

# **M.5**

## **CVM Power analyzers**



### M.5 - Analizadores de redes CVM

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Three-phase power analyzer(balanced and unbalanced) for panel or DIN rail mounting. . . . . M5-8

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## CVM Power analyzers

Nowadays, companies, industries or any consumer of electrical energy are trying to optimise costs to become the most competitive players in the market. We can act over a large number of parameters to save on costs, such as on the consumption of electrical energy.

**CIRCUTOR's** analyzers offer state-of-the-art technology, measuring a large variety of electrical parameters, with the main purpose of controlling and managing an installation, machine, industry, etc. thus optimising the energy costs.

# M.5

## Definition

The **CVM** series of analyzers includes highly accurate metering stations that are aimed at the control and supervision of the main electrical parameters in three or four-wire, low and high voltage, single and/or three-phase grids. In addition, they offer the most innovative technologies and offer metering in true root mean square. Its indirect current outputs use ITF technologies in the .../5 A secondary or .../1 A or efficient transformers **MC1** and **MC3**.../250mA secondary: galvanic insulation protection inputs

**What functions do CIRCUTOR's analyzers offer?**

- They display and transmit all electrical parameters metered and/or calculated.
- They incorporate the metering function, storing in the memory the value of energy consumed and generated, even in the absence of an auxiliary power supply. Hourly discriminator with previous programming mode, thus obtaining a totalizer of active, apparent, reactive inductive and reactive capacitive energy, for each rate programmed (depending on the type). They incorporate the maximeter function, calculating the demand integrated in a programmable period (depending on the type). The integration is carried out with a sliding window and it can be carried out over the following adjustable parameters: three-phase current, active three-phase power, apparent three-phase power or current per phase.
- Some of **CIRCUTOR's** analyzers can be expanded or offer modular capabilities, with additional functions that can be associated to any electrical parameter monitored or calculated, such as:





○ Multi-converter functions: analogue inputs and outputs.

○ Alarm station or impulse generation function: digital inputs and outputs. The communications outputs, connection topologies and network protocols can be of different types.

○ Connections: Ethernet, RS-232, RS-485, RF

○ Protocols: Modbus TCP, Modbus RTU, Profibus DP, Metasys N2 and XML.

### INTEGRATION OF COMMUNICATIONS IN ANALYZERS

Communications let you make the most of the metering equipment in combination with **PowerStudio**, **CIRCUTOR's** energy monitoring and supervision software.

RS-485 communications can be used to make the most out of **CIRCUTOR's** analyzers with the management software, reading all parameters metered and calculated in real time. The **PowerStudio Scada** software not only displays the electrical parameters in real time, but it also generates a database in the PC, where it stores the log of values, which can be studied later on.

**CIRCUTOR** offers a range of analyzers, which have Ethernet communications, so they can be connected directly to the intranet and Internet. Therefore, their integration with the **PowerStudio** software is quick and easy.

In addition, **CIRCUTOR** offers Profibus analyzers, which can access a large variety of industrial automation applications, where the protocol is commonly used.

### Integration systems (Modbus RTU vs. Modbus TCP)

Until now, **CIRCUTOR** offered and is currently offering Ethernet communication gateways, (Modbus RTU), (TCP2RS code M54031), used for the integration of RS-485 equipment, making use of the Ethernet infrastructures existing in installations. Said gateways

were designed for the communication with market SCADAs that did not have the possibility of establishing IP addressing communications, since this was through a virtual port redirection software. Another problem with this type of communications was that it was a mono-master system, i.e., communications could only be established with slave equipment, with a single master or control PC. Communications could not be established with other equipment that was not established as a slave.

Fortunately, PLC data acquisition systems and other market masters, as well as the slaves commonly installed in these cases (three-phase power quality analyzers) have been unified under a standardised protocol that is very popular among manufacturers: Industrial Ethernet or Modbus/TCP. The implementation of this system has led to the standardisation of the protocol so that any slave can be queried by various masters at the same time (up to eight), thus multiplying the different and diverse communication topologies in an energy control installation or in any process control situation (multi-master cases). Therefore, **CIRCUTOR** has launched its range of Ethernet analyzers again, implementing the new protocol with the main purpose of standardising the communication methods used by most of the global manufacturers.

○ **CVMk2-ITF + k2-EXP-SD-MODBUS/TCP**: Power Quality Analyzer M54400 / M54402 + Ethernet expanding module (Modbus/TCP) M54504

○ **CVM144-ITF-Ethernet-TCP**: Power Quality Analyzer (Modbus/TCP): M50790

○ **CVM96-ITF-Ethernet-TCP**: Power Quality Analyzer (Modbus/TCP): M51241

○ **TCP2RS**: Converter RS232-RS485 / Ethernet (Modbus/TCP): M54032

○ **LM50-TCP**: Alarm / Impulse Centralizer (Modbus/TCP): M54032

With this type of analyzers, the integration of **CIRCUTOR's** units with any market SCADA, PLC or control master is easier and simpler than ever.



## ENERGY MANAGEMENT SOFTWARE: Power Studio Scada

Toph-performance management software designed for the analysis of the consumption of energy and other parameters metered by **CIRCUTOR's** equipment.

### What can this software be used for?

- Control of the energy in an installation, analysing the status of its lines and installations in real time.

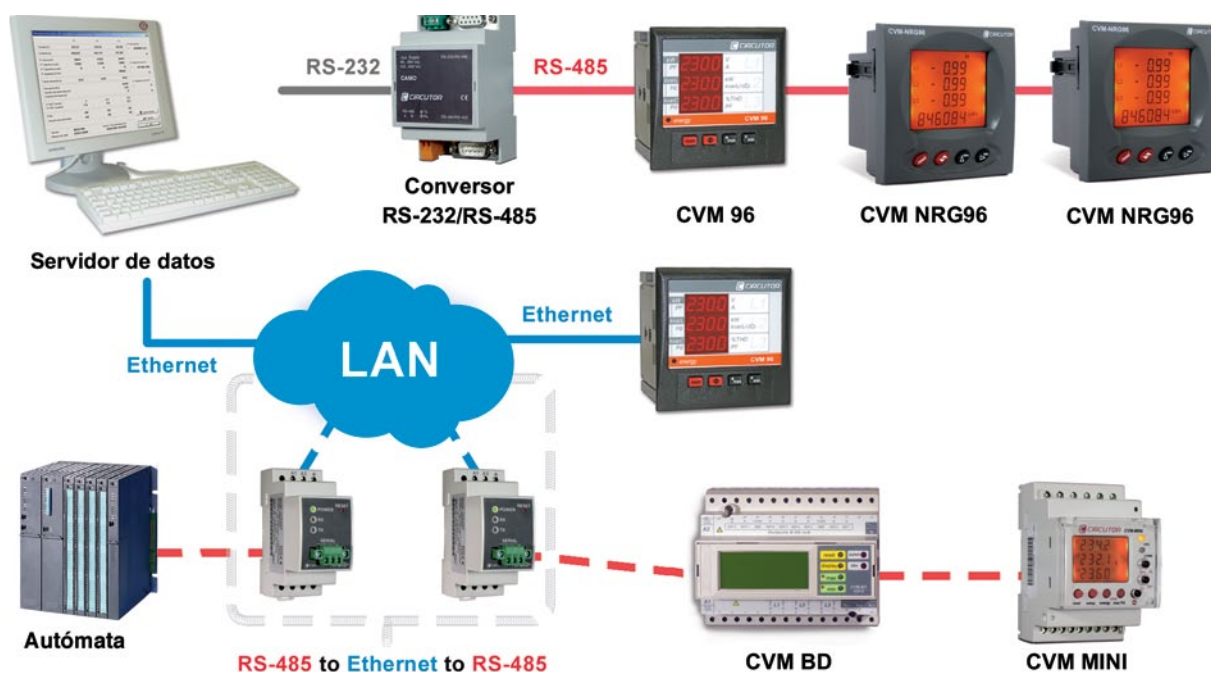
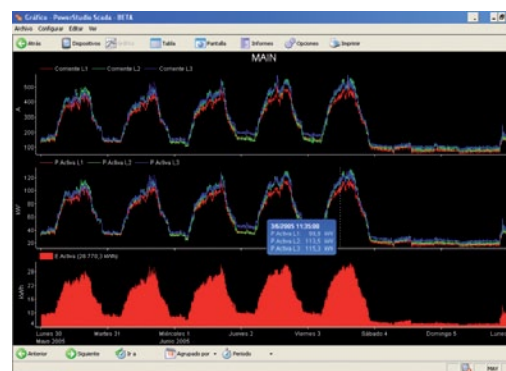
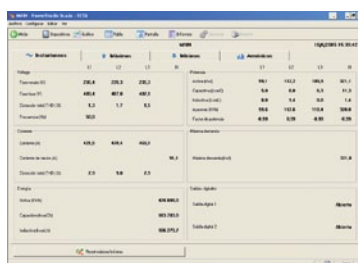
- Simulation of receipts, depending on the version. It can be used to analyse the consumption of energy in the installations with the equipment supplied by **CIRCUTOR** and it also enables the simulation of bills, defining different rates, whether they are regulated or not.

- Study of the evolution of electrical parameters in time, such as: V, A, kW, etc, with graphs and tables. Data and graphs can be exported to draw up reports. Different analyzers can be used to analyse and study the quality parameters defined by the IEC 61000-4-30 Standard.








## Applications

Supervision and preventive maintenance of an installation, with the real-time and log of the status and consumption of all sorts of low and medium voltage (LV and MV) machines and installations.



## Product selection table

	CVMk2					MP3 / MP4				CVM NRG96				CVM MINI				CVM NET			
																					
METERING FEATURES	L1	L2	L3	N	III	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
Single phase voltage	*	*	*		*	*	*	*		*	*	*		*	*	*		*	*	*	
Phase-phase voltage	*	*	*							*	*	*		*	*	*		*	*	*	
Vref Voltage (GND)-NEUTRAL				*																	
Current	*	*	*	*		*	*	*		*	*	*	**	*	*	*	*	*	*	*	*
Frequency	*					*	*	*		*				*				*			
Active power	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Reactive power L	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Reactive power C	*	*	*		*				*	*	*	*	*	*	*	*	*	*	*	*	*
Apparent power	*	*	*		*	*	*	*	*				*	*	*	*	*	*	*	*	*
Power factor	*	*	*		*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*
cos φ	*	*	*		*								*				*				*
Maximum active power demand					*	*	*	*	*				*				*				*
Maximum apparent power demand					*	*	*	*	*				*				*				*
Maximum current demand	*	*	*		*	*	*	*	*	*			*	*			*	*			*
Neutral current	*									*				*				*			
THD Voltage	*	*	*		*					*	*	*		*	*	*		*	*	*	
THD Current	*	*	*		*					*	*	*		*	*	*		*	*	*	
Voltage harmonics (depending on the type *)	*	*	*	*	50					*	*	*	15	*	*	*	15				
Current harmonics (depending on the type *)	*	*	*	*	50					*	*	*	15	*	*		15				
Active energy					*	*	*	*	*				*				*				*
Reactive energy L					*	*	*	*	*				*				*				*
Reactive energy C					*	*	*	*	*				*				*				*
Apparent energy					*				*				*				*				*
Flicker (WA and PST)	*	*	*																		
Factor K (current)	*	*	*																		
Peak factor (voltage)	*	*	*																		
Unbalance (voltage and current)	*	*	*																		
Asymmetry (voltage and current)	*	*	*																		
Rates (depending on the type)	9					1				1				1				1			
Analogue inputs (0/4...20 mA)	*					*															
Analogue outputs (0/4...20 mA)	*					*															
Digital inputs	*					*															
Digital outputs	T/R					T				T				T				T			
COMMUNICATIONS FEATURES																					
RS-232																					
RS-485	*					*				*				*				*			
Ethernet	*																				
COMMUNICATIONS PROTOCOL																					
Modbus RTU	*					*				*				*				*			
Modbus TCP	*																				
Profibus DP	*																				
Johnson Controls																					
Compatible with <b>PowerStudio SCADA</b>	*					*				*				*				*			
Página	8					14				17				19				21			

Possible parameters, depending on the unit selected.

\* Available for display and communications

\*\* Available only for communications.

(\*) Harmonic decomposition in HAR types.

Possible parameters, depending on the unit selected.

*	Available for display and communications
**	Available only for communications.
(*)	Harmonic decomposition in HAR types.

# CVMk2

Three-phase power analyzer(balanced and unbalanced) for panel or DIN rail mounting

## Description

Three-phase power analyzer (balanced and unbalanced) for its assembly on panel or DIN rail mounting with a graphical display. measuring in 4 quadrants.

Other features include:

- Class 0.2 or 0.5 power and energy
- Measuring of Class B supply quality events (guaranteeing the power supply of the unit with an UPS, battery, etc.)
- Current measuring .../5 or .../1 A
- Measure of neutral current with transformer
- Optional energy consumption and generation billing (up to 9 rates)
- RS-485 Modbus/RTU Communications
- Expansion possibilities (up to 3 modules)
- Backlit graphical display
- Instantaneous display of maximum and minimum electrical parameters with date and hour
- Measure of energy consumed and generated, up to 100 GW·h
- Universal series power supply
- With ITF technology: galvanic insulation protection inputs

## Application

- Applied to the control of general switchboards and low, medium and high voltage connection points
- Alarm station with voltage-free digital inputs
- Submetering station: impulse meter with other types of consumption, such as gas, water, steam, etc. with their digital inputs
- Measuring converter: optional association of an instantaneous parameter to one of the analogue outputs available (0...20 mA / 4...20 mA)
- Instantaneous, maximum and minimum parameter recording unit, with date and hour and an expandable memory card
- Power quality analyzer: harmonic decomposition up to order 50°, asymmetries, flicker, unbalances, overvoltages, gaps, interruptions, etc.



## Features

<b>Power supply circuit</b>	85...265 V ac / 90...300 V dc
ac Power supply frequency	50..0.60 Hz
ac Power supply consumption	30 V·A
dc Power supply consumption	< 25 W
<b>Metering circuit</b>	
Nominal voltage	300/500 V ph-n / V ph-ph or 500/866 V ph-n / V ph-ph
Frequency	45..0.65 Hz
Metering margin	5...120 % of the $U_n$ for $U_n = 300$ V ac (ph-n) 5...120 % of the $U_n$ for $U_n = 500$ V ac (ph-n)
Maximum metering voltage	360 V ac
Admissible overvoltage	750 V ac
Maximum consumption (limited current)	< 0.6 V·A
<b>Current measuring circuit</b>	
Nominal current	.../5 A or .../1 A
Metering margin	1..0.120 % of $I_n$ for $I_n = 5$ A
Primary current metered	Programmable <30,000 A
Admissible overload	6 A permanent, 100 A $t < 1$ s
Consumption	< 0.45 V·A
<b>Maximum meter value</b>	100 GW·h
<b>Class/Accuracy</b>	0.2 or 0.5 power and energy
<b>Ambient conditions</b>	
Operating temperature	-10 ... +50 °C
Relative humidity	5 ... 95%
Altitud	2000 m
<b>Build features</b>	
Metering module	Assembly on DIN Rail 46277 (EN 50022)
Screen or screen + metering module	Assembly on panel (96 x 96 mm, 144 x 144 mm) or opening with a 103 mm diameter
External dimensions	144 x 144 x 116 mm
<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>	
IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-11, IEC 61000-4-4, IEC 61000-4-5	



## CVMk2

Three-phase power analyzer(balanced and unbalanced) for panel or DIN rail mounting



### References

Compact units (metering + display module)

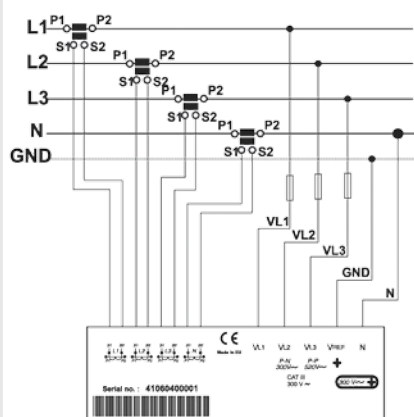
Quadrants	Class	Communications MODBUS / RTUProtocol	Neutral current	Universal power supply	Type	Code
4	0,5	RS-485	Yes	Yes	CVMk2-ITF-405	M54400
4	0,5	RS-485	Yes	Yes	CVMk2-ITF-402	M54402

Measuring units (measuring module)

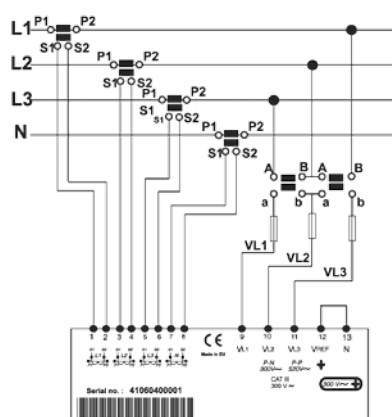
Quadrants	Class	Communications MODBUS / RTUProtocol	Neutral current	Universal power supply	Type	Code
4	0,5	RS-485	Yes	Yes	M-CVMk2-ITF-405	M54410
4	0,5	RS-485	Yes	Yes	M-CVMk2-ITF-402	M54412

