Measurement and electric control

m.5

CVM Power analyzers

CVM Power analyzers

M.5 - CVM Power analyzers

M.5

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.

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 M54033), 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 redirectioning 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 (multimaster 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 RS-232-RS-485 / Ethernet (Modbus/TCP): M54033

- **LM50-TCP+**: Alarm / Impulse Centralizer (Modbus/TCP): M31566

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

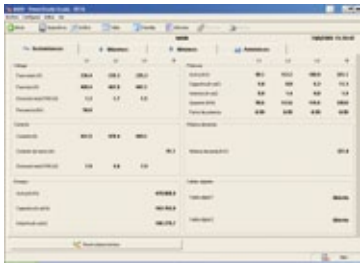
Toph-pherformance management software designed for the analysis of the consumption of energy and other parameters metered by **CIRCUTOR's** equipment.

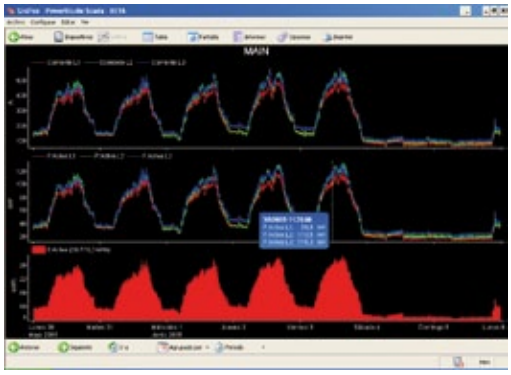
What can this software be used for?

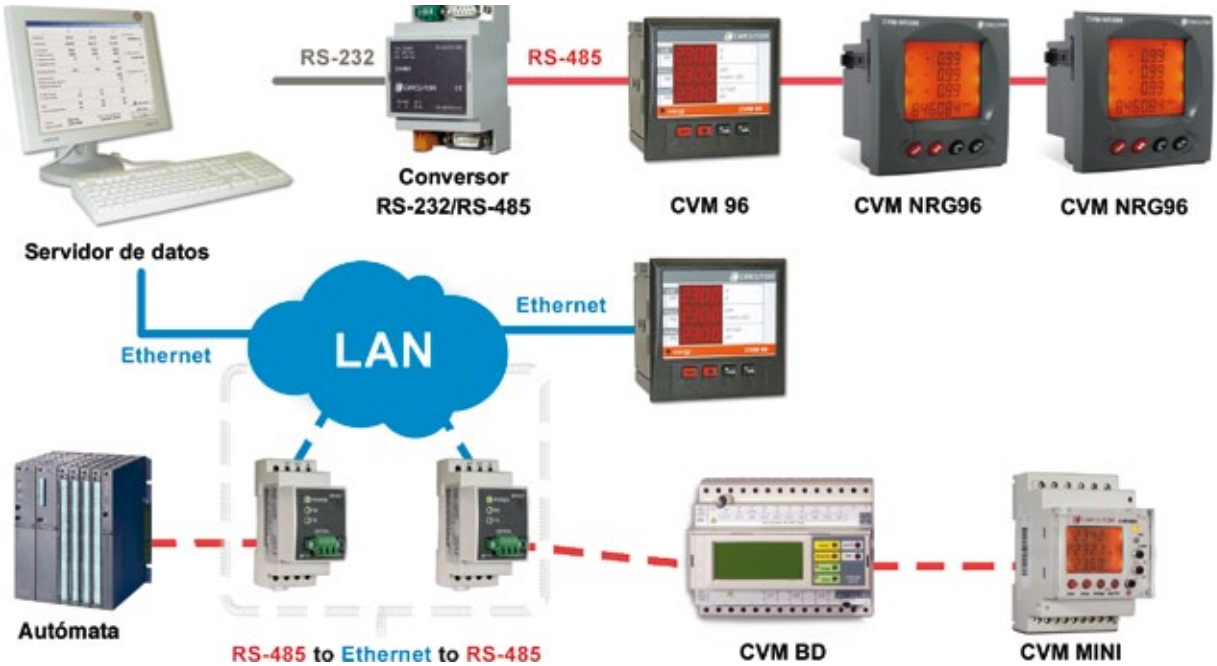
- Control of the energy in an installation, analysing the status of its lines and installations in real time.
- Simulation of receipts, depending on the version. It can be used to analyse the consumption of energy in the installations with the equipment supplied by **CIRCUTOR** and it also enables the 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			
Measure points (Voltage/Current)	1 / 1					1 / 1				1 / 1				1 / 1				1 / 1			
COMMUNICATIONS FEATURES																					
RS-232																					
RS-485	*					*				*				*				*			
Ethernet	*																				
COMMUNICATIONS PROTOCOL																					
Modbus RTU	*					*				*				*				*			
Modbus TCP	*																				
Profibus DP	*																				
Johnson Controls																					
Compatible with **PowerStudio SCADA**	*					*				*				*				*			
Page	M5-8					M5-14				M5-17				M5-19				M5-21			

