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CVM-C10-Flex

Panel-mounted power analyser with flexible Rogowski sensors

Description

Compact and versatile power analyser, with 4-quadrant measurement (Consumption and Generation), suitable for High, Medium and Low-Voltage installations, since it can process high voltage:current transformation ratios of up to 2000 A. Measures current with flexible Rogowski sensors.

Capable of adapting to any type of electrical network topology, from single-phase lines, two-phase lines with or without neutral to three-phase lines with or without Neutral. The **CVM-C10-Flex** calculates the sensitivity of the measurement range scale automatically, according to the nominal value of the detected current, up to a full-scale of 2000 A. (Twice the full-scale value of measured current, 1000 A).

The flexible sensors feature a magnetic lock, which allows the sensors to be sealed. They are robust and can withstand frequent assembly and disassembly procedures, thanks to these magnetic lock.

Quick installation on distribution panels or switchboards of the unit, thanks to its flexible current sensors. Self-adjustment of the scale sensitivity. Does not require the current primary to be programmed. (1000 A by default, factory setting). Remote correction of errors associated with the incorrect connection of the unit to the electrical installation via remote communication systems (PowerStudio).

Display features and interface:
- Backlit keypad (capacitive)
- Analogue display for instantaneous parameters (power, maximum power reached and cos φ or PF)
- Backlit display
- Cost by tariff
- Operating time indicator for preventive maintenance.

The unit has the following functions:
- Recording of the energy consumption from three different sources: network, generator set or photovoltaic energy generation system.
- Selection of tariffs with digital inputs. Perfect for calculating costs in three different work shifts.

Applications

- Management Systems that require roaming measuring points.
- Distribution panels or switchboards that cannot stop the installation of a measuring unit.

CVM-C10-Flex

Panel-mounted power analyser with flexible Rogowski sensors

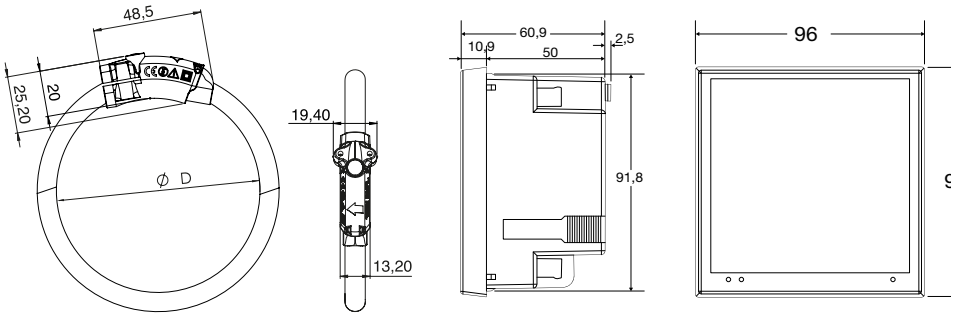
References

Type	Code	Power supply	Communications
CVM-C10-FLEX-IN-485-I2	M55963	85...265 V_{ac} / 95...300 V_{dc}	RS-485; Modbus/BACnet
CVM-C10-SDC-FLEX-IN-485-I2	M5596300F0000	20...120 V_{dc}	RS-485; Modbus/BACnet

Flexible sensor references

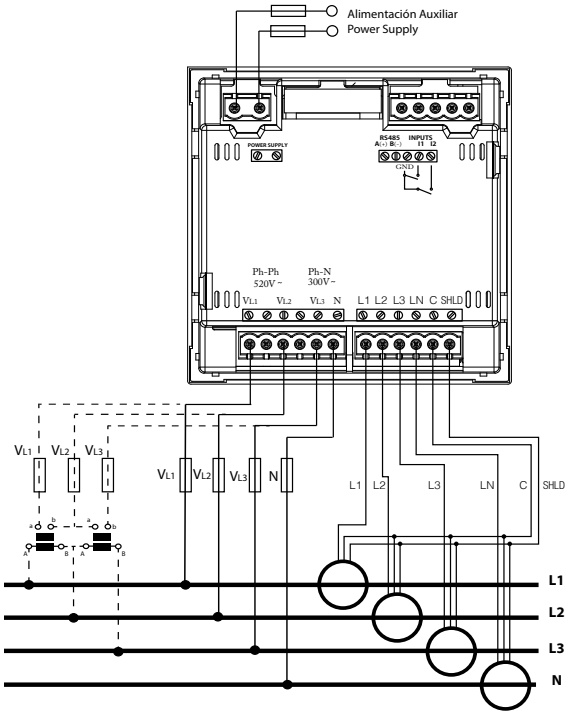
Type	Code	Scale	Length	Diameter D	Sensitivity	Full-scale
FLEX-MAG70	M818110041500	Config.	2 m	Ø 70 mm	1000 A / 100 mV	2000 A
FLEX-MAG120	M818120041500	Config.	2 m	Ø 120 mm	1000 A / 100 mV	2000 A

Dimensions

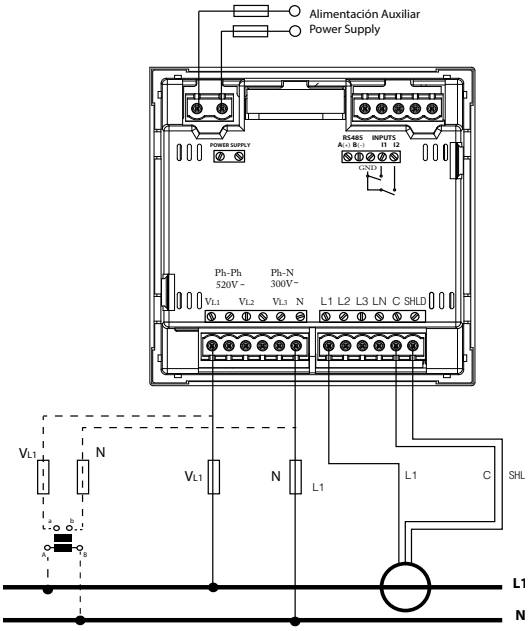


Connections

Three-phase connection + Neutral
with or without voltage transformers



Single-phase connection
with or without voltage transformers



CVM-B100
CVM-B150

Power analyzers for panel

Description

The **CVM-B100** and **CVM-B150** units are panel mounted three-phase power analyzers (dimensions: 96x96 and 144x144 mm, respectively). Both offer 4-quadrant measurement (consumption and generation). Suitable for Medium or Low voltage installations, in both 3 or 4-wire three-phase circuits, two-phase circuits with or without neutral, single-phase circuits or ARON connections.

The **CVM-B100** and **CVM-B150** high-performance units feature a measurement engine that allows the user to analyse many different electrical parameters, in addition to offering a large variety of optional expansion modules for the same unit.