### Connections

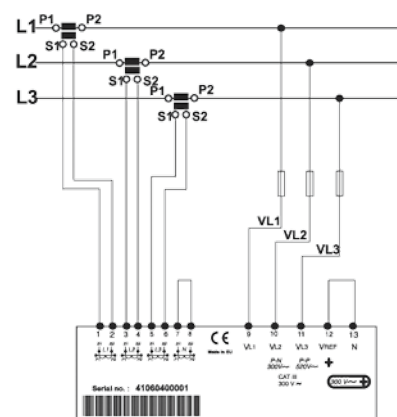
Connection of 4 Current transformers (5 wires)



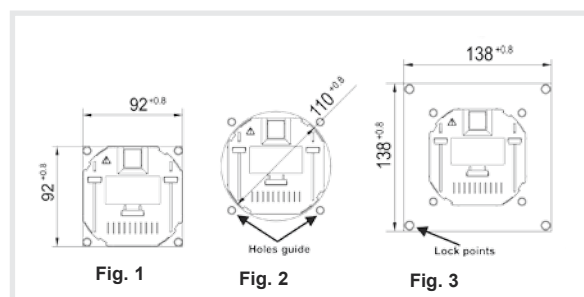
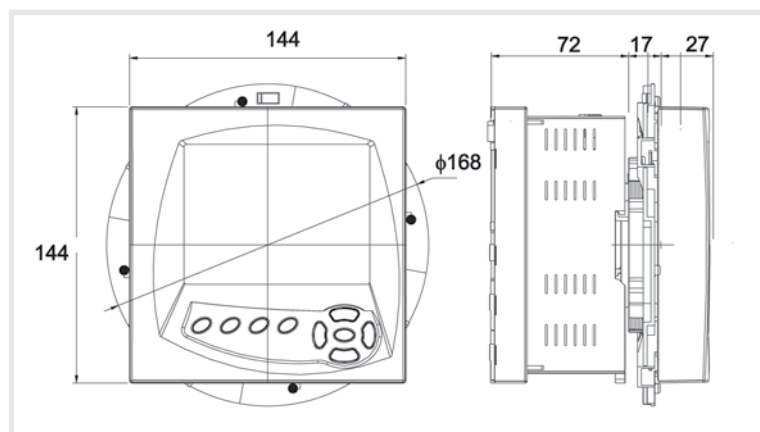
Connection of 4 Current transformers and 2 voltage transformers



Connection of 3 Current transformers (3 wires)



### Dimensions



Figures 1, 2 and 3: Display of the frontal panel part embedding (display) in a 92 x 92 mm opening, with a diameter of 110 mm and 138 x 138 mm, respectively

## Exchangeable modules

### CVM k2

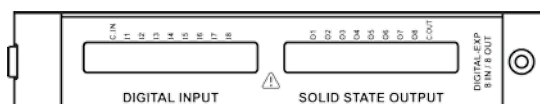
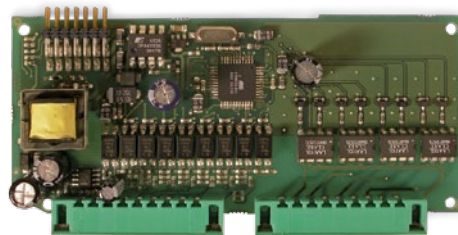


#### 1. k2-EXP-8I / 8O-Digital-TR Card

Card with 8 digital inputs and 8 digital outputs of transistor

##### Features

Features	
Logical inputs	
Type of input	Voltage-free
Type of coupling	Optoinsulated
V max	24 Vdc
minimum t ON / t OFF	t ON 40 ms
	t OFF 40 ms
Static outputs	
AC Voltage	<100 Vac
Non-repetitive Peak voltage	350 V pk.
Nominal current	100 mA
Repetitive current during t=1s	120 mA
Maximum current t=10 ms	350 mA
Connection	
Rigid conductor section	0.05...1 mm <sup>2</sup>
Code	M54501



##### Connection

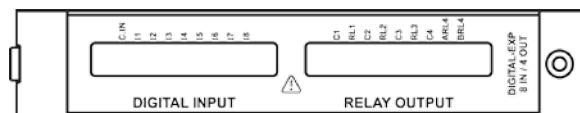
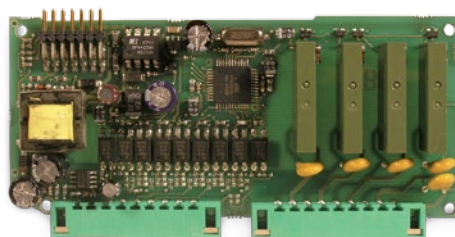


#### 2. k2-EXP-8I / 4O-Digital-RL Card

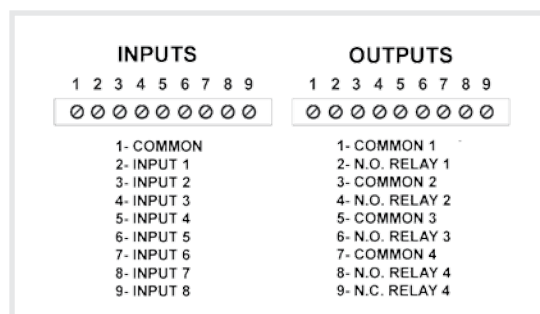
Card with 8 digital inputs and 4 digital outputs. Outputs with relay.

##### Features

Features	
Logical inputs	
Type of input	Voltage-free
Type of coupling	Optoinsulated
V max	24 Vdc
minimum t ON / t OFF	t ON 40 ms
	t OFF 40 ms
Relay outputs	
AC Voltage	250 Vac
AC Current	6 Aac
Minimum relay load	1 Vac
	0.001 Aac
Mechanical working life	5 x 10 <sup>6</sup> operations
Electrical working life	NO: 5x10 <sup>4</sup> , NC: 3x10 <sup>4</sup> cycles
Connection	
Rigid conductor section	0.05...1 mm <sup>2</sup>
Code	M54503



##### Connection



## Exchangeable modules

## CVM k2

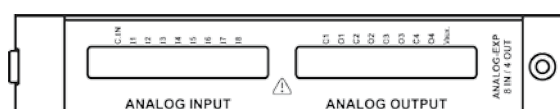
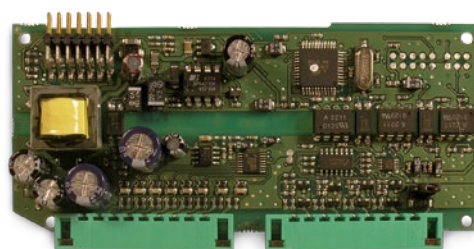


## 3. k2-EXP-8I / 4O-Analogue Card

Card with 8 digital inputs and 4 digital outputs

## Features

Features	
Analogue outputs	
Maximum internal voltage	20 / 24 Vdc
Output range	0 / 4...20 mA
Linearity	1 %
Load resistance	< 500 ohm
Output range	4000 points
Analogue inputs	
Type of metering	-
Input range	0 / 4...20 mA
Metering accuracy	1 %
Input impedance	200 ohm
Connection	
Rigid conductor section	0.05...1 mm <sup>2</sup>
Code	M54502



## Connection

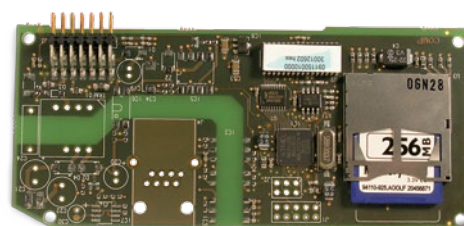
ENTRADAS									SALIDAS								
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1- COMUN									1- COMUN								
2- Entrada Analógica 1									2- Salida Analógica 1								
3- Entrada Analógica 2									3- COMUN								
4- Entrada Analógica 3									4- Salida Analógica 2								
5- Entrada Analógica 4									5- COMUN								
6- Entrada Analógica 5									6- Salida Analógica 3								
7- Entrada Analógica 6									7- COMUN								
8- Entrada Analógica 7									8- Salida Analógica 4								
9- Entrada Analógica 8									9- Vaux. EXTERNA								

## 4. k2-EXP-SD Card

Ethernet communications card and SD memory

## Features

SD Card	
Type of card	SD
Maximum capacity	2 Gb
Format	FAT 16
Code	M54506



## Recommendations

Card used to record up to 400 electrical variables coming from a CVMk2 power quality analyzer. It also includes a log of the quality events: overvoltages, voltage interruptions or gaps.

## Icons



• Correct SD memory state



• Incorrect SD memory state



• SD Card removal enabled



## Exchangeable modules

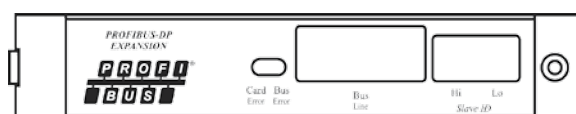
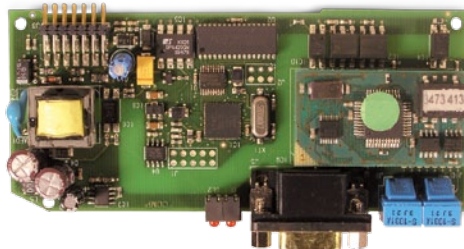
### CVM k2

#### 5. PROFIBUS Card

##### GSD Modules

The GSD modules are configured in accordance with the following table. The table shows the module number, content (variables) and the total size of the module.

Mod.	Parameters	Byte	Size
1	Simple voltages	12	52
	Phase currents	12	
	Compound voltages	12	
	Power factor	12	
	Frequency	4	
2	Power ratings	48	48
3	Mean values	12	44
	Neutral values	8	
	Three-phase values	24	
4	Current energy with no billing	48	48
5	THD U / I	32	32
6	THD odd / even	64	64
7	Unbal / Asymmetry / Flicker	44	44
8	Odd harmonics, Voltage (15°)	72	72
9	Even harmonics, Current (15°)	72	72
10	Digital I. 1 / Analogue I. 2	64	64
11	Digital I. 2 / Analogue I. 3	64	64
12	Digital I. 3 / Analogue I. 1	64	64
13	Cos φ	12	12



Code M5450A

#### 6. k2-EXP-SD-MODBUS/TCP Card

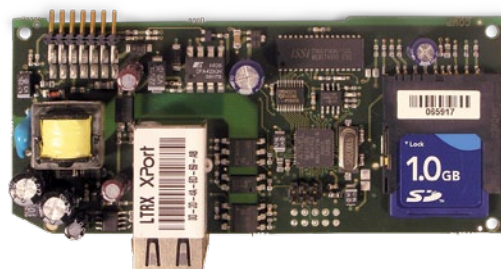
Ethernet communications card and SD memory

##### Features

Ethernet output	
Network Protocol	Ethernet RJ-45
Communication protocol	Modbus / TCP
Speed	compatible with 10 base T / 100 base Tx
SD Card	
Type of card	SD
Maximum capacity	2 Gb
Format	FAT 16
Code	M54504

##### Recommendations

- The unit is formatted automatically when installing an SD card. Do not install cards with contents stored that you wish to keep.
- To remove the SD card safely, interrupt the communications between the unit and the memory. There are two ways to do so; either turning the unit off or accessing the card setup menu.



##### Icons



- Correct SD memory state



- Incorrect SD memory state



- SD Card removal enabled

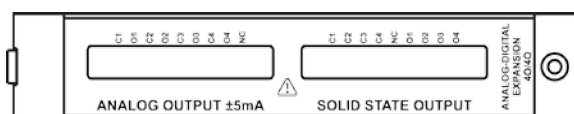
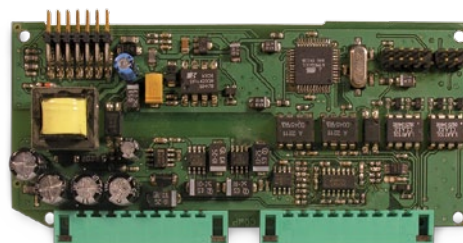
## Exchangeable modules

### CVM k2

#### 7. Exp. Card 4 S analogue + 4 S static. $\pm 5$ mA

##### Features

Features	
Logical outputs	
Output range	$\pm 5$ mA
Linearity	1 %
Load resistance	< 1000
Output range	4000 points
Static outputs	
Voltage	<100 Vac/Vdc
Non-repetitive Peak voltage	350 V pk.
Nominal current	100 mA
Repetitive current during $t=1$ s	120 mA
Maximum current $t=10$ ms	350 mA
Connection	
Rigid conductor section	0.05...1 mm <sup>2</sup>
Code	M54507



##### Connection

A.OUTPUTS									T.INPUTS								
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1- COMMON									1- COMMON								
2- Analogic output 1									2- COMMON								
3- COMMON									3- COMMON								
4- Analogic output 2									4- COMMON								
5- COMMON									5- COMMON								
6- Analogic output 3									6- Transistor output 1								
7- COMMON									7- Transistor output 2								
8- Analogic output 4									8- Transistor output 3								
9- Not used									9- Transistor output 4								





# MP3 / MP4

Three-phase  
power analyzers



## Description

- **MP3-P** and **MP4-P** are measuring equipment models that fulfil the functions of power analyzers and earth leakage protection relay in just one unit. They also have the advantage of having measuring transformers and the earth leakage transformer incorporated into one unit.
- Communications RS 485 ModbusRTU
- Optional display LCD.
- 2 digital inputs
- 2 relay outputs
- 2 energy impulse outputs
- Conductor section with power of 120-185 mm without adaptor and 35-95 mm with adaptor
- Possibility of 2 additional relay outputs (optional)
- Possibility of 1 additional analogue output (optional)
- Compatible with the energy management software: **PowerStudio**, **PowerStudio Scada** and **PowerStudio Scada Deluxe**

## Application

- It's specially designed equipment for assembly in electrical panels. It's been designed to be compatible with any automatic switch on the market.
- Earth leakage protection in the electrical panel.
- Control of instantaneous values and the recording of maximums and minimums of the measured electrical parameters.

## Features

Power circuit	
Voltage	18 - 36 V cc
Maximum power consumption	200 mA
Connector	Phoenix Contact® GMVSTBR 2,5-2-ST-7,62
Voltage measurement	
Nominal voltage	690 V ca
Maximum voltage	800 V ca
Maximum impulse voltage 8/20 us	8000 V
Impedance	1 MΩ
Frequency	45 - 65 Hz
Accuracy	0.4% measurement + 0.1% FS
Category <b>EN61010</b>	<b>CAT IV-600 V</b>
Current measurement	
Nominal current	250 A ca
Maximum current	300 A ca
Maximum impulse current 1s	30 kA
Frequency	45 - 200 Hz
Accuracy	0.45% measurement + 0.05% FS
Category <b>EN61010</b>	<b>CAT IV-600 V</b>
Power measurement / energy	
Maximum power (per phase)	240 kW
Accuracy	0.95% measurement + 0.05% FS
Active energy accuracy	Class 1 (IEC62053-21)
Reactive energy accuracy	Class 2 (IEC62053-23)
Pulse output	
Type	Isolated solid-state relay
V <sub>CE</sub> max	350 V
V <sub>CE</sub> sat	120 mA
I <sub>C</sub> recommended	10 mA
Insulation	3 kV - EN61010 CAT III 300 V
Maximum frequency	4 Hz
Minimum pulse width	20 ms

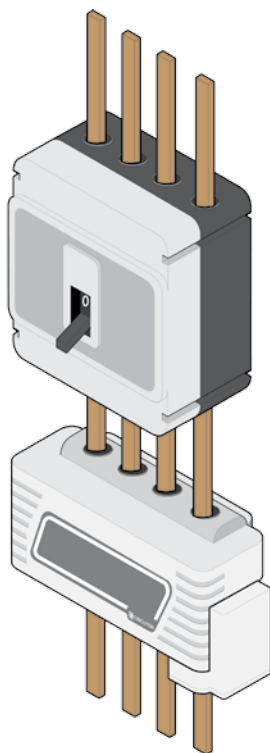
## MP3 / MP4

### Three-phase power analyzers



#### Application

- Fully programmable alarm function for any electrical parameter measured by the unit.
- Control of active and reactive energy using impulse output.
- Incorporation of measurements and earth leakage protection in SCADA systems through its communications



#### Features

Digital output		
Type	Isolated solid-state relay	
$U_{\max}$	350 V	
$I_{\max}$	120 mA	
Insulation	2.5 kV - <b>EN61010 CAT III 300 V</b>	
Digital input		
$U_{\max}$	50 V	
$I_{\max}$	300μA ( $U<15V$ )	
$I_{\max}$	4 mA ( $U<24V$ )	
$I_{\max}$	15 mA ( $U<48V$ )	
$V_{IH\ max}$	3V31	
Modbus output - RS485		
Speed (bps)	9600, 19200, 38400	
Stop bits	1.2	
Parity	None, even, odd	
Insulation	2.5 kV - <b>EN61010 CAT III 300 V</b>	
Modbus output - Display		
Power Supply	5 dc, max 180 mA	
Speed (bps)	9600, 19200, 38400	
Stop bits	1.2	
Parity	None, even, odd	
Environmental specifications		
Operating temperature	-15 – 65 °C	
Storage temperature	-40 - 80 °C	
Humidity (without condensation)	5 - 95%	
Maximum operating height	2000 m	
IP protection	IP20	
Build features	MP3	MP4
Dimensions	209 x 91 x 132 mm	251 x 91 x 132 mm
Weight	850 g	975 g
Material	UL94-V0	
Standards		
EN -61010: Double-insulation electric shock protection, class II		

#### References

MP series. Direct connection analyzers and bushing bar assembly for installations on 250/400 A switches

