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CVM-A1500

Power analyzer for panel with power quality measurement parameters

Description

CVM-A1500 is a panel mounted power quality analyzer with EMS (Energy Management Software) integrated. Its internal Web Server (html5) allows any user to have full installation control by using any web browser.

Designed to be installed in the most relevant or critical part of electric installations since it registers and monitors a wide range of variables (almost one year of data with RMS, maximum and minimum values). The device also registers power quality events such as swells, dips, interruptions (every half cycle) and transients (according to **IEC 61000-4-30** Class A). Any event will be immediately captured with the voltage and current waveform.

This model adds the measurement of power quality variables (defined in the standard **EN 50160**) such as flicker, unbalance (Kd) and asymmetry (Ka) coefficients or voltage and current harmonics decomposition up to 63th. In addition it is possible to monitor in real time the instantaneous waveforms of voltage and current through its oscilloscope function.

As an added value, **CVM-A1500** displays the number of events and transients on each affected phase with the level reached, duration and its associated waveform. In addition, those events are directly displayed in CBEMA, ITIC y SEMI-F47 graphs.

The smart design of the **CVM-A1500** allows users to customize their own screens in order to access to the information faster and easy. Remark that the device allows the connection though PowerStudio software to save and store, in a redundant way, all the information in a server or PC avoiding memory limits.

- Dimensions:144 x 144 mm
- Energy Management Software (EMS) included with historical data register
- Register of power quality events, waveforms and instantaneous parameters.
- Expandable up to 3 modules (inputs/outputs and communications)
- VGA color display with high definition
- IP 65 with airtight seal
- 5 voltage channels + 4 ITF current channels
- Active energy class 0,2S (**IEC 62053-22**)
- Universal switching power supply AC/DC or DC
- Ethernet communications (Web Server) + RS-485 (ModBus RTU or BACnet protocol)
- 5 user customizable screens
- 3 tariffs (selectable by digital input or by communications)
- Cost calculation(any currency) and emissions of $kgCO_2$
- 2 relay outputs for alarms + 2 transistor outputs for alarms or pulses + 2 digital inputs to select tariff, to control logical states or pulse centralizer from any external meter.

CVM-A1500

Power analyzers for panel with power quality measurement parameters

Applications

— Control, monitoring and logging of the power quality in High and Low Voltage distribution panels. Performed directly or remotely thanks to its WEB server. Integration in SCADA systems through XML requests.
— 4 alarms (2 per transistor and 2 per relay), fully and independently programmable according to a low or high value, hysteresis, connection/disconnection delays, normally open or closed standby status and interlocking.
— Generation of impulses with transistor outputs, fully and independently configurable over any incremental parameter (energy, costs, $kgCO_2$, total meter or tariff hours).
— Transducer converting analogue signals to any instantaneous parameter measured or calculated by the unit, with built-in expansion modules with analogue outputs.
— Display of process signals featuring a built-in expansion module with analogue inputs, with optional reporting of these signals to SCADA systems through communications systems.
— Control of electrical load or alarm signal operations by programming the transistor or relay outputs that are built-in or added through expansion modules.
— Datalogger integrated with Web server and XML (log of historical data).

Technical features

Power circuit	Power supply voltage	85...265 Vac / 120...300 Vdc 20...120 Vdc (SDC model)		
	AC frequency	50...60 Hz		
	AC consumption	max 29,4 V·A		
	DC consumption	max 11,9 W max 13,8 W (SDC model)		
Voltage measurement circuit	Voltage range	500 V_{p-n} - 866 V_{p-p} (functional up to 600 V_{p-n} / 1000 V_{p-p})		
	Frequency	40...70 Hz		
	Measurement margin	7...200% of the U_n for U_n = 300 Vac. (p-n)		
	Admissible overvoltage	750 Vac		
	Maximum power consumption (limited current)	< 0.15 VA		
Current measurement circuit	Current measurement	4 (3 phases + 1 neutral)		
	Input current	.../5 A or.../1 A or .../250 mA		
	Minimum current for class	250 mA		
	Start-up current	10 mA		
	Measurement margin	0.2...200% I_n (.../5 A) 1...200% I_n (.../1 A) 4...200% I_n (.../250 mA)		
	Admissible overload	2 I_n A permanent, 100 A t < 1 s		
	Consumption	< 0.9 VA		
Maximum transformation ratios	Primary V: 500,000 (500 kV) Primary A: 999.9 to 1.0 (10 kA) in .../5 A and .../1 A, 63...2000 A in **MC** Prim V x Prim A < 60 MW			
Maximum meter value (total)	Yes (Primary A / Secondary A) < 1000 (2 GW)			
	Yes (Primary A / Secondary A) ≥ 1000 (2 TW)			
Accuracy class		.../5 A	.../1 A	.../250 mA
	Voltage	0,1 ±1 digit (20...600 $V_{a.c.}$)	0,1 ±1 digit (20...600 $V_{a.c.}$)	0,1 ±1 digit (20...600 $V_{a.c.}$)
	Neutral voltage	0,5 ±1 digit (55...500 $V_{a.c.}$)	0,5 ±1 digit (55...500 $V_{a.c.}$)	0,5 ±1 digit (55...500 $V_{a.c.}$)
	Current	0,1 ±1 digit (0,05...8 A)	0,1 ±1 digit (0,01...1,2 A)	0,1 ±1 digit (0,01...0,3 A)
	Neutral current	1 ±1 digit (0,1...6 A)	1 ±1 digit (0,05...1,2 A)	1 ±1 digit (calculated)
	Active power	0,2 ±2 digits	0,2 ±2 digits	0,5 ±2 digits
	Reactive power	1 ±1 digit (0,05...6 A)	1 ±1 digit (0,01...1,2 A)	1 ±1 digit (0,01...0,3 A)
	Active energy	0,2S	0,5S	0,5S
	Reactive energy	1	2	2
Display of harmonics	Voltage / Current	to 63rd		

