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# CVM

## Power analyzers



# More than simply measuring...



## Manage

Record the real cost of your manufacturing processes and the kgCO<sub>2</sub> emissions of your installation during different time bands.

## Quantify

Record the total cost of electrical energy consumed by your installation, including the operating time of each line, process or activity.

## Analyse

Obtain information about a large number of electrical variables in real time to achieve the maximum energy efficiency of your installations.

## And much more...

Use your inputs and outputs to manage loads and processes, and to combine different communication modes used in your installation to gather data.

## A vast range of possibilities

Users need increasingly advanced measurement, control and management systems, as a result of the perpetual growth of energy costs. CIRCUTOR offers a wide range of power analyzers that can cater for the most demanding needs of its customers. CIRCUTOR, a leading company in the Electrical Energy Efficiency sector, offers units that can measure many different electrical parameters, such as energy meters and management software, allowing customers to control and optimise the performance of their installations.

# We offer solutions

## Much more than a power analyzer



CIRCUTOR's power analyzers are much more than a simple power analyzer. These units feature many different communication options, inputs and outputs used to control consumption and industrial processes and they can manage any type of alarm. In addition, the user can calculate the cost of energy, kgCO<sub>2</sub> emissions and the operating time of their production processes. Units communicate via our **PowerStudio Scada** monitoring and management software, a system that provides all information required for implementing real time actions and for preparing studies and reports about the behaviour of your network.

## The most complete range



Our products are suited to any type of installation and space; they can be mounted on a panel or DIN rail in both High and Low Voltage installations. Our offer ranges from the most complete unit with a 0.5S energy accuracy that measures up to the 50th harmonic, communications and more than 700 variables, to the most basic unit, which measures the main electrical parameters and without communication system. All of our analyzers are very easy to install helping to save time and money.

## Always with our customers in mind



CIRCUTOR has a vast network of professionals that are always ready to help you choose the best product, adapted to your needs and those of your customers. In addition, our technical assistance service is always there to help you, guaranteeing the success of your projects.

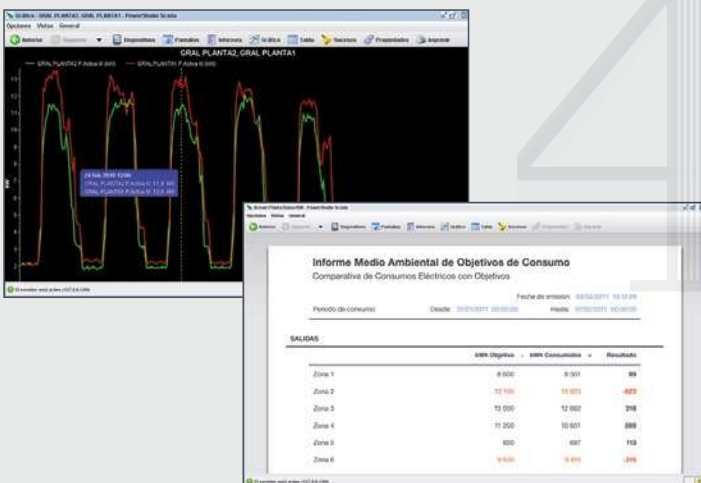
We offer products that have been exclusively design to help our customers enter or consolidate their position in the electrical energy efficiency sector. Discover our winning formula:

**MEASUREMENT + MANAGEMENT = SAVINGS**

# Why should you install a power analyzer?

Gathering information is vital to know, understand and perform actions that reduce the cost of energy.

- / Learn more about where and when you are consuming
  - / Control and reduce unnecessary and inefficient consumption
  - / Anticipate possible penalties due to excess power or the consumption of reactive energy and remove them from your electricity bill
  - / The software can perform a continuous and simple energy and electric audit
- Connect to <http://powerstudio.circuitor.com>



**Power**studio  
circuitor.com SCADA

## Permanently communicated

You can get the most out of the models with built-in communication systems when they are combined with **PowerStudio**, CIRCUTOR's energy monitoring and supervision software. In addition, **PowerStudio Scada**, can display electrical parameters in real time, generating a database in the computer, which will store the log of values that can be analysed exhaustively later on.

# Where are analyzers installed?

## Main

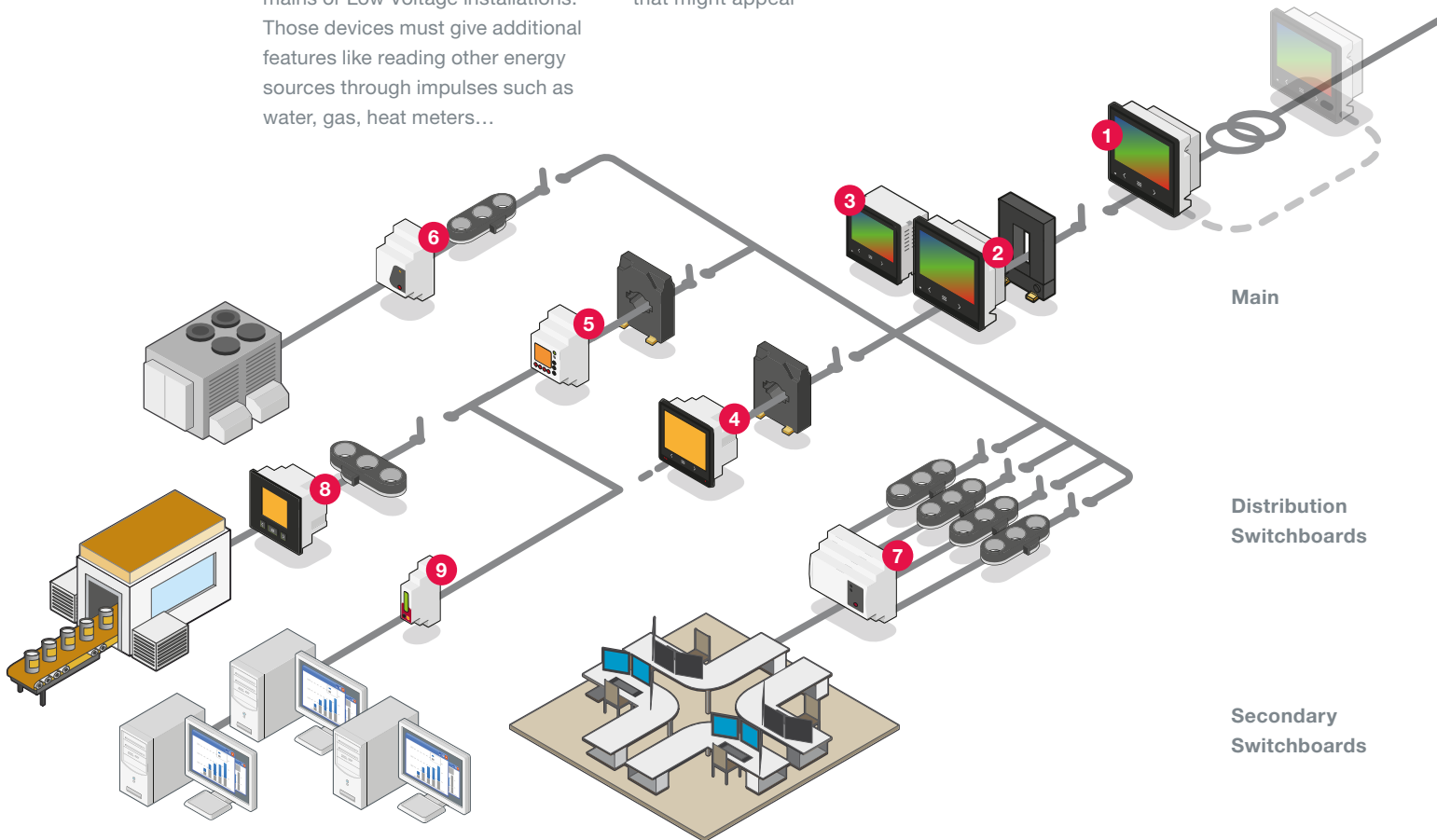
Devices with high performance and accuracy for monitoring, registering and controlling energy and electrical variables of any installation. Specially designed to be connected in Medium Voltage applications or in the mains or Low Voltage installations. Those devices must give additional features like reading other energy sources through impulses such as water, gas, heat meters...

## Distribution Switchboards

Devices dedicated to register electrical parameters and energy consumption in distribution switchboards. Provide relevant information related the status of each electrical line as well as reporting any alarm that might appear

## Secondary Switchboards

Devices dedicated to read loads which are installed at the end of the lines or secondary Low Voltage switchboards. Those gives fully information related the status and consumption of each load or line.



### Power analyzers on Main

- 1 CVM-A1500** (Panel 144x144 mm)  
High-performance three-phase power analyzer with communication system and supply quality.
- 2 CVM-B150** (Panel 144x144 mm)  
High-performance three-phase power analyzer with communication system.
- 3 CVM-B100** (Panel 96x96 mm)  
High-performance three-phase power analyzer with communication system.

### Power analyzers on distribution switchboards

- 4 CVM-C10** (Panel 96x96 mm)  
Three-phase power analyzer with RS-485 communications.
- 5 CVM-MINI** (3 DIN rail module)  
Indirect three-phase power analyzer with LCD display and communication system.
- 6 CVM-NET** (3 DIN rail module)  
Indirect three-phase power analyzer with RS-485 communications.
- 7 CVM-NET4+** (6 DIN rail module)  
Indirect three-phase power analyzer for 4 three-phase networks with RS-485 communications.

### Power analyzers on secondary switchboards

- 8 CVM-C5** (Panel 96x96 mm)  
Multifunction multimeter with energy meter.
- 9 CVM-1D** (1 DIN rail module)  
Basic single-phase power analyzer.

# Panel mounted Power Analyzers

The **CVM** series of panel mounted analyzers (96x96 or 144x144) features very accurate units, which have been designed to control and supervise the main electrical parameters of different network topologies: Single-phase, Two-phase with or without neutral and Three-phase with or without neutral. The unit features two indirect current inputs, either with .../5 A, .../1 A secondary or with **MC1** and **MC3** efficient transformers (.../250 mA). The units feature ITF technology: galvanic insulation protection. In addition, these analyzers can perfectly cater for new market needs, provi-

ding information associated with Electrical Energy Efficiency management parameters, showing different variables, such as: kgCO<sub>2</sub> Emissions, Cost of energy and Operating time. The different combinations of inputs and outputs can check your installation to prevent and/or improve processes. This is why it has become **the most original range in the market**, offering a series of advantages, such as: Modular and Expandable System, Communications, Definition of custom screens, Colour graphical display (digital and analogue), etc.