Current	Three-phase installation	Power Supply	Inputs / outputs	Impulse output	Communications	Type	Code
250 A	3 wires	24 V cc	2	2	RS-485	MP3-250-P	M54A4300A
400 A						MP3-400-P	M54A2300A
250 A	4 wires	24 V cc	2	2	RS-485	MP4-250-P	M5494300A
400 A						MP4-400-P	M5492300A
Visual display, 96 x 96 mm in size						D-MP	M54A01
Source of power supply 24 V cc / 230 V ca						PS-MP-24 V cc	M54A02

## MP3 / MP4

Three-phase  
power analyzers



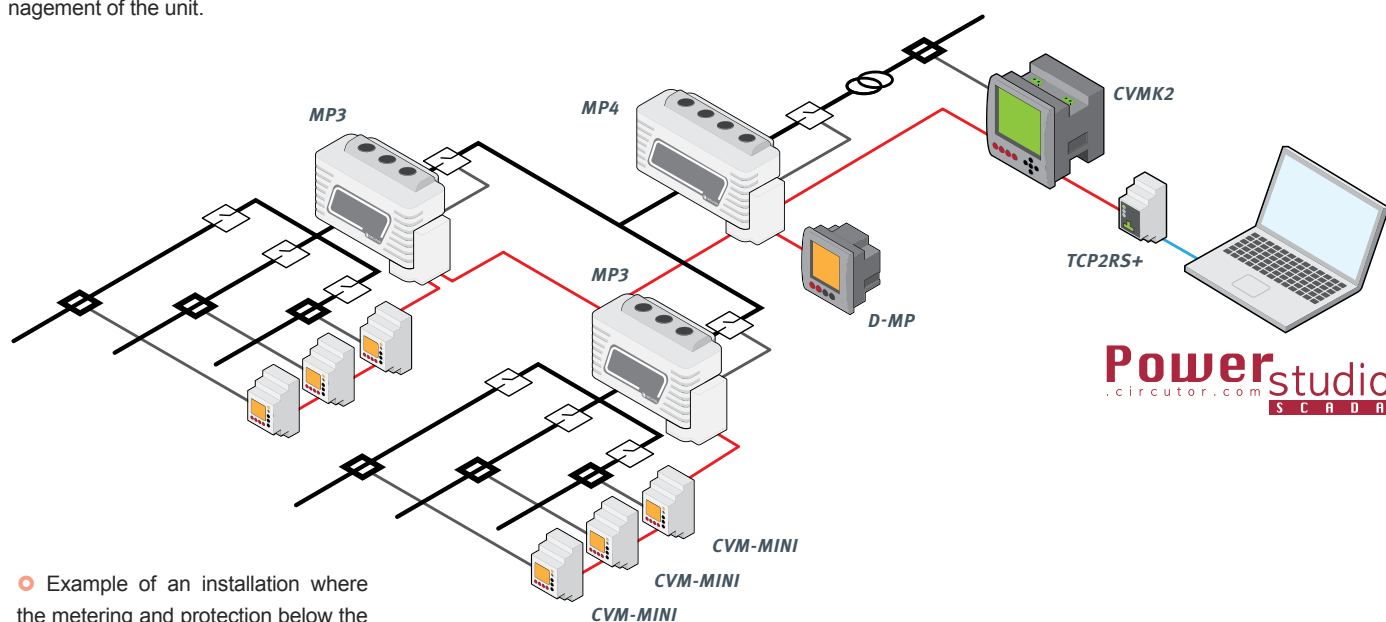
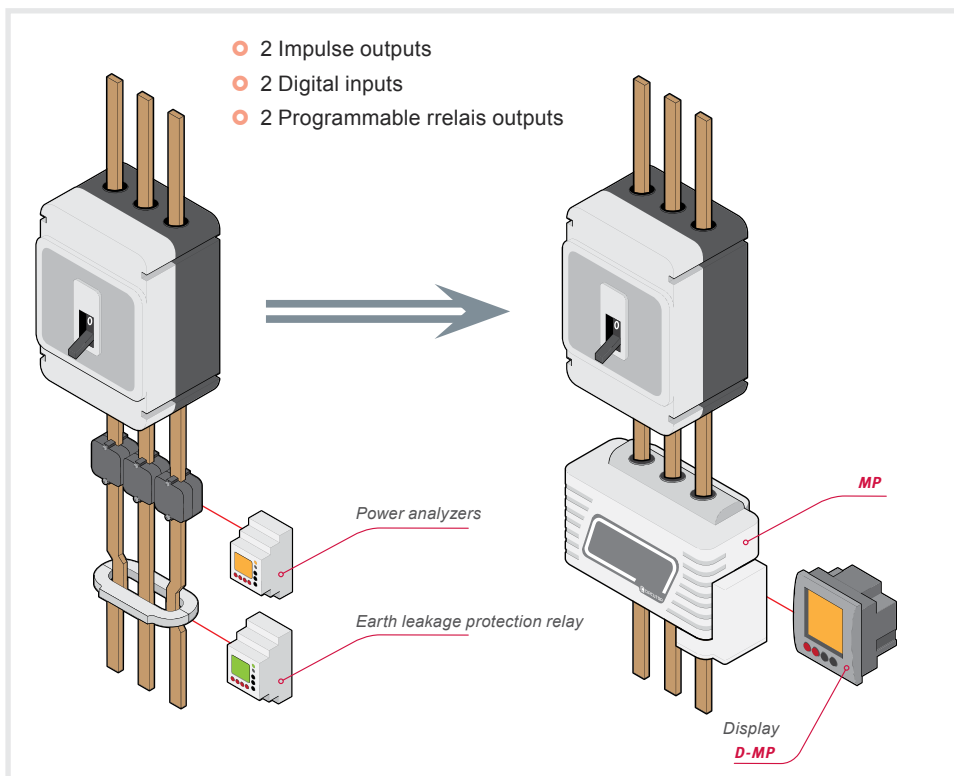
### Features

- Max. 185 mm<sup>2</sup>  
Min. 120 mm<sup>2</sup>
- Max. 95 mm<sup>2</sup>  
Min. 35 mm<sup>2</sup>
- Max. 25 mm
- Min. 12 x 2 mm

### Dimensions

MP3 250	MP4 250
125x87x132 mm	160x87x132 mm
MP3 400	MP4 400
209x91x132 mm	251x91x132 mm

The **MP** series can use its 2 RS-485 communications ports to several advantages. In addition to the optional incorporation of a **D-MP** display model for visualizing the data measured by the unit on site, it can use the other port to incorporate the unit in a **SCADA** energy management application. The **CIRCUTOR** software designed for energy management and supervision is **PowerStudio SCADA**, which enables data processing and remote management of the unit.



○ Example of an installation where the metering and protection below the automatic switch is carried out with MP.

# CVM NRG 96

Three-phase power analyzer (balanced and unbalanced) for panel mounting



## Description

Three-phase power analyzer (balanced and unbalanced) for its assembly on panels with a minimum depth, measuring in 4 quadrants.

- Other features include: Class 0.5 energy
- Current measure .../5
- RS-485 Modbus/RTU Communications, depending on the type
- Instantaneous, maximum and minimum parameter display
- Digital output with optoisolated transistor
- ITF Technology: Galvanic insulation protection inputs, depending on the type
- Maximeter function (A / A III / kW III / kV·A III)
- Default page selection
- Universal power AC and DC optional

## Application

- Applied to the control of switchboards and low and medium voltage connection points.
- Alarm control, with full programming of the variable controlled, maximum and minimum values and the delay
- Control of active or reactive energy with pulses
- Control of instantaneous, maximum and minimum values of the electrical parameters metered

## Features

Power supply circuit	dc Version	Plus Version: ac and dc
	24 Vdc (-15...+10%)	85...265 V ac / 95...300 V dc
AC Power supply frequency	-	50...60 Hz (ac type)
Maximum consumption (equipment with communications)	2.2 W	2 V·A
DC Power supply consumption (equipment w/o communications)	1.8 W	2 V·A
Metering circuit		
Nominal voltage	300 Vac (ph-n) / 520 Vac (ph-ph)	
Frequency	45..0.65 Hz	
Nominal current	$I_n$ .../ 5 A	
Current consumption of the circuit	0.75 V·A	
Overload (permanent)	1.1 $I_n$	
Class/Accuracy		
Voltage	0.5 % ± 2 digits	
Current	0.5 % ± 2 digits	
Power rating	1 % ± 2 digits	
Ambient conditions		
Operating temperature	-10 ... +50 °C	
Relative humidity	5 ... 95%	
Output transistor		
Optoinsulated (collector open) NPN		
Maximum switching voltage	24 Vdc	
Maximum switching current	50 mA	
Maximum impulse frequency	5 impulse / s	
Duration of the impulse	100 ms	
Build features		
Type of box	VO self-extinguishing plastic	
Degree of protection	Fitted unit (frontal): IP 51	
	Non-fitted unit (sides and rear cover): IP 31	
Dimensions	96 x 96 x 63 mm	
Safety		
Designed for CAT III 300/520 Vac installations, in accordance with <b>EN 61010</b> . 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 NRG 96

Three-phase power analyzer (balanced and unbalanced) for panel mounting

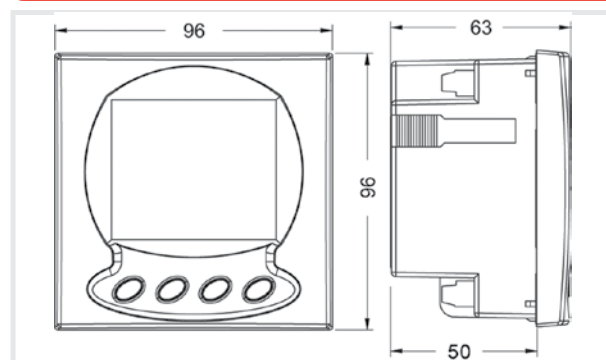


## References

Quadrants	Class (V, A)	Communications	Digital output	Universal power supply	Harmonics	Type	Code
4	0,5	-	-	Yes	-	CVM-NRG 96	M51800
4	0,5	-	-	Yes	-	CVM-NRG 96-ITF	M51900
4	0,5	RS-485	1	Yes	-	CVM-NRG 96-ITF, RS485 C	M51911
4	0,5	RS-485	1	Yes	U and I (15°)	CVM-NRG 96-ITF-HAR, RS485 C	M51B11
4	0,5	LonWorks	1	Yes	-	CVM-NRG 96-ITF-LonWorks-C	M51951
4	0,5	BACnet	1	Yes	-	CVM-NRG 96-ITFBACnet-C	M51981
<b>CVM NRG96-MC, Sistemas de medida Eficiente</b>							
4	0,5	-	-	Si	-	CVM NRG96-MC-ITF	M52070
4	0,5	RS-485	1	Si	-	CVM NRG96-MC-ITF-RS485-C2	M52081
<b>MC1 single-phase and MC3 three-phase Efficient Transformers, MC Series*</b>							
Max. A	Ranges	Class 0,5 Power	Measurement	Internal diameter		Type	Code
63	-	0,1 VA	3 Phases	7,1 mm		MC3-63	M73121
125	-	0,1 VA	3 Phases	14,6 mm		MC3-125	M73122
250	-	0,25 VA	1 Phase	26 mm		MC3-250	M73123
250	150/200/250	0,25 VA	1 Phase	20 mm		MC1-20-150/200/250	M73113
500	250/400/500	0,25 VA	1 Phase	30 mm		MC1-30-250/400/500	M73114
1500	500/1000/1500	0,25 VA	1 Phase	55 mm		MC1-55-500/1000/1500	M73115

\* Mas información sobre transformadores eficientes consulte M7

## Dimensions

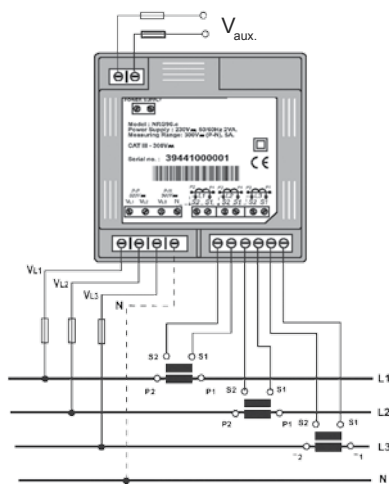


## Coding table

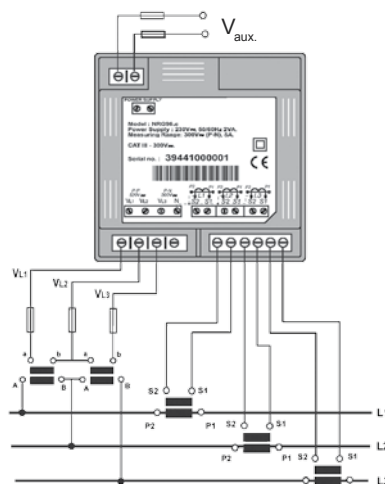
M	5	X	X	X	X	0	0	X
Code						Internal Code		↑
Power Supply Voltage (PSV)						Standard (230 Vac)		0
						85...265 Vac		A
						95...300 Vdc		
						24...0.120 Vdc		5

## Connections

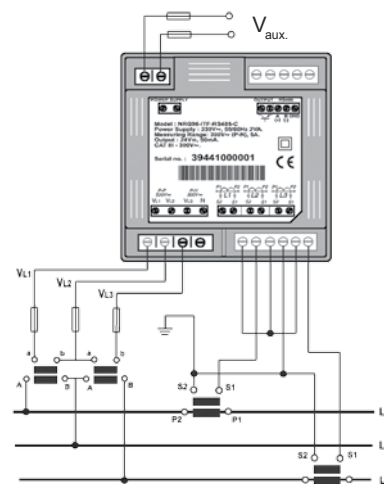
### CVM NRG96, 3 or 4 wires (low voltage)



### CVM NRG96, 3 wires (2 Voltage transformers and 3 Current transformers)



### CVM NRG96, 3 wires (2 Voltage transformers and 2 Current transformers)





# CVM MINI

Three-phase power analyzer (balanced and unbalanced) for DIN rail mounting



## Description

Three-phase power analyzer (balanced and unbalanced) for its assembly on DIN rails with very small dimensions, measuring in 4 quadrants.

Other features include:

- Current measuring .../5 or .../1 A
- DIN rail format with only 3 modules
- Assembly on the 72 x 72 mm panel with frontal adaptor (cod. M5ZZF1)
- RS-485 Communications (Modbus-RTU)
- Two transistor outputs
- ITF technology: galvanic insulation protection inputs, depending on the type
- Selection of parameters displayed
- Default page selection
- Universal power supply for the Plus type
- Sealable

## Application

- Application for the control of switchboards and low and medium voltage connection points, where an analyzer must be installed on the DIN rail due to space restrictions.
- Control of instantaneous, maximum and minimum values of the electrical parameters metered.

## Features

<b>Power supply circuit</b>	230 Vac (-15...+10%) Plus: 85...0.265 Vac / 95...300 V dc
Consumption	3 V·A
Frequency	45...65 Hz
<b>Metering circuit</b>	
Nominal voltage	300 Vac (ph-n) / 520 Vac (ph-ph)
Frequency	40...0.65 Hz
Voltage consumption of the circuit	0.7 V·A
Current consumption of the circuit	ITF 0.9 / Shunt 0.75 V·A
Transformadores	.../5 A ó.../ 1 A / 250 mA
Minimum direct current	110 mA
Maximum direct current	6 A
Maximum current con transformador	$I_n/5$ 1,2 $I_n$
<b>Class/Accuracy</b>	
Voltage	0.5 % ± 1 digit
Current	0.5 % ± 1 digit
Power rating	1 % ± 1 digit
<b>Ambient conditions</b>	
Operating temperature	-10 ... +50 °C
Relative humidity (non-condensing)	5 ... 95%
Altitud	2000 m
<b>Output transistor</b>	Optoinsulated (collector open) NPN
Maximum switching voltage	24 V dc
Maximum switching current	50 mA
Maximum impulse frequency	5 impulse / s
Duration of the impulse	100 ms / 100 ms
<b>Build features</b>	
Type of box	VO self-extinguishing plastic
Degree of protection	Embedded equipment: IP 41 Terminals: IP 20
Dimensions	52.5 x 85 x 67.9 mm (3 modules)
Weight	210 g
<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>	
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(balanced and unbalanced) for DIN rail mounting

## References

Quadrants	Class (V, A)	Communications	Protocol	Digital output	Harmonics	Type	Code
4	0,5	-	-	-	-	CVM-MINI	M52000
4	0,5	-	-	-	-	CVM-MINI-ITF	M52010
4	0,5	RS-485	MODBUS / RTU	2	-	CVM-MINI-ITF-RS485-C2	M52021
4	0,5	RS-485	MODBUS / RTU	2	V and I (15°)	CVM-MINI-ITF-HAR-RS485-C2	M52031
4	0,5	RJ-45	MODBUS/TPC	2	-	CVM-MINI-ITF-ETHERNET-C2	M520J1
4	0,5	-	BACnet	2	-	CVM-MINI-ITF-BACnet-C2	M520F1
4	0,5	LonTalk ISO/IEC 14908 ANSI/EIA 7091	LonWorks	2	-	CVM-MINI-ITFLonWorks-C2	M52091