Possible parameters, depending on the unit selected.

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

	CVM NET4				CVM1D	CVM 96				CVM 144				CVM BD				CVM BDM				Power Net			
																									
	L1	L2	L3	III	L1	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	*	*	*			*	*	*		*	*	*		*	*	*		*	*	*		*	*	*	
	*	*	*		*	*	*	*		*	*	*		*	*	*		*	*	*		*	*	*	
	*	*	*	*	*	*	*	*	**	*	*	*	**	*	*	*	*	*	*	*	*	*	*	*	*
	*				*	*				*				*				*				*			
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	*	*	*	*	*	**	**	**	*	*	*	*	*	*	*	*	*	*	*	*	*				*
	*	*	*	*	*	**	**	**	**	*	*	*	*	*	*	*	*	*	*	*	*				*
	*	*	*	*	*				*				**				*				*				*
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
				*					**				**												*
				*	*				*				*				*				*				*
				*					*				*				*				*				*
		*		*			*		*		*		*				*								
			*					*				*								*					
	*	*	*			*	*	*		*	*	*		*	*	*		*	*	*		*	*	*	
	*	*	*			*	*	*		*	*	*		*	*	*		*	*	*		*	*	*	
																		**	**	**	15				
						**	**	**	31	*	*	*	31					**	**	**	15				
				*	*				*				*				*				*				*
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	1				1	1				1				3				1							
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	T				T	R				R				R				R							
	1 / 1				1 / 1	1 / 1				1 / 1				1 / 1				1 / 1				1 / 1			
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	M5-23				M5-25	M5-27				M5-29				M5-32				M5-34				M5-36			

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 50º, asymmetries, flicker, unbalances, overvoltages, gaps, interruptions, etc.

Features

Power supply circuit	85...265 Vac / 90...300 Vdc
ac Power supply frequency	50..0.60 Hz
ac Power supply consumption	30 V·A
dc Power supply consumption	< 25 W
Metering circuit	
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 Vac (ph-n) 5...120 % of the U_n for U_n= 500 Vac (ph-n)
Maximum metering voltage	360 Vac
Admissible overvoltage	750 Vac
Maximum consumption (limited current)	< 0.6 V·A
Current measuring circuit	
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
Maximum meter value	100 GW·h
Class/Accuracy	0.2 or 0.5 power and energy
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity	5 ... 95%
Altitud	2000 m
Build features	
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
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010** Double-insulated electric shock protection, class II	
Standards	
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)