CVM-A1500

Power analyzers for panel with power quality measurement parameters

Technical features

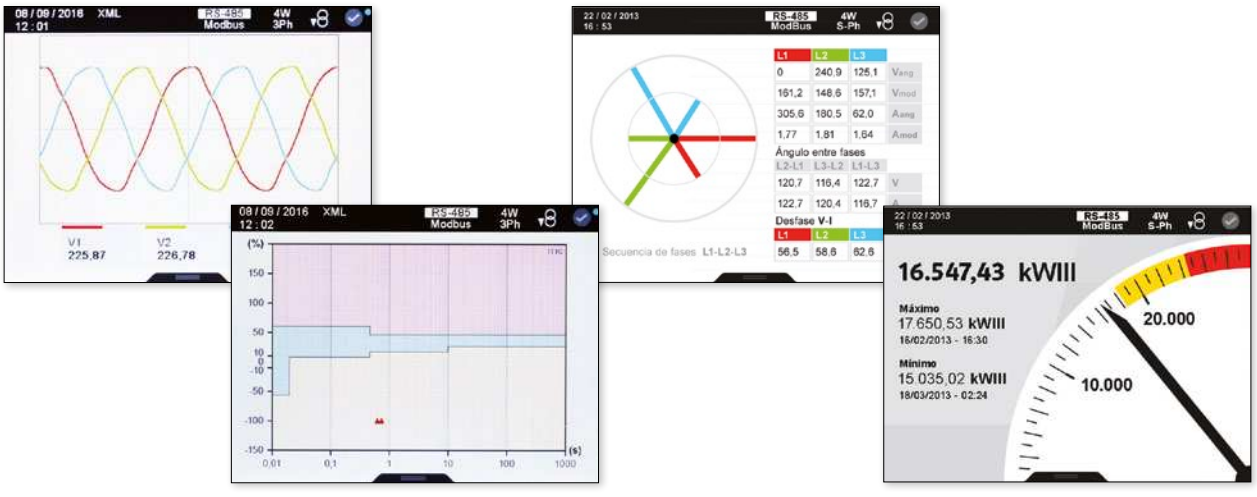
Connections		
Digital inputs	Selection of tariffs, states or external alarms	
	Type	Optoisolated potential-free contact
	Quantity	2
	Activation current	5 mA (15 V maximum voltage of open contact)
	Insulation	4 kV
Digital outputs	Generation of impulses or alarms	
	Type	NPN transistor
	Quantity	2
	Maximum operation voltage	48 Vdc
	Maximum switching current	130 mA
	Maximum frequency	1 kHz
	Pulse duration (T_{on} / T_{off})	0.3 / 0.7 ms (1 ms of a complete impulse)
	Alarms	
	Type	Relay
	Quantity	2
	Maximum operating power	1500 W
	Maximum voltage, open contacts	250 Vac
	Maximum switching current	6 A
	Electrical working life (400 V / 6 A)	3 x 10^4 cycles
	Mechanical working life	1 x 107 cycles
Built-in communications	Protocols	Modbus RTU / BACnet
	Speed	9600...115200
	bits, parity, stop	8, n, 1 (configurable)
Environmental conditions	Working temperature	-10...+50°C
	Relative humidity	5...95%
	Altitude	2000 m
Build features	Format	Assembly on 96x96 mm or 144x144 mm panel
	Depth	1 module
	Front panel IP protection	IP 40 (IP 65 with sealing gasket)
	Rear panel IP protection	IP 30
Safety	Designed for CAT III 300/520 Va.c. installations, in accordance with **EN 61010** Double-insulated electric shock protection, class II	
Standards	**IEC 62053-22**, **ANSI** (class 0.2S), **IEC 62053-24** (Class 1) / **ANSI C12.1** (Class 2), class A acc. to **IEC 61000-4-30**, **IEC 61010**, **IEC 61000**, **UNE-EN 55022** Measurement acc. to **MID**, **UL** certification **IEC 61000-4-2**, **IEC 61000-4-3**, **IEC 61000-4-11**, **IEC 61000-4-4**, **IEC 61000-4-5**	