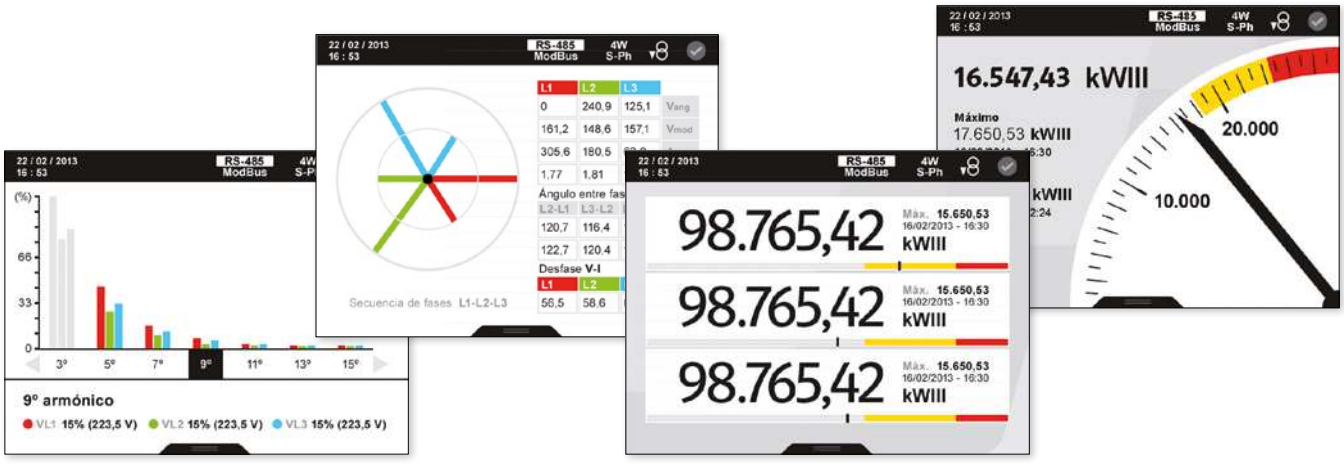
Features:

- Format: 96x96 (**CVM B100**) and 144x144 (**CVM B150**)
- High-resolution VGA colour screen
- IP 65* front panel protection
- 5 voltage inputs (3 phases + neutral + earth) 1000 V_{f-f}
- 4 Current inputs, ITF
- Class 0.2 voltage and current accuracy
- Class 0.5S energy accuracy
- Expandable unit, up to 4 modules, combining digital and analogue outputs, Modbus/TCP, MBus, LonWorks, Profibus, XML/Web
- Modular (optional addition of expansion modules)
- Touch-sensitive movement buttons
- Universal power supply source
- RS485 communications port (Modbus/RTU and BACnet protocols)
- Customisation of parameters to be displayed
- Operating hour indicator for preventive maintenance.

Other features:

- Innovative SCV interface (Slide, Choose & View) for versatile data display, enabling the customisation of the parameters displayed on the screen
- Electrical parameters: instantaneous, maximum, minimum (with date and time) and demand
- Incremental electrical parameters (energy), times, costs, emissions
- 3 Tariffs (can be selected via the digital input or RS485 communications)
- Capable of showing costs and $kgCO_2$ emission sources on the screen, depending on the energy consumed or generated
- 2 Relay outputs for alarms with delay, times, ON and OFF, etc.
- 2 transistor outputs for alarms or impulse generation, with all the possible configuration parameters
- 2 digital inputs, with control over the selection of the unit's tariffs or configurable for monitoring purposes, with RS-485 Modbus communications, monitoring of logical states of other electromechanical units. (RCCBs, thermal-magnetic circuit breakers, etc.)

* with sealing joint.



CVM-B100
CVM-B150

Power analyzers for panel

Applications

— Control and monitoring of all electrical parameters measured in any electric distribution panel and low and high-voltage connection points.
— 4 alarms (2 per transistor and 2 per relay), fully and independently programmable: 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 that converts analogue signals to any instantaneous parameter that the unit can measure or calculate, with built-in expansion modules with analogue outputs.
— Display of process signals, with a built-in expansion module with analogue inputs; optional reporting of these signals to SCADA systems through communication 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.
— Autonomous datalogger with web server, connected to a **M-CVM-AB-Datalogger** module. Enables direct monitoring of the historical data stored in the unit via a conventional web browser.

Technical features

Power circuit	Power supply voltage	85...265 Va.c. / 120...300 Va.c. 20...120 Vd.c. (SDC Model)
	AC Frequency	50...60 Hz
	AC Consumption	**CVM-B100 -** 6...8 VA (max. 24 VA) **CVM-B150 -** 7...12 VA (max. 30 VA)
	DC consumption	**CVM-B100 -** 3...4 W (max. 13 W) **CVM-B150 -** 4...7 W (max. 12 W)
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 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 permanent, 100 A t < 1 s
	Consumption	max I_{in} 0.9 VA
Maximum transformation ratios	Primary V : 500,000 Primary A : 999,9 (10 kA) .../5 and .../1A, 63...2000 **MC** type Product of Primary V x Primary A <60 MW	
Maximum meter value (total)	If (Primary A / Secondary A) < 1,000 (2 GW)	
	If (Primary A / Secondary A) ≥ 1,000 (2 TW)	
Accuracy class	Voltage	Class 0.2 ± 1 digit
	Neutral voltage	Class 0.5 ± 1 digit
	Current	Class 0.2 ± 1 digit
	Neutral current	Class 1 ± 1 digit
	Active power	Class 0.5 ± 1 digit
	Reactive power	Class 1 ± 1 digit
	Active energy	Class 0.5 S (.../5 A) Class 1 (.../1 A and .../250 mA)
	Reactive energy	Class 1 (.../5 A) Class 2 (.../1 A and .../250 mA)
Display of harmonics	Voltage/Current	up to 50

CVM-B100
CVM-B150

Power analyzers for panel

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 operating voltage	48 Vdc
	Maximum operation 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	3 A
	Electrical working life (400 V / 6 A)	3 x 10^4 cycles
	Mechanical working life	1 x 10^7 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 96x96mm or 144x144 panel
	Depth	110 mm w/o expansion modules (both models)
	Front panel IP Protection	IP 40 (IP 65 with accessory)
	Rear panel IP protection	IP 30
Safety	Designed for CAT III 300/520 Vac installations, in accordance with EN 61010 Double-insulated electric shock protection, class II	
Standards	**IEC 62053-22**, **ANSI** (Class 0.5S), **IEC 62053-24** (Class 1) / **ANSI C12.1** (Class 2), **IEC 61010**, **IEC 61000**, **UNE-EN 55022**, Measurement in accordance with MID, **UL** certification, **IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-11, IEC 61000-4-4, IEC 61000-4-5**	

References

96 x 96

Current measuring secondaries	Type	Code
.../5 or .../1 A or ...250 mA	**CVM-B100-ITF-RS485-ICT2**	**M56011**
.../5 or .../1 A or ...250 mA	**CVM-B100-SDC-ITF-485-ICT2***	**M5601100F0000**

* Power Supply 20...120 Vdc

144 x 144

Current measuring secondaries	Type	Code
.../5 or .../1 A or ...250 mA	**CVM-B150-ITF-RS485-ICT2**	**M56111**
.../5 or .../1 A or ...250 mA	**CVM-B150-SDC-ITF-485-ICT2***	**M5651100F0000**

* Power Supply 20...120 Vdc

CVM-B100
CVM-B150

Power analyzers for panel

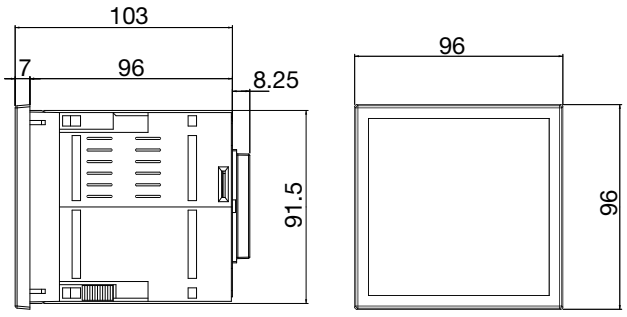
Expansion modules for CVM B150 and CVM B100