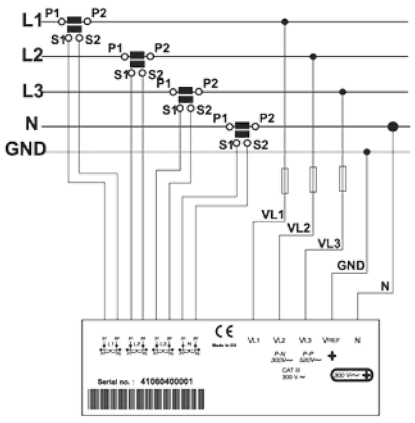
Quadrants	Class	Communications MODBUS / RTUProtocol	Neutral current	Universal power supply	Type	Code
4	0,5	RS-485	Yes	Yes	**CVMk2-ITF-405**	**M54400**
4	0,5	RS-485	Yes	Yes	**CVMk2-ITF-402**	**M54402**

Measuring units (measuring module)

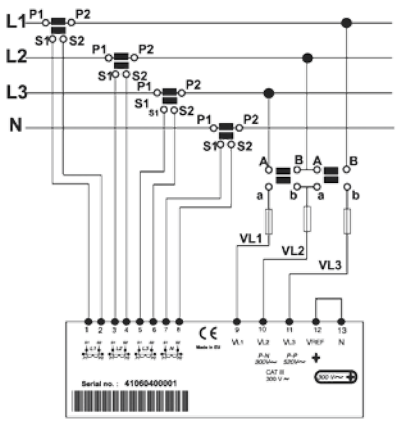
Quadrants	Class	Communications MODBUS / RTUProtocol	Neutral current	Universal power supply	Type	Code
4	0,5	RS-485	Yes	Yes	**M-CVMk2-ITF-405**	**M54410**
4	0,5	RS-485	Yes	Yes	**M-CVMk2-ITF-402**	**M54412**

Connections

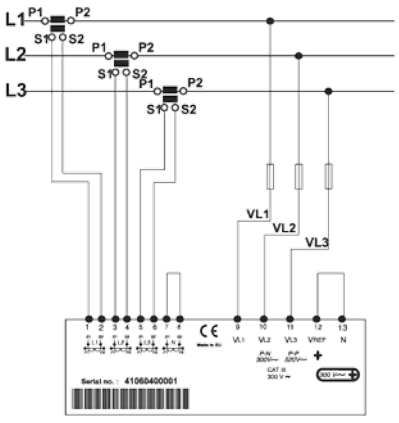
Connection of 4 Current transformers (5 wires)



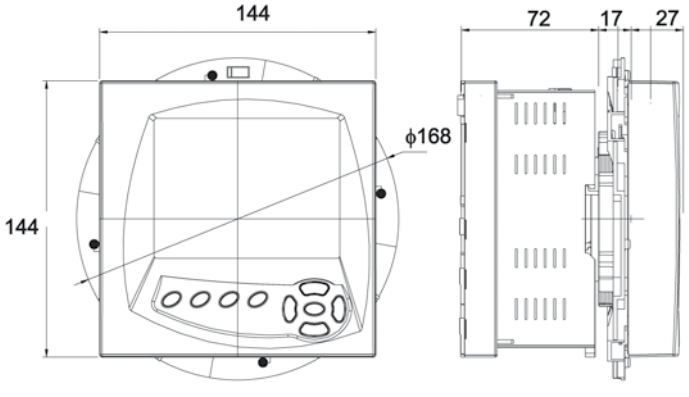
Connection of 4 Current transformers and 2 voltage transformers

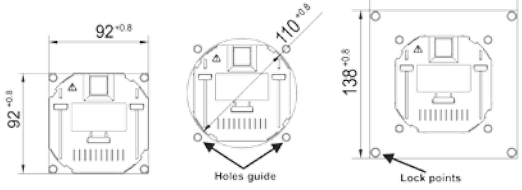


Connection of 3 Current transformers (3 wires)



Dimensions





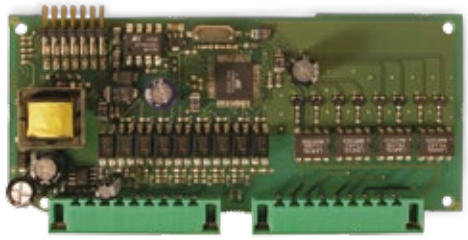
Figures 1, 2 and 3: Display of the frontal panel part embedding (display) in a 92 x 92 mm opening, with a diameter of 110 mm and 138 x 138 mm, respectively

