0... 99%	0%
Contact status	Uint [16]	4E35	**0:** Normally open **- 1:** Normally closed	**0**
Latch	Bool	4E3D	**0:** No **- 1:** Yes	
Latching time	Uint [16]	4E3E	0... 65499 s	0 s
Unlatch the output [18]	Bool	7544	0	0
Manual Operation: Output status [18]	Bool	754D	**ON(connected output):** FF00 **OFF (disconnected output):** 0000	0

[18] Functions **0x01** and **0x05** are used for this variable.

7.3.11.- CLEAR PARAMETERS

Parameters are cleared by **Function 05**: writing a relay.

Table 35: Modbus Memory Map: Clear parameters.

Clear parameters	Format	Address	Value to be sent
Clear energies and counters	Bool	834	0xFF00
Clear maximum and minimum values	Bool	837	0xFF00
Clear Maximum Demand values	Bool	83E	0xFF00
Clear the Maximums values of the Maximum Demand	Bool	83F	0xFF00
Clear all (Energy Meters, maximums and minimums, Quality Parameter Meters, Maximum Demand and Maximum Demand maximums)	Bool	848	0xFF00
Clear energy meters	Bool	849	0xFF00
Clear quality parameters	Bool	2B5C	0xFF00

8.- TECHNICAL FEATURES

AC Power supply	
Rated voltage	80... 264 V ~
Frequency	50... 60 Hz
Consumption	3... 8 VA
Installation category	CAT III 300V

DC Power supply	
Rated voltage	100 ...300 V ⎓
Consumption	2... 3 W
Installation category	CAT III 300V

Voltage measurement circuit	
Rated voltage (Un)	300 V_{Ph-N} , 520 V_{Ph-Ph}
Voltage measuring margin	20... 300 V ~
Frequency measuring margin	47... 63 Hz
Input impedance	1 MΩ
Minimum measurement voltage (Vstart)	10 V~
Installation category	CAT III 300V

Current measurement circuit			
Rated current (In)	... / 5A,... / 1A or.../0.250 A (MC type transformers)		
Current measurement margin	**In: .../5A**	**In: .../1A**	**In: .../0.250A**
	0.01 ... 10 A	0.01 ... 2 A	0.01 ... 0.5 A
Maximum current, impulse < 1s	100 A		
Minimum current measurement (Istart)	0.01 A		
Max. consumption of the current input	0.9 VA		
Installation category	CAT III 300V		

Measurement accuracy			
	Class (... / 5A)	**Class (... / 1A)**	**Class (... / 0.250A)**
Voltage measurement	0.2 % (19)	0.2 % (19)	0.2 % (19)
Current measurement	0.2 % (19)	0.2 % (19)	1 % for I >=20% In (19)
Active power measurement	0.5 % (19)	0.5 %	1 %
Reactive power measurement	1 % (19)	1 %	2 %
Apparent power measurement	0.5 % (19)	1 % for I >=5% In	1 % for I >=20% In
Active energy measurement	0.5s	1	1
Reactive energy measurement	1	2	2
Frequency measurement	0.1 % (19)	0.1 %	0.1 %
Power Factor measurement	0.5 % (19)	0.5 %	0.5 %

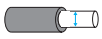
(19) For three-phase and phase values.

Digital transistor outputs	
Quantity	2
Type	Optocoupled (Open-collector)
Maximum voltage	48 V ⎓
Maximum current	120 mA
Maximum frequency	500 Hz
Pulse width	1 ms

RS-485 Communications	
Communications protocol	Modbus RTU
Baud rate	9600 - 19200 - 34800 - 57600 - 76800 - 115200 bps
Data bits	8
Stop bits	1 - 2
Parity	without - even - odd

User interface	
Display	TFT RGB 1.77" 160x128 pixels
Keyboard	3 keys
LED	2 LEDs

Environmental features	
Operating temperature	-10ºC ... + 50ºC
Storage temperature	-20ºC ... +70ºC
Relative humidity (non-condensation)	5... 95%
Maximum altitude	2000 m
Protection degree	IP30, **Front:** IP40,

Mechanical features			
Terminals			
1... 24	2.5 mm²	≤ 0.4 Nm, M2.5	Flat
Dimensions	**Figure 32** (mm)		
Weight	350 g.		
Enclosure	Self-extinguishing V0 plastic		
Attachment	DIN rail [20]		

[20] Recommended minimum distance between DIN rails: 150 mm.