References

144 x 144

Current measuring secondaries	Type	Code
.../5 or .../1 A or ...250 mA	**CVM-A1500-ITF-RS485-ICT2**	**M56311**
.../5 or .../1 A or ...250 mA	**CVM-A1500-SDC-ITF-485-ICT2***	**M5631100F0000**

* Power supply 20...120 Vdc



CVM-A1500

Power analyzers for panel with power quality measurement parameters

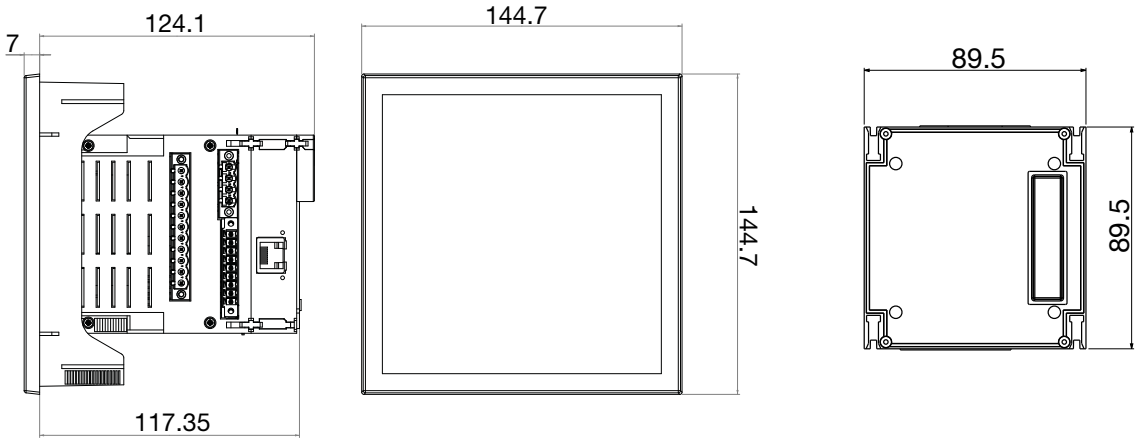
Expandable modules for CVM-A1500

Outputs	Digital Inp.	Analogue Inp.	Communication	Protocol	Type	Code
8 Trans.(*)	8	-	-	-	**M-CVM-AB-8I-8OTR**	**M56E01**
8 relay	8	-	-	-	**M-CVM-AB-8I-8OR**	**M56E02**
8 (0/4...20 mA)	-	4 (0/4...20 mA)	-	-	**M-CVM-AB-4AI-8AO**	**M56E03**
-	-	-	Ethernet (RS-485 Bridge)	Modbus / TCP	**M-CVM-AB-Modbus-TCPBridge**	**M56E05**
-	-	-	Ethernet (Ethernet Bridge)	Modbus / TCP	**M-CVM-AB-Modbus-Switch**	**M56E0A**
-	-	-	MBus	MBus	**M-CVM-AB-MBUS**	**M56E07**
-	-	-	LonWorks	**LonTalk ISO/IEC 14908 ANSI/EIA 7091**	**M-CVM-AB-LonWorks**	**M56E08**
-	-	-	-	Profibus/DP	**M-CVM-AB-Profibus**	**M56E09**

Description	Type	Code
IP 65 sealing gasket for CVM-AB (144x144)	**IP65-AB-144**	**M5ZZ5V**