Outputs	Digital Inp.	Analogue Inp.	Communications	Protocol	Type	Code
8 Trans.(*)	8	-	-	-	**M-CVM-AB-8I-8OTR**	**M56E01**
8 relay	8	-	-	-	**M-CVM-AB-8I-8OR**	**M56E02**
8 (0/4...20mA)	-	4 (0/4...20mA)	-	-	**M-CVM-AB-4AI-8AO**	**M56E03**
-	-	-	Ethernet (Bridge RS-485)	Modbus/TCP	**M-CVM-AB-Modbus-TCPBridge**	**M56E05**
-	-	-	Ethernet (Bridge Ethernet)	Modbus/TCP	**M-CVM-AB-Modbus-Switch**	**M56E0A**
-	-	-	Ethernet	Web/XML/PowerStudio	**M-CVM-AB-Datalogger**	**M56E06**
-	-	-	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 joint for CVM-AB (96x96)	**IP65-AB-96**	**M5ZZ5U**
IP 65 sealing joint for CVM-AB (144x144)	**IP65-AB-144**	**M5ZZ5V**

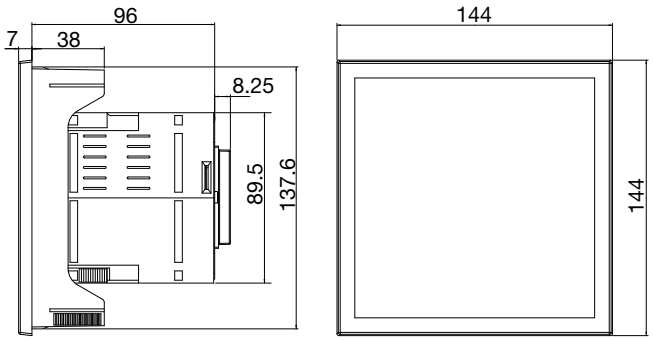
Dimensions

CVM-B100



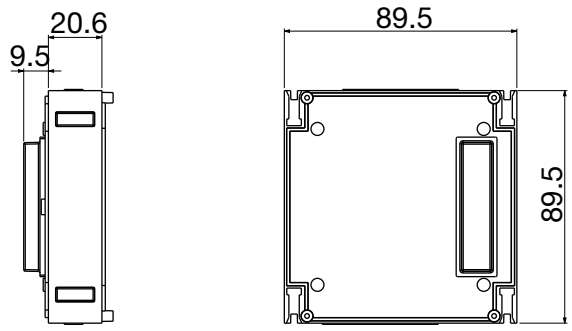
Window level: 92x92 mm

CVM-B150



Window level: 138x138 mm

CVM-B Module



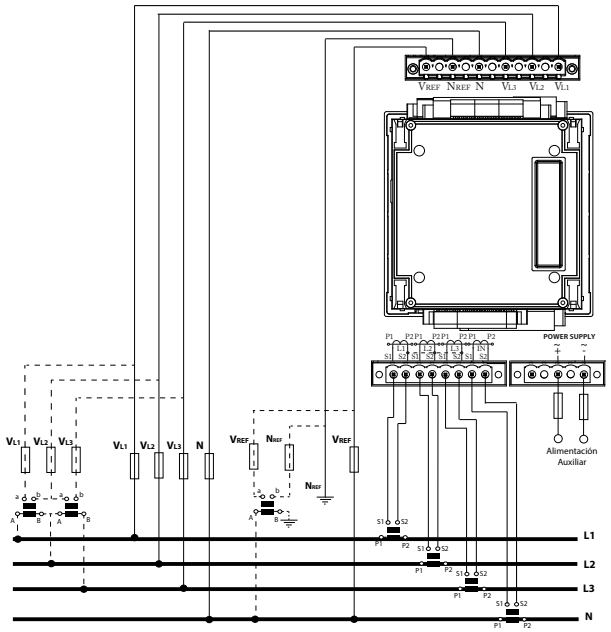
Note: Refer to the product manual for other options

CVM-B100
CVM-B150

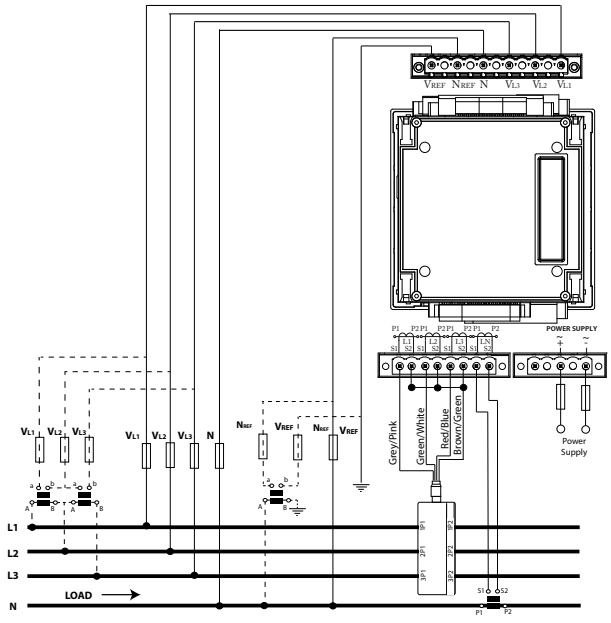
Power analyzers for panel

Connections

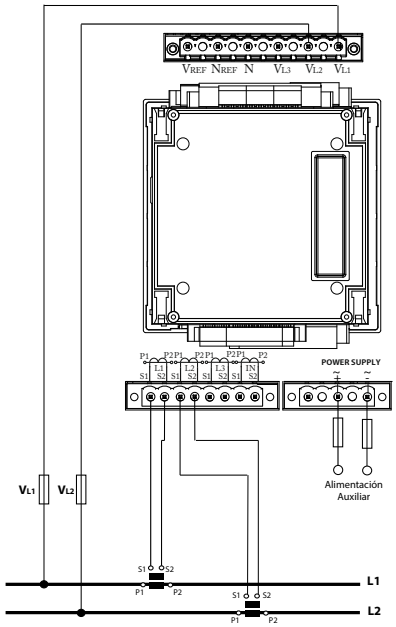
Three-phase measurement, with or without voltage transformer and current transformers



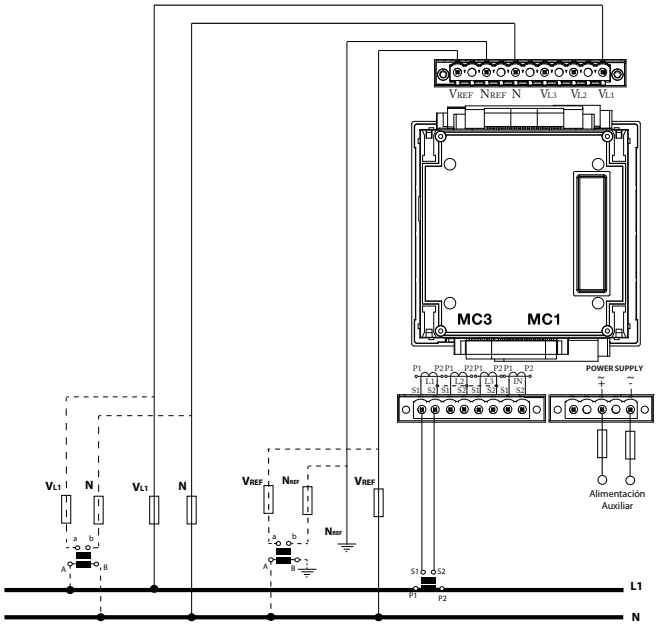
Three-phase measurement, with or without voltage transformer and **MC3** type transformers (1250 mA) + **MC1** for neutral current