Standards	
Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements.	EN 61010-1
Safety requirements for electrical equipment for measurement, control, and laboratory use Part 2-030: Specific requirements for test and measuring circuits.	EN 61010-2-030
Electrical material for measurement, control and laboratory use Electromagnetic compatibility (EMC) requirements Part 1: General requirements	EN 61326-1

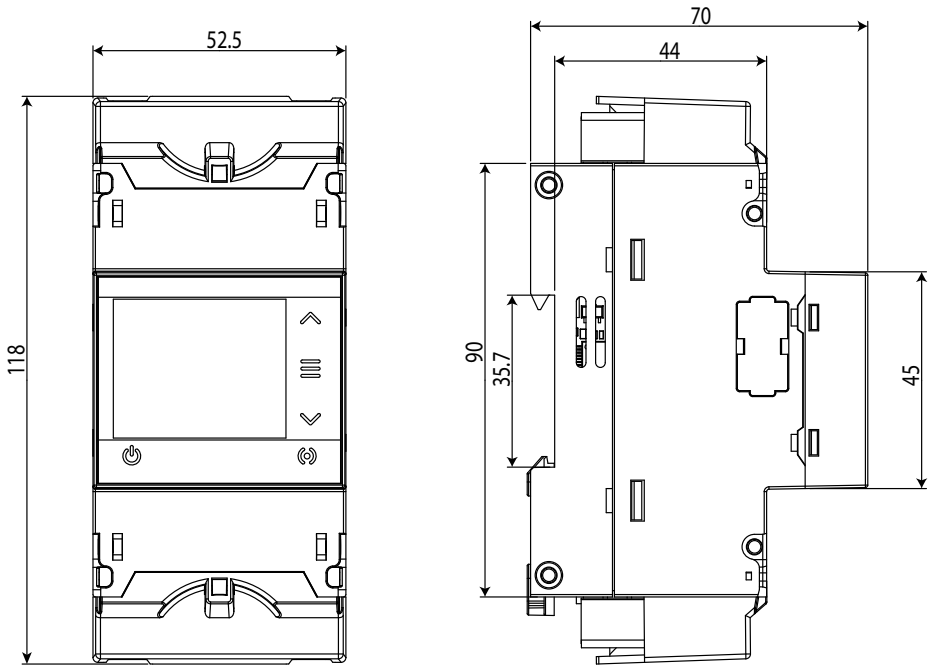


Figure 32: Line-CVM-D32 Dimensions

9.- MAINTENANCE AND TECHNICAL SERVICE

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

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

10 .- GUARANTEE

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.

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

(ES) 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:

Energy Data Server

Serie:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

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
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

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

IEC 61010-1:2010+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 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Año de marcado "CE":

2020

(EN) 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:

Energy Data Server

Series:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

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
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS 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 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Year of CE mark:

2020

(FR) 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:

Energy Data Server

Série:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

Marque:

CIRCUTOR

L'objet de la déclaration est conforme à la législation d'harmonisation pertinente dans l'UE, à condition d'avoir été installé, entretenu 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
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

Il est en conformité avec la(les) 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 61326-1:2012 Ed 2.0	IEC 61000-6-2:2016 Ed 3.0
IEC 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Année de marquage « CE »:

2020

Viladecavalls (Spain), 3/3/2020
General Manager: Ferran Gil Torné

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(DE)

KONFORMITÄTSERKLÄRUNG UE

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

Produkt:

Energy Data Server

Serie:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

Marke:

CIRCUTOR

Der Gegenstand der Konformitätserklärung ist konform mit der geltenden Gesetzgebung zur Harmonisierung der EU, sofern die Installation, Wartung undVerwendung der Anwendung seinem Verwendungszweck entsprechend gemäß den geltenden Installationsstandards und der Vorgaben des Herstellers erfolgt.