Dimensions

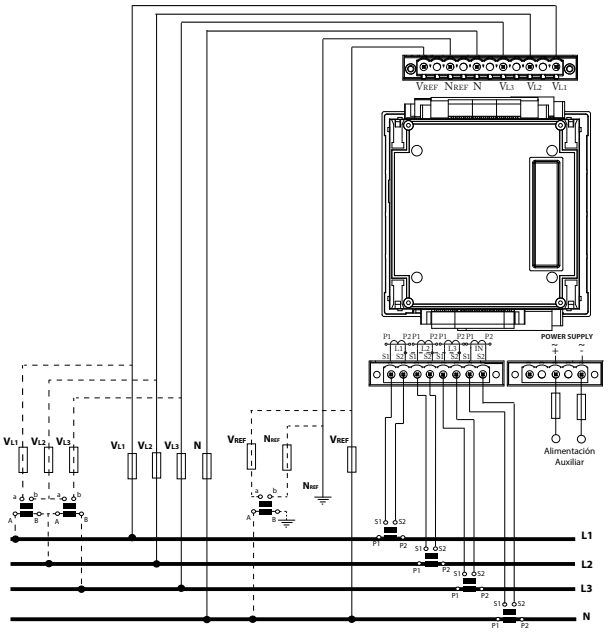
CVM-A1500

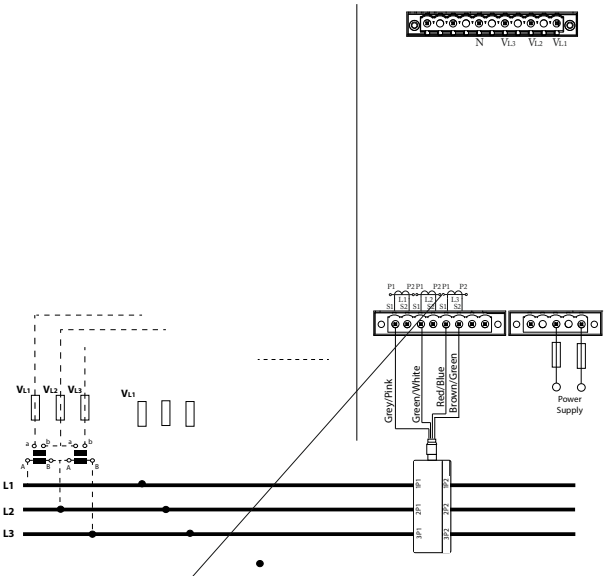


Window level: 138x138 mm

Note: Refer to the product manual for other options

CVM-A1500


VREF NREF N VL3 VL2 VL1
POWER SUPPLY
Alimentación Auxiliar
VL1 VL2 VL3
N
VREF NREF
L1
L2
L3
N


N VL3 VL2 VL1
Grey/Pink
Green/White
Red/Blue
Brown/Green
Power Supply
L1
L2
L3

CVM MINI

Three-phase power analyzer, assembly on DIN rail

Description

Three-phase power analyzer (balanced and unbalanced), assembly on DIN rail, with a very compact size, and 4-quadrant measurement.

Other features include:

- Current measurement .../5 or .../1 A or .../250 mA, .../333 mV
- DIN rail format of only 3 modules
- Assembly on 72 x 72 mm panel with adapter front panel
- RS-485 Communications (Modbus-RTU) depending on model
- It features two transistor outputs (programmable)
- With ITF technology: galvanic insulation protection, depending on the type
- Selection of parameters to display
- Selection of the default page
- Universal power supply (optional)
- Sealable

Applications

- Control application on switchboards and low and medium voltage connection points, where an analyzer must be installed on a DIN rail due to space restrictions.
- Alarm control. Maximum value, minimum value and programmable delay.
- Control of active or reactive energy using the impulse output.
- Instantaneous data capture, maximum and minimum values of the electrical parameters measured.

Technical features

Power circuit	Standard Optional	230 Vac (-15...+10%) 85...265 Vac / 95...300 Vdc (optional) 20...120 Vdc (optional)
	Consumption	3 V·A
	Frequency	50...60 Hz
Measurement circuit	Rated voltage	300 Vac (p-n) / 520 Vac (p-p)
	Frequency	45...65 Hz
	Voltage circuit consumption	0.7 V·A
	Current circuit consumption	ITF 0.9 VA/ Shunt 0.75 VA
	Transformers	.../5 A or.../1 A or .../250 mA, .../333 mV
	Minimum direct current	110 mA
	Maximum direct current	6 A
Accuracy class	Voltage, Current	0.5% + 1 digit
	Active power, Reactive power	1% + 2 digit
	Active energy Reactive energy	1% + 2 digit Class 1
Environmental conditions	Operating temperature	-10...+50 °C
	Relative humidity	5 ... 95%
	Maximum altitude	2000 m
Optocoupled output transistor (open collector) NPN	Maximum operating voltage	24 Vdc
	Maximum operating current	50 mA
	Maximum frequency of impulses	5 imp/s
	Duration of the impulse	100 ms
Build features	Measurement module	Assembly on **DIN 46277** rail (**EN 50022**)
	Protection degree	Embedded unit: IP 51 Terminals: IP 31
	Dimensions	52.5 x 85 x 67.9 mm (3 modules)
Safety	Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010**. Double-insulated electric shock protection, class II	
Standards	**IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1**	