**CVM-C5**



**CVM-C10**



**CVM-B100**



**CVM-B150**



**CVM-A1500**

SELECTION GUIDE

	Panel mounted								
	96 x 96 mm			144 x 144 mm			Single phase		
	Display								
	NO Coms.	Communications				NO Coms.	Coms.		
	Digital Inputs / Outputs								
	NO Expandable			Expandable		NO Harmonics			
	NO Coms.	Modbus RTU RS485	Modbus RTU RS485 / BACnet				NO Coms.	Modbus RTU RS485	
			Flexible Clamps			Power Quality			
	<b>CVM-C5</b> -IC -MC-IC	<b>CVM-C5</b> -ITF-485-C -ITF-485-I -MC-485-C -MC-485-I	<b>CVM-C10</b> -ITF-485-ICT2 -MC-485-ICT2 -ITF-IN-485-IC2 -MV-485-ICT2	<b>CVM-C10</b> -FLEX-IN-485-ICT2	<b>CVM-B100</b> -ITF-485-ICT2	<b>CVM-B150</b> -ITF-485-ICT2	<b>CVM-A1500</b> -ITF-485-ICT2	<b>CVM-1D</b> -C	<b>CVM-1D</b> -RS485-C
	Page 10	Page 10	Page 12	Page 14	Page 16	Page 16	Page 21	Page 28	Page 28

# Power Analyzers for assembly on DIN Rail

The **CVM** series of DIN rail analyzers features units that have been especially designed for installation on switchboards or industrial machinery. Their main purpose is to control and supervise the main electrical parameters of different network topologies: Single-phase, Two-phase with or without neutral and Three-phase with or without neutral. The CIRCUTOR range of analyzers can cater for different market needs, with direct single-phase connection (up to 32 A) and models with indirect current inputs, either with a .../5 A , .../1 A

secondary (depending on the model) or with **MC1** and **MC3** efficient transformers (.../250 mA). The units feature ITF technology: galvanic insulation protection. Therefore, CIRCUTOR offers a wide range of power analyzers for assembly on DIN rails to the market, which take up less space on electric panels, while offering a great number of possibilities.



**CVM-1D    CVM-NET    CVM-MINI    CVM-NET4+**

DIN rail mounted									
Three phase			Mixed			NO Display			
NO Display			Display			NO Display			
Coms.			NO Coms.			Communications			
Digital Outputs			NO Outputs			Digital Outputs			
NO Harmonics						Harmonics			
Modbus RTU RS485		NO Coms.		Modbus TCP TCP/IP		BACnet	LonWorks	Modbus RTU RS485	
1 three phase line	CVM-MINI		CVM-MINI		CVM-MINI	CVM-MINI	CVM-MINI	CVM-MINI	
CVM-NET -ITF-RS485-C2 -MC-ITF-RS485-C2	CVM-MINI		CVM-MINI -MC-ITF-C2 -ITF-C2		CVM-MINI -ITF-Ethernet-C2	CVM-MINI -ITF-BACnet-C2	CVM-MINI -ITF-LonWorks-C2	CVM-MINI -ITF-RS485-C2 -MC-ITF-RS485-C2	CVM-MINI -ITF-HAR-RS485-C2
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								CVM-NET4+ -ITF-RS485-C2 -MC-ITF-RS485-C2	Page 34

SELECTION GUIDE



Comparison table  
Panel mounted



CVM C5



CVM C10

		CVM-C5-IC (*1) CVM-C5-ITF-485-C (*2) CVM-C5-ITF-485-I (*3)	CVM-C5-MC-IC (*1) CVM-C5-MC-485-C (*2) CVM-C5-MC-485-I (*3)	CVM-C10-ITF-485-ICT2 (*1) CVM-C10-SDC-ITF-485-ICT2 (*2)	CVM-C10-MC-485-ICT2
Power circuit	Power supply voltage	85-265 V a.c. / 95-300 V d.c.	85-265 V a.c. / 95-300 V d.c.	85-265 V a.c. / 95-300 V d.c. (*1) 20-120 V d.c. (*2)	85-265 V a.c. / 95-300 V d.c.
	Frequency	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz
	Consumption	3.5...6 VA; 2...6 W	3.5...6 VA; 2...6 W	4...6 VA; 2...6 W (*1) 4...6 VA; 3.5...3 W (*2)	4...6 VA; 2...6 W
	Installation category	CAT III (300V)	CAT III (300V)	CAT III (300V)	CAT III (300V)
Voltage measurement circuit	Voltage	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)
	Voltage measurement margin	5...120% ( $U_p$ )	5...120% ( $U_p$ )	5...120% ( $U_p$ )	5...120% ( $U_p$ )
	Frequency measurement margin	45...65 Hz	45...65 Hz	45...65 Hz	45...65 Hz
Current measurement circuit	Nominal current	.../5 A ó .../1 A	.../250 mA (MC)	.../5 A ó .../1 A	.../250 mA (MC)
	Maximum current	1.1 $I_n$	1.1 $I_n$	1.2 $I_n$	1.2 $I_n$
	Current measurement margin	5...110% $I_n$	5...110% $I_n$	2...120% $I_n$	2...120% $I_n$
	Neutral current	-	-	-	-
Sampling	Samples/cycle	32	32	64	64
	Voltage	0.5%	0.5%	0.5% + 1 digit	0.5% + 1 digit
Accuracy	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	0.5% + 2 digits	1% + 2 digits
	Reactive power	1% ± 1 digit	1% ± 1 digit	1% + 2 digits	2% + 2 digits
	Active energy	1% (Class 1)	1% (Class 1)	$I \geq 0,1 I_n$ (Class 0,5S)	1% (Class 1)
	Reactive energy	1% (Class 1)	1% (Class 1)	1% (Class 1)	2% (Class 2)
Digital transistor outputs (NPN)	Quantity	1 (*1. *2)	1 (*1. *2)	2	2
	Maximum voltage	24 V d.c.	24 V d.c.	24 V d.c.	24 V d.c.
	Maximum current	50 mA	50 mA	50 mA	50 mA
	Weight	Configurable	Configurable	Configurable	Configurable
Digital relay outputs	Quantity	-	-	2	2
	Maximum voltage open contacts	-	-	250 V a.c.	250 V a.c.
	Thermal current ( $I_{th}$ )	-	-	6 A	6 A
	Maximum switching power	-	-	1500 VA (250 V a.c. / 5 A)	1500 VA (250 V a.c. / 5 A)
Potential-free digital inputs	Insulation	Optoisolated	Optoisolated	Optoisolated	Optoisolated
	Quantity	1 (*1. *3)	1 (*1. *3)	2	2
Parameters	V. A. W. Wh. var. cos $\phi$	•	•	•	•
	Quadrants	4	4	4	4
	THD	•	•	•	•
	Harmonics	-	-	31	31
	Phase parameters	•	•	•	•
	Maximum demand	•	•	•	•
	Tariffs	2 (*1. *3)	2 (*1. *3)	3	3
	Hours. Cost. kgCO <sub>2</sub>	•	•	•	•
	Single phase measurement	•	•	•	•
	Three phase measurement	•	•	•	•
Front panel	Display	LCD	LCD	LCD custom COG	LCD custom COG
	Keyboard	Silicone Button	Silicone Button	Capacitive	Capacitive
Communications	RS-485	•(*2. *3)	•(*2. *3)	•	•
	Ethernet	-	-	-	-
Protocols	ModBus/RTU	•(*2. *3)	•(*2. *3)	•	•
	ModBus/TCP	-	-	-	-
	BacNet	-	-	•	•
	LonWorks	-	-	-	-
	MBUS	-	-	-	-
	PROFIBUS	-	-	-	-
Expandable	Additional modules	-	-	-	-
Standards	Designed according to UL	-	-	•	•
	Designed according to MID	-	-	•	•
Environmental features	Working temperature	-5°C ... +45°C	-5°C ... +45°C	-5°C ... +45°C	-5°C ... +45°C
	Relative humidity (non-condensing)	5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%
	Protection Degree	IP 31 - Frontal : IP 51	IP 31 - Frontal : IP 51	IP 31 - Frontal : IP 51 IP 64 (with accessories)	IP 31 - Frontal : IP 51 IP 64 (with accessories)
Mechanical features	Dimensions	96.7 x 96.7 x 62.6 mm	96.7 x 96.7 x 62.6 mm	96.7 x 96.7 x 63.4 mm	96.7 x 96.7 x 63.4 mm
	Format	96 x 96	96 x 96	96 x 96	96 x 96
	Weight (Kg)	0.480	0.480	0.330	0.330