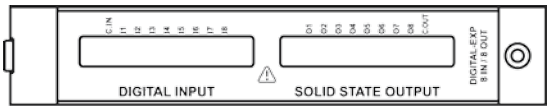
Exchangeable modules

CVM k2

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

Card with 8 digital inputs and 8 digital outputs of transistor





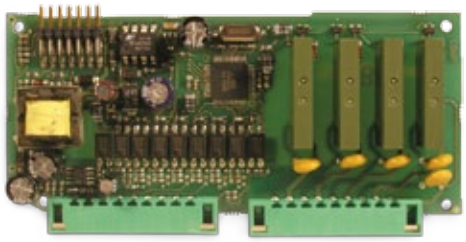
Features

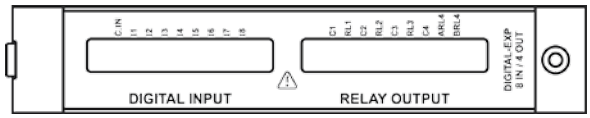
Features	
Logical inputs	
Type of input	Voltage-free
Type of coupling	Optoinsulated
V max	24 Vdc
minimum t ON / t OFF	t ON 40 ms
	t OFF 40 ms
Static outputs	
AC Voltage	<100 Vac
Non-repetitive Peak voltage	350 V pk.
Nominal current	100 mA
Repetitive current during t=1s	120 mA
Maximum current t=10 ms	350 mA
Connection	
Rigid conductor section	0.05...1 mm²
Code	**M54501**

Connection

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

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

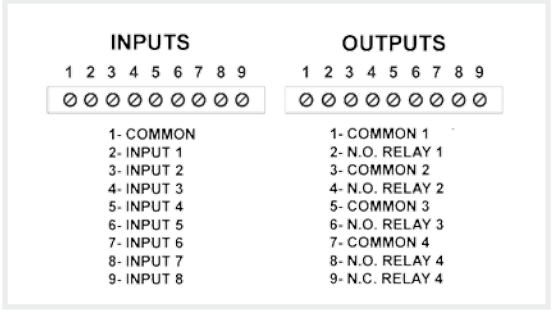




Features

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 10^6 operations
Electrical working life	NO: 5x10^4, NC: 3x10^4 cycles
Connection	
Rigid conductor section	0.05...1 mm²
Code	**M54503**

Connection

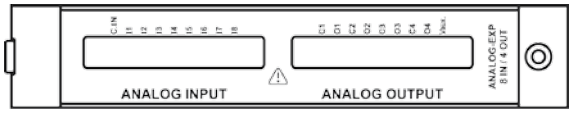


Exchangeable modules

CVM k2

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

Card with 8 digital inputs and 4 digital outputs



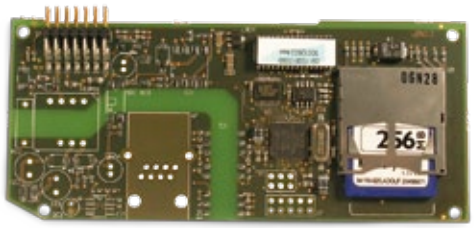
Features

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^2
Code	**M54502**

Connection

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**

Icons

- Correct SD memory state
- Incorrect SD memory state
- SD Card removal enabled

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.