Direct phase-phase measurement with current transformers



Measurement in single-phase system with or without voltage transformer



Note: Refer to the product manual for other options

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

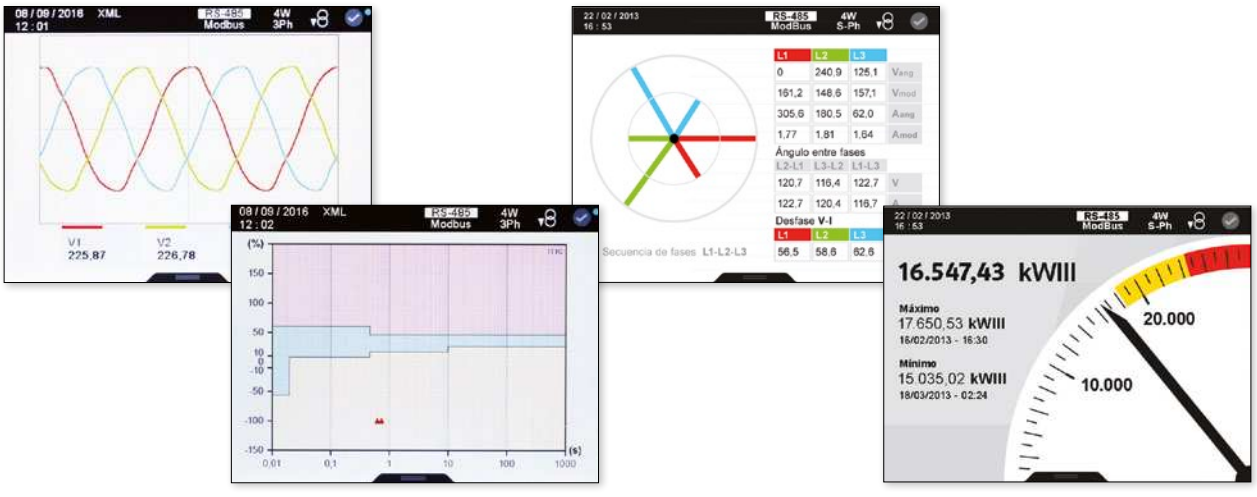
Connections		
Digital inputs	Selection of tariffs, states or external alarms	
	Type	Optoisolated potential-free contact
	Quantity	2
	Activation current	5 mA (15 V maximum voltage of open contact)
	Insulation	4 kV
Digital outputs	Generation of impulses or alarms	
	Type	NPN transistor
	Quantity	2
	Maximum 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

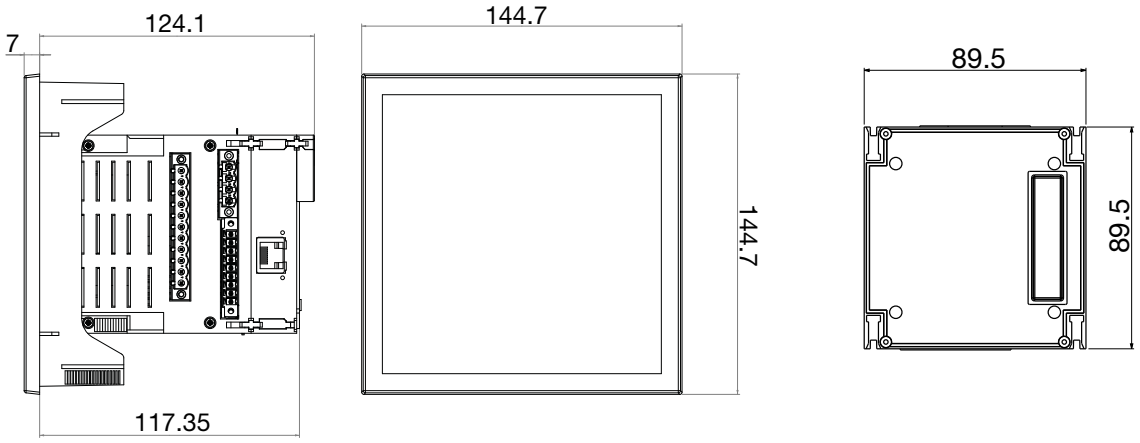
Expandable modules for CVM-A1500

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

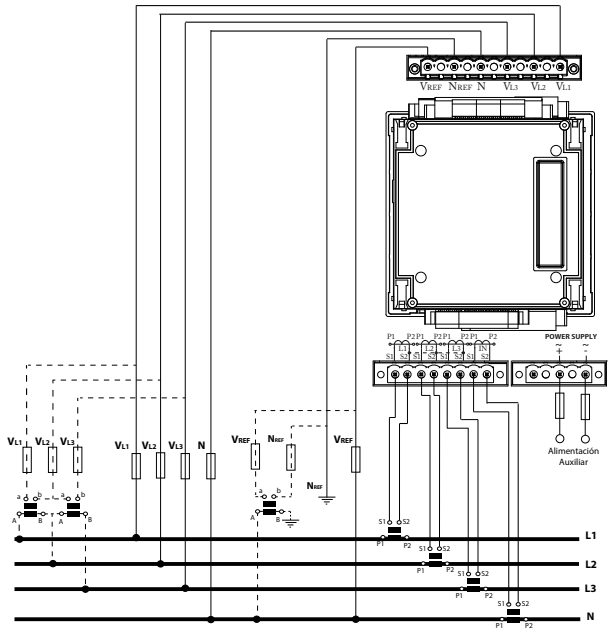
Note: Refer to the product manual for other options

CVM-A1500

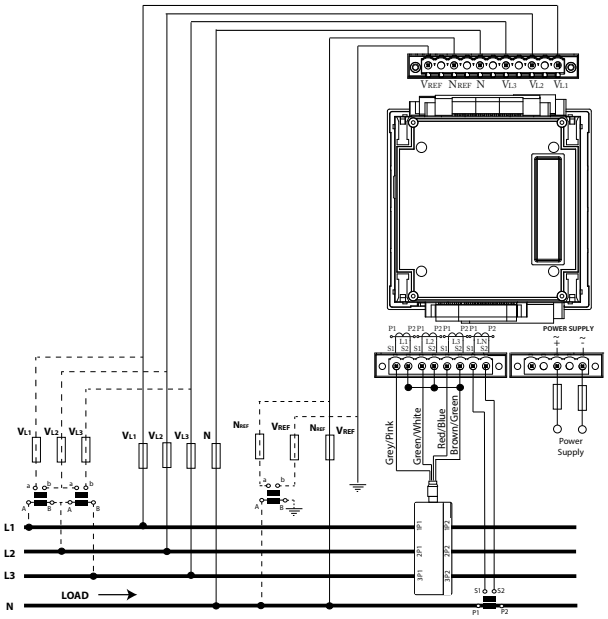
Power analyzers for panel with power quality measurement parameters

Connections

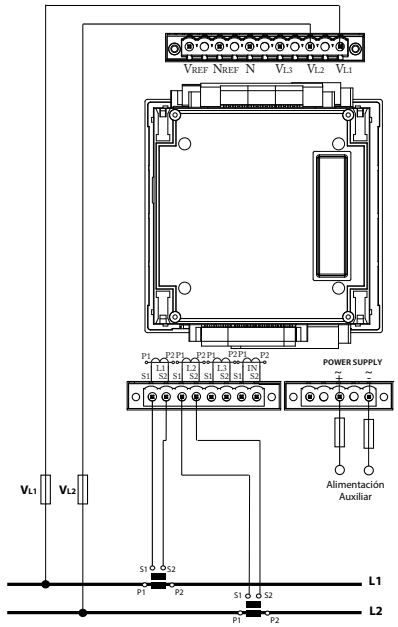
Three-phase measuring with or without voltage transformer and current transformers.