**CVM B100****CVM B150****CVM A1500**

<b>CVM-C10-ITF-IN-485-ICT2</b>	<b>CVM-C10-FLEX-IN-485-I2 (*1) CVM-C10-SDC-FLEX-IN-485-I2 (*2)</b>	<b>CVM-B100-ITF-485-ICT2 (*1) CVM-B100-SDC-ITF-485-ICT2 (*2)</b>	<b>CVM-B150-ITF-485-ICT2 (*1) CVM-B150-SDC-ITF-485-ICT2 (*2)</b>	<b>CVM-A1500-ITF-485-ICT2 (*1) CVM-A1500-SDC-ITF-485-ICT2 (*2)</b>
85-265 V a.c. / 95-300 V d.c.	85-265 V a.c. / 95-300 V d.c. (*1) 20-120 V d.c. (*2)	85-265 V a.c. / 120-300 V d.c. (*1) 20-120 V d.c. (*2)	85-265 V a.c. / 120-300 V d.c. (*1) 20-120 V d.c. (*2)	85-265 V a.c. / 120-300 V d.c. (*1) 20-120 V d.c. (*2)
50...60 Hz	50...60 Hz	45...65 Hz	45...65 Hz	50...60 Hz
4...6 VA; 2...6 W	4...6 VA; 2...6 W	6...8 VA; 3...4 W (*1) 5...6 W (*2)	7...12 VA; 4...7 W (*1) 7...8 W (*2)	max 29,4 VA; max 11,9 W (*1) max 13,8 W (*2)
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)	Hasta 600 V a.c. (ph-n) Hasta 1000 V a.c. (ph-ph)	Hasta 600 V a.c. (ph-n) Hasta 1000 V a.c. (ph-ph)	Hasta 600 V a.c. (ph-n) Hasta 1000 V a.c. (ph-ph)
5...120% ( $U_p$ )	5...120% ( $U_p$ )	7...200% ( $U_p$ )	7...200% ( $U_p$ )	7...200% ( $U_p$ )
45...65 Hz	45...65 Hz	40...70 Hz	40...70 Hz	40...70 Hz
.../5 A ó .../1 A	1000 A / 100 mV	.../5 A .../1 A ó .../250 mA (MC)	.../5 A .../1 A ó .../250 mA (MC)	.../5 A .../1 A ó .../250 mA (MC)
1.2 $I_n$	2 $I_n$	2 $I_n$	2 $I_n$	2 $I_n$
2...120% $I_n$	2...200% $I_n$	0.2...200% $I_n$ (.../5 A) 1...200% $I_n$ (.../1 A) 4...200% $I_n$ (.../250 mA)	0.2...200% $I_n$ (.../5 A) 1...200% $I_n$ (.../1 A) 4...200% $I_n$ (.../250 mA)	0.2...200% $I_n$ (.../5 A) 1...200% $I_n$ (.../1 A) 4...200% $I_n$ (.../250 mA)
•	•	•	•	•
64	64	128	128	128
0.5% + 1 digit	±0,5% + 1 digit	0.2% + 1 digit / 0.5% + 1 digit ( $U_p$ )	0.2% + 1 digit / 0.5% + 1 digit ( $U_p$ )	0.1% ± 1 digit
0.5% + 1 digit	±3%	0.2% ± 1 digit	0.2% ± 1 digit	0.1% ± 1 digit for .../5A
0.5% + 2 digits	±4%	0.5% + 1 digit	0.5% + 1 digit	0.2% + 2 digit for .../5A
1% + 2 digits	±4%	1% + 1 digit	1% + 1 digit	1% + 1 digit for .../5A
$I \geq 0,1 I_n$ (Class 0,5S)	1% (Class 1)	0.5% (Class 0.5S) for .../5 A 1% (Class 1) for .../1A ó .../250 mA	0.5% (Class 0.5S) for .../5 A 1% (Class 1) for .../1A ó .../250 mA	0.2% (Class 0,2S) for .../5 A, 0.5% (Class 0,5S) for .../1 A & .../250 mA
1% (Class 1)	2% (Class 2)	1% (Class 1) for .../5 A 2% (Class 2) for .../1A ó .../250 mA	1% (Class 1) for .../5 A 2% (Class 2) for .../1A ó .../250 mA	1% (Class 1) for .../5 A 2% (Class 2) for .../1A ó .../250 mA
-	-	2	2	2
-	-	48 V d.c.	48 V d.c.	48 V d.c.
-	-	130 mA	130 mA	130 mA
-	-	Configurable	Configurable	Configurable
2	-	2	2	2
250 V a.c.	-	250 V a.c.	250 V a.c.	250 V a.c.
6 A	-	6 A	6 A	6 A
1500 VA (250 V a.c. / 5 A)	-	1500 VA (250 V a.c. / 5 A)	1500 VA (250 V a.c. / 5 A)	1500 VA (250 V a.c. / 5 A)
Optoisolated	Optoisolated	Optoisolated	Optoisolated	Optoisolated
2	2	2	2	2
•	•	•	•	•
4	4	4	4	4
•	•	•	•	•
31	31	50	50	50
•	•	•	•	•
•	•	•	•	•
3	3	3	3	3
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
LCD custom COG	LCD custom COG	TFT color display	TFT color display	TFT color display
Capacitive	Capacitive	Capacitive	Capacitive	Capacitive
•	•	•	•	•
-	-	M-CVM-AB-Modbus-TCP (Bridge)	M-CVM-AB-Modbus-TCP (Bridge)	M-CVM-AB-Datalogger built-in (WebServer)
•	•	•	•	•
-	-	M-CVM-AB-Modbus-TCP (Bridge)	M-CVM-AB-Modbus-TCP (Bridge)	M-CVM-AB-Modbus-TCP (Bridge)
•	•	•	•	•
-	-	M-CVM-AB-LonWorks	M-CVM-AB-LonWorks	M-CVM-AB-LonWorks
-	-	M-CVM-AB-MBUS	M-CVM-AB-MBUS	M-CVM-AB-MBUS
-	-	M-CVM-AB-Profibus	M-CVM-AB-Profibus	M-CVM-AB-Profibus
-	-	• 8 transistor outputs + 8 digital inputs • 8 relay outputs + 8 digital inputs • 8 analog outputs (0/4...20 mA) + 4 analog inputs (0/4...20 mA) • Datalogger (Built-in energy management software + memory + Ethernet)	• 8 transistor outputs + 8 digital inputs • 8 relay outputs + 8 digital inputs • 8 analog outputs (0/4...20 mA) + 4 analog inputs (0/4...20 mA) • Datalogger (Built-in energy management software + memory + Ethernet)	• 8 transistor outputs + 8 digital inputs • 8 relay outputs + 8 digital inputs • 8 analog outputs (0/4...20 mA) + 4 analog inputs (0/4...20 mA) • Modbus-TCP (Bridge) • Modbus-TCP (Switch)
•	•	•	•	•
•	•	•	•	•
-5°C ... +45°C	-5°C ... +45°C	-10°C ... +50°C	-10°C ... +50°C	-10°C ... +50°C
5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%	5 ... 95%
IP 31 - Frontal : IP 51 IP 64 (with accessories)	IP 31 - Frontal : IP 51 IP 64 (with accessories)	IP 30 - Frontal : IP 40 IP 65 (with accessories)	IP 30 - Frontal : IP 40 IP 65 (with accessories)	IP 30 - Frontal : IP 40 IP 65 (with accessories)
96.7 x 96.7 x 63.4 mm	96.7 x 96.7 x 63.4 mm	98.7 x 97 x 110.50 mm	144.7 x 144.7 x 110.50 mm	144.7 x 144.7 x 131.1 mm
96 x 96	96 x 96	96 x 96	144 x 144	144 x 144
0.330	0.330	0.500	0.698	0.778

# CVM-C5

## Multifunctional multimeter for panel



### Description

The **CVM-C5** is a panel mounted (96 x 96 mm) multimeter that records energy values. Compact and intuitive, with 4-quadrant measurement (Consumption and Generation). The **CVM-C5** is suitable for Low Voltage installations, in both 3 and 4-wire three-phase circuits, two-phase circuits with or without neutral, single-phase circuits or ARON connections.

#### Display features and interface:

- Quick display of parameters with a single button
- Clearly displays the electric parameters of the installation
- Displays the electricity consumption value according to the cost per kWh
- kgCO<sub>2</sub> consumption/generation indicator or according to the energy source
- Backlit LCD screen
- Operating hour indicator for preventive maintenance.

#### Other features:

- Modbus/RS-485 communications (optional)
- Measurement with **CIRCUTOR's MC** efficient current transformers or .../5 A, .../1 A or .../333 mV transformers.
- 1 digital output (S0 interface)
- 1 digital input (tariff or energy source selection)
- Maximum, minimum values and maximum demand.

### Applications

- Recording and displaying the consumption of energy from two different sources (network/generator set).
- Generation of an impulse signal associated with the cost, kgCO<sub>2</sub> emissions or savings, according to the consumption or generation of energy.
- Generation of alarms with a transistor output; configurable parameters: Low/High, hysteresis (%), NO/NC, connection/disconnection delay and interlocking.

### Technical features

<b>Power circuit</b>	Power supply voltage	85-265 Vac / 50...60 Hz 95-300 Vdc
	<b>Measurement circuit</b>	Voltage
	Frequency	45 ... 65 Hz
	Current	.../5 A or .../1 A <b>MC</b> : .../250 mA .../333 mV
	Sampling	32 samples/cycle
	<b>Accuracy class</b>	V, A
<b>Output</b>	Power / Energy	1%
	1 digital output	S0 interface Configurable, up to 1,000 impulses per kW-h, kvar-h, etc. (24 Vdc max., 50 mA, 5 imp/s, Configurable Max. T <sub>on</sub> /T <sub>off</sub> )
<b>Input</b>	1 digital input	Tariff selection, NPN, optocoupled
<b>Communications</b>	Protocol	RS-485 Modbus/RTU (depending on model)
	Speed	9600, 19200, 38400
	Bit, parity, stop	8, n, 1
<b>Build features</b>	Enclosure	VO self-extinguishing plastic
	IP protection degree	Front panel: IP 51 Rear: IP 31
	Dimensions	96,7 x 96,7 x 62,60 mm
<b>Environmental conditions</b>	Working temperature	-5...+45 °C
	Storage temperature	-10...+50 °C
	Relative humidity	5 ... 95%
	Maximum altitude	2000 m
<b>Safety</b>	Class III according to <b>EN 61010</b> Double-insulated electric shock protection, Class II	
<b>Standards</b>	<b>IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1, CE, UL certified</b>	

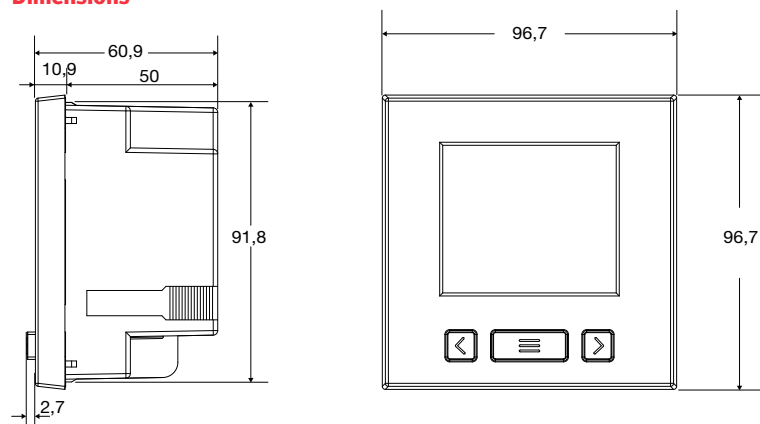
# CVM-C5

## Multifunctional multimeter for panel

### References

Current input	Inputs	Outputs	Communication	Type	Code
.../5 A, .../1 A	1	1	-	CVM-C5-IC	M55853
.../250 mA	1	1	-	CVM-C5-MC-IC	M55873
.../333 mV	1	1	-	CMV-C5-mV-IC	M558730000V00
.../5 A, .../1 A	-	1	RS-485	CVM-C5-ITF-485-C	M55884
.../5 A, .../1 A	1	-	RS-485	CVM-C5-ITF-485-I	M55885
.../250 mA	-	1	RS-485	CVM-C5-MC-485-C	M55894
.../250 mA	1	-	RS-485	CVM-C5-MC-485-I	M55895
.../333 mV	-	1	RS-485	CVM-C5-mV-485-C	M558940000V00
.../333 mV	1	-	RS-485	CVM-C5-mV-485-I	M558950000V00

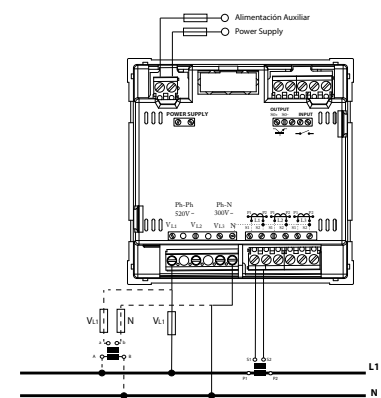
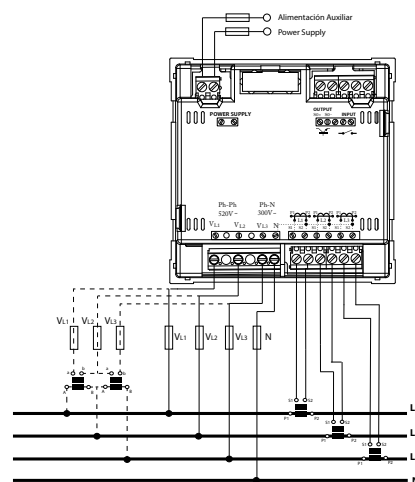
### Dimensions



### Connections

Three-phase + neutral connection  
with or without voltage transformers

Single-phase connection  
with or without voltage transformers



# CVM-C10

## Power analyzer for panel



### Description

The **CVM-C10** is a panel mounted (96 x 96 mm) power analyzer that records energy values. Compact and versatile, with 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.