CVM-MINI

Three-phase power analyzer, assembly on DIN rail

References

Isolated Inp.	Current Inp.	Digital output	Harmonics	Protocol	Communications	Type	Code
-	.../1 A, .../5 A	-	-	-	-	**CVM MINI**	**M52000**
Yes	.../1 A, .../5 A	2	-	-	-	**CVM MINI-ITF-C2**	**M52011**
Yes	.../250 mA	2	-	-	-	**CVM MINI-MC-ITF-C2** (*1)	**M52071**
Yes	.../1 A, .../5 A	2	-	Modbus/RTU	RS-485	**CVM MINI-ITF-RS485-C2**	**M52021**
Yes	.../250 mA	2	-	Modbus/RTU	RS-485	**CVM MINI-MC-ITF-RS485-C2** (*1)	**M52081**
Yes	.../1 A, .../5 A	2	*U* e *I* (15º)	Modbus/RTU	RS-485	**CVM MINI-ITF-HAR-RS485-C2**	**M52031**
Yes	.../1 A, .../5 A	2	-	Modbus/TCP	TCP/IP	**CVM-MINI-ITF-ETH-C2**	**M520J1**
Yes	.../250 mA	2	-	Modbus/TCP	TCP/IP	**CVM-MINI-MC-ITF-ETH-C2** (*1)	**M520L1**
Yes	.../1 A, .../5 A	2	-	BACnet	-	**CVM-MINI-ITF-BACnet-C2** (*2)	**M520F1**
Yes	.../250 mA	2	-	BACnet	-	**CVM-MINI-MC-BACnet-C2** (*1*2)	**M520H1**
Yes	.../1 A, .../5 A	2	-	LonWoks	LonTalk	**CVM MINI-ITF-LonWorks-C2**	**M52091**
				ISO/IEC 14908 – ANSI/EIA 7091			
Yes	.../333 mV	2	-	Modbus/RTU	RS-485	**CVM-MINI-mV-RS485-C2**	**M520810000V**
Panel adapter for **CVM-MINI** (72 x 72)						**Panel adapter**	**M5ZZF1**

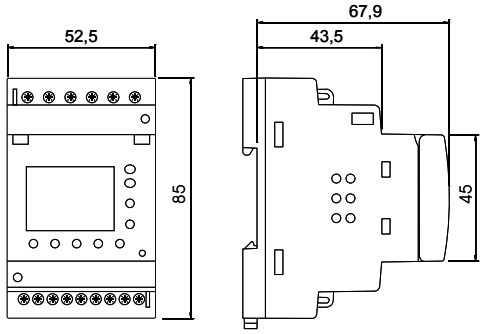
(*1) Requires the installation of **MC** series efficient transformers. – (*2) Only available with 230 V_{ac} power supply

Coding table

M	5	X	X	X	X	0	0	X
Code						Internal code		↑
			Standard (230 Vac)					0
Power supply voltage			85...285 Vac 95...300 Vdc					C
			20...120 Vdc					5*

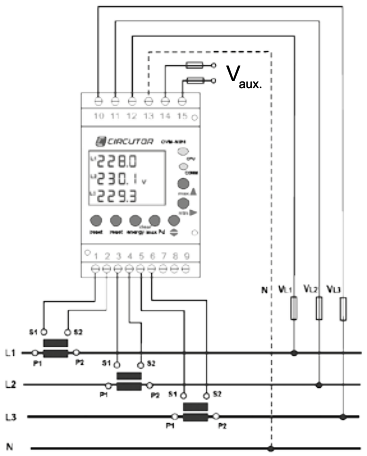
* Only **CVM MINI-ITF-RS485-C2**

Dimensions

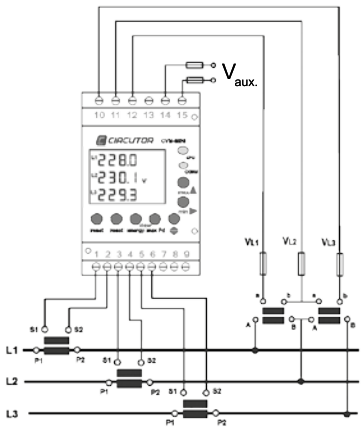


Connections

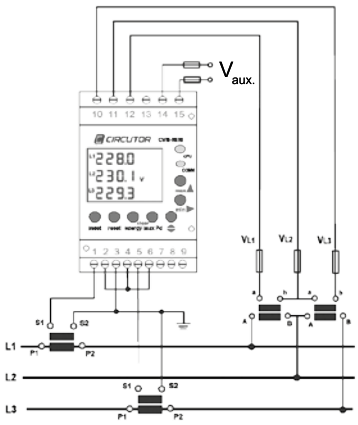
3 or 4 wires (low voltage)



3 wires (2 voltage transformers and 3 current transformers)



3 wires (2 voltage transformers and 3 current transformers)



CVM-NET4+

Multi-channel power analyzer for DIN rail - no display

Description

CVM-NET4+ is a multi-channel power analyzer designed to measure balanced or unbalanced three-phase networks and to measure single-phase networks. Its versatile configuration options enable you to take measurements in single-phase systems, three-phase systems or a combination of both. It has a single three-phase voltage input combined with 12 single-phase channels to measure the current from the **MC efficient current transformers**.

Its main features include:

- Assembly on DIN rail
- Compact size (6 DIN rail modules)
- Measurement of up to 12 single-phase channels or combined single-phase and three-phase current channels.
- Current measurement using efficient **MC** series transformers (.../250 mA)*
- RS-485 Communications (Modbus/RTU)
- 4 programmable digital outputs for alarms or impulses
- Compatible with **PowerStudio** /**PowerStudio SCADA** / **PowerStudio SCADA Deluxe** software.