2014/35/UE: Low Voltage Directive	2014/30/UE: EMC Directive
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

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

IEC 61010-1:2010+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 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Jahr der CE-Kennzeichnung:

2020

(PT)

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

Producto:

Energy Data Server

Série:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

Marca:

CIRCUTOR

O objeto da declaração está conforme a 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
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

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

IEC 61010-1:2010+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 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Ano de marcação "CE":

2020

(IT)

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:

Energy Data Server

Serie:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

MARCHIO:

CIRCUTOR

L'oggetto della dichiarazione è conforme alla pertinente normativa di armonizzazione dell'Unione Europea, a 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
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

È conforme alle seguenti normative o altri documenti normativi:

IEC 61010-1:2010+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 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Anno di marcatura "CE":

2020

Viladecavalls (Spain), 3/3/2020
General Manager: Ferran Gil Torné

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(PL)

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:

Energy Data Server

Seria:

Equipo/Device: line-EDS, line-PSS, line-CVM-D32

Módulo/Module: line-M-410-T, line-M-410-R, line-M-410-A, line-M-20I, line-M-3G, line-TCPRS1, line-M-EXT-PS

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 mającymi zastosowanie normami dotyczącymi instalacji oraz instrukciami producenta

2014/35/UE: Low Voltage Directive	2014/30/UE: EMC Directive
2014/53/UE: RED Directive	2011/65/UE + 2015/863/UE: RoHS Directive

Jest zgodny z następującą(ymi) normą(ami) lub innym(i) dokumentem(ami) normatywnym(i):

IEC 61010-1:2010+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 61000-6-4:2018 Ed 3.0	ETSI EN 301 489-1 Ver. 2.1.1
ETSI EN 301 489-17 Ver. 3.2.1	

Rok oznakowania "CE":