Display features and interface:

- Backlit touch-screen (capacitive)
- Analogue display of instantaneous parameters (power, maximum power reached and  $\cos \varphi$  or PF)
- Backlit display
- Alarm LED indicator.
- Tariff cost
- Operating hour indicator for preventive maintenance

### Applications

- Record the energy consumption from three different sources: network, generator set or photovoltaic energy generation system.
- Generation of an impulse signal associated with the cost,  $\text{kgCO}_2$  emissions or savings, according to the consumption or generation of energy.
- Selection of tariffs with digital inputs. Perfect to calculate costs in three different work shifts.
- Programs alarms on any instantaneous parameter measured or calculated. Configurable parameters: Low/High, hysteresis (%), NO/NC, connection/disconnection delay and interlocking.

### Technical features

<b>Power circuit</b>	Power supply voltage	85...265 Vac / 95...300 Vdc 20...120 Vdc (SDC model)
<b>Measurement circuit</b>	Voltage	300 V ac Ph-N / 520 V ac Ph-Ph
	Frequency	50...60 Hz
	Current	<b>ITF</b> ... /5 A or .../1 A <b>MC</b> .../250 mA .../333 mV
<b>Accuracy class</b>	Sampling	64 samples/cycle
	V, A, Power	0,5%
	Active Energy	Class 0,5S ( $\geq 0,1 I_n$ ) acc. to <b>IEC 62053-22</b>
<b>Display of harmonics, up to the</b>	Reactive Energy	Class 1 ( $\geq 0,1 I_n$ ) acc. to <b>IEC 62053-24</b>
	V, A	3 <sup>1st</sup>
<b>Communications</b>	Protocol	Modbus RTU / BACnet (RS-485)
	Speed	9600, 19200
	Bit, parity, stop	8, n, 1
<b>Outputs</b>	2 digital outputs	OS Interface Configurable, up to 1000 impulses 2 NPN Transistors (Only in version 3 TS) (24 Vdc max, 50 mA, 16 imp/s, Max $T_{on}/T_{off}$ configurable)
	2 relay outputs	Max. / Min / NO/NC / Hysteresis / Interlocking 250 Vac, 6 A
<b>Inputs</b>	2 digital inputs	Tariff selection or external alarms NPN, optocoupled
	<b>Build features</b>	Enclosure
<b>Environmental conditions</b>	Protection Degree	Front panel: IP 51 (IP 64 with accessory) Rear: IP 31
	Dimensions	96.7 x 96.7 x 63.4 mm
	Operating temperature	-5...+45 °C
<b>Safety</b>	Relative humidity	5 ... 95%
	Maximum altitude	2000 m
<b>Standards</b>	<b>Safety</b>	CAT III 300 V according to <b>EN 61010</b> Double-insulated electric shock protection, Class II
	<b>Standards</b>	<b>BS EN 61000-6-4, BS EN-61000-6-2, IEC 61000-6-2, IEC 62053-22</b> (Class 0,5S), <b>IEC 62053-24</b> (Class 1), <b>IEC 61000, IEC 61000-4-3, IEC 610004-11, IEC 61000-4-4, IEC 610004-5</b> , Measurement according to <b>MID, UL</b> certification

# CVM-C10

## Power analyzer for panel

### Other features:

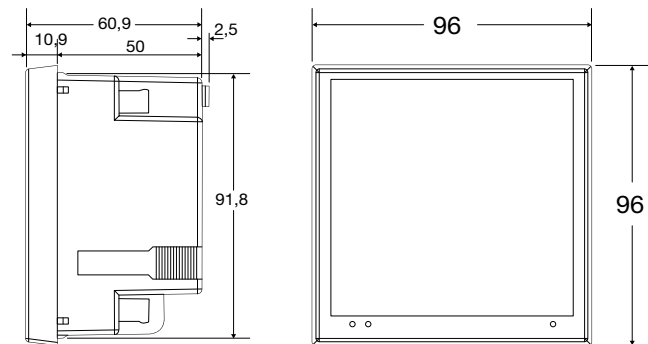
- Modbus RS-485 serial communications
- 2 transistor outputs, configurable for impulses or alarms
- 2 relay outputs, configurable for alarms
- 2 digital inputs for selecting three tariffs or detecting logical states
- Allows for tariff selection through communications
- Precision class 0.5% in voltage, current and power.
- Class 1 in active energy and Class 2 in reactive energy.

### References

Transistor output	Current measurement channels	Current input	Type	Code
2	3	.../5 or .../1 A	CVM-C10-ITF-485-ICT2	M55911
2	3	.../250 mA	CVM-C10-MC-485-ICT2	M55921
-	4	.../5 or .../1 A	CVM-C10-ITF-IN-485-IC2	M55942
2	2	.../333 mV	CVM-C10-mV-485-ICT2	M559210000V
2	3	.../5 or .../1 A	CVM-C10-SDC-ITF-485-ICT2*	M5591100F0000
IP 64 sealing joint			IP64-C10-96	M5ZZ5T

\* Power Supply 20...120 Vdc

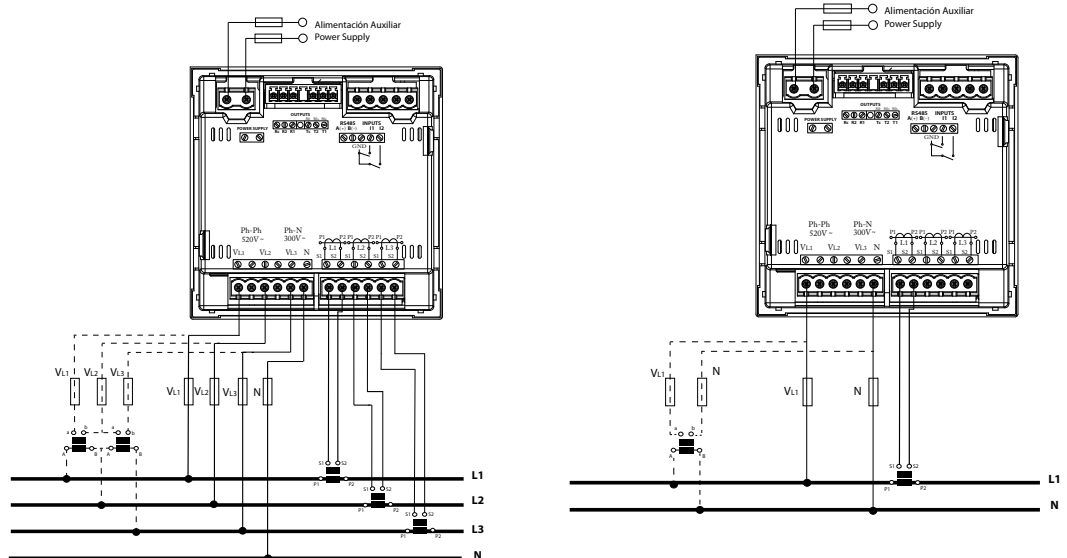
### Dimensions



### Connections

Three-phase + neutral connection  
with or without voltage transformers

Single-phase connection  
with or without voltage transformers



# 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  $\cos \varphi$  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