## CVM MINI-MC, Efficient measuring Systems

4	0,5	-	-	Si	-	CVM MINI-MC-ITF	M52070
4	0,5	RS-485	1	Si	-	CVM MINI-MC-ITF-RS485-C2	M52081

## MC1 single-phase and MC3 three-phase Efficient Transformers, MC Series

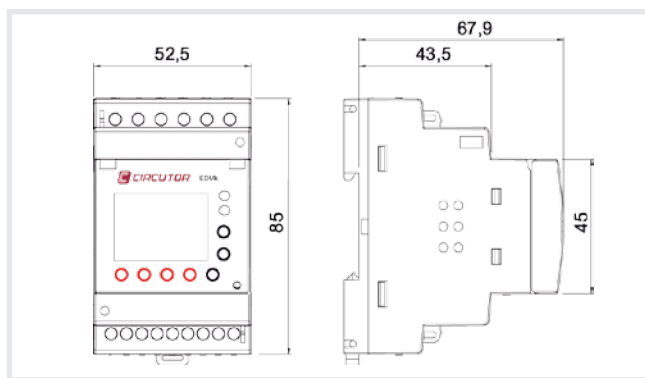
Max. A	Ranges	Class 0,5 Power	Measurement	Internal diameter	Type	Code
63	-	0,1 VA	3 phase	7,1 mm	MC3-63	M73121
125	-	0,1 VA	3 phase	14,6 mm	MC3-125	M73122
250	150/200/250	0,25 VA	1 phase	20 mm	MC1-20-150/200/250	M73113
250	-	0,25 VA	1 phase	26 mm	MC3-250	M73123
500	250/400/500	0,25 VA	1 phase	30 mm	MC1-30-250/400/500	M73114
1500	500/1000/1500	0,25 VA	1 phase	55 mm	MC1-55-500/1000/1500	M73115

## Coding table

M	5	X	X	X	X	0	0	X
Code						Internal Code		↑
Power Supply Voltage (PSV)						Standard 230 Vac		0
						85...285 Vac		C
						95...300 Vdc		
						20...120 V c.c.		5*

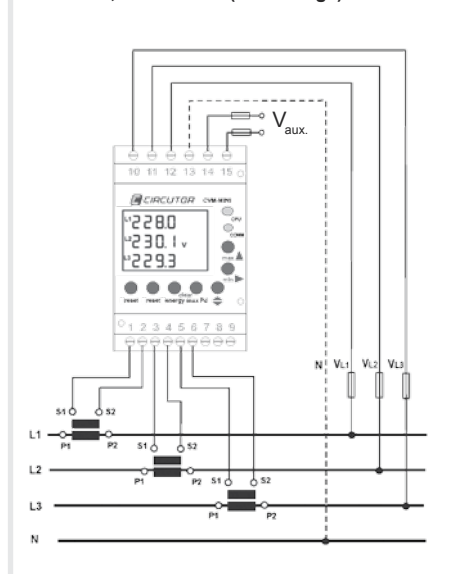
\* MC transformer's connection

## Dimensions

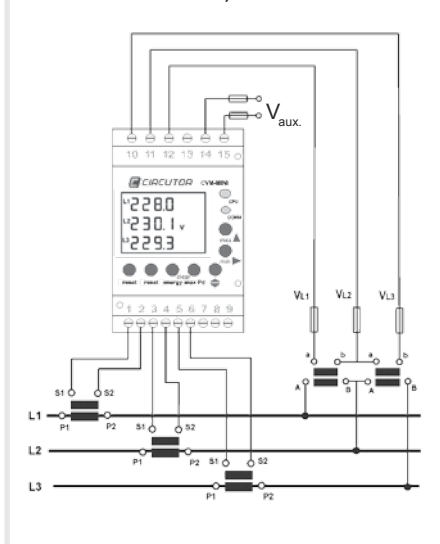


## Connections

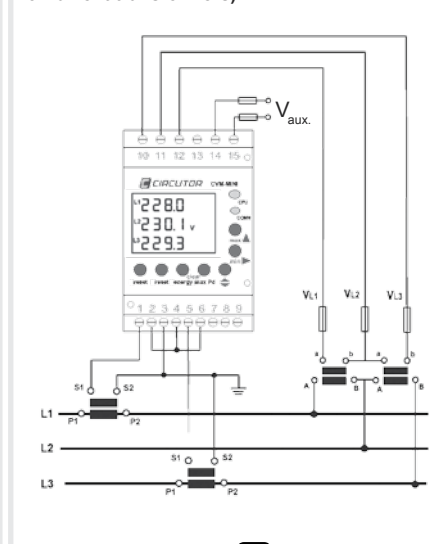
### CVM MINI, 3 or 4 wires (low voltage)



### CVM MINI, 3 wires (2 Voltage transformers and 3 Current transformers)



### CVM MINI, 3 wires (2 Voltage transformers and 3 Current transformers)



# CVM NET

Three-phase power analyzer



## Description

**CVM NET** is a Power Analyzer for measuring balanced and unbalanced three-phase networks specifically designed for measuring up to 230 electrical parameters and transmission of this data through RS-485 communication bus with Modbus/RTU protocol to supervision SCADA.

Its main features are:

- DIN rail format of just 3 modules
- 72 x 72 mm panel assembly, with front panel adapter
- Current reading using external transformers ... / 5\*
- Possibility of measuring medium and low voltage systems
- Communication RS-485 (Modbus RTU)
- Compatible with PowerStudio / PSS / PSSDeluxe software
- 2 programmable digital outputs
- Universal power supply:

\*... / 250 mA in **MC** model

## Application

- Application for the control of switchboards and low and medium voltage connection points, where an analyzer must be installed on the DIN rail due to space restrictions.
- Control of instantaneous, maximum and minimum values of the electrical parameters metered.

## Features

<b>Power circuit</b>	
Nominal voltage	230 V <sub>AC</sub>
Power supply frequency	50 - 60 Hz
Maximum power consumption	3.0 V·A
<b>Measurement circuit</b>	
Nominal voltage	300 V <sub>AC</sub> / 520 V <sub>AC</sub>
Frequency	45 - 65 Hz
Nominal current	I <sub>n</sub> / 5 A or / 250 mA
Overload (permanent)	
<b>Communications</b>	
Network protocol	RS-485 (A / B / C)
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 voltage of operation	24 V <sub>DC</sub>
Maximum current of operation	50 mA
Maximum frequency	5 imp/s
Impulse duration	100 ms
<b>Build features</b>	
Metering module	Assembly on <b>DIN rail 46277 (EN 50022)</b>
Number of modules	3
<b>Environmental conditions</b>	
Operating temperature	-10 – +50°C
Protection degree	IP
Humidity (without condensation)	5 – 95% (without condensation)
Maximum altitude	2000 m
<b>Safety</b>	
Type of insulation	<b>EN 61010</b> double-insulated electric shock protection class II
<b>Standards</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, EN 61000-4-11, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 55011, CE	

# CVM NET

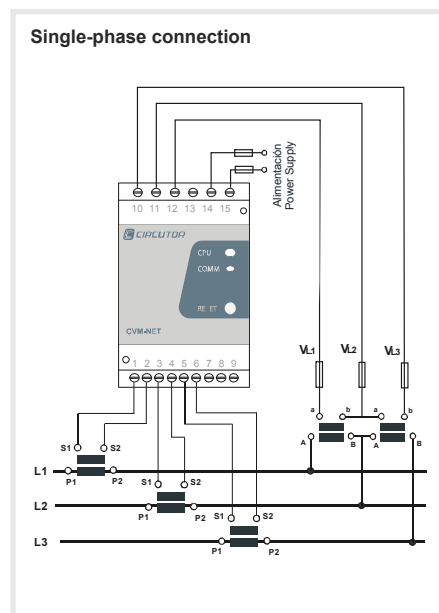
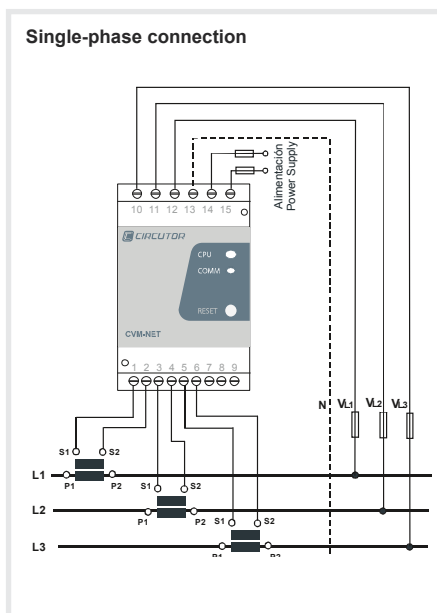
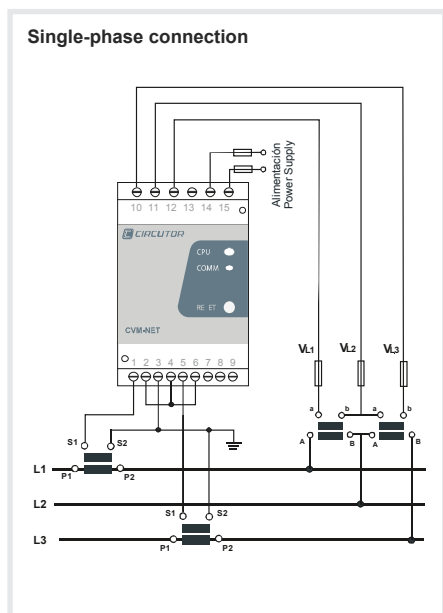
Three-phase power analyzer



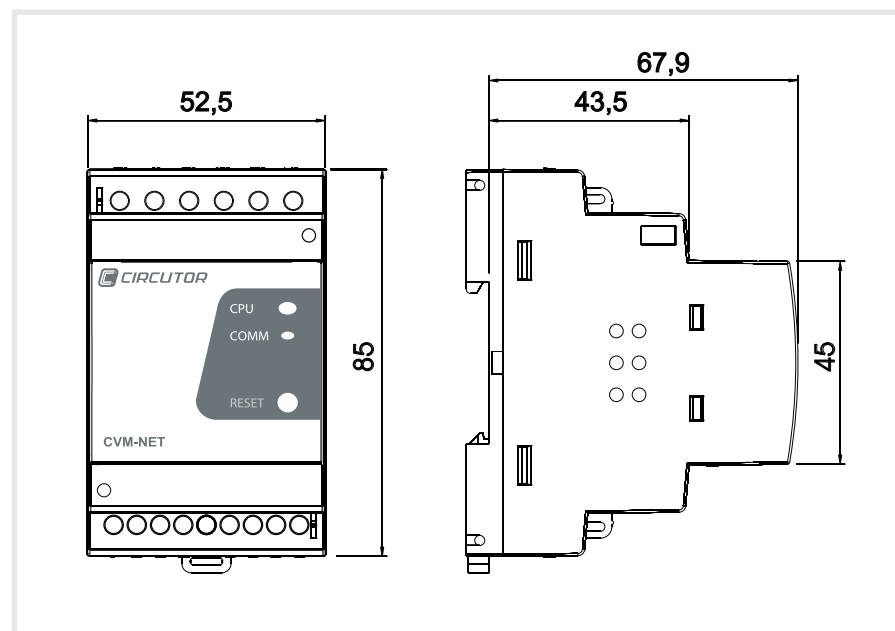
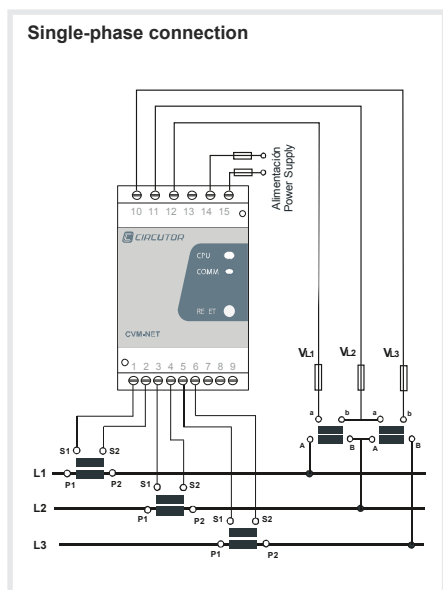
## References

Quadrants	Communications Protocol MODBUS / RTU	Digital output	Measurement	Transformer type	Type	Code
4	RS-485	2	3 Phases	/ 5 A	CVM NET-ITF-RS485-C2	M54B21
4	RS-485	2	3 Phases	/ 250 mA (type MC)	CVM NET-ITF-MC-RS485-C2	M54B31

## Connections \*



## Dimensions



\* To see more connections, see CVM-MINI

# CVM-NET-4

Three-phase power analyzer



## Description

**CVM-NET4-MC** is a Power Analyzer used to measure balanced and unbalanced three-phase networks; specifically designed to take measurements from 4 different points of the installation. It has a single three-phase voltage input, with 4 three-phase channels for current signal inputs coming from the efficient **CIRCUTOR MC** transformers (see **M7** catalogue). The data acquired by the analyzer is transmitted via the RS-485 communications bus with the Modbus/RTU protocol to the supervision SCADA.

The main features are as follows:

- DIN rail format with only 6 modules
- Reads 4 current channels via efficient **MC**-series transformers (./250mA)
- RS-485 Communications (Modbus RTU)
- 4 Programmable digital outputs
- Compatible with **PowerStudio** / **PowerStudio SCADA** / **PowerStudio SCADA Deluxe** software.

## Application

- Can take measurements from 4 points of the installation at the same time. Ideal for assembling on electrical control panels (compact size)
- Control of active and reactive energy via impulses.
- Ideal **EDS** accessory (see **M6**). This equipment measures the main parameters and the **EDS** manages them.

## Features

Power circuit	
Nominal voltage	85...365 V <sub>a.c.</sub> / 95...300 V <sub>d.c.</sub>
Power supply frequency	50-60 Hz (AC mode)
Maximum power consumption	6,0 V·A
Measurement circuit	
Nominal voltage	300 V <sub>c.a.</sub> / 520 V <sub>a.c.</sub>
Frequency	45 ~ 65 Hz
Nominal current	I <sub>n</sub> / 250 mA
Overload (permanent)	1,3 I <sub>n</sub>
Communications	
Network protocol	RS-485 (A / B / S)
Communications protocol	Modbus / RTU
Speed	9600 / 19200 / 38400 / 57600 bps
Length	8
Parity	No parity / even / odd
Bits of parity	1 / 2
Output transistors	
Type: Isolated transistor	Open NPN collector
Maximum voltage of operation	24 V <sub>c.c.</sub>
Maximum current of operation	50 mA
Maximum frequency	5 imp/s
Impulse duration	100 ms
Build features	
Measure of module	Assembly on DIN rail 46277 (EN 50022)
Number of modules	6
Environmental conditions	
Operating temperature	-10 ... +50 °C
Protection degree	IP 51
Humidity (without condensation)	5 ... 95% (without condensation)
Maximum altitude	3000 m
Safety	
Type of insulation	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, EN 61000-4-11, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN-61000-4-5, EN 55011, CE	



# CVM NET-4

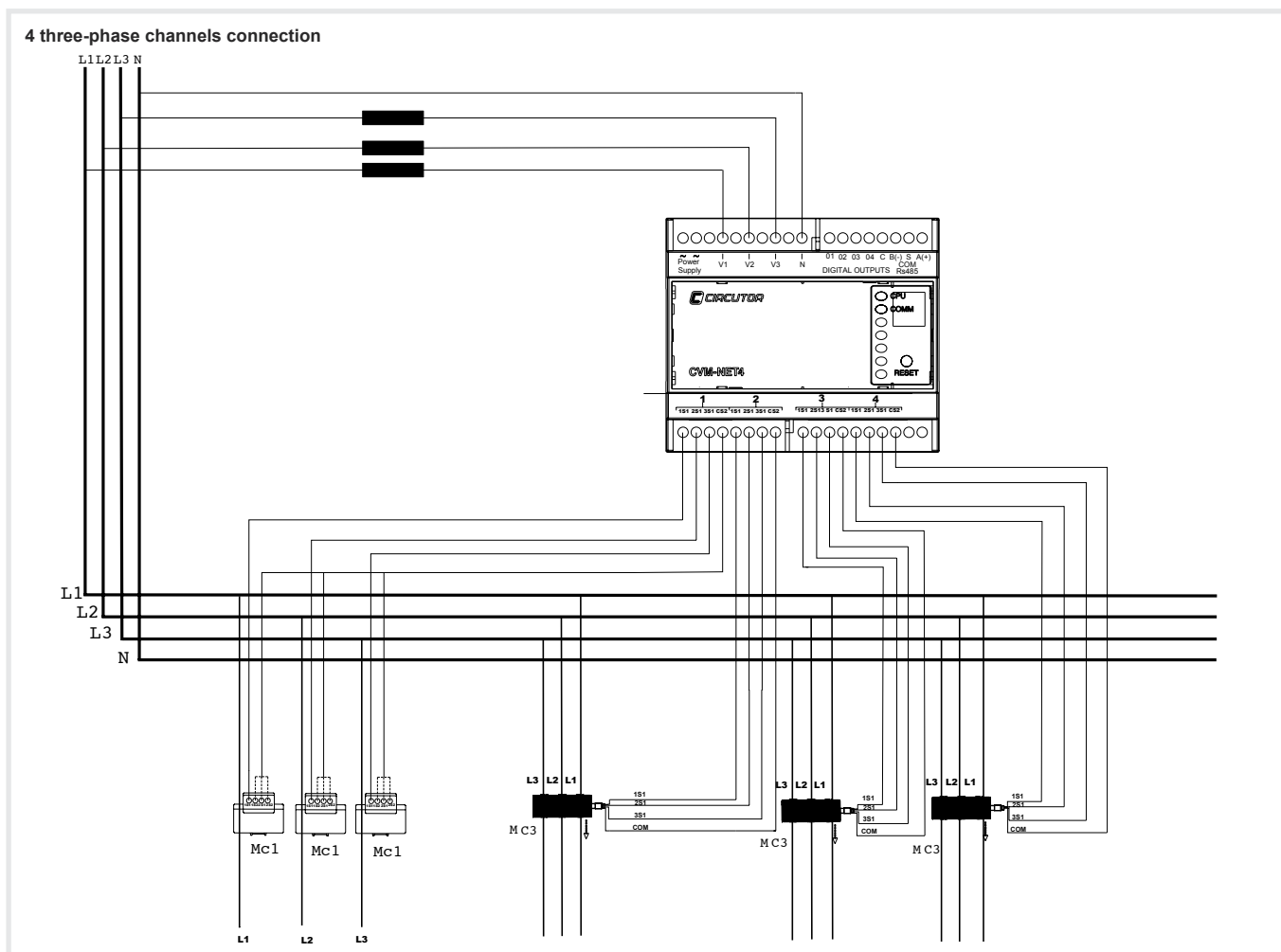
Three-phase power analyzer



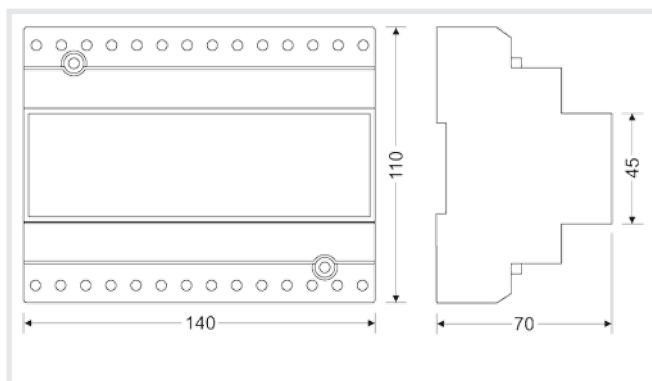
## References

Quadrants	Communications Protocol MODBUS / RTU	Digital output	Measurement	Transformer type	Type	Code
4	RS-485	4	4 three-phase channels	./ 250 mA (type MC)	CVM-NET4-MC-RS485-C4 M	M55732

## Connections



## Dimensions



# CVM-1D

Single-phase power analyzer



## Description

**CVM-1D** is a power analyzer for single-phase circuits up to 32 A. It has 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), and the size of the analyzer allows it to be installed in any electrical panel. The unit has the Modbus/RTU (RS-485) protocol and is compatible with the energy management software **PowerStudio**.