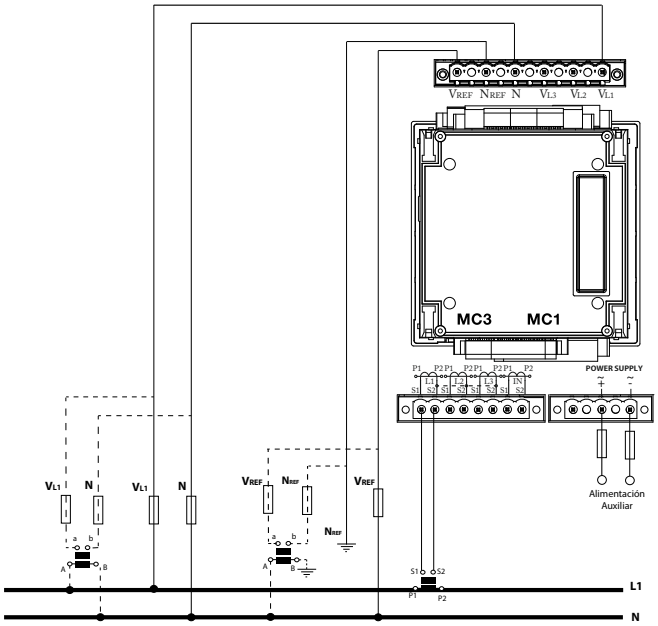
Three-phase measuring with or without voltage transformer and **MC3** (250 mA) + **MC1** type transformers for neutral current.



Direct phase-phase measurement with current transformers



Measurement in single-phase system with or without voltage transformer



Note: Refer to the product manual for other options

Comparison table
Assembly on DIN Rail

		CVM 1D	CVM NET		CVM MINI
		CVM 1D-C **CVM 1D**-RS485-C (*1)	**CVM NET**-ITF-RS485-C2	**CVM NET**-MC-ITF-RS485-C2	**CVM MINI**
Power circuit	**Power supply voltage**	88-276 V a.c	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)
	Frequency	50/60 Hz	50...60 Hz	50...60 Hz	50...60 Hz
	Consumption	<2 VA	<3 VA	<3 VA	<3 VA
	Installation category	CAT III (300V)	CAT III (300V)	CAT III (300V)	CAT III (300V)
Voltage measurement circuit	**Voltage**	110…230 V a.c.	300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)
	Voltage measurement margin	80…120 % (U_n)	4…100 % (U_n)	4…100 % (U_n)	4…100 % (U_n)
	Frequency measurement margin	50/60 Hz	45…65 Hz	45…65 Hz	45…65 Hz
Current measurement circuit	**Nominal current**	5 A	…/5A	…/250 mA (MC)	…/5A ó …/1A
	Maximum current	32 A	1.2 I_n	1.2 I_n	1.2 I_n
	Current measurement margin	0.5…120% I_n	0.2…120% I_n	0.2…120% I_n	2…120% I_n
Sampling	**Samples/Cycle**	16	32	32	32
Accuracy	**Voltage**	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit
	Current	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit
	Active power	1% + 1 digit	1% + 1 digit	1% + 1 digit	1% + 2 digits
	Reactive power	1% + 1 digit	1% + 1 digit	1% + 1 digit	1% + 2 digits
	Active power	1% (Class 1)	1% (Class 1)	1% (Class 1)	1% (Class 1)
	Reactive power	2% (Class 2)	1% (Class 1)	1% (Class 1)	1% (Class 1)
Digital transistor outputs	**Quantity**	1	2	2	-
	Maximum voltage	42 V d.c.	24 V d.c.	24 V d.c.	-
	Maximum current	50 mA	50 mA	50 mA	-
	Weight	Configurable	Configurable	Configurable	-
Parameters	**V. A. W. Wh. var. cos φ**	•	•	•	•
	Quadrants	4	4	4	4
	THD	-	•	•	•
	Harmonics	-	-	-	-
	Phase parameters	•	•	•	•
	Maximum demand	•	•	•	•
	Tariffs	-	1	1	1
	Single phase measurement	•	•	•	•
	Three phase measurement	-	•	•	•
Frontal panel	**Display**	LCD 6 digits	-	-	Backlit LCD
	Keyboard	Button	Communications	Communications	Silicone
Communications	**RS-485**	•(*1)	•	•	-
	TCP/IP	-	-	-	-
Protocols	**ModBus/RTU**	•(*1)	•	•	-
	ModBus/TCP	-	-	-	-
	BacNet	-	-	-	-
	LonWorks	-	-	-	-
Standards	**Designed acording to UL**	-	-	-	•
Environmental features	**Working temperature**	-5°C ... +45°C	-10°C ... +50°C	-10°C ... +50°C	-10°C ... +50°C
	Relative humidity (non-condensing)	5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%
	Protection degree	IP20- Frontal: IP31	IP31- Frontal: IP51	IP31- Frontal: IP51	IP31- Frontal: IP51
Mechanical features	**Dimensions**	85.5 x 64.2 x 18 mm	85 x 52 x 70 mm	85 x 52 x 70 mm	85 x 52 x 70 mm
	Format	1 module	3 modules	3 modules	3 modules
	Weight (Kg)	0.150	0.210	0.210	0.210

CVM NET4+

CVM MINI-ITF-C2	**CVM MINI**-MC-ITF-C2	**CVM MINI**-ITF-RS485-C2 (*1) **CVM MINI**-ITF-HAR-RS485-C2 (*2) **CVM MINI**-ITF-ETHERNET-C2 (*3) **CVM MINI**-ITF-BACnet-C2 (*4) **CVM MINI**-ITF-LonWorks-C2 (*5)	**CVM MINI**-MC-ITF-RS485-C2 (*1) **CVM MINI**-MC-BACnet-C2 (*2) **CVM MINI**-MC-Ethernet-C2 (*3)	**CVM NET4+**-MC-ITF-RS485-C4
230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	230 V a.c. 85…265 V a.c. / 95…300 V d.c. (Plus version)	85…265 V a.c. / 95…300 V d.c.
50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz
<3 VA	<3 VA	<3 VA	<3 VA	2.9…6 VA /3…6 W
CAT III (300V)	CAT III (300V)	CAT III (300V)	CAT III (300V)	CAT III (300V)
300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)	300 V a.c. (ph-n) 520 V a.c. (ph-ph)
4…100 % (U_n)	4…100 % (U_n)	4…100 % (U_n)	4…100 % (U_n)	2…100 % (U_n)
45…65 Hz	45…65 Hz	45…65 Hz	45…65 Hz	45…65 Hz
…/5A ó …/1A	…/250 mA (MC)	…/5A ó …/1A	…/250 mA (MC)	…/250 mA (MC)
1.2 I_n	1.2 I_n	1.2 I_n	1.2 I_n	1.3 I_n
0.2…120% I_n	0.2…120% I_n	0.2…120% I_n	0.2…120% I_n	1.2…105% I_n
32	32	32	32	32
0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit
0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit	0.5% + 1 digit
1% + 2 digits	1% + 2 digits	1% + 2 digits	1% + 2 digits	1% + 1 digit
1% + 2 digits	1% + 2 digits	1% + 2 digits	1% + 2 digits	1% + 1 digit
1% (Class 1)	1% (Class 1)	1% (Class 1)	1% (Class 1)	1% (Class 1)
1% (Class 1)	1% (Class 1)	1% (Class 1)	1% (Class 1)	1% (Class 1)
2	2	2	2	4
24 V d.c.	24 V d.c.	24 V d.c.	24 V d.c.	24 V d.c.
50 mA	50 mA	50 mA	50 mA	50 mA
Configurable	Configurable	Configurable	Configurable	Configurable
•	•	•	•	•
4	4	4	4	4
•	•	•	•	•
-	-	15 (*2)	-	15
•	•	•	•	•
•	•	•	•	•
1	1	1	1	1
•	•	•	•	-
•	•	•	•	•
Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	-
Silicone	Silicone	Silicone	Silicone	Communications
-	-	(*1). (*2)	(*1)	•
-	-	(*3)	(*3)	-
-	-	(*1). (*2)	(*1)	•
-	-	(*3)	(*3)	-
-	-	(*4)	(*2)	-
-	-	(*5)	-	-
•	•	•	•	-
-10ºC ... +50ºC	-10ºC ... +50ºC	-10ºC ... +50ºC	-10ºC ... +50ºC	-10ºC ... +50ºC
5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%
IP31- Frontal: IP51	IP31- Frontal: IP51	IP31- Frontal: IP51	IP31- Frontal: IP51	IP31- Frontal: IP51
85 x 52 x 70 mm	85 x 52 x 70 mm	85 x 52 x 70 mm	85 x 52 x 70 mm	105 x 70 x 90 mm
3 modules	3 modules	3 modules	3 modules	6 modules
0.210	0.210	0.210	0.210	0.250