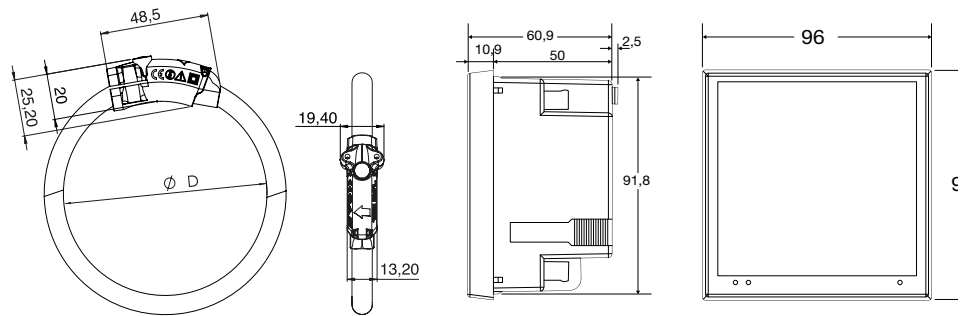
## References

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

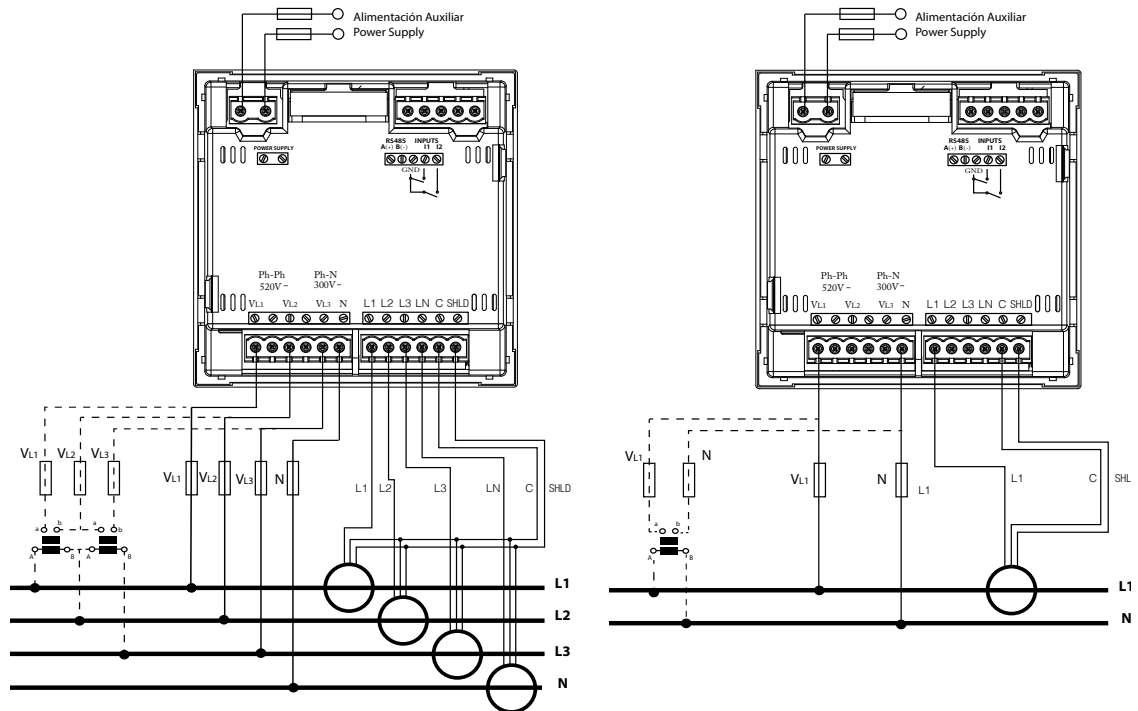
## Dimensions



## 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.

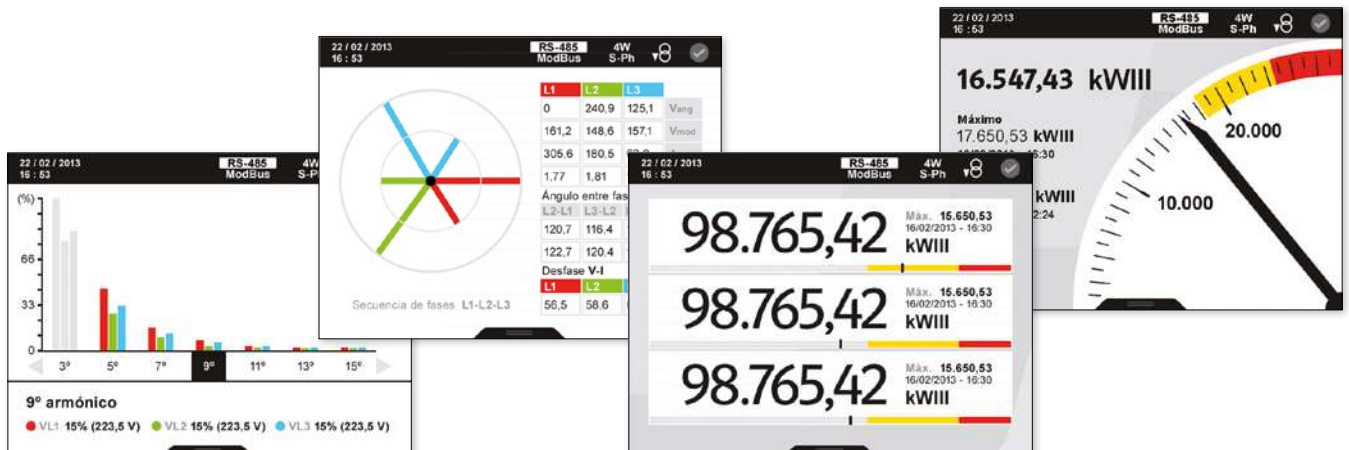
### Features:

- 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<sub>f-f</sub>
- 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<sub>2</sub> 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<sub>2</sub>, 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

<b>Power circuit</b>	Power supply voltage	85...265 Va.c. / 120...300 Va.c. 20...120 Vd.c. (SDC Model)
	AC Frequency	50...60 Hz
	AC Consumption	<b>CVM-B100</b> - 6...8 VA (max. 24 VA) <b>CVM-B150</b> - 7...12 VA (max. 30 VA)
	DC consumption	<b>CVM-B100</b> - 3...4 W (max. 13 W) <b>CVM-B150</b> - 4...7 W (max. 12 W)
<b>Voltage measurement circuit</b>	Voltage range	500 V <sub>p-n</sub> - 866 V <sub>p-p</sub> (functional up to 600 V <sub>p-n</sub> / 1000 V <sub>p-p</sub> )
	Frequency	40...70 Hz
	Measurement margin	7 %...200% of the U <sub>n</sub> for U <sub>n</sub> =300 Vac (p-n)
	Admissible overvoltage	750 Vac
	Maximum consumption (limited current)	< 0.15 VA
<b>Current measurement circuit</b>	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 <sub>n</sub> (.../5 A) 1...200% I <sub>n</sub> (.../1 A) 4...200% I <sub>n</sub> (.../250 mA)
	Admissible overload	2 I <sub>n</sub> permanent, 100 A t < 1 s
	Consumption	max I <sub>m</sub> 0.9 VA
<b>Maximum transformation ratios</b>	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	
<b>Maximum meter value (total)</b>	If (Primary A / Secondary A) < 1,000 (2 GW) If (Primary A / Secondary A) ≥ 1,000 (2 TW)	
<b>Accuracy class</b>	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)
<b>Display of harmonics</b>	Voltage/Current	up to 50

# CVM-B100

# CVM-B150

## Power analyzers for panel

### Technical features

<b>Connections</b>	
<b>Digital inputs</b>	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
<b>Digital outputs</b>	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) $3 \times 10^4$ cycles
	Mechanical working life $1 \times 10^7$ cycles
<b>Built-in communications</b>	Protocols Modbus RTU / BACnet
	Speed 9600...115200
	bits, parity, stop 8, n, 1 (configurable)
<b>Environmental conditions</b>	Working temperature -10...+50 °C
	Relative humidity 5...95%
	Altitude 2000 m
<b>Build features</b>	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
<b>Safety</b>	Designed for CAT III 300/520 Vac installations, in accordance with EN 61010 Double-insulated electric shock protection, class II
<b>Standards</b>	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

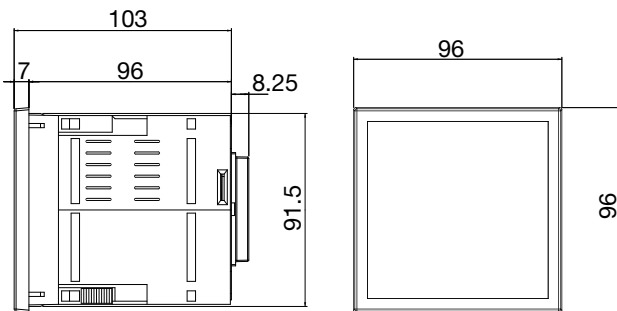
Outputs	Digital Inp.	Analogue Inp.	Communications	Protocol	Type	Code
8 Trans.(*)	8	-	-	-	M-CVM-AB-8I-8OTR	M56E01
8 relay	8	-	-	-	M-CVM-AB-8I-8OR	M56E02
8 (0/4...20mA)	-	4 (0/4...20mA)	-	-	M-CVM-AB-4AI-8AO	M56E03
-	-	-	Ethernet (Bridge RS-485)	Modbus/TCP	M-CVM-AB-Modbus-TCPBridge	M56E05
-	-	-	Ethernet (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

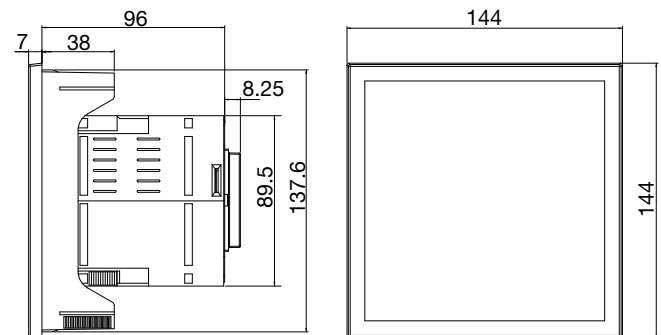
### Dimensions

#### CVM-B100



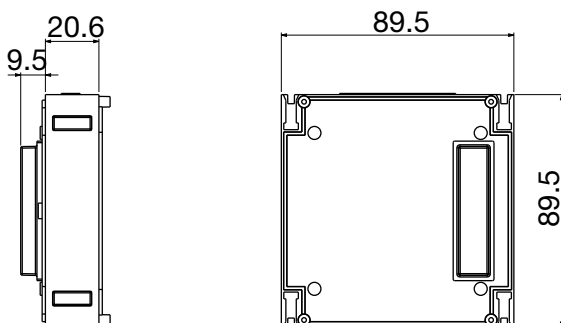
Window level: 92x92 mm

#### CVM-B150



Window level: 138x138 mm

#### CVM-B Module



Note: Refer to the product manual for other options

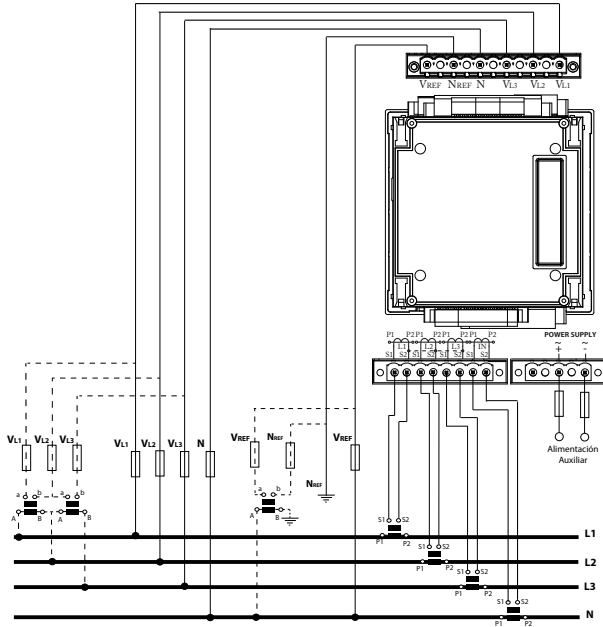
# CVM-B100

# CVM-B150

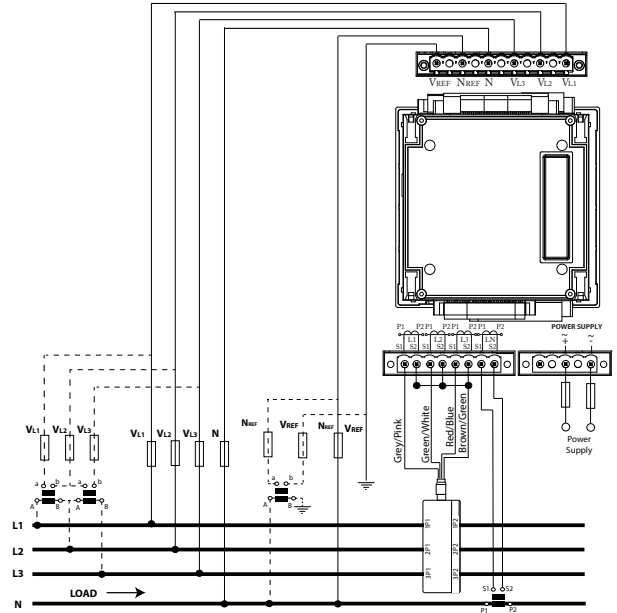
## Power analyzers for panel

### Connections

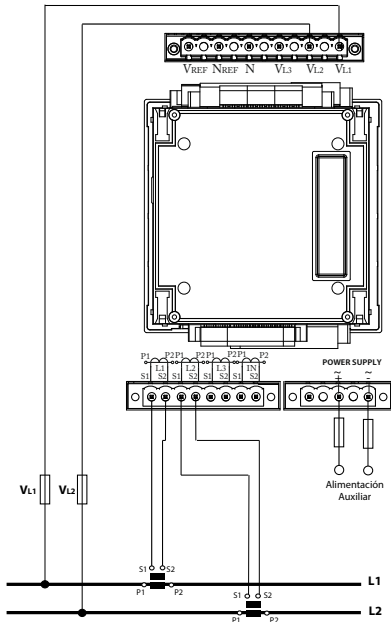
Three-phase measurement, with or without voltage transformer and current transformers