Other features:

- Six-digit LCD Display
- RS-485 Modbus/RTU interface
- Programmable impulse output and alarm
- Metering in four quadrants

## Application

Application in:

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

## Features

<b>Power circuit</b>	
Single-phase power supply	230 V <sub>AC</sub> ±20%
Power supply frequency	50 / 60 Hz
Power supply use	1.5 VA
<b>Measurement circuit</b>	
Phase – Neutral nominal voltage	184 V <sub>AC</sub> to 276 V <sub>AC</sub>
Frequency	50 / 60 Hz
Nominal current	32 A
Minimum current	250 mA
Maximum current	32 A
<b>Output transistor features</b>	
Type	Optoinsulated transistor (commutator open) NPN
Maximum voltage of operation	35 V <sub>DC</sub>
Maximum current of operation	50 mA
Maximum frequency	5 impulses / s
Impulse duration	100 ms (configurable)
Insulation	3.7 kV <sub>RMS</sub> / 1 min
<b>Communications</b>	
Port	RS-485
Protocol	Modbus / RTU
<b>Build features</b>	
Measuring module	Assembly on <b>DIN rail 46277 (EN 50022)</b>
Number of modules	1
<b>Environmental conditions</b>	
Operating temperature	-10 – +50 °C
Protection degree	IP 31
Humidity (without condensation)	5% - 95%
Maximum altitude	2000 m
<b>Safety</b>	
Type of insulation	<b>EN 61010</b> double-insulated electric shock protection class II
<b>Standards</b>	
IEC 664, VDE 0110, UL94-V0, EC 801, IEC 348, IEC 571-1, Class B	
EN 50470-3 in Active Energy, Class 2 EN 62053-23 in Reactive Energy,	
EN 50470-1, EN 61010, EN 61000-4-3, EN 61000-4-4, EN 61000-6-4, EN 55022	

## CVM-1D

Single-phase power analyzer

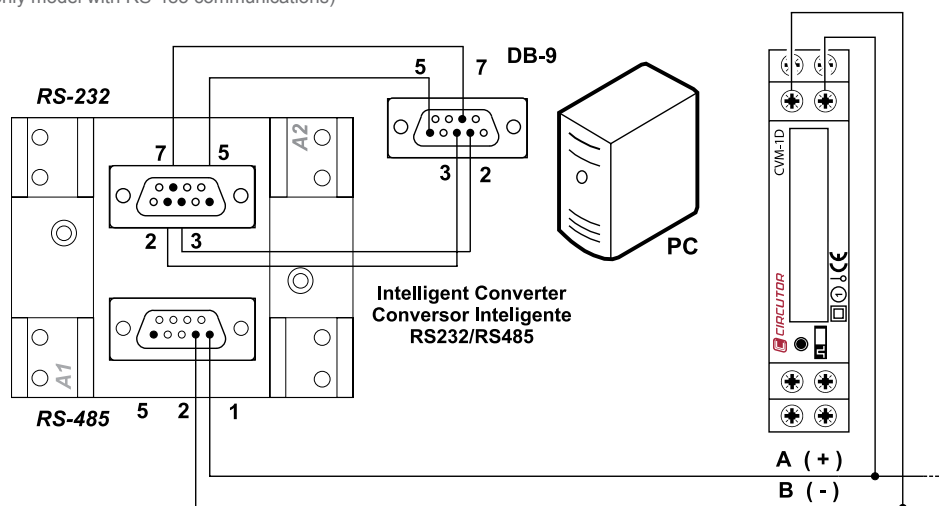


### References

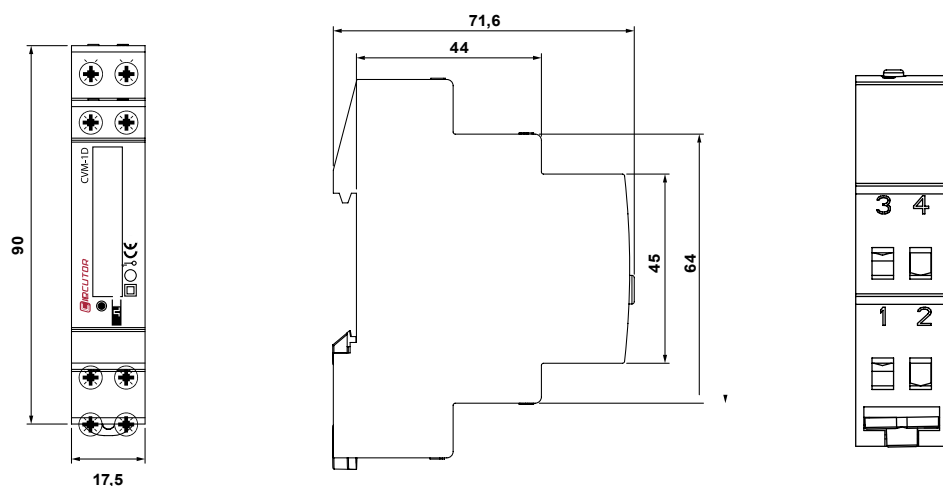
Quadrants	Communications Protocol MODBUS / RTU	Impulse output	Measurement	Type	Code
4	-	Yes	Single-phase	CVM-1D-C	M55510
4	RS-485	Yes	Phase 1	CVM-1D-RS-485-C	M55511

### Connections

RS-485 connection communication through Intelligent Converter RS-232 / RS-485  
(only model with RS-485 communications)



### Dimensions



# CVM 96

Three-phase power analyzer(balanced and unbalanced) for panel mounting



## Description

Three-phase power analyzer(balanced and unbalanced) for its assembly on 96 x 96 mm panels, measuring in 2 quadrants.

Other features include:

- Current measuring .../5 ó .../ 1 A
- Communication protocol: Modbus RTU, Modbus TCP, Johnson Controls, MetasysN2
- Connections: RS-232, RS-485, Ethernet
- 2 relay outputs
- ITF Technology: galvanic insulation protection inputs, depending on the type
- Maximeter function (A / A III / kW III / kV·A III)
- Default page selection
- Metering ranges: 110, 520, 866 V·f·f
- Detection of incorrect connections

## Application

- Applied to the control of switchboards and low and medium voltage connection points.
- Control of alarms; the variable controlled, maximum and minimum values and delay variables are fully programmable.
- Control of instantaneous values and storage of maximum and minimum values of the electrical parameters metered.

## Features

<b>Power supply circuit</b>	230 Vac (-15...+10%). For other values, see the coding table
Consumption	5 V·A
Frequency	45...0.65 Hz
<b>Metering circuit</b>	
Nominal voltage	300 Vac (ph-n) / 520 Vac (ph-ph)
Frequency	45...65 Hz
Current consumption of the circuit	0.75 V·A
Nominal current	... / 5 A
Overload (permanent)	1.2 I <sub>n</sub>
<b>Class/Accuracy</b>	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power ratings	1 % ± 2 digits
<b>Type of output</b>	Relay
Maximum switching voltage	250 Vac
Maximum switching current	3 A
Mechanical working life	3 x 10 <sup>7</sup> operations
Maximum impulse frequency	1 impulse / s
<b>Ambient conditions</b>	
Operating temperature	-10 ... +50 °C
Relative humidity (non-condensing)	5 ... 95%
<b>Build features</b>	
Type of box	VO self-extinguishing plastic
Degree of protection	Fitted unit (frontal): IP 54 Non-fitted unit (sides and rear cover): IP 31
Dimensions	96 x 96 x 78 mm
Weight	520 g.
<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>	
	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 96

Three-phase power analyzer(balanced and unbalanced)  
for panel mounting



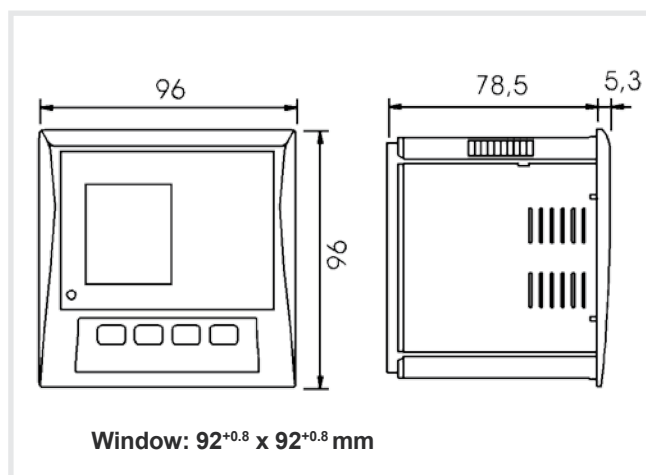
#### References

Quadrants	Class (V,A)	Communications	Protocol	Relay output	Harmonics	Current neutral	Type	Code
2	0,5	-	-	-	-	-	CVM 96	M51100
2	0,5	-	-	-	-	-	CVM 96-ITF	M51200
2	0,5	RS-485	Modbus / RTU	2	-	-	CVM 96-ITF-RS485-C2	M51211
2	0,5	Ethernet	Modbus / TCP	2	-	-	CVM 96-ITF-Ethernet-C2	M51231
2	0,5	RS-485	Johnson Controls	2	-	-	CVM 96-ITF-Johnson-C2	M51711
2	0,5	RS-485	Modbus / RTU	2	U e I (31°)	Yes	CVM 96-F- ITF-RS485-C2-HAR-IN	M51513

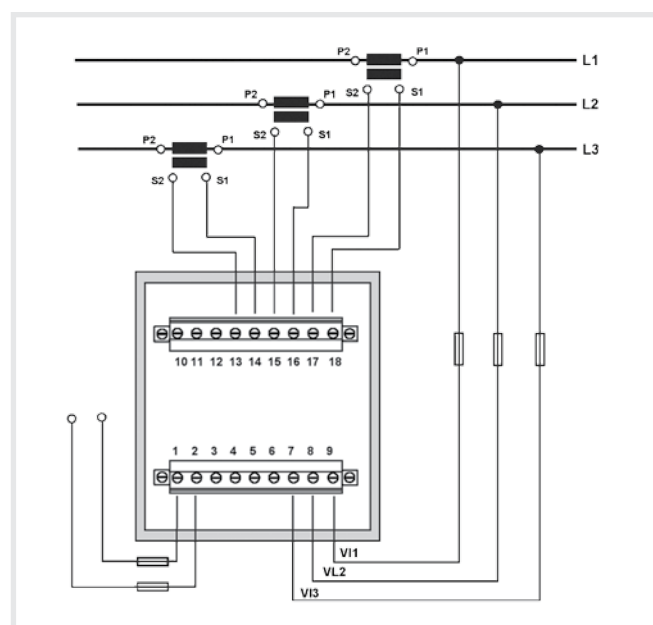
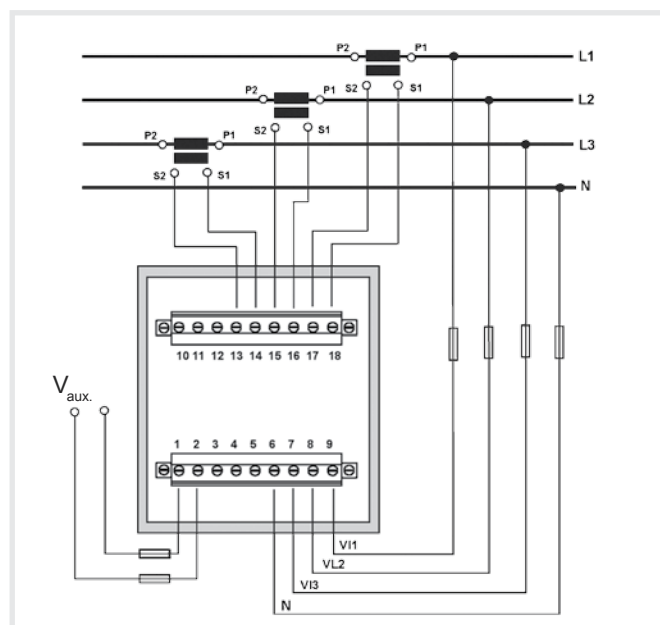
#### Coding table

M	5	X	X	X	X	0	0	X	X	X
Code						Internal Code				
Power Supply Voltage (PSV)	Standard (230 V ac)					0				
	110 V ac					1				
	400 V ac					3				
	480 V ac					4				
	24...0.120 V dc					5				
Voltage metered (VM)	Standard (300 V <sub>ph-n</sub> / 520 V <sub>ph-ph</sub> )					0				
	63.5 V <sub>ph-n</sub> / 110 V <sub>ph-ph</sub>					1				
	500 V <sub>ph-n</sub> / 866 V <sub>ph-ph</sub>					3				
Current input (CI)	Standard (.../ 5 A)					0				
	.../ 1 A (Only ITF)					1				

#### Dimensions



#### Connections



See the user manual for other types of connections



# CVM 144

Three-phase power analyzer(balanced and unbalanced) for panel mounting



## Description

Three-phase power analyzer(balanced and unbalanced) for its assembly on 144 x 144 mm panels, measuring in 2 quadrants.

Other features include:

- Current measuring .../5 A
- Communication protocol: Modbus RTU, Modbus TCP, Johnson Controls
- Connections: RS-232, RS-485, Ethernet.
- Expandable input/output modules
- ITF Technology: galvanic insulation protection inputs inputs, depending on the type.
- Maximeter function (A / A III / kW III / kV·A III).
- Default page selection
- Varied measuring ranges (110, 520, 866 V ph-ph)
- Incorrect connection detection (LED flashing).