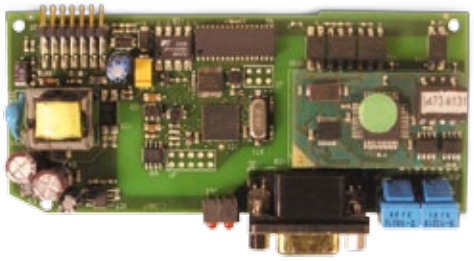
Exchangeable modules
CVM k2

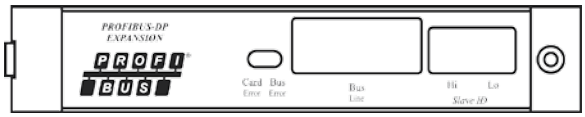
5. PROFIBUS Card

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 (15º)	72	72
9	Even harmonics, Current (15º)	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

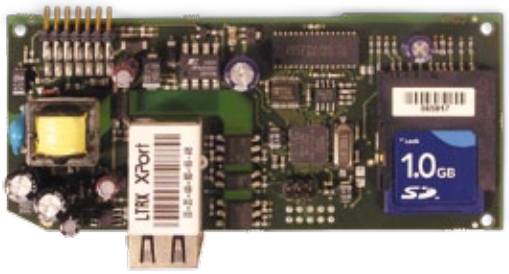




Code	M5450A

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

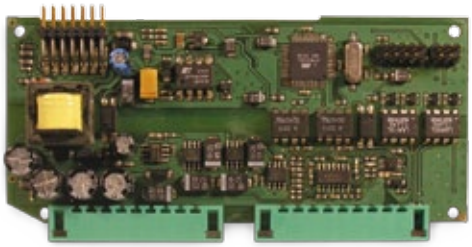
- The unit is formatted automatically when installing an SD card. Do not install cards with contents stored that you wish to keep.
- To remove the SD card safely, interrupt the communications between the unit and the memory. There are two ways to do so; either turning the unit off or accessing the card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

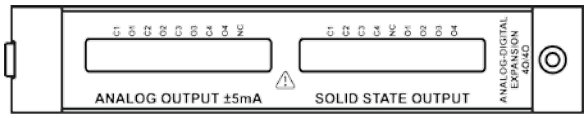
Icons

- 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. ±5 mA

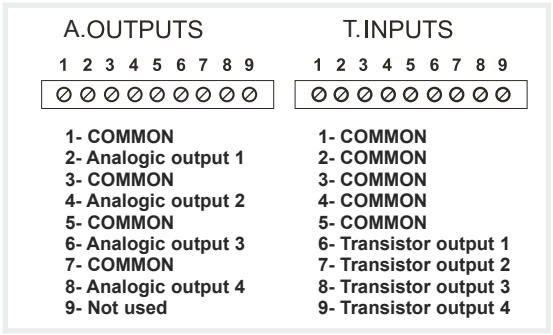




Features

Features	
Logical outputs	
Output range	±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*=1s	120 mA
Maximum current *t*=10 ms	350 mA
Connection	
Rigid conductor section	0.05...1 mm²
Code	**M54507**

Connection



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

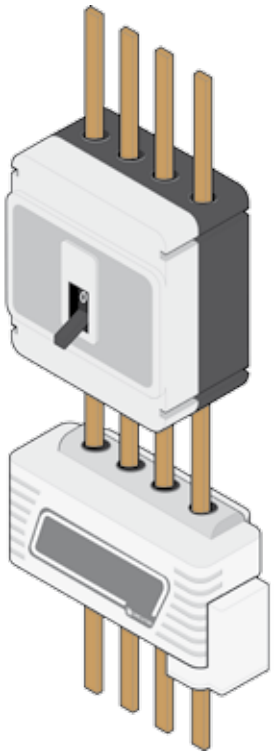
Power circuit	
Voltage	18 - 36 V cc
Maximum power consumption	200 mA
Connector	Phoenix Contact® GMVSTBR 2,5-2-ST-7,62
Voltage measurement	
Nominal voltage	690 V ca
Maximum voltage	800 V ca
Maximum impulse voltage 8/20 us	8000 V
Impedance	1 MΩ
Frequency	45 - 65 Hz
Accuracy	0.4% measurement + 0.1% FS
Category **EN61010**	**CAT IV-600 V**
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 **EN61010**	**CAT IV-600 V**
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_{CE} max	350 V
V_{CE} sat	120 mA
I_C 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 - **EN61010 CAT III 300 V**	
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 - RS-485		
Speed (bps)	9600, 19200, 38400	
Stop bits	1.2	
Parity	None, even, odd	
Insulation	2.5 kV - **EN61010 CAT III 300 V**	
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**