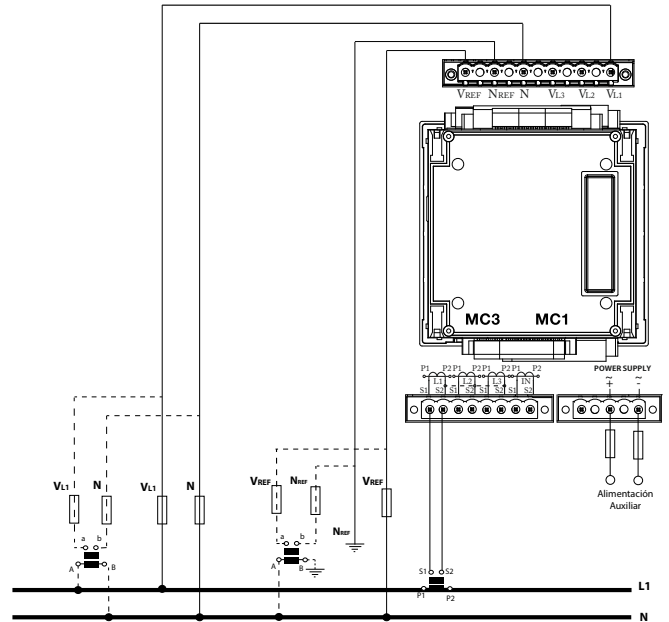
Three-phase measurement, with or without voltage transformer and MC3 type transformers (1250 mA) + MC1 for neutral current



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 through 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<sub>2</sub>
- 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<sub>2</sub>, 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

<b>Power circuit</b>	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)			
	<b>Voltage measurement circuit</b>	Voltage range	500 V <sub>p-n</sub> - 866 V <sub>p-p</sub> (functional up to 600 V <sub>p-n</sub> / 1000 V <sub>p-p</sub> )		
Frequency		40...70 Hz			
Measurement margin		7...200% of the U <sub>n</sub> for U <sub>n</sub> = 300 Vac. (p-n)			
Admissible overvoltage		750 Vac			
Maximum power consumption (limited current)		< 0.15 VA			
<b>Current measurement circuit</b>		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 <sub>n</sub> (.../5 A) 1...200% I <sub>n</sub> (.../1 A) 4...200% I <sub>n</sub> (.../250 mA)			
	Admissible overload	2 I <sub>n</sub> A permanent, 100 A t < 1 s			
	Consumption	< 0.9 VA			
<b>Maximum transformation ratios</b>	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			
<b>Maximum meter value (total)</b>	Yes (Primary A / Secondary A) < 1000 (2 GW)				
	Yes (Primary A / Secondary A) ≥ 1000 (2 TW)				
<b>Accuracy class</b>		.../5 A	.../1 A	.../250 mA	
	Voltage	0,1 ±1 digit (20...600 V <sub>a.c.</sub> )	0,1 ±1 digit (20...600 V <sub>a.c.</sub> )	0,1 ±1 digit (20...600 V <sub>a.c.</sub> )	
	Neutral voltage	0,5 ±1 digit (55...500 V <sub>a.c.</sub> )	0,5 ±1 digit (55...500 V <sub>a.c.</sub> )	0,5 ±1 digit (55...500 V <sub>a.c.</sub> )	
	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	
	<b>Display of harmonics</b>	Voltage / Current	to 63 <sup>rd</sup>		

# CVM-A1500

Power analyzers for panel with power quality measurement parameters



## Technical features

<b>Connections</b>	
<b>Digital inputs</b>	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
<b>Digital outputs</b>	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)
<b>Alarms</b>	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): $3 \times 10^4$ cycles Mechanical working life: $1 \times 10^7$ cycles
<b>Built-in communications</b>	Protocols: Modbus RTU / BACnet Speed: 9600...115200 bits, parity, stop: 8, n, 1 (configurable)
<b>Environmental conditions</b>	Working temperature: -10...+50°C Relative humidity: 5...95% Altitude: 2000 m
<b>Build features</b>	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
<b>Safety</b>	Designed for CAT III 300/520 Va.c. installations, in accordance with <b>EN 61010</b> Double-insulated electric shock protection, class II
<b>Standards</b>	<b>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</b> Measurement acc. to <b>MID, UL certification IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-11, IEC 61000-4-4, IEC 61000-4-5</b>

## References

### 144 x 144

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

\* Power supply 20...120 Vdc





# CVM-A1500

Power analyzers for panel with power quality measurement parameters

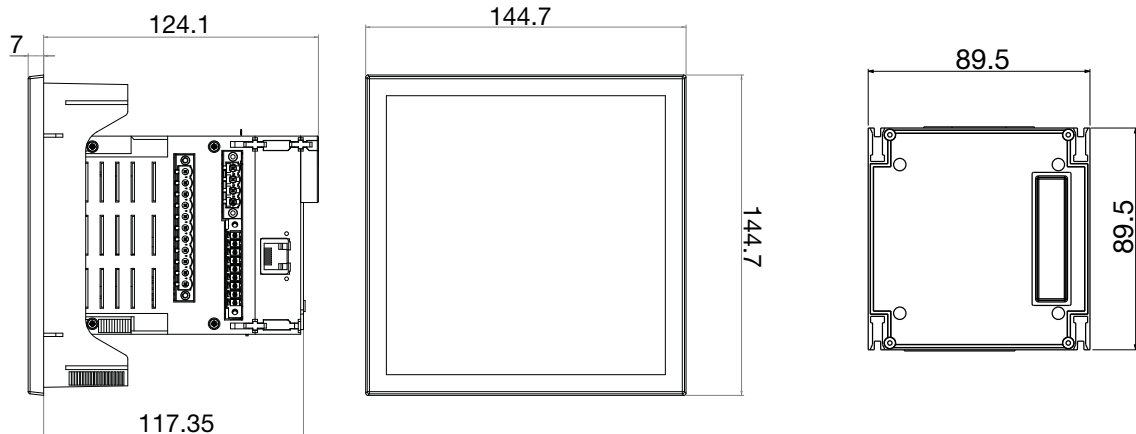
## Expandable modules for CVM-A1500

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

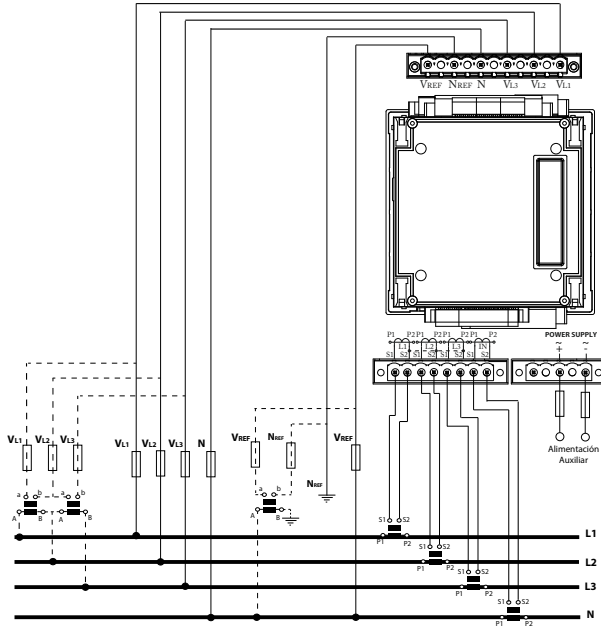
Note: Refer to the product manual for other options

# CVM-A1500

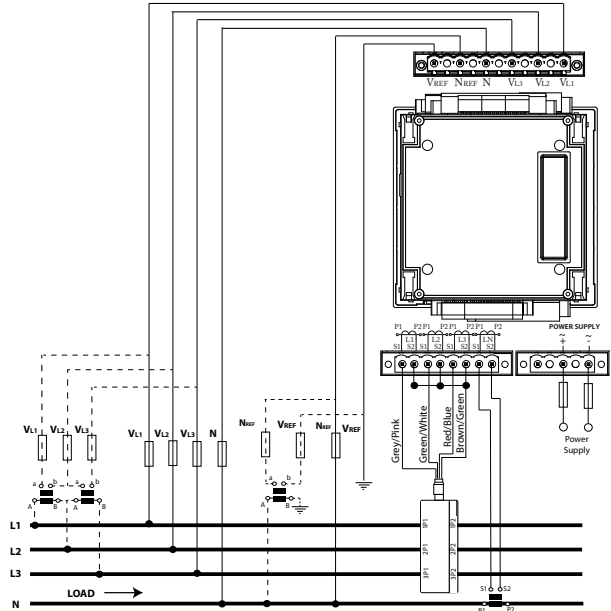
## Power analyzers for panel with power quality measurement parameters

### Connections

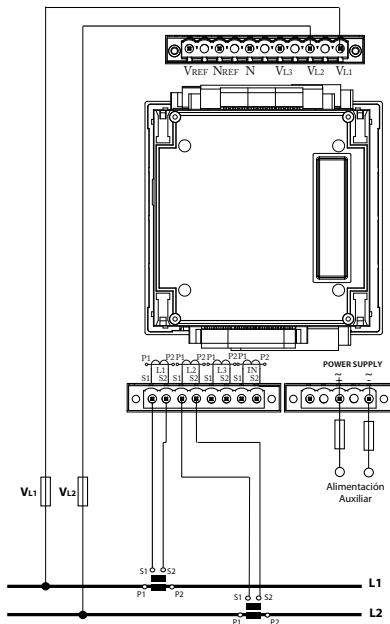
Three-phase measuring with or without voltage transformer and current transformers.