Applications

- Measurement of electrical parameters in multi-channel installations, such as data processing centres and switchboards of single-phase loads.
- Simultaneous measurement at 4 different points in three-phase installations
- Its compact size is perfect for assembly on electric panels

Technical features

Power circuit	Rated voltage	85...265 Vac / 95...300 Vdc
	Power supply frequency	50...60 Hz
	Maximum consumption	2,9...6 V·A / 3...6 W
Measurement circuit	Rated voltage	300 Vac (Ph-N) / 520 Vdc (Ph-Ph)
	Frequency	45...65 Hz
	Nominal current	I_n .../250 mA
	Permanent overload	1,3 I_n
Accuracy class	Voltage, current	0,5 %
	Active Power	1 % (> 90 W)
	Active energy	1 % (class 1)
Communications	Network protocol	RS-485
	Communication protocol	Modbus/RTU
	Speed	9600 / 19200 / 38400 / 57600 bps
	Lenght	8
	Parity	No parity / odd / even
	Stop bits	1 / 2
Output transistors	Type: Isolated transistor	Open NPN collector
	Maximum operation voltage	24 Vdc
	Maximum operation current	50 mA
	Maximum frequency	5 imp/s
	Impulse duration	100 ms
Build features	Measurement module	Assembly on **DIN 46277** rail (**EN 50022**)
	Number of modules	6
	Protection Degree	IP 31, Front panel IP 51
Environmental conditions	Working temperature	-10 ... +50 °C
	Humidity (non-condensing)	5 ... 95% (non-condensing)
	Maximum altitude	2000 m
Safety	**IEC 61010** Double-insulated electric shock protection, class II	
Standards	**IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, IEC 61000-6-3, IEC 61000-6-1, IEC 61010-1, IEC 61000-4-11, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC-61000-4-5, EN 55011, CE**	

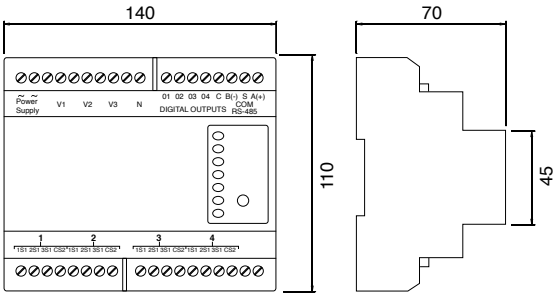
CVM-NET4+

Multi-channel power analyzer for DIN rail - no display

References

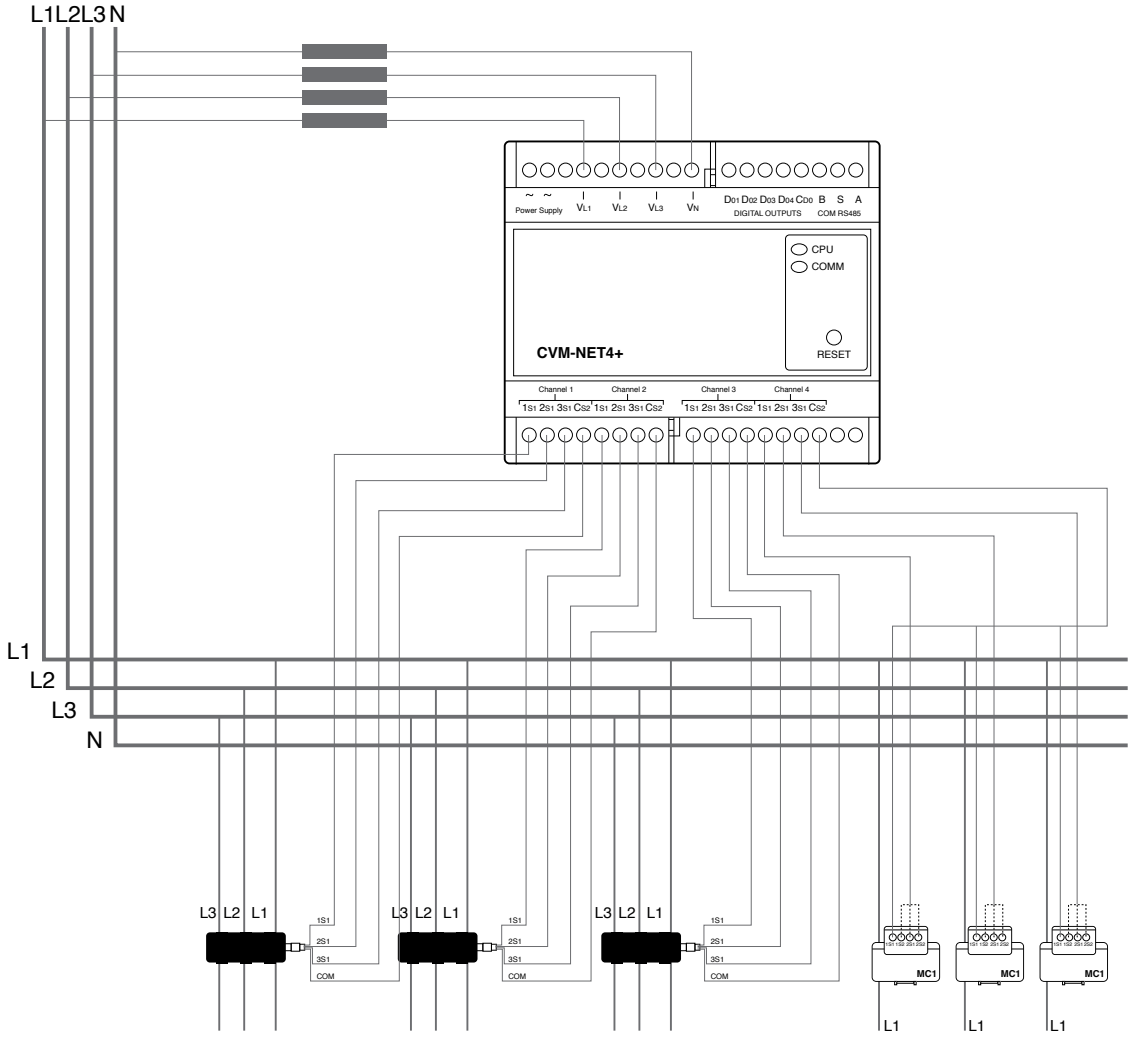
Type	Code	Communications	Transformer
CVM-NET4+-MC-RS485-C4	**M55782**	RS-485 Modbus/RTU	.../250 mA (type **MC**)
CVM-NET4+-mV-RS485-C4	**M557820000V00**	RS-485 Modbus/RTU	.../ 333 mV