## Application

- Applied to the control of switchboards and low and medium voltage connection points
- Alarm station, fully programmable variables controlled, maximum value, minimum value and delay
- Control of instantaneous values, maximum and minimum values of the electrical parameters metered
- Multiple-converter function with its analogue outputs 0/4..20 mA
- Leakage current and neutral metering function

## Features

<b>Power supply circuit</b>		230 Vac (-15...+10%). For other values, see the coding table
Consumption		5 V·A
Frequency		45..0.65 Hz
<b>Metering circuit</b>		
Nominal voltage		300 Vac (ph-n) / 520 Vac (ph-ph)
Frequency		45..0.65 Hz
Current consumption of the circuit		0.75 V·A
Nominal current		... / 5 A
Overload (permanent)		1.2 I <sub>n</sub>
<b>Class/Accuracy</b>		
Voltage		0.5 % ± 2 digits
Current		0.5 % ± 2 digits
Power ratings		1 % ± 2 digits
<b>Type of output</b>		Relay
Maximum switching voltage		250 Vac
Maximum switching voltage		750 V·A
Maximum switching current		3 A
Mechanical working life		3 x 10 <sup>7</sup> operations
Maximum impulse frequency		1 impulse / s
<b>Ambient conditions</b>		
Operating temperature		-10 ... +50 °C
Relative humidity (non-condensing)		5 ... 95%
<b>Build features</b>		
Type of box		VO self-extinguishing plastic
Degree of protection	Fitted unit (frontal)	IP 54
	Non-fitted unit (sides and rear cover)	IP 31
Dimensions		144 x 144 x 76 mm
Weight		400 g
<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 664, VDE 0110, UL 94, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1		

# CVM 144

Three-phase power analyzer  
(balanced and unbalanced) for panel mounting



## References

Quadrants	Class (V,A)	Communications	Protocol	Digital outputs	Analogue outputs	Digital inputs	Analogue inputs	Harmonics	Current leakages / neutral	Type	Code
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### EXPANDABLE EQUIPMENT

2	0,5	-	-	-	-	-	-	-	-	CVM 144	M50600
2	0,5	-	-	-	-	-	-	-	-	CVM 144-ITF	M50700
2	0,5	-	-	-	-	-	-	U/I (31°)	-	CVM 144-ITF-HAR	M50A60
2	0,5	Ethernet	Modbus / TCP	-	-	-	-	-	-	CVM 144-ITF-Ethernet-TCP	M50790
2	0,5	RS-485	Profibus DP	-	-	-	-	-	-	CVM 144-ITF-Profibus	M50730
2	0,5	RS-485	Johnson Controls	-	-	-	-	-	-	CVM 144-ITF-Johnson Controls	M50C10

### EXCHANGEABLE MODULES (for expandable equipment)

-	-	-	-	2	-	-	-	-	Yes	CVM 144-C2-Currents Module	M51001
-	-	RS-485	Modbus / RTU	2	-	-	-	-	-	CVM 144-RS485-C2 Module	M51010
-	-	RS-485	Modbus / RTU	2	-	-	-	-	Yes	CVM 144-RS485-C2-Currents Module	M51011
-	-	RS-485	Modbus / RTU	2	-	4	-	-	-	CVM 144-RS485-C2-Digital Module	M51016
-	-	RS-232	Modbus / RTU	2	-	-	-	-	-	CVM 144-RS232-C2 Module	M51020

### COMPLETE EQUIPMENT

2	0,5	RS-485	Modbus / RTU	2	-	-	-	-	-	CVM 144-ITF-RS485-C2	M50710
2	0,5	RS-485	Modbus / RTU	2	4	-	-	-	-	CVM 144-ITF-RS485-C2-A40	M50A14
2	0,5	RS-485	Modbus / RTU	2	2	-	2	-	-	CVM 144-ITF-RS485-C2-A2I/2O	M50A18
2	0,5	Ethernet	Modbus / TCP	2	2	-	2	-	-	CVM 144-ITF-Ethernet-C2-A2I/2O-TCP	M50A98
2	0,5	Ethernet	Modbus / TCP	2	-	-	-	-	Yes	CVM 144-ITF-Ethernet-C2-currents-TCP	M50791
2	0,5	RS-485	Profibus DP	2	2	-	2	-	-	CVM 144-ITF-Profibus-C2-A2I/2O	M50A38
2	0,5	RS-485	Profibus DP	2	-	-	-	-	Yes	CVM 144-ITF-Profibus-C2-Currents	M50741
2	0,5	RS-485	Johnson Controls	2	-	-	-	-	Yes	CVM 144-ITF-Johnson Controls-C2-currents	M50C11

## CVM 144

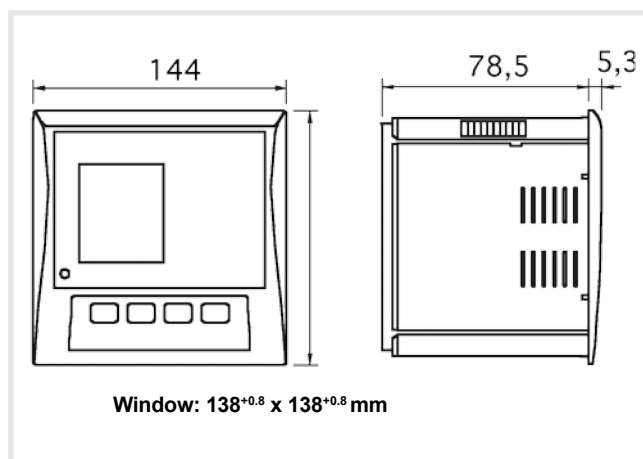
Three-phase power analyzer  
(balanced and unbalanced) for panel mounting



### Coding table

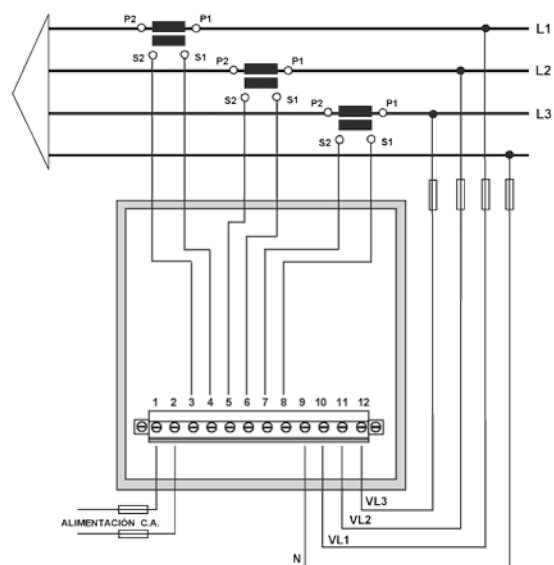
M	5	X	X	X	X	0	0	X	X	X
Code						Internal Code				
Power Supply Voltage (PSV)	Standard (230 V ac)					0				
	110 V ac					1				
	400 V ac					3				
	480 V ac					4				
	24...0.120 V dc					5				
Voltage metered (VM)	Standard (300 V <sub>ph-n</sub> / 520 V <sub>ph-ph</sub> )					0				
	63.5 V <sub>ph-n</sub> / 110 V <sub>ph-ph</sub>					1				
	500 V <sub>ph-n</sub> / 866 V <sub>ph-ph</sub>					3				
Current input (CI)	Standard (.../ 5 A)								0	
	.../ 1 A (Only ITF)									1

### Dimensions



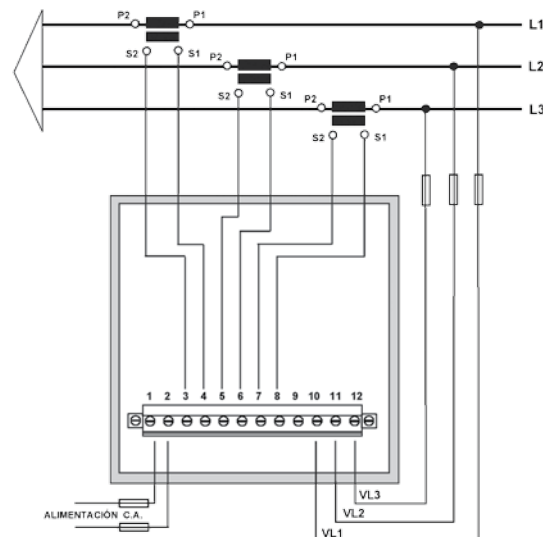
### Connections

CVM 144



Three-phase networks - 4 wires (low voltage)

CVM 144



Three-phase networks - 3 wires (low voltage)

See the user manual for other types of connections

# CVM BD

Three-phase power analyzer(balanced and unbalanced) for DIN rail mounting



## Description

Three-phase power analyzer (balanced and unbalanced) assembled on DIN rail, measuring in 4 quadrants (consumption and generation).

Other features include:

- Current measuring .../5 or .../1 A
- Measuring of active (kW·h) and reactive (kvarh) energy consumed and generated, both capacitive and inductive. (4 quadrants)
- 8 module DIN Rail format
- Adjustable dual kW/MW scale
- Modbus -RTU Communications protocol
- Optional second RS-485 port to connect I/O peripherals, depending on the type.
- ITF Technology: galvanic insulation protection inputs, depending on the type
- Selection of the parameters displayed
- Selection of the default page
- Internal clock used to program and classify the three hourly rates

## Application

- Application for the control of switchboards and low and medium voltage connection points, where an analyzer must be installed on the DIN rail
- Control of instantaneous, maximum and minimum values of the electrical parameters metered
- Alarm station of alarms with analogue signal
- Rate establishing control for up to three different rates

## Features

<b>Power supply circuit</b>	230 Vac (-15...+10%) For other values, see the coding table
Consumption	6 V·A
Frequency	45..0.65 Hz
<b>Metering circuit</b>	
Nominal voltage	500 Vac (ph-n) / 866 Vac (ph-ph)
Frequency	40..0.65 Hz
Current consumption of the circuit	0.6 V·A
Nominal current	... / 5 A
Overload (permanent)	1.2 $I_n$
<b>Class/Accuracy</b>	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power rating	1 % ± 2 digits
<b>Ambient conditions</b>	
Operating temperature	-10 ... +50 °C
Relative humidity (non-condensing)	5 ... 95%
<b>Build features</b>	
Type of box	VO self-extinguishing plastic
Degree of protection	Embedded equipment: IP 41 Terminals: IP 20
Dimensions	140 x 110 x 70 mm (3 modules)
Weight	520 g
<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>	
	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 BD

Three-phase power analyzer  
(balanced and unbalanced) for DIN rail mounting



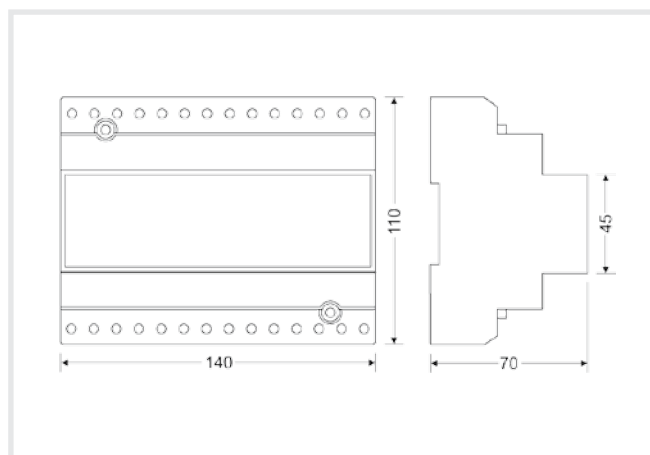
### References

Quadrants	Class (V/A)	Clock	THD/D (V/A)	Maximum demand	MODBUS / RTU Communications	RED Communications	Relay output	Output 4...20 mA	Type	Code
4	0,5	Yes	Yes	Yes	RS-485	RS-485	-	-	CVM-BD-RED-H	M52110
4	0,5	Yes	Yes	Yes	RS-485	RS-485	2	-	CVM-BD-RED-C2-H	M52111
4	0,5	Yes	Yes	Yes	-	-	-	8	CVM-BD-420-8-H	M52105
4	0,5	Yes	Yes	Yes	RS-485	RS-485	1	1	CVM-BD-RED-C420-H	M52122
4	0,5	Yes	Yes	Yes	RS-485	RS-485	-	2	CVM-BD-RED-420-H	M52123

### Coding table

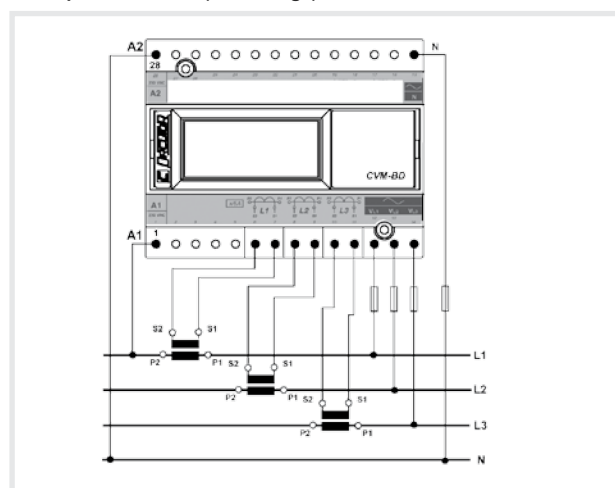
M	5	X	X	X	X	0	0	X	X	X	X	X
Code							Internal Code					
Power Supply Voltage (PSV)	Standard (230 Vac)						0					
	110 Vac						1					
	24...0.120 Vdc						5					
Voltage metered (VM)	Standard (300 V <sub>ph-n</sub> /520 V <sub>ph-ph</sub> )						0					
	110 V <sub>ph-n</sub> / 190 V <sub>ph-ph</sub>						1					
	500 V <sub>ph-n</sub> / 866 V <sub>ph-ph</sub>						3					
Current input (CI)	Standard (.../ 5 A)						0					
	.../ 1 A (Only ITF)						1					
Other (only CVM-BD-RED/ BDM)	Standard							0	0			
	RS-232 Communications							0	1			

### Dimensions

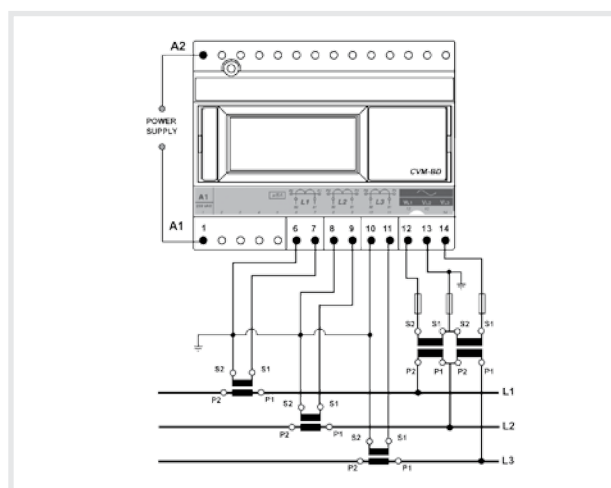


### Connections

#### Three-phase network (low voltage)



#### 3 current transformers + 2 voltage transformers



See the user manual for other types of connections

# CVM BDM

Three-phase power analyzer(balanced and unbalanced) for DIN rail mounting, with internal 1 MB memory



## Description

Three-phase power analyzer(balanced and unbalanced) for its assembly on DIN rails, with internal 1 MB memory, measuring in 4 quadrants.

Other features include:

- Current measuring .../5 A
- Measuring of active (kW·h) and reactive (kvarh) energy consumed and generated, both capacitive and inductive. (4 quadrants)
- 8 module DIN rail format
- Adjustable dual kW/MW scale
- Calculates the flicker per phase
- RS-485 communications with Modbus RTU and Zmodem protocol to download files
- Optional second RS-485 port to connect I/O peripherals
- ITF Technology: galvanic insulation protection inputs, depending on the type
- Default page selection
- Optional use of rates with RED or RED-MAX modules

## Application

- Application for the control of switchboards and low and medium voltage connection points, where an analyzer must be installed on the DIN rail
- Control of instantaneous, maximum and minimum values of the electrical parameters metered
- Applications where the analyzer's memory must store the electrical parameters measured.

## Features

<b>Power supply circuit</b>		230 V ac (-15...+10%). For other values, see the coding table
Consumption		6 V·A
Frequency		45..0.65 Hz
<b>Metering circuit</b>		
Nominal voltage		500 V ac (ph-n) / 866 V ac (ph-ph)
Frequency		40...65 Hz
Current consumption of the circuit		0.6 V·A
Nominal current		... / 5 A
Overload (permanent)		1.2 I <sub>n</sub>
<b>Class/Accuracy</b>		
Voltage		0.5 % ± 2 digits
Current		0.5 % ± 2 digits
Power rating		1 % ± 2 digits
<b>Internal memory</b>		1 MB
<b>Ambient conditions</b>		
Operating temperature		-10 ... +50 °C
Relative humidity (non-condensing)		5 ... 95%
<b>Build features</b>		
Type of box		VO self-extinguishing plastic
Degree of protection		Embedded equipment: IP 41 Terminals: IP 20
Dimensions		140 x 110 x 70 mm (3 modules)
Weight		520 g
<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>		
		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 BDM

Three-phase power analyzer  
(balanced and unbalanced) for its assembly on DIN rails,  
with internal 1 MB memory



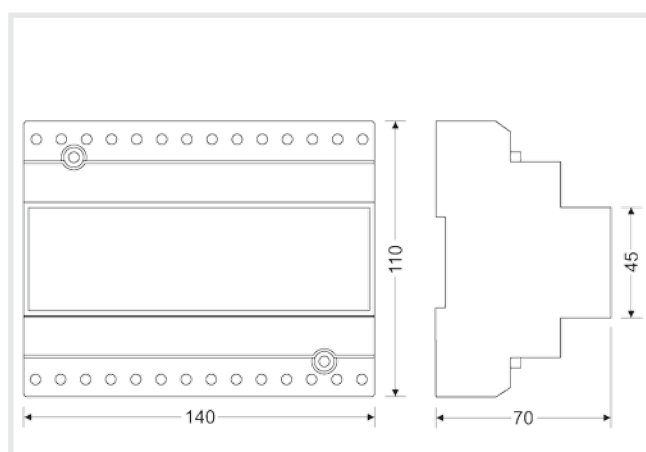
### References

Quadrants	Class (V/A)	Clock	THD/D (V/A)	Maximum demand	Flicker meter	Harmonics meter	MODBUS / RTU Communications	Internal memory	Relay output	Output 4...20 mA	Type	Code
4	0,5	Yes	Yes	Yes	Yes	Yes	RS-485	1 MB	-	-	CVM-BDM	M52210
4	0,5	Yes	Yes	Yes	Yes	Yes	RS-485	1 MB	2	-	CVM-BDM-C2	M52211
4	0,5	Yes	Yes	Yes	Yes	Yes	-	1 MB	1	1	CVM-BDM-C420	M52212
4	0,5	Yes	Yes	Yes	Yes	Yes	RS-485	1 MB	-	2	CVM-BDM-420	M52213