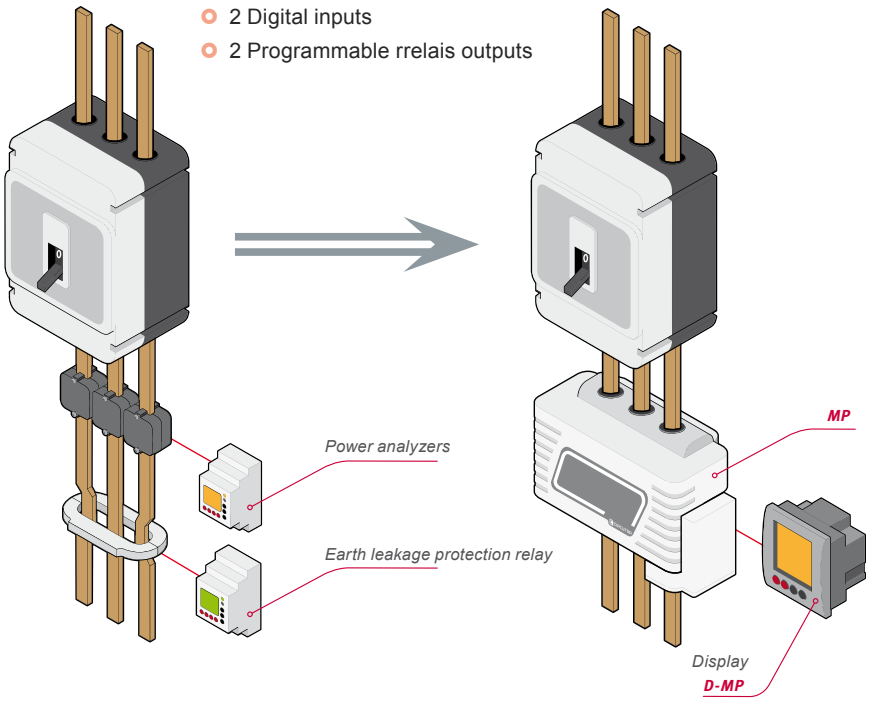
MP3 / MP4

Three-phase power analyzers

Features

- Max. 185 mm² / Mín. 120 mm²
- Max. 95 mm² / Mín. 35 mm²
- Max. 25 mm
- Mín. 12 x 2 mm