Dimensions



Connections

Combined three-phase and single-phase channel connections



PowerStudio

Energy supervision and centralisation software

PowerStudio is a powerful, simple and user-friendly software tool that can be used for the integral supervision of energy of power analyzers, energy meters, earth leakages and offers complete control of a wide range of magnitudes.

PowerStudio, together with CIRCUTOR units and systems, adapts to the needs of the installation, offering the following efficient management measures:

Versions

PowerStudio is available in three versions with different features, to suit the needs of the particular management system.

PowerStudio

PowerStudio SCADA

PowerStudio SCADA Deluxe

Energy management

- Creation of historical logs
- Baseline determination
- Control of energy costs
- Energy balance
- Energy consumption ratios
- Consumption reports

Essential tool for UNE 16001 / ISO 50001 certification

Improved productivity

Maintenance
- Alarm tables
- Power quality control
- Variables analysis and management
- Technical reports

Production costs
- Correct allocation of energy costs
- Energy ratio / unit of production
- Cost reports / production ratios

Additional software

SQL DATA

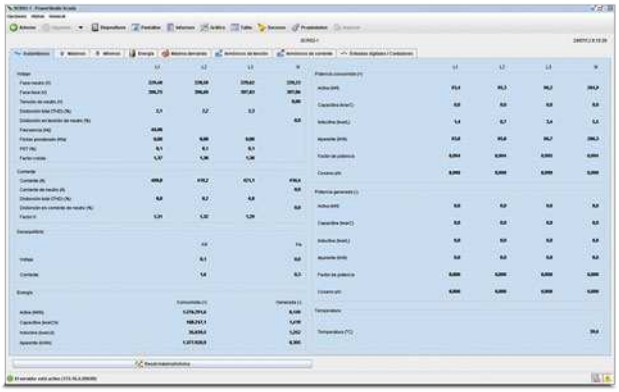
Modules for exporting historical logs to an SQL server

OPC-DA

Data connector for external systems with an OPC-DA client

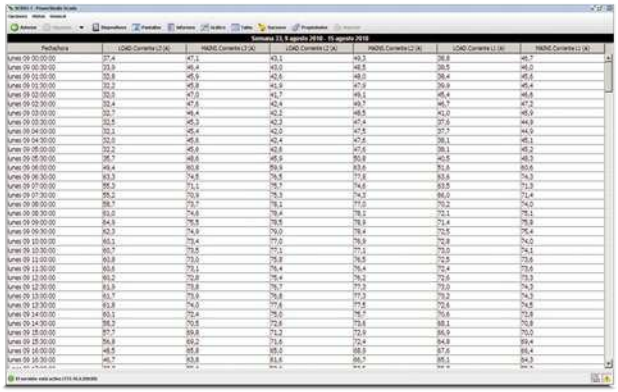
Real time variables

Displays all variables measured from all units in real time.