### Coding table

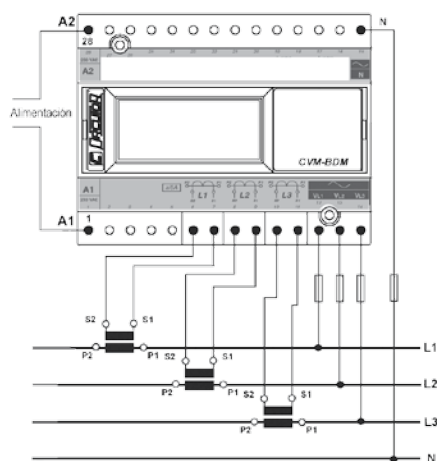
M	5	X	X	X	X	0	0	X	X	X	X	X
Code	Internal Code						↑	↑	↑	↑	↑	↑
Power Supply Voltage (PSV)	Standard (230 V ac)						0					
	110 V ac						1					
	24..0.120 V dc						5					
Voltage measurement (VM)	Standard (300 V <sub>ph-n</sub> /520 V <sub>ph-ph</sub> )						0					
	110 V <sub>ph-n</sub> / 190 V <sub>ph-ph</sub>						1					
	500 V <sub>ph-n</sub> / 866 V <sub>ph-ph</sub>						3					
Current input (CI)	Standard (.../ 5 A)						0					
	.../ 1 A (Only ITF)						1					
Other (only CVM-BD-RED/ BDM)	Standard							0	0			
	RS-232 Communications							0	1			

### Dimensions

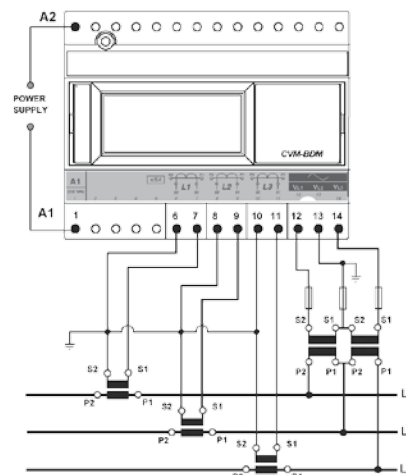


### Connections

#### Three-phase network (low voltage)

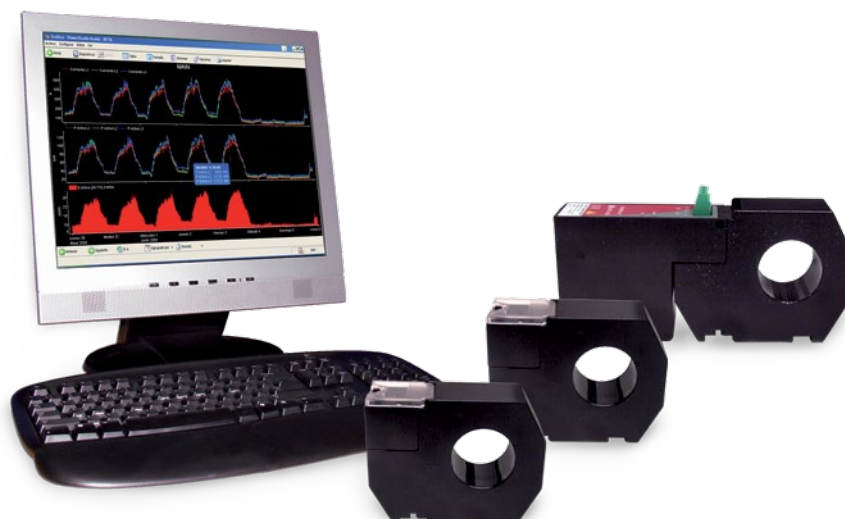


#### 3 current transformers + 2 voltage transformers



# Power Net

Three-phase power analyzer



## Description

- Direct Current measuring, up to 1,000 Aac, depending on the type
- The measure points are composed of a PowerNet and 2 TC-PowerNet

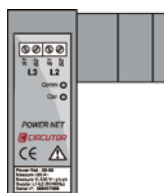
## Application

- Control application in distribution panels and low and medium voltage connections, with the need to measure various points with compact units, with no need to install them on DIN rail or panel
- Control of instantaneous, maximum and minimum values of the electrical parameters measured.

PowerNet - 0°



PowerNet - 90°



## Features

<b>Power supply circuit</b>	400 Vac (-15...+10%) between L1-L2
Frequency	50...60 Hz
Consumption	4.2 V·A
<b>Metering circuit</b>	
Nominal voltage	300 Vac (ph-n) / 520 Vac (ph-ph)
Frequency	45...65 Hz
Nominal current	Up to 1,000 Aac, depending on the model
Voltage consumption of the circuit	0.75 V·A
Overload (permanent)	1.2 $I_n$
<b>Class/Accuracy</b>	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power rating	1 % ± 2 digits
<b>Ambient conditions</b>	
Operating temperature	-10 ... +50 °C
Relative humidity	5 ... 95%
<b>Build features</b>	
Type of box	VO self-extinguishing plastic
Degree of protection	IP 54
Dimensions	165 x 73 x 33 mm
Weight	220 g
<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>	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

## References

### PowerNet Units

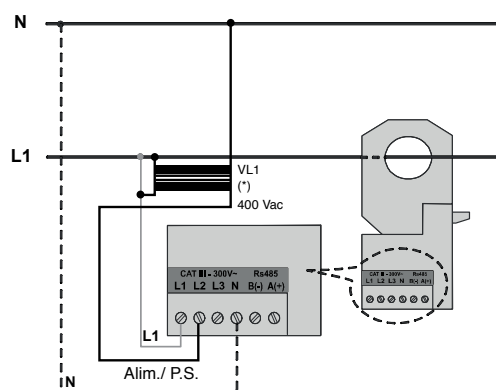
Metering current	Quadrants	Class	Communications	Protocol	Net section (mm)	Analyzer position with its TC	Type	Code
50 A	2	0,5	RS-485	Modbus/RTU	Ø 35 mm	0°	Power Net-35-50	M52621
100 A	2	0,5	RS-485	Modbus/RTU	Ø 35 mm	0°	Power Net-35-100	M52622
250 A	2	0,5	RS-485	Modbus/RTU	Ø 35 mm	0°	Power Net-35-250	M52623
500 A	2	0,5	RS-485	Modbus/RTU	Ø 70 mm	0°	Power Net-70-500	M52624
1000 A	2	0,5	RS-485	Modbus/RTU	Ø 70 mm	0°	Power Net-70-1000	M52625

### TC-PowerNet Units

Metering current	Class	Net section (mm)	Type	Code
50 A	0,5	Ø 35 mm	TC-PowerNet- 35-50	M52631
100 A	0,5	Ø 35 mm	TC-PowerNet- 35-100	M52632
250 A	0,5	Ø 35 mm	TC-PowerNet- 35-250	M52633
500 A	0,5	Ø 70 mm	TC-PowerNet- 70-500	M52634
1000 A	0,5	Ø 70 mm	TC-PowerNet- 70-1000	M52635

## Connections

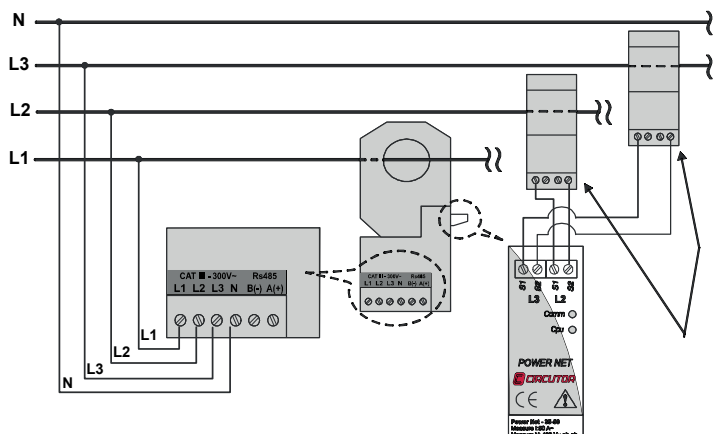
### Single-phase system



(\*) Requires voltage transformer for power supply (L1-L2 to 400 Vac) Not provided

Single-phase connection: 1 power Net

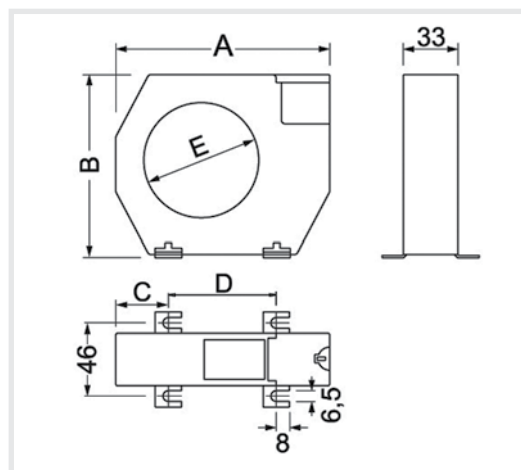
### Unbalanced three-phase system



Unbalanced three-phase connection: 1 Power Net + 2 TC-PowerNet

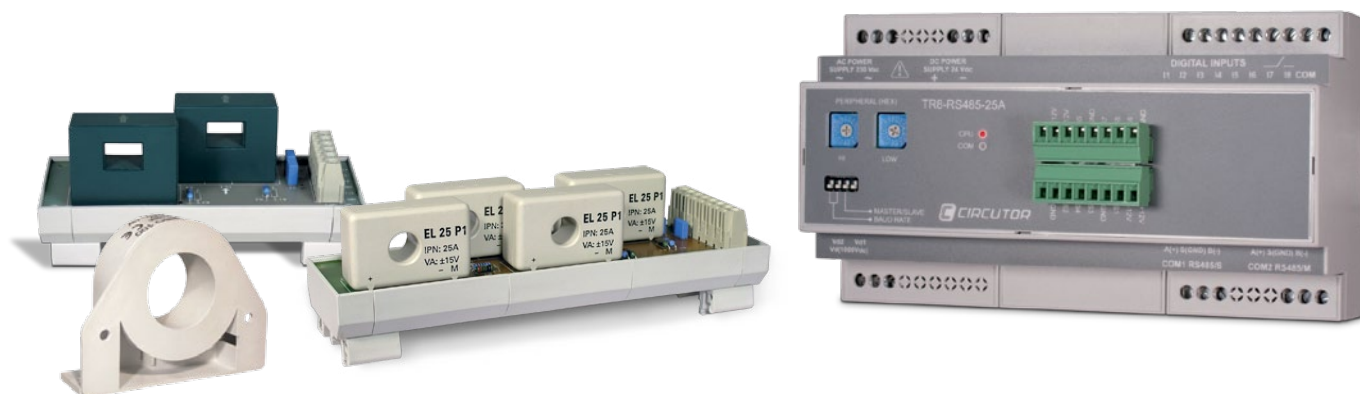
## Dimensions

TC-Power Net	Dimensions (mm)					Weight (kg)
	A	B	C	D	EØ	
WG-35	100	79	26	48,5	35	0,150
WG-70	130	110	32	66	70	0,240



# TR8

Multi-channel DC voltage and current analyzer



## Description

It is extremely difficult to certify that a photovoltaic plant is at its peak performance without having control of the primary power generation sources that would certify it. **TR8** has been specifically designed to control string in photovoltaic plants; it knows the level of current generated in the different groups in real time, and therefore knows the current flowing through the external sensors.

## Application

- Application of photovoltaic string control, up to 8 strings.

## Features

Power supply		Alternating C.	Direct C.
Nominal voltage		230 Vac	24 Vdc =
Power supply tolerance		± 30 %	± 10 %
Frequency		50 Hz	-
Consumption of the equipment without transformers		8 mA / 1.84 V•A	70 mA
Consumption of the equipment with 8 sensors (no load)		32 mA / 7.36 V•A	270 mA
Consumption of the equipment with 8 sensors (with current)		32 mA / 7.36 V•A	270 mA
Operating conditions			
Operating temperature		-35...+65°C	
Relative humidity		5... 95% RH (non-condensing)	
Maximum operating altitude		2,000 metres	
Protection		IP 20	
TR8-RS485 precision			
Linearity Error	± 0.1 %	Offset Error	0.075 % I <sub>n</sub>
Total Error	± 0.5 % I <sub>n</sub>	Range	2,5 .... 100% I <sub>n</sub>
Resolution Error	± 0.075 % I <sub>n</sub>	Voltage Error	1 %
Transformer precision			
Linearity Error (not including offset)	± 0.5%	Offset Drift / Temp.	±1 mV / °C
Offset Error 25°C	±10 mV a I <sub>n</sub> =0	Thermal Gain Drift	±0.05 % / °C
Safety			
Category III – 300 Vac (EN61010)			
Double-insulated electric shock protection class II			

# TR8

Multi-channel DC voltage and current analyzer

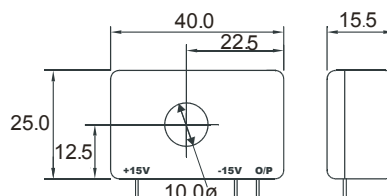
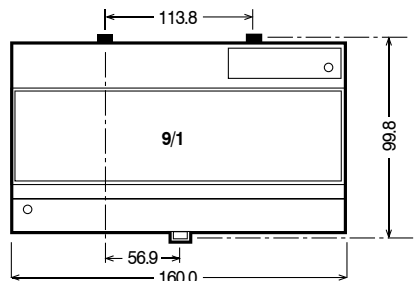


## References

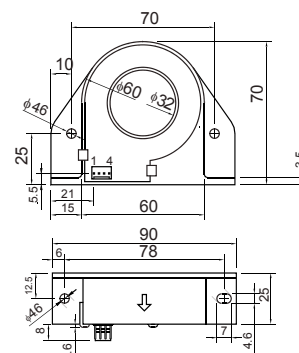
Current	Output	Communications	Description	Type	Code
<b>Equipment, up to 25 A</b>					
25 A	8	RS-485 Modbus/RTU	8 25 A <sub>dc</sub> channels Connection of up to 2 M/TR8-25Ax4 (8 channels) Voltage measurement of 1000 V <sub>dc</sub> 8 voltage-free digital inputs	TR8-RS485-25	M54600
<b>Equipment, up to 100 / 200 A</b>					
Depends on transformer	8	RS-485 Modbus/RTU	8 100 A <sub>dc</sub> channels Connection of up to 8 M/TR8-100A or M/TR8-200A One 1000 V <sub>dc</sub> voltage input 8 voltage-free digital inputs	TR8-RS485-100/200	M54601
<b>Measurement modules</b>					
2 circuits 25 A				M/TR-25A x2	M54606
4 circuits 25 A				M/TR-25A x4	M54602
1 circuit 100 A Ø32 mm				M/TR-100A	M54603
1 circuit 100 A Ø28 mm				M/TR-100A-CC-28Ø	M54604
1 circuit 200 A				M/TR-200A	M54605

## Dimensions

M/TR25x2

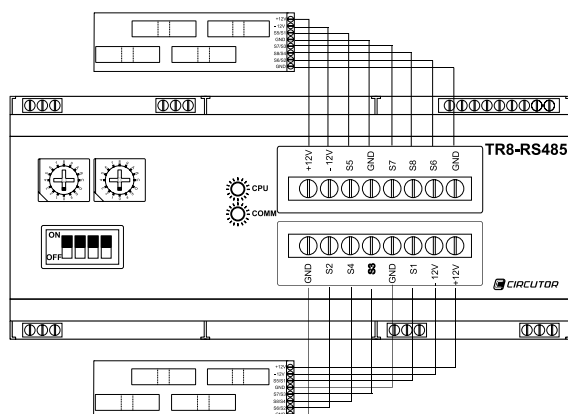


M/TR8-100/200

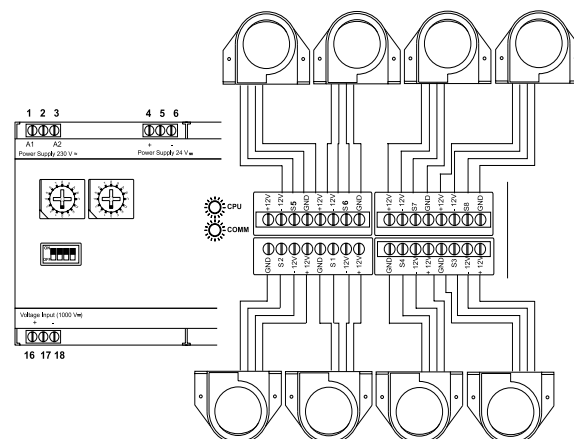


## Connections

TR8-25

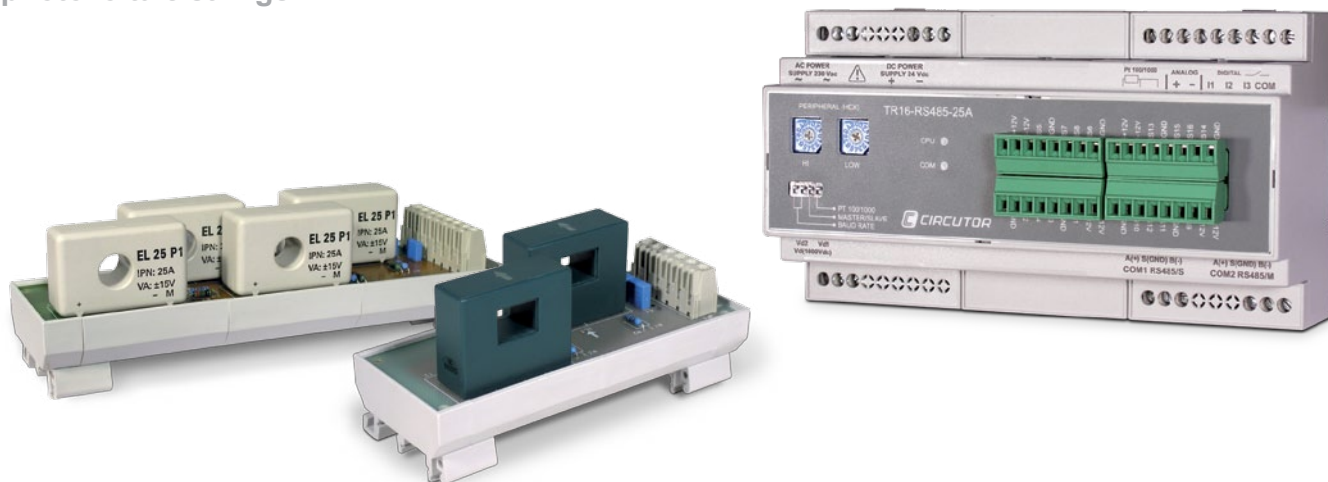


TR8-100/200



# TR16

Multi-channel voltage and DC analyzer for photovoltaic strings



## Description

**TR16-RS485** is an advanced version of the model **TR8** which, besides the main features of current measurement, has other useful features for large-scale photovoltaic installations such as the possibility of atmospheric temperature measurement for each area of the installation.