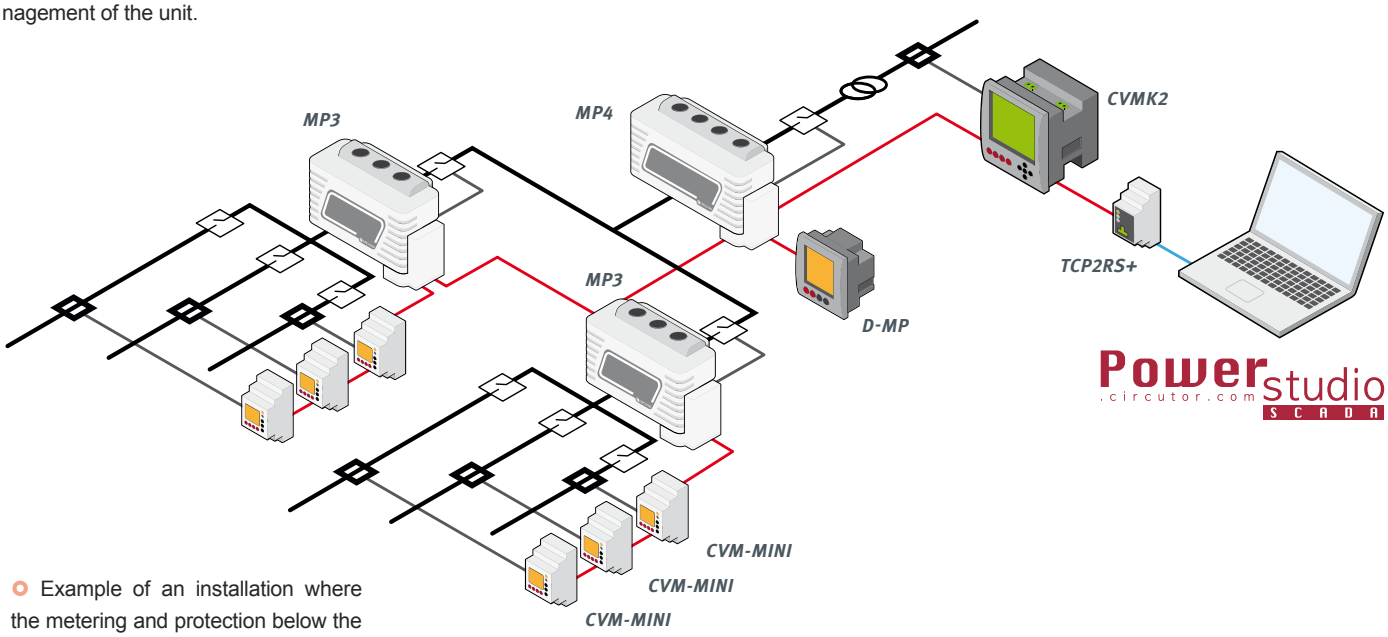
- 2 Impulse outputs
- 2 Digital inputs
- 2 Programmable rrelais outputs



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**.

CIRCUTOR

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 optoinsulated transistor
- ITF Technology: Galvanic insulation protection inputs 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 ºC	
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 **EN 61010**. Double-insulated electric shock protection, class II		
Standards		
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1		

CVM 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, RS-485 C**	**M51911**
4	0,5	RS-485	1	Yes	*U* and *I* (15º)	**CVM-NRG 96-ITF-HAR, RS-485 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**
CVM NRG96-MC, Sistemas de medida Eficiente							
4	0,5	-	-	Si	-	**CVM NRG96-MC-ITF**	**M52070**
4	0,5	RS-485	1	Si	-	**CVM NRG96-MC-ITF-RS-485-C2**	**M52081**

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

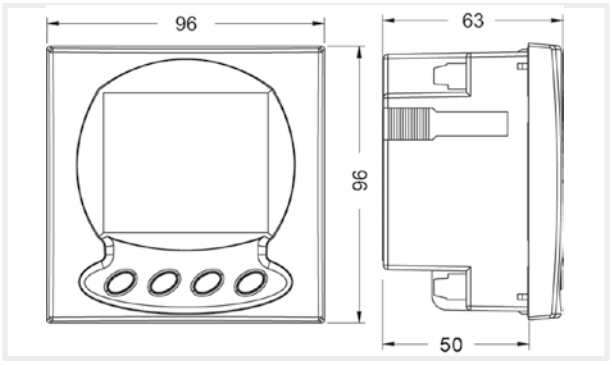
Max. A	Ranges	Class 0,5 Power	Measurement	Internal diameter		Type	Code
63	-	0,1 VA	3 Phases	7,1 mm		**MC3-63**	**M73121**
125	-	0,1 VA	3 Phases	14,6 mm		**MC3-125**	**M73122**
250	-	0,25 VA	1 Phase	26 mm		**MC3-250**	**M73123**
250	150/200/250	0,25 VA	1 Phase	20 mm		**MC1-20-150/200/250**	**M73113**
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