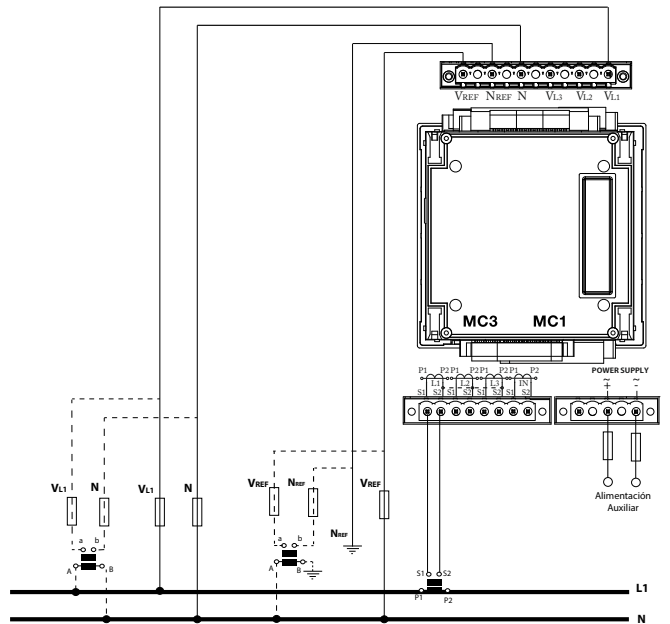
Three-phase measuring with or without voltage transformer and MC3 (250 mA) + MC1 type transformers for neutral current.



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 % ( $U_v$ )	4...100 % ( $U_v$ )	4...100 % ( $U_v$ )	4...100 % ( $U_v$ )
	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 $\varphi$	•	•	•	•
	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 according 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 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 % ( $U_v$ )	4...100 % ( $U_v$ )	4...100 % ( $U_v$ )	4...100 % ( $U_v$ )	2...100 % ( $U_v$ )
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)	-	-
•	•	•	•	-
-10°C ... +50°C	-10°C ... +50°C	-10°C ... +50°C	-10°C ... +50°C	-10°C ... +50°C
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

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

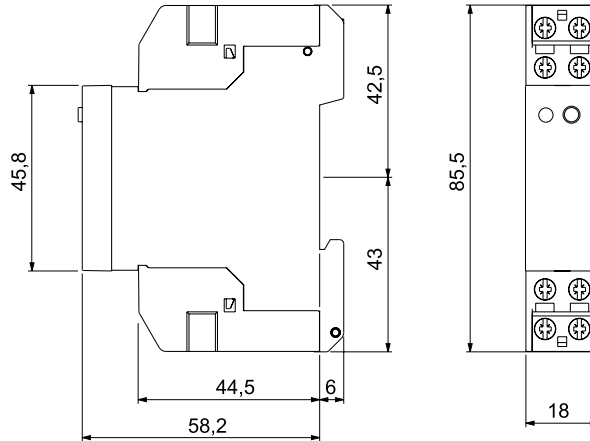
# CVM-1D

## Single-phase power analyzer, DIN rail

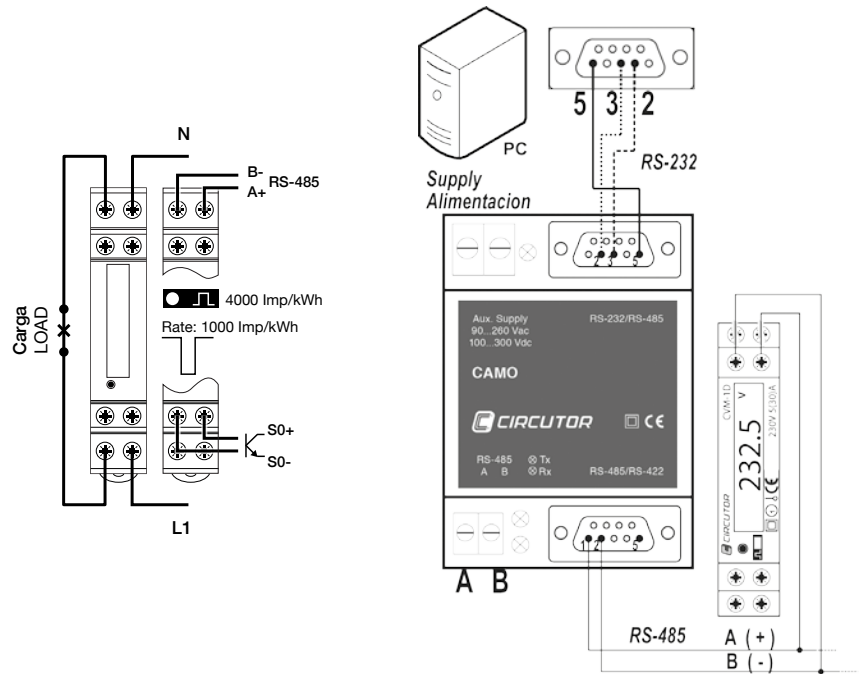
### References

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

<b>Power circuit</b>	Rated voltage	230 Vac (-15...+10 %) 85...265 Vac / 95...300 Vdc optional
	Power supply frequency	50...60 Hz
	Maximum power consumption	3 VA
<b>Measurement circuit</b>	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 $I_n$
<b>Accuracy class</b>	Voltage, Current	0.5% ± 1 digit
	Active power, Reactive power	1% ± 1 digit
	Active energy Reactive energy	1% (Class 1)
<b>Communications</b>	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
<b>Output transistors</b>	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
<b>Build features</b>	Measurement module	DIN Rail 46277 (EN 50022)
	Number of modules	3
<b>Environmental conditions</b>	Operating temperature	-10 °C...+50 °C
	Protection degree	Embedded unit: IP51 Terminals: IP31
	Humidity (without condensation)	5 ... 95% (non-condensing)
	Maximum altitude	2000 m
<b>Safety</b>	<b>IEC 61010</b> Double-insulated electric shock protection, class II	
<b>Standards</b>	<b>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</b>	

# CVM NET

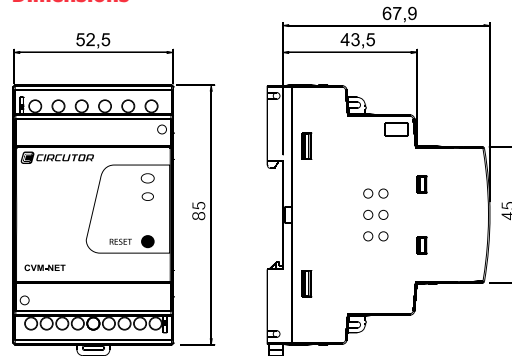
## Three-phase power analyzer, assembly on DIN rail - without display

### References

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

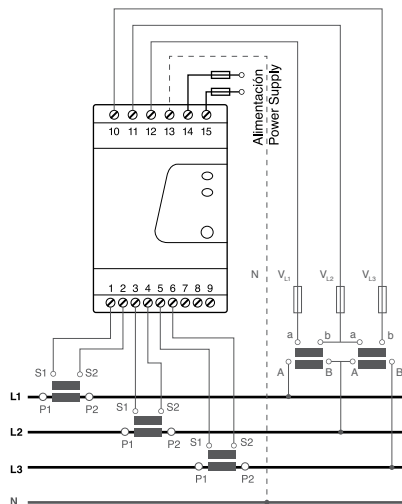
(\*) Requires **MC** efficient transformers.

### Dimensions

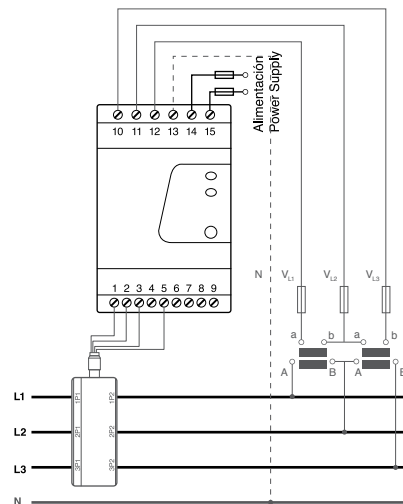


### Connections

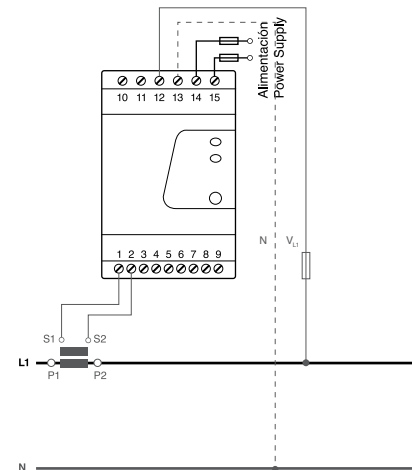
Three-phase + neutral connection  
3 voltage transf. + 3 current transf.



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

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

# 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 (*)	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 (*)	M52081
Yes	.../1 A, .../5 A	2	U e I (15°)	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 (*)	M520L1
Yes	.../1 A, .../5 A	2	-	BACnet	-	CVM-MINI-ITF-BACnet-C2 (*)	M520F1
Yes	.../250 mA	2	-	BACnet	-	CVM-MINI-MC-BACnet-C2 (*)	M520H1
Yes	.../1 A, .../5 A	2	-	LonWoks	LonTalk	CVM MINI-ITF-LonWorks-C2	M52091
<b>ISO/IEC 14908 – ANSI/EIA 7091</b>							
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

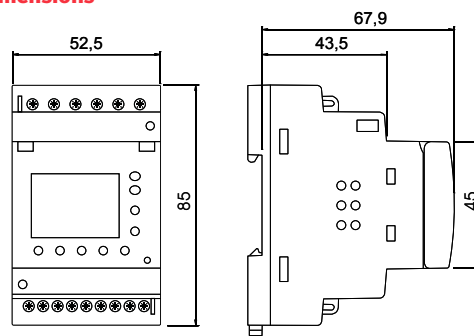
(\*) Requires the installation of MC series efficient transformers. – (\*) Only available with 230 V<sub>ac</sub> power supply

### 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
								20...120 Vdc 5*

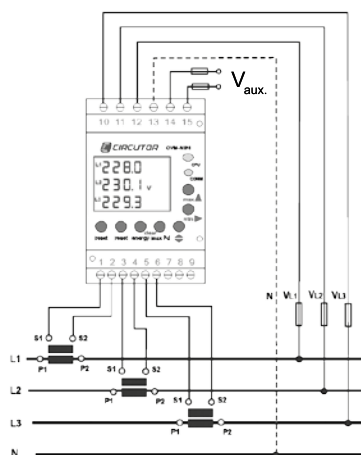
\* Only CVM MINI-ITF-RS485-C2

### Dimensions

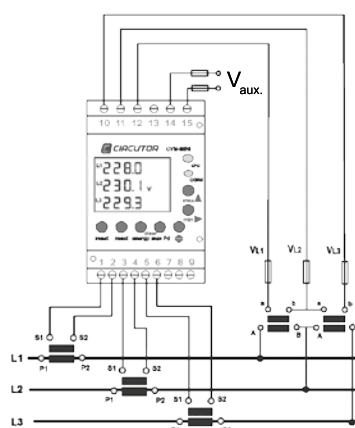


### Connections

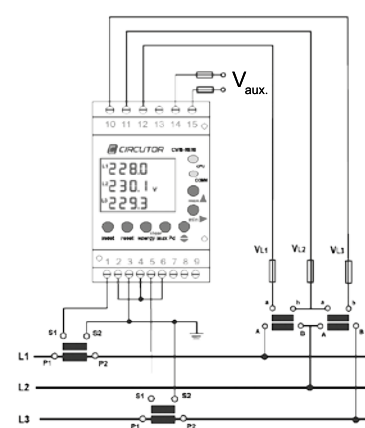
3 or 4 wires (low voltage)