2020

Viladecavalls (Spain), 3/3/2020
General Manager: Ferran Gil Torné

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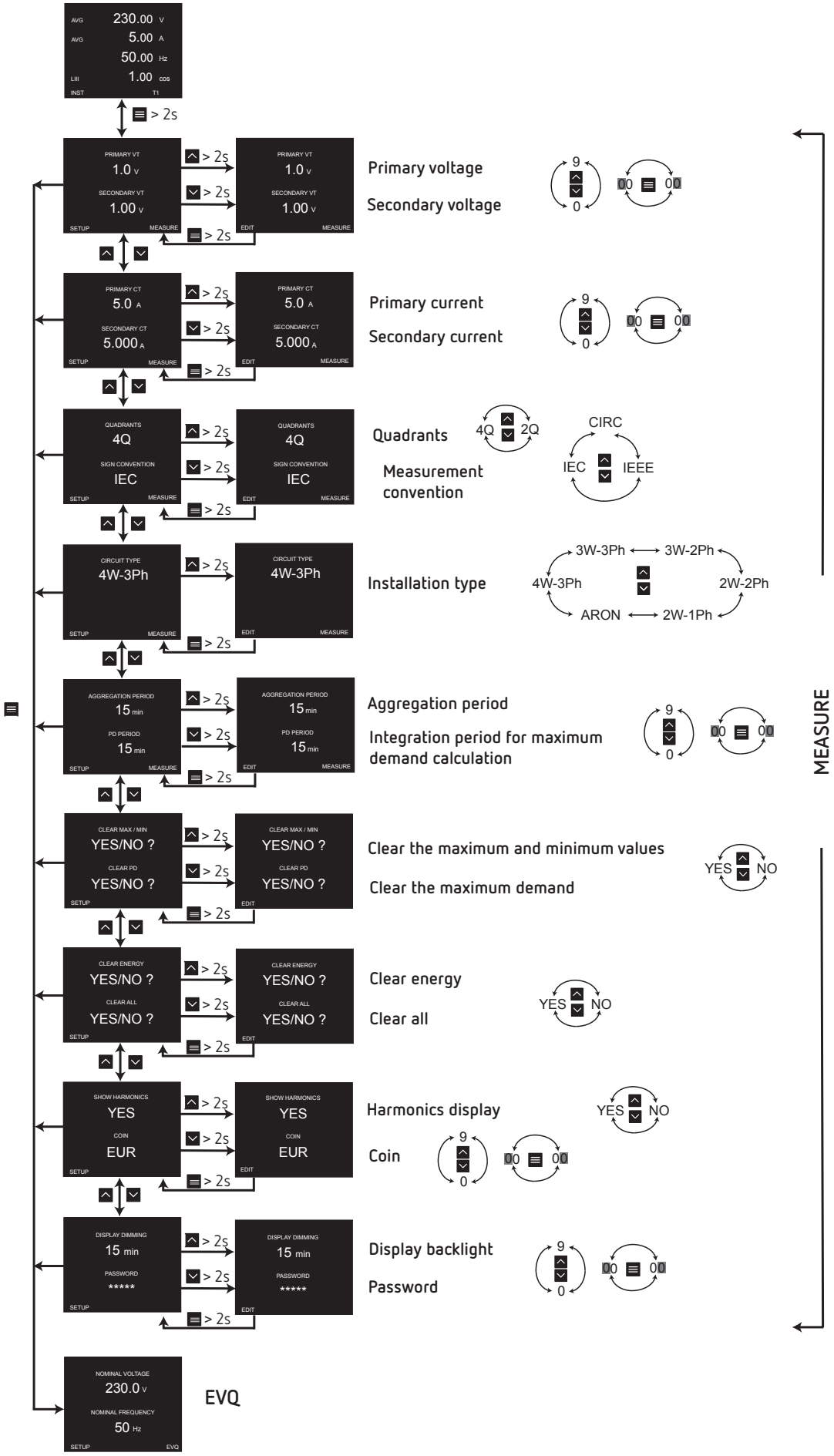
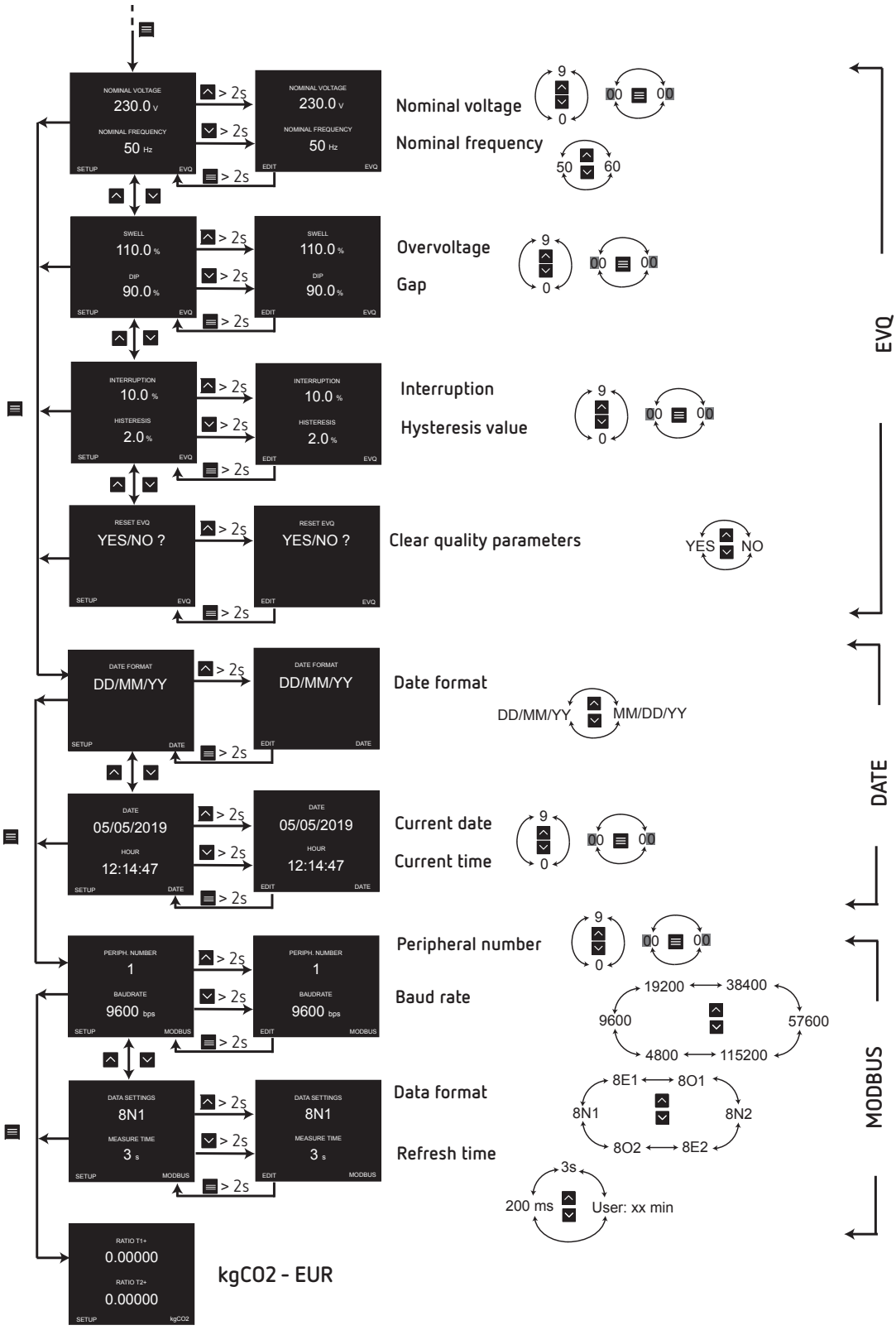