## Application

- Application of photovoltaic string control, up to 16 strings.

## Características

Alimentación		C.Alterna	C.Continua
Tensión nominal		230 Vc.a.	24 Vcc
Tolerancia de alimentación		± 30 %	± 10 %
Frecuencia		50 Hz	-
Consumo del equipo sin transformadores		8 mA / 1,84 V•A	70 mA
Consumo del equipo con 8 sensores (en vacío)		32 mA / 7,36 V•A	270 mA
Consumo del equipo con 8 sensores (corriente)		32 mA / 7,36 V•A	270 mA
Condiciones de trabajo			
Temperatura de trabajo		-20 ... +50 °C	
Humedad relativa		5 ... 95% (sin condensación)	
Altitud máxima de trabajo		2000 metros	
Protección		IP 20	
Precisión			
Error Linealidad	± 0.1 %	Error Offset	0.075 % I <sub>n</sub>
Error Total	± 0.5 % I <sub>n</sub>	Margen de medida	2,5 .... 100% I <sub>n</sub>
Error Resolución	± 0.075 % I <sub>n</sub>	Error tensión	1 %
Precisión transformadores			
Error Linealidad (excluyendo offset)	± 0.5%	Deriva Offset / Tª	±1 mV / °C
Error Offset 25°C	±10 mV a I <sub>n</sub> =0	Deriva Térmica de la Ganancia	±0.05 % / °C
Seguridad			

Categoría III – 300 Vc.a. (**EN61010**)

Protección al choque eléctrico por doble aislamiento clase II



# TR16

Multi-channel voltage and DC analyzer for photovoltaic strings

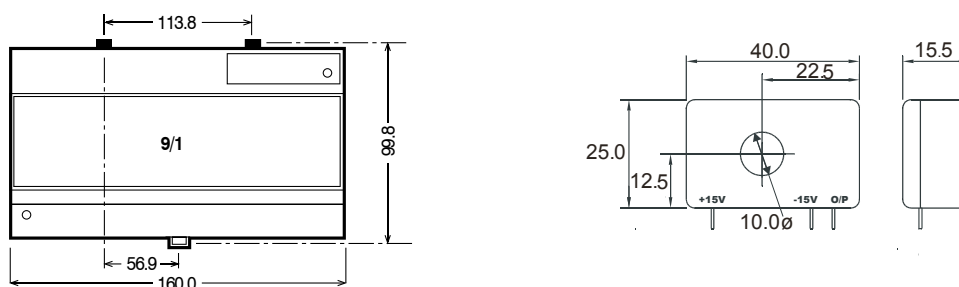


## References

Current	Outputs	Communications	Description	Type	Code
<b>Equipment, up to 25 A</b>					
25 A	16	RS-485 Modbus/RTU	16 channels, 25 A <sub>DC</sub> Connection of up to 2 <b>M/TR-25Ax4</b> (8 channels) 1000 V <sub>AC</sub> voltage meter. Three voltage-free digital inputs 1 voltage input of 1000 V <sub>DC</sub> 1 temperature probe input Pt100 or Pt1000 (selectable) 1 analogue input, type 0 – 20 mA Power supply voltage 230 V <sub>AC</sub> or 24 V <sub>DC</sub>	<b>TR16-RS485-25</b>	<b>M55300</b>
<b>Measurement modules</b>					
2 x 25 A circuits				<b>M/TR-25 x2</b>	<b>M54606</b>
4 circuits 25 A				<b>M/TR-25 x4</b>	<b>M54602</b>

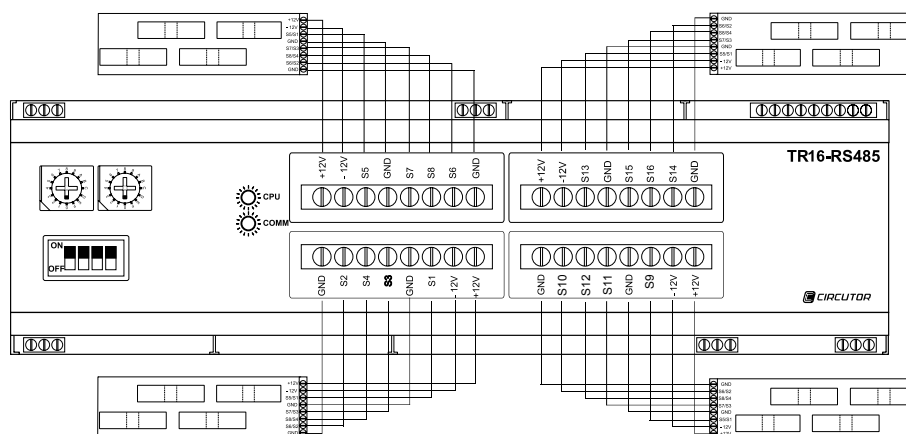
## Dimensions

TR16-25



## Connections

TR16-25



# accessories

## Converter TCP2RS+

Converter of RS-232 / RS-485 to Ethernet Modbus



### Description

**TCP2RS+** is a gateway for the conversion of the Ethernet physical medium to RS232 or RS485, or vice versa. The unit is fitted with a Web Server, from which the user can fully parameterize the device configuration parameters.

### Powerful

**TCP2RS+** is a gateway developed entirely in the **CIRCUTOR** factory, incorporating the latest Ethernet network integration technology with high reliability, stability and robustness of use. TCP2RS+ can work in fixed IP mode, and even in DHCP mode through name identification.

### Versatile

**TCP2RS+** is designed to work in multiple communication modes by simply selecting the desired option through the configuration Web Server. In master-slave function, the unit's Ethernet port can work in UDP or TCP mode to a configurable port, or in Modbus/TCP to port 502. In addition, the unit has routing functions to develop RS232/485 topologies on existing Ethernet infrastructures.

The selection of the network protocol series (RS232 or RS485) and other network parameters is done through the configuration web site.

### Industrial

**TCP2RS+** is the only gateway on the market with multi-range power supply and a DIN-type enclosure with as few as 2 modules. Its switching power supply allows you to power the device from 85 to 290 volts in alternating current, and from 120 to 410 volts in direct current.

- Easy IP programming through the IP setup program (Windows)
- Easy access to the configuration Web Server once its IP is known
- RS232 or RS485 interface can be selected through Internet Explorer
- Multiple communications protocols: UDP, TCP, Modbus/TCP or routing functions
- Ethernet connection RJ45 10/100BaseTX
- Connection of up to 32 units on the bus (RS485)
- Compatible with any application on the market (PowerStudio / PowerStudio SCADA)

### Application

Converting RS-232 or RS-485 signals to Ethernet or viceversa

### Features

Network protocols	TCP / UDP / MODBUS TCP / HTTP
Ethernet	10BaseT / 100BaseTX with autodetect (RJ45)
Serial port	RS485/RS232 three cables (A/B/GND) (RX/TX/GND)
Serial port speed	4800...115,200 bps
Serial port data bits	7 / 8
Serial port stop bits	1 / 2
Serial port parities	even, odd, none
Configuration	HTTP/JSON/DHTML
Firmware	Upgradeable from a web site
Diagnosis LEDs	Power / RX / RT / FULL/HALF (Ethernet) / ACTIVITY / 10M/100M / LINK
Versatile power supply	85...290 VAC / 120...410 VDC
Power supply connection	Metallic terminals for "posidraft" screws
<b>Build features</b>	
Box	Self-extinguishible polycarbonate UL94 PV0
Protection degree	IP20
Attachment	Can be attached to DIN rail 46277 (2 modules)
<b>Environmental conditions</b>	
Standard temperature	-10 / 60 °C B
Storage temperature	-40 / 85 °C
Humidity without condensation	5...95%
<b>Safety</b>	
Installation category Class III / EN61010 double-insulated electric shock protection class II. The equipment must be connected to a power circuit protected with type gl fuses, in compliance with IEC 269, or type M, with values from 0.5 to 1A. It must be fitted with a circuit breaker switch or equivalent device, in order to be able to disconnect the device from the power supply. The power supply cable must have a cross-section of at least 1mm2.	
<b>Standards</b>	
IEC 60664, VDE 0110, UL 94, EN61010-1, EN55011, EN 61000-4-2, EN 61000-4-3, 61000-4-11, EN 61000-6-4, EN 61000-6-2, EN 61000-6-1, EN 61000-6-3, EN 61000-4-5, EC	

### References

Type	Code
TCP2RS+, Ethernet Converter to RS232 / RS485	M54033

# accessories

## CAMO Converter / Amplifier

RS-232 - RS-485 converter / amplifier

### Description

Versatile equipment that performs the function of physical communication medium transducer between RS-232 / RS-485-RS422 data buses or RS-485/RS-485 multi-optocoupled amplifier.

The CAMO transducer function automatically performs transmission reception switching to detect activity in the TX transmission line, avoiding the need for software control.

The amplifier function lets you increase the cabling of a RS-485 bus. As a general rule the maximum length of Modbus RS-485 cabling must not exceed 1,200 metres; by installing the CAMO as a Modbus RS-485 amplifier, it is possible to overcome this limitation.

- Transducer of RS-232 / RS-485-RS-422 bus or vice versa.
- RS-485/RS-485 Amplifier.
- Auto-detection of speed and word length, from 600 to 57,600 baud.
- Galvanic insulation up to 3 kV.
- Power supply 85..264Vac / 2.5 VA / 47..63Hz.
- LED Power, TX and RX
- Attachment. DIN 46277 (EN-50022)
- 3 Modules DIN 43 880
- Dimensions: 53 x 90 x 58 mm

### Application

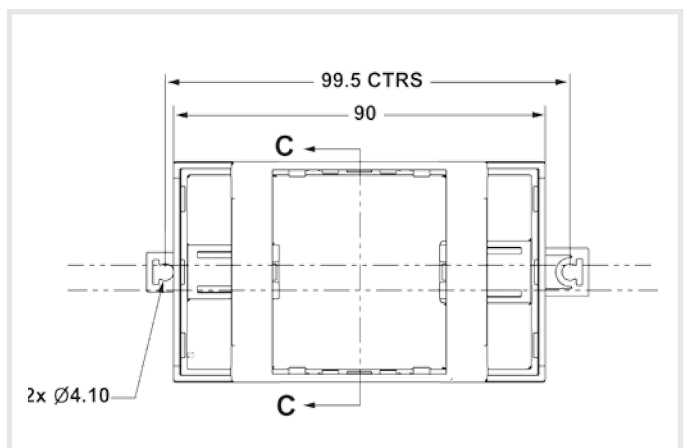
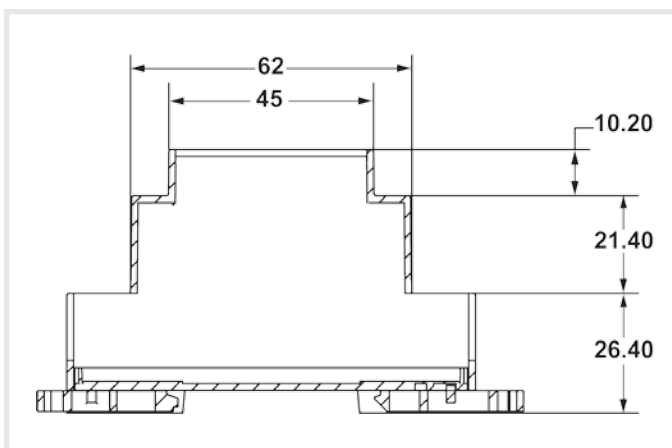
For any installation with various units connected to an RS-485 network and which must be monitored with an RS-232 connection.

Amplifier of Modbus RS485 signals.

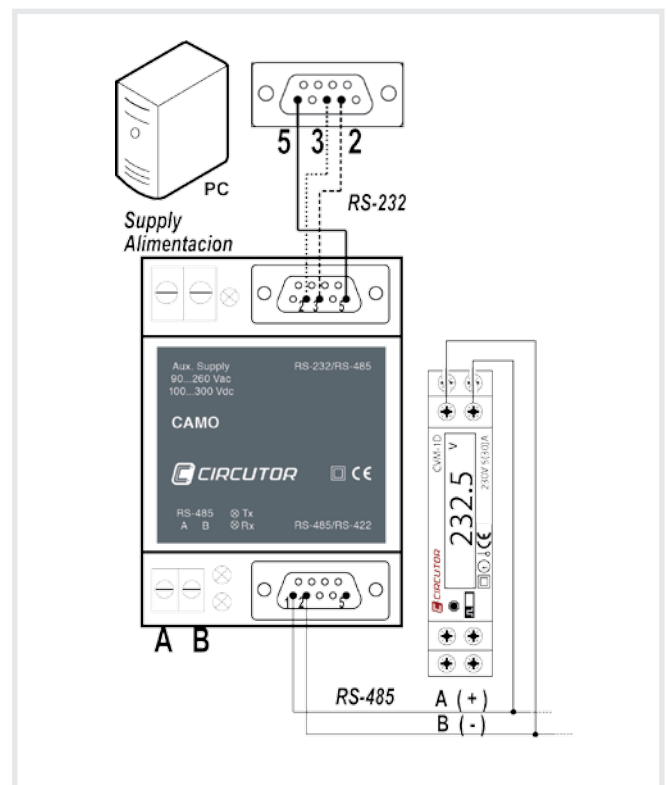
### References

Type	Code
Amplifier / transducer	M54090

### Dimensions



### Connection



# accessories

## USB converter

USB Converter to RS-232 or RS-485

### Description

- Converter of the USB network protocol to RS-232 or RS-485
- Power supply through the PC's USB port
- Transmission speed: 4800 bps to 128000 bps
- Recommended only for start-ups and possible communications

### Application

To convert the USB signal to RS-232 or RS-485.



### References

Type	Code
USB / RS-485 converter	M54040
USB / RS-232 converter	M54050

## CVM-MINI Adaptor

Front panel adaptor

### Description

Adaptor for the CVM-MINI for its installation on 72 x 72 mm panels

### Application

- For 72 x 72 mm front panel
- Central fixing
- Adjustable on the rear with two straps



### References

Type	Code
MINI panel adaptor	M5ZZF1

## Relation between products and accessories

		LM	TCP2RS+	CONVERTER	TP	POWER STUDIO	Adaptor panel
							
		Impulse centralizing unit	RS-232/485 Converter Ethernet	Converter of RS-485 to RS-232	Measuring transformers	Management software	Adaptor for 72 x 72 panel
		See <b>M.3</b>	<b>M54032</b>	<b>M54020</b>	depending on the type	<b>M90231</b>	<b>M5ZZF1</b>
CVM k2		•	•	•	•	•	-
MP3 / MP4		•	•	•	-	•	-
CVM NRG 96		•	•	•	•	•	-
CVM MINI		•	•	•	•	•	•
CVM NET		•	•		•	•	•
CVM 1D		•	•	•	-	•	-
CVM 96		•	•	•	•	•	-
CVM 144		•	•	•	•	•	-
CVM BD		•	•	•	•	•	-
CVM BDM		•	•	•	•	-	-
POWER NET		-	•	•	-	•	-

## Relation between products and accessories

		LM	TCP2RS+	CONVERTER	TP	POWER STUDIO	Adaptor panel
							
		Impulse centralizing unit	RS-232/485 Converter Ethernet	Converter of RS-485 to RS-232	Measuring transformers	Management software	Adaptor for 72 x 72 panel
		See <b>M.3</b>	<b>M54032</b>	<b>M54020</b>	depending on the type	<b>M90231</b>	<b>M5ZZF1</b>
CVM k2		•	•	•	•	•	-
MP3 / MP4							
CVM NRG 96		•	•	•	•	•	-
CVM MINI		•	•	•	•	•	•
CVM NET							
CVM 1D							
CVM 96		•	•	•	•	•	-
CVM 144		•	•	•	•	•	-
CVM BD		•	•	•	•	•	-
CVM BDM		•	•	•	•	-	-
POWER NET		-	•	•	-	•	-