CVM-1D

Single-phase power analyzer, DIN rail

Description

CVM-1D is a power analyzer for single-phase circuits up to 32 A. It features an LCD display with a rotating screen system, showing a total of 24 instantaneous, maximum and minimum, electrical variables. It has been designed in an enclosure with only 1 DIN module (18 mm). The compact size of the analyzer allows it to be installed on any electric panel. The unit has the Modbus/RTU (RS-485) protocol and is compatible with the **PowerStudio** energy management software.

Its main features are:

- Sealable
- Six-digit LCD display
- RS-485 Modbus/RTU communication (depending on model)
- Programmable alarm or impulse output
- Measurement in four quadrants

Applications

- Student residences / Hotels
- Marinas
- Shopping centres
- Buildings with rented office space
- Campgrounds
- Domestic and industrial lines
- Single-phase lines in general

Technical features

Power circuit	Single-phase power supply	88...276 Vac
	Power supply frequency	50 / 60 Hz
	Power supply use	2 V·A
Measurement circuit	Phase – Neutral rated voltage	110...230 Vac (±20%)
	Frequency	50 / 60 Hz
	Nominal current	5 A
	Minimum current	250 mA
	Maximum current	32 A
Accuracy class	Voltage, Current	0.5% + 1 digit
	Active power, Reactive power	1% + 1 digit
	Active Energy	Class 1 (**IEC 62053-21**)
	Reactive Energy	Class 2 (**IEC 62053-23)**
Output transistor features	Type	Optoisolated transistor (collector open) NPN
	Maximum operating voltage	42 Vdc
	Maximum operating current	50 mA
	Maximum frequency	1000 imp/kWh
	Impulse duration	4...200 ms (configurable)
	Insulation	3.7 kV $_{RMS}$ / 1 min
Communications	Port	RS-485 (depending on model)
	Protocol	Modbus / RTU (depending on model)
Build features	Measurement module	Assembly on DIN 46277 rail (**EN 50022**)
	Number of modules	1
Environmental conditions	Operating temperature	-5...+45 °C
	Protection degree	IP 20 / Frontal IP 31
	Humidity (non-condensing)	5 ... 95% (non-condensing)
	Maximum altitude	2000 m
Safety	**EN 61010** Double-insulated electric shock protection, class II	
Standards	**IEC 664, VDE 0110, UL94-V0, EC 801, IEC 348, IEC 571-1,** Class 2 **EN 62053-23** in Reactive Energy, **EN 61010, EN 61000-4-3, EN 61000-4-4, EN 61000-6-4, EN 55022**	

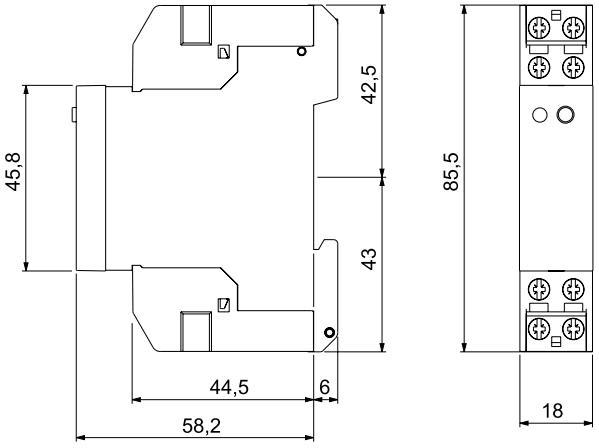
CVM-1D

Single-phase power analyzer, DIN rail

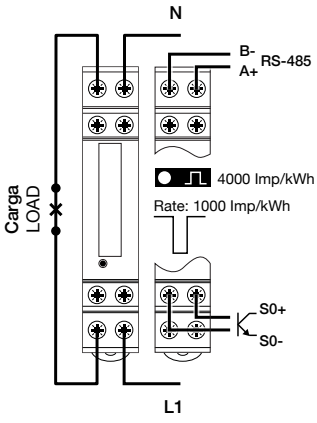
References

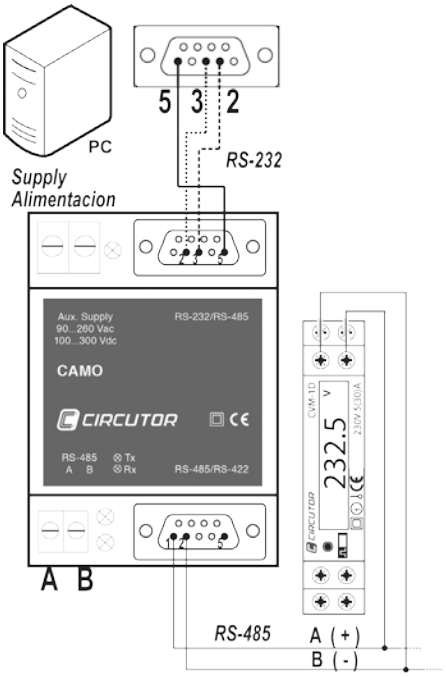
Type	Code	Nominal current	Protocol	Communication
CVM 1D-C	M55510	250 mA...32 A	-	-
CVM 1D-RS485-C	M55511	250 mA...32 A	Modbus/RTU	RS-485

Dimensions



Connections





CVM NET

Three-phase power analyzer, assembly on DIN rail - without display

Description

CVM NET is a Power Analyzer for measuring balanced or unbalanced single and three-phase networks. It has been specifically designed for measuring up to 230 electrical parameters and for transmitting this data through the RS-485 communication bus with the Modbus/RTU protocol to the supervision SCADA.

Its main features are:

- DIN rail format of only 3 modules
- Mounted on 72 x 72 mm panel, with adapter front panel (M5ZZF1)
- Measures the current with ... / 5 A and .../250 mA external transformers (**MC** model), .../333 mV
- Possibility of measuring Medium and Low Voltage networks
- RS-485 communication (Modbus RTU)
- Compatible with **PowerStudio / PSS / PSSDeluxe software**
- 2 programmable digital outputs
- 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	Rated voltage	230 Vac (-15...+10 %) 85...265 Vac / 95...300 Vdc optional
	Power supply frequency	50...60 Hz
	Maximum power consumption	3 VA
Measurement circuit	Rated voltage	300 Vac Ph-N / 520 Vac Ph-Ph
	Frequency	45...65 Hz
	Nominal current	.../5 A or .../250 mA, .../333 mV
	Permanent overload	1.2 I_n
Accuracy class	Voltage, Current	0.5% ± 1 digit
	Active power, Reactive power	1% ± 1 digit
	Active energy Reactive energy	1% (Class 1)
Communications	Protocol	RS-485
	Communications protocol	Modbus / RTU
	Speed	1200 / 2400 / 4800 / 9600 / 19200 bps
	Length	8
	Parity	No parity / even / odd
	Bits of parity	1 / 2
Output transistors	Type: Isolated transistor	Open NPN collector
	Maximum operating voltage	24 Vdc
	Maximum operating current	50 mA
	Maximum frequency	5 imp/s
	Impulse duration	100 ms
Build features	Measurement module	DIN Rail 46277 (**EN 50022**)
	Number of modules	3
Environmental conditions	Operating temperature	-10 °C...+50 °C
	Protection degree	Embedded unit: IP51 Terminals: IP31
	Humidity (without condensation)	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 NET