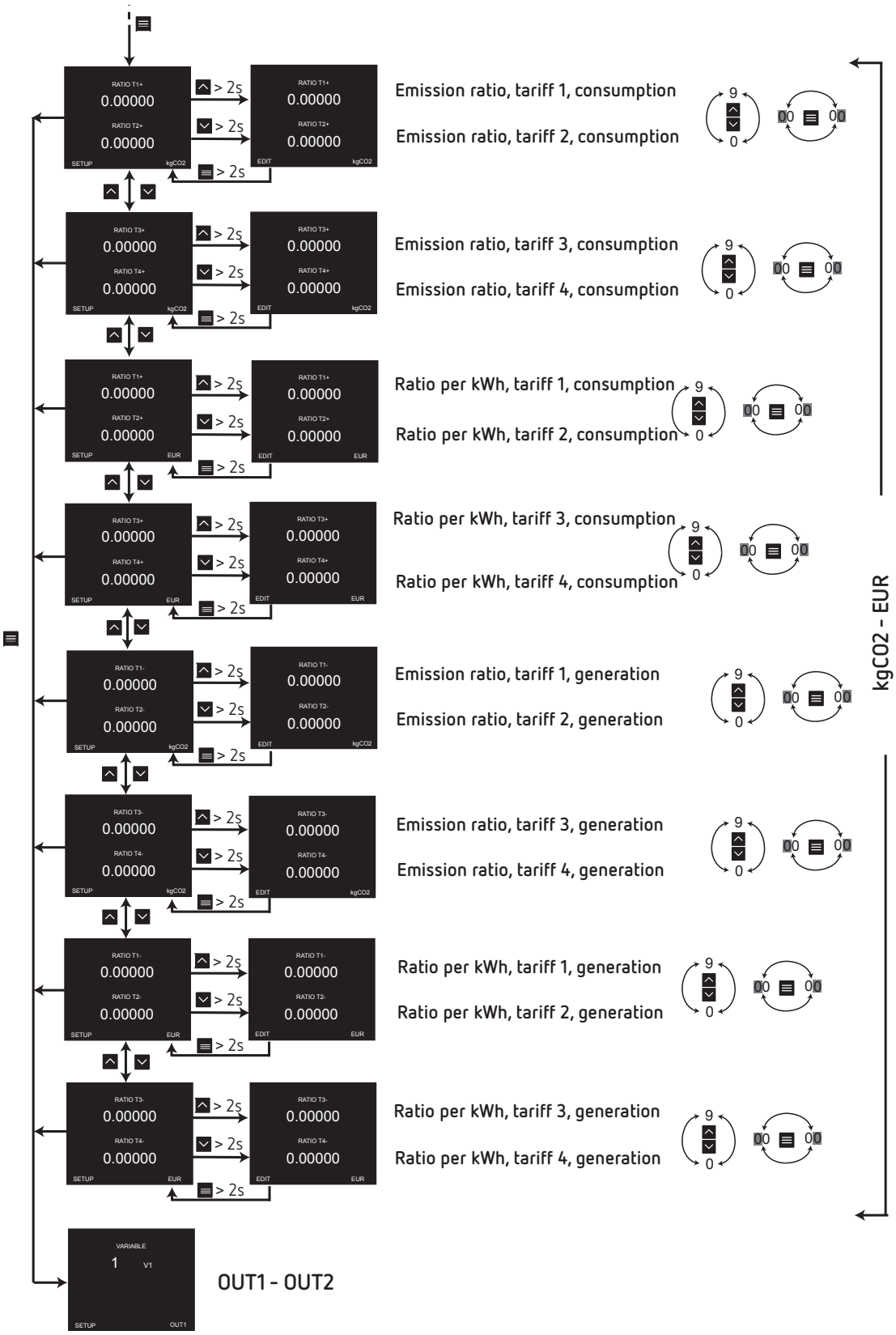
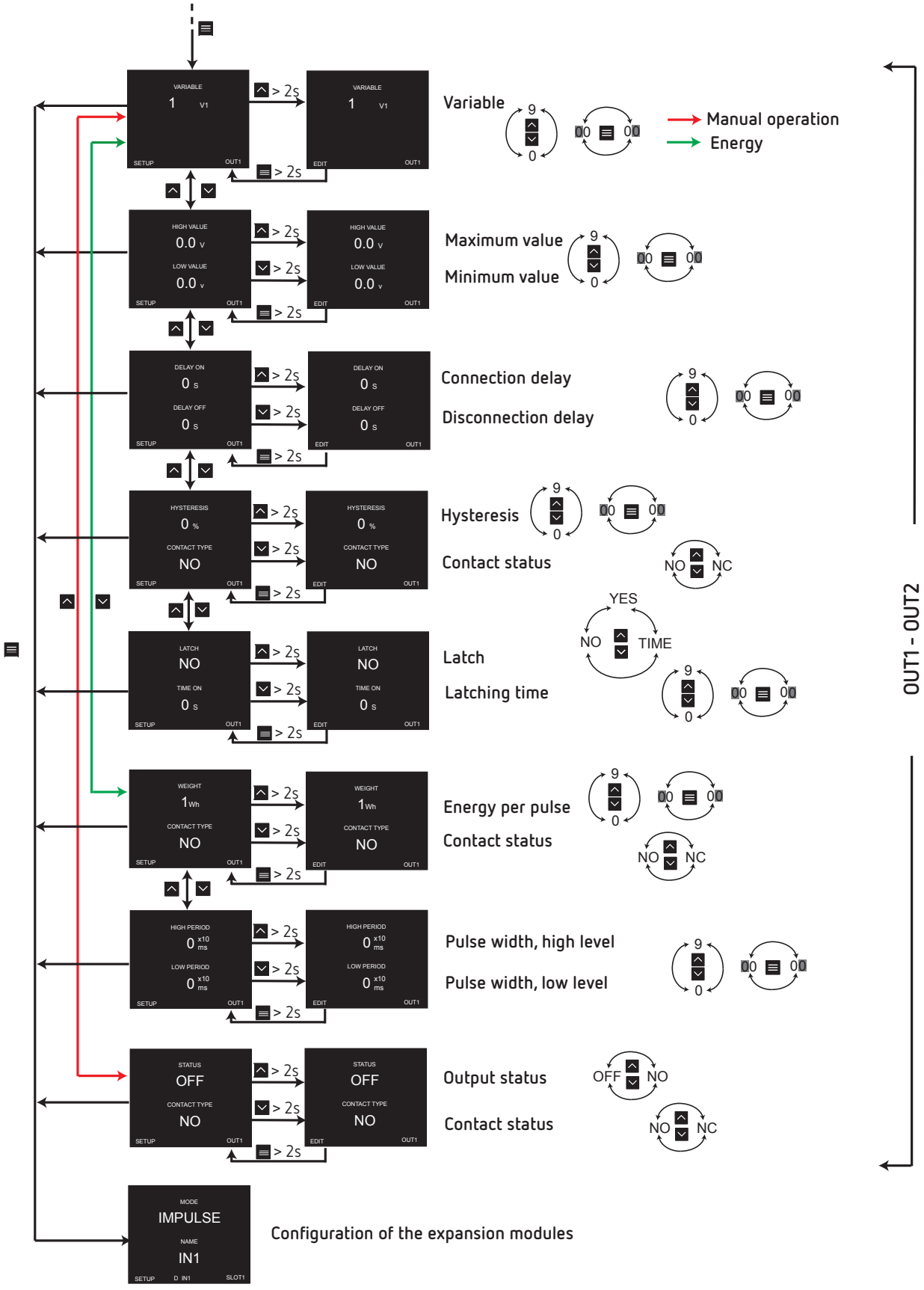
ANNEX A.- CONFIGURATION MENU