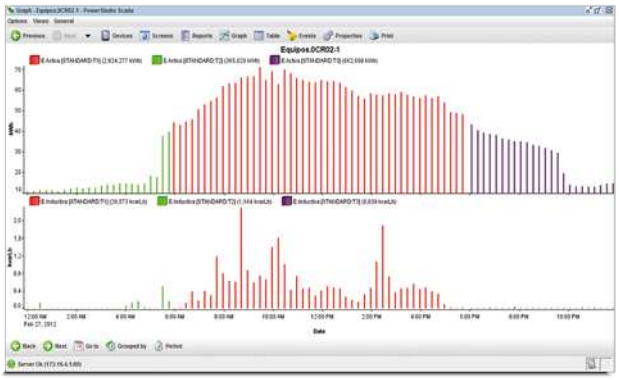
Tables

Displays data on tables; this information can be exported to .txt or .csv files.



Graphics

Graphical representation of the historical data recorded by software. Enables configuration of colours and layout individually. Displays multiple parameters simultaneously.

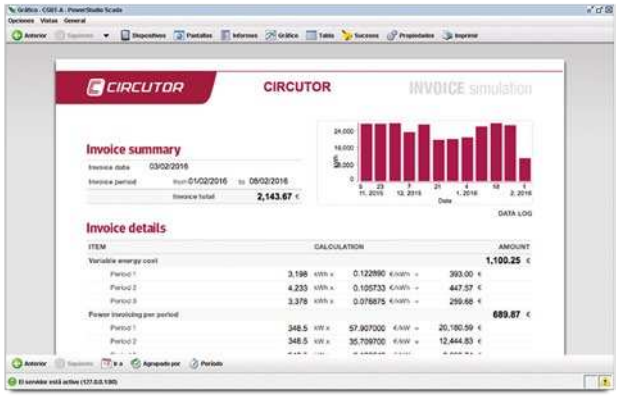


SCADA screens

With **SCADA** screens you can configure all kinds of interactive windows, create personalised screens and combine different parameters from different CIRCUTOR units easily, thus obtaining the maximum amount of information possible in an intuitive and user-friendly environment.

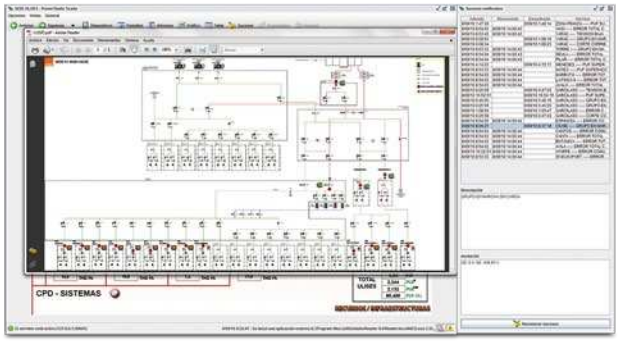
Reports

PowerStudio SCADA can generate reports for all types of bills, with the allocation of partial costs, production ratios, etc.



Events

With the events module, you can control and automate alarms and events, automatically controlling the installation's most critical and important conditions.



Accessories

TC, TCH y **TP** | **Transformers**
These units can be installed in installations with space restrictions. They are designed with a wide range of diameters and operating current values. They are easily installed, ideal for switch outputs and provide highly accurate measurement. They can be mounted on panels or assembled on DIN rails with accessories.

MC1 | **Transformers**
Very useful for installing in places where the exact nominal current range is not known. Each unit features 3 ratio ranges. Compliant with the **IEC 60044-1** Standard, featuring a 250 mA output for more efficient measurements.

RS2RS | **Converter**
Gateway that converts an RS-232 channel to RS-485. It can also operate as an amplifier-repeater of the signals of the RS-485 bus.

CMBUS-8/24 | **Converter**
Gateway designed to convert the M-Bus protocol to Modbus, with up to 24 slave units.

STP-24 | **Transformers**
Open-core current transformers with compact dimensions for easy installation. This type of transformer is very easy to install and uninstall on compact panels. In addition, these open-core transformers can measure current without the need to cut the power supply.

MC3 | **Transformers**
The new system comprises three efficient transformers in the same enclosure. This innovative design provides important advantages during installation. Compliant with the **IEC 60044-1** Standard, featuring a 250 mA output for more efficient measurements.

TCP1RS+ | **Converter**
Gateway designed to convert the Ethernet physical environment to RS-485.

TCP2RS+ | **Converter**
Gateway designed to convert the Ethernet physical environment to RS-485.

Wireless system

AirGATEWAY | **Converter**
AirGATEWAY converts the Modbus serial environment to Radio.

AirREPEATER | **Repeter**
AirREPEATER is a repeater unit that expands the range of the Radio signal.

AirHANZER | **Repeter**
AirHANZER is a handheld unit that measures radio signals, providing information about the available coverage and the need to install a repeater unit.

AirBRIDGE | **Converter**
AirBRIDGE converts Radio signals to Modbus RS-485 signals for slave units.

AirTHL | **Sensor**
AirTHL provides the infrastructure with wireless communications and can measure temperature, humidity and brightness.

Advanced system for absolute management

CVM
Power Analyzers

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