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

<b>Power circuit</b>	Rated voltage	85...265 Vac / 95...300 Vdc
	Power supply frequency	50...60 Hz
	Maximum consumption	2,9...6 V-A / 3...6 W
<b>Measurement circuit</b>	Rated voltage	300 Vac (Ph-N) / 520 Vdc (Ph-Ph)
	Frequency	45...65 Hz
	Nominal current	$I_n$ .../250 mA
	Permanent overload	1,3 $I_n$
	<b>Accuracy class</b>	Voltage, current
	Active Power	1 % (> 90 W)
	Active energy	1 % (class 1)
	<b>Communications</b>	Network protocol
Communication protocol		Modbus/RTU
Speed		9600 / 19200 / 38400 / 57600 bps
Length		8
Parity		No parity / odd / even
<b>Output transistors</b>	Stop bits	1 / 2
	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
<b>Build features</b>	Measurement module	Assembly on <b>DIN 46277</b> rail ( <b>EN 50022</b> )
	Number of modules	6
	Protection Degree	IP 31, Front panel IP 51
<b>Environmental conditions</b>	Working temperature	-10 ... +50 °C
	Humidity (non-condensing)	5 ... 95% (non-condensing)
	Maximum altitude	2000 m
<b>Safety</b>	<b>IEC 61010</b> Double-insulated electric shock protection, class II	
<b>Standards</b>	<b>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</b>	

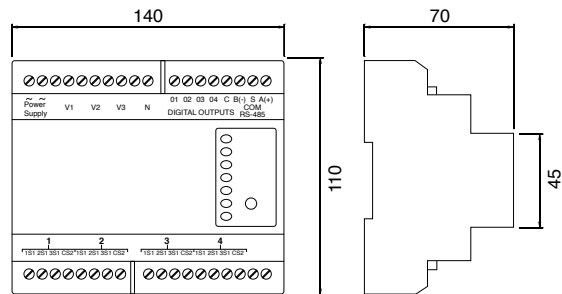
# CVM-NET4+

Multi-channel power analyzer  
for DIN rail - no display

## References

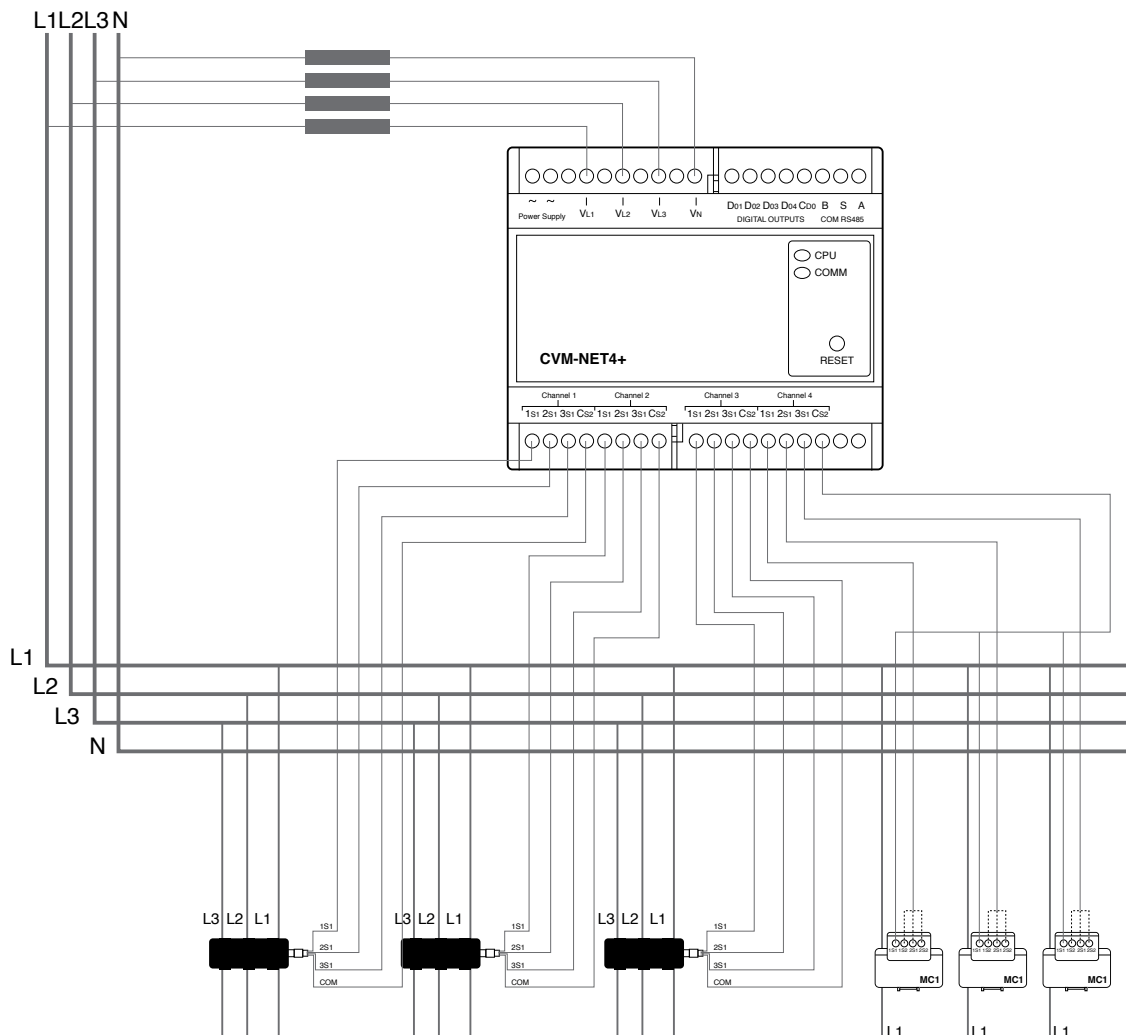
Type	Code	Communications	Transformer
CVM-NET4+-MC-RS485-C4	M55782	RS-485 Modbus/RTU	.../250 mA (type MC)
CVM-NET4+-mV-RS485-C4	M557820000V00	RS-485 Modbus/RTU	.../333 mV

## 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.



### 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<sup>®</sup> DATA**

Modules for exporting historical logs to an SQL server

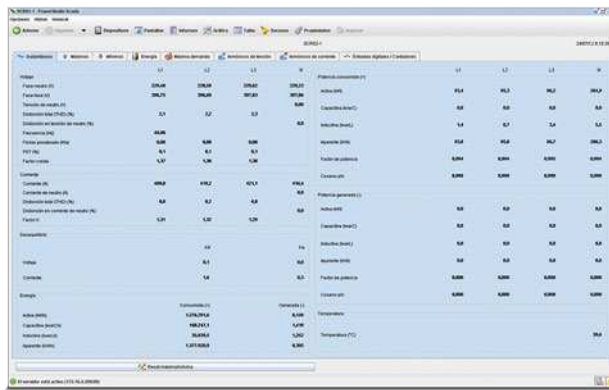


**OPC-DA**

Data connector for external systems with an OPC-DA client

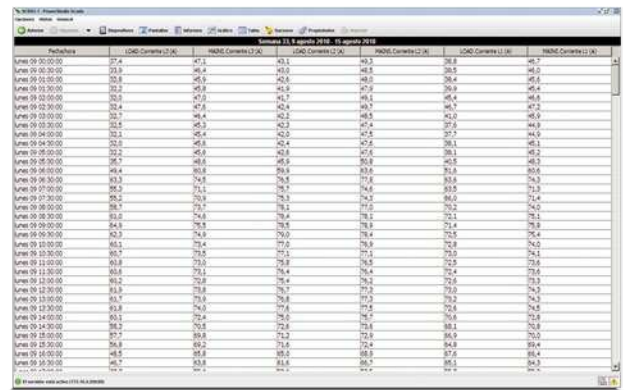
## Real time variables

Displays all variables measured from all units in real time.



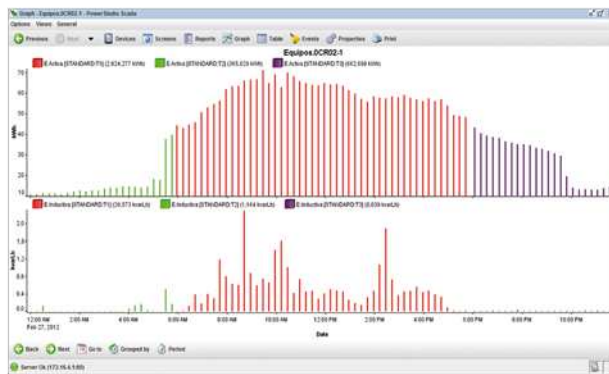
## Tables

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.



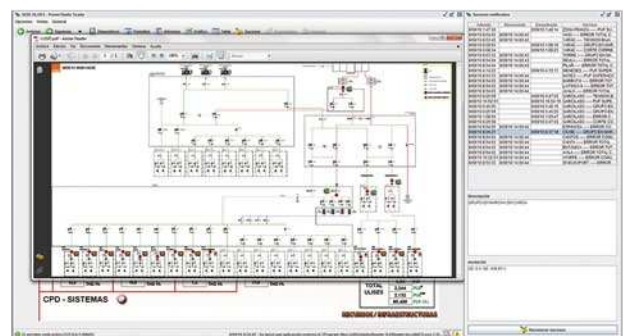
## Reports

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.



### 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.



### 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.



### 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.



### 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.



### TCP1RS+ | Converter

Gateway designed to convert the Ethernet physical environment to RS-485.



### CMBUS-8/24 | Converter

Gateway designed to convert the M-Bus protocol to Modbus, with up to 24 slave units.



### 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.



### AirBRIDGE | Converter

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



### AirREPEATER | Repeater

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



### AirTHL | Sensor

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



### AirHANZER | Repeater

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

# Advanced system for absolute management



# CVM

## Power Analyzers

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[www.circutor.com](http://www.circutor.com)



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