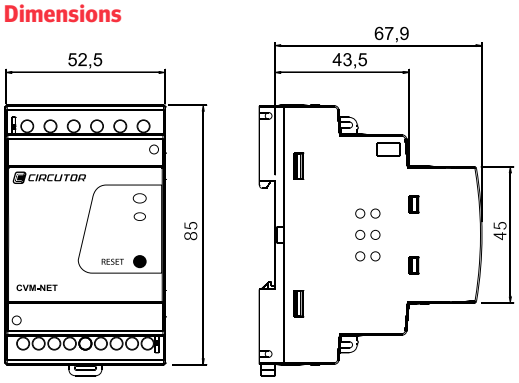
Three-phase power analyzer, assembly on DIN rail - without display

References

Current input	Protocol	Communications	Type	Code
.../5 A	Modbus/RTU	RS-485	**CVM NET ITF-RS485-C2**	**M54B21**
.../250 mA	Modbus/RTU	RS-485	**CVM NET-MC-ITF-RS485-C2**(*)	**M54B31**
.../333 mV	Modbus/RTU	RS-485	**CVM-NET-mV-RS485-C2**	**M54B310000V00**
Panel adapter for **CVM NET** (72 x 72 mm)			**Panel adapter**	**M5ZZF1**

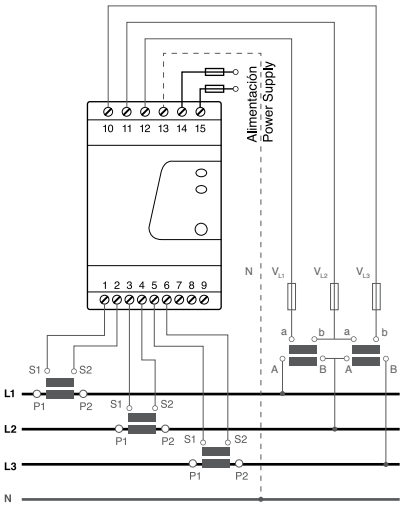
(*) Requires **MC** efficient transformers.

Dimensions

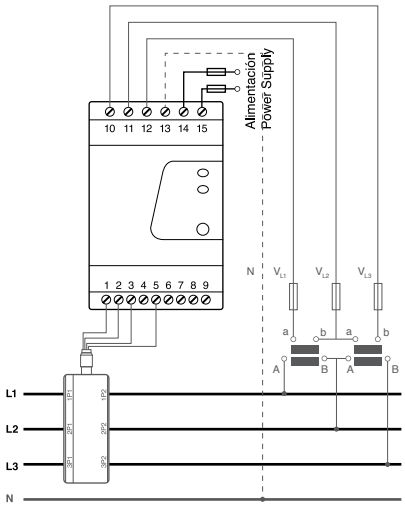


Connections

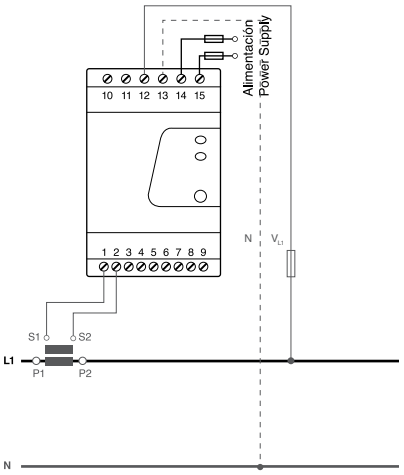
Three-phase + neutral connection
3 voltage transf. + 3 current transf.



Three-phase + neutral connection
MC efficient transformer



Single-phase connection



Coding table

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

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**

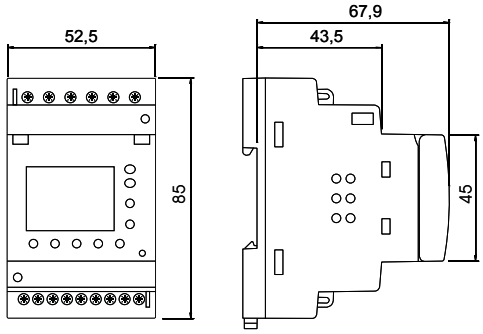
(*1) Requires the installation of **MC** series efficient transformers. – (*2) Only available with 230 V_{ac} power supply

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*

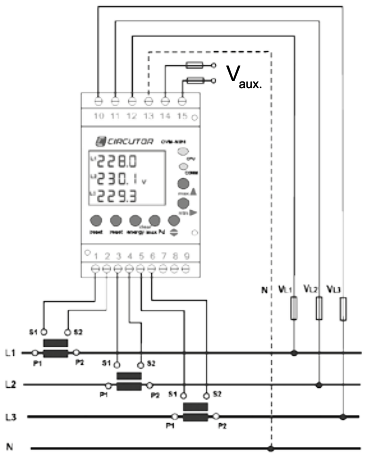
* Only **CVM MINI-ITF-RS485-C2**

Dimensions

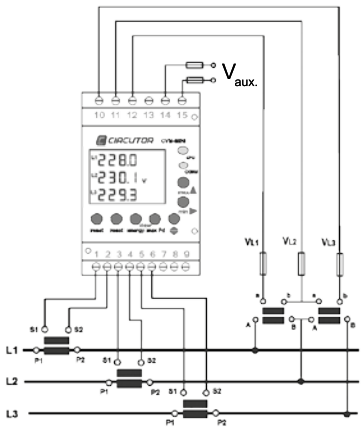


Connections

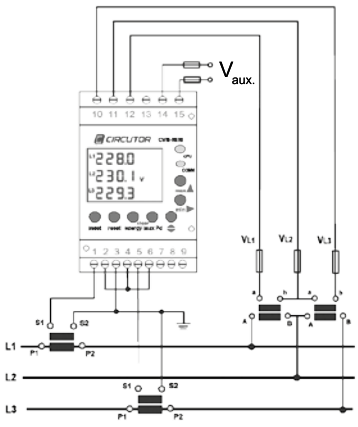
3 or 4 wires (low voltage)