NOMINAL VOLTAGE
230.0 V
NOMINAL FREQUENCY
50 Hz
SETUP
EVQ
EDIT
> 2s
Nominal voltage
Nominal frequency
50
60
SWELL
110.0 %
DIP
90.0 %
Overvoltage
Gap
INTERRUPTION
10.0 %
HISTERESIS
2.0 %
Interruption
Hysteresis value
RESET EVQ
YES/NO ?
Clear quality parameters
YES
NO
EVQ
DATE FORMAT
DD/MM/YY
Date format
DD/MM/YY
MM/DD/YY
DATE
05/05/2019
HOUR
12:14:47
Current date
Current time
DATE
PERIPH. NUMBER
1
BAUDRATE
9600 bps
MODBUS
Peripheral number
Baud rate
19200
38400
9600
57600
4800
115200
DATA SETTINGS
8N1
MEASURE TIME
3 s
Data format
Refresh time
8E1
8O1
8N1
8N2
8O2
8E2
3s
200 ms
User: xx min
MODBUS
RATIO T1+
0.00000
RATIO T2+
0.00000
kgCO2
kgCO2 - EUR


RATIO T1+
0.00000
RATIO T2+
0.00000
SETUP
kgCO2
EDIT
> 2s
Emission ratio, tariff 1, consumption
Emission ratio, tariff 2, consumption
RATIO T3+
RATIO T4+
Emission ratio, tariff 3, consumption
Emission ratio, tariff 4, consumption
EUR
Ratio per kWh, tariff 1, consumption
Ratio per kWh, tariff 2, consumption
Ratio per kWh, tariff 3, consumption
Ratio per kWh, tariff 4, consumption
RATIO T1-
RATIO T2-
Emission ratio, tariff 1, generation
Emission ratio, tariff 2, generation
RATIO T3-
RATIO T4-
Emission ratio, tariff 3, generation
Emission ratio, tariff 4, generation
Ratio per kWh, tariff 1, generation
Ratio per kWh, tariff 2, generation
Ratio per kWh, tariff 3, generation
Ratio per kWh, tariff 4, generation
kgCO2 - EUR
VARIABLE
1 V1
OUT1
OUT1 - OUT2


VARIABLE
1 V1
SETUP
OUT1
> 2s
EDIT
Variable
Manual operation
Energy
HIGH VALUE
0.0 V
LOW VALUE
0.0 V
Maximum value
Minimum value
DELAY ON
0 s
DELAY OFF
0 s
Connection delay
Disconnection delay
HYSTERESIS
0 %
CONTACT TYPE
NO
Hysteresis
Contact status
LATCH
TIME ON
0 s
Latch
Latching time
YES
TIME
WEIGHT
1 Wh
Energy per pulse
HIGH PERIOD
LOW PERIOD
0 x10 ms
Pulse width, high level
Pulse width, low level
STATUS
OFF
Output status
MODE
IMPULSE
NAME
IN1
D IN1
SLOT1
Configuration of the expansion modules
OUT1 - OUT2

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