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**	

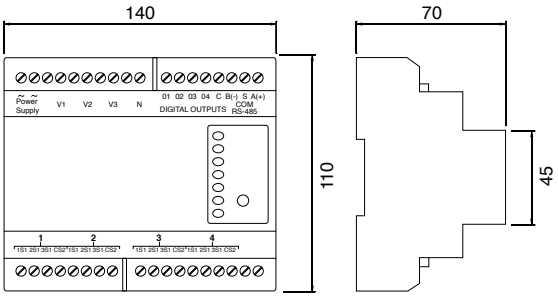
CVM-NET4+

Multi-channel power analyzer for DIN rail - no display

References

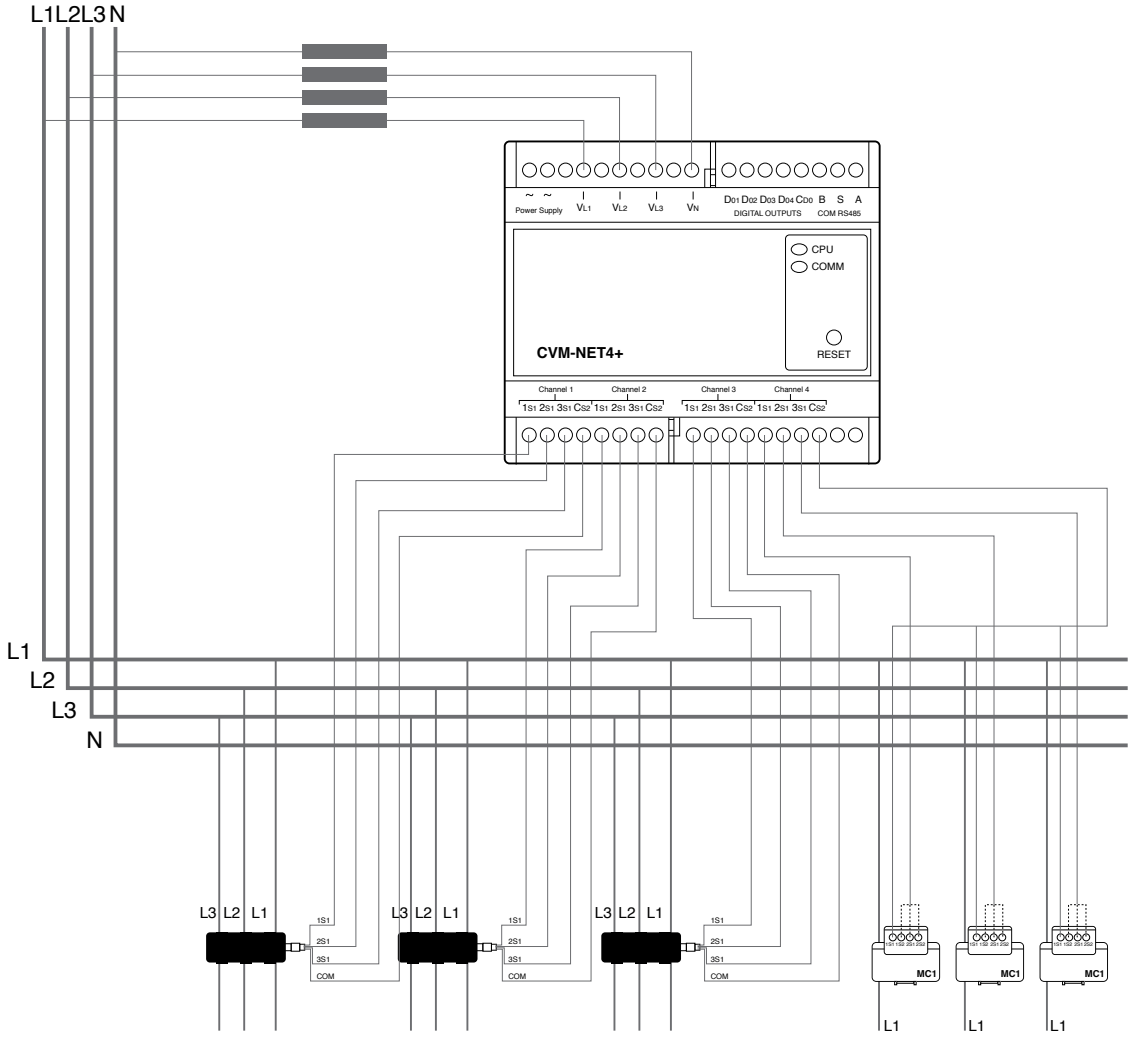
Type	Code	Communications	Transformer
CVM-NET4+-MC-RS485-C4	**M55782**	RS-485 Modbus/RTU	.../250 mA (type **MC**)
CVM-NET4+-mV-RS485-C4	**M557820000V00**	RS-485 Modbus/RTU	.../ 333 mV

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

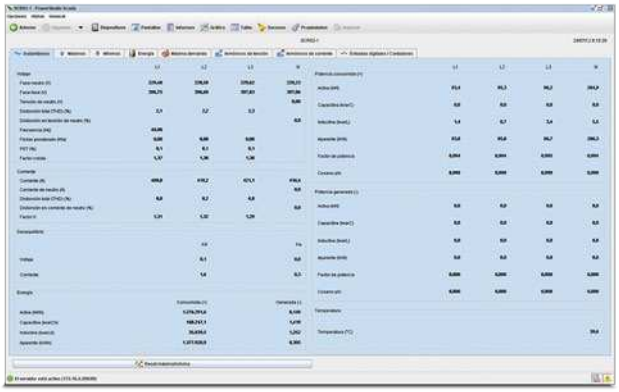
Modules for exporting historical logs to an SQL server

OPC-DA

Data connector for external systems with an OPC-DA client

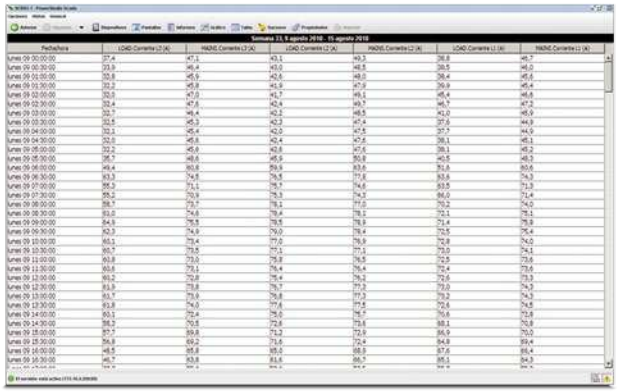
Real time variables

Displays all variables measured from all units in real time.



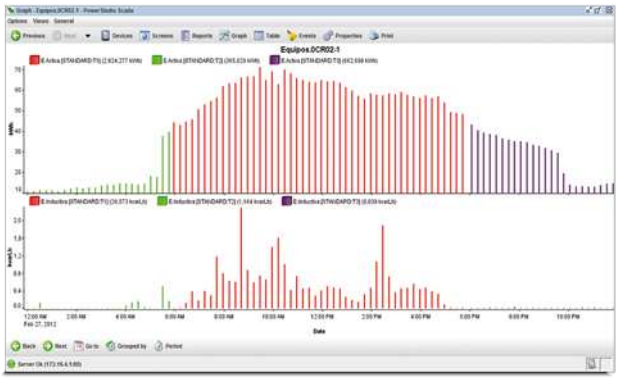
Tables

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.

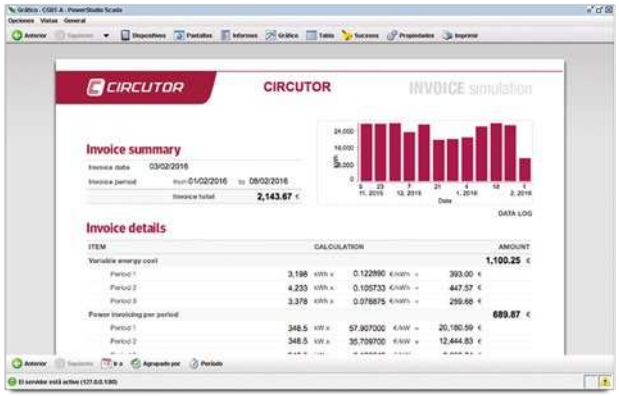


SCADA screens

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.

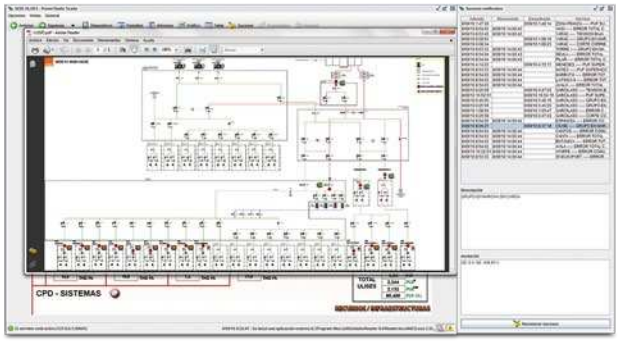
Reports

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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