Coding table

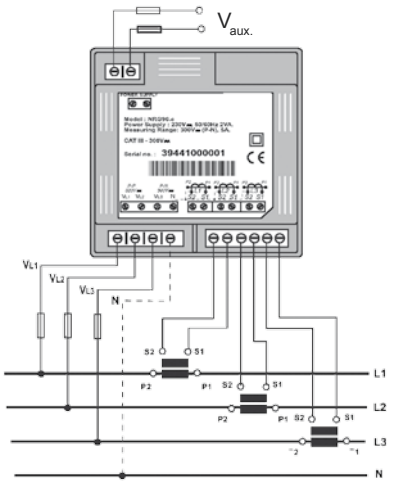
M	5	X	X	X	X	0	0	X
Code						Internal Code		
Power Supply Voltage (PSV)						Standard (230 Vac)		0
						85...265 Vac 95...300 Vdc		A
						24..0.120 Vdc		5

Dimensions

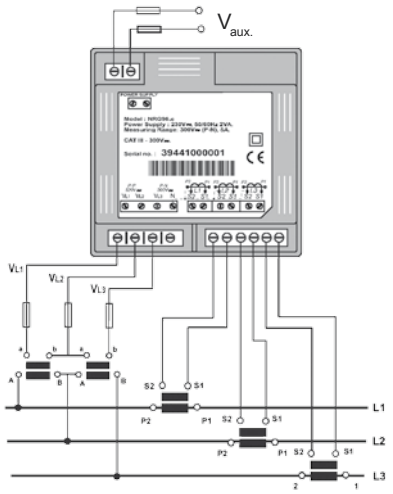


Connections

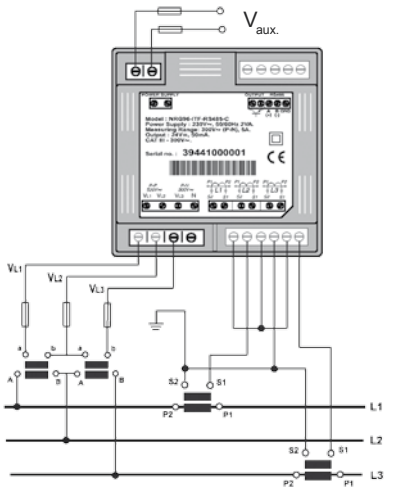
CVM NRG96, 3 or 4 wires (low voltage)



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 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

Power supply circuit	230 V ac (-15...+10%) Plus: 85..0.265 V ac / 95...300 V dc
Consumption	3 V·A
Frequency	45...65 Hz
Metering circuit	
Nominal voltage	300 V ac (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
Class/Accuracy	
Voltage	0.5 % ± 1 digit
Current	0.5 % ± 1 digit
Power rating	1 % ± 1 digit
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity (non-condensing)	5 ... 95%
Altitud	2000 m
Output transistor	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
Build features	
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
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010**. Double-insulated electric shock protection, class II	
Standards	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

CVM MINI

Three-phase power analyzer(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-RS-485-C2**	**M52021**
4	0,5	RS-485	MODBUS / RTU	2	V and I (15º)	**CVM-MINI-ITF-HAR-RS-485-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-RS-485-C2**	**M52081**

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

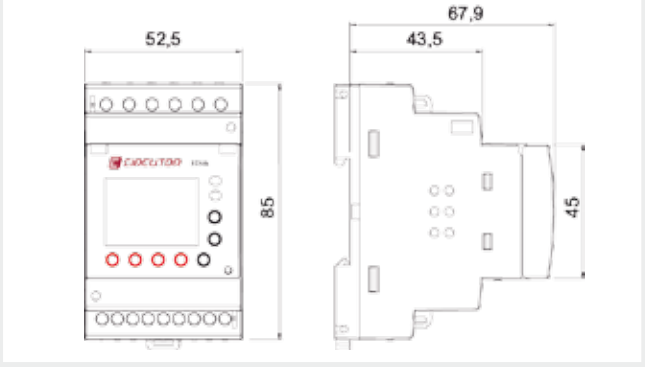
Max. A	Ranges	Class 0,5 Power	Measurement	Internal diameter		Type	Code
63	-	0,1 VA	3 phase	7,1 mm		**MC3-63**	**M73121**
125	-	0,1 VA	3 phase	14,6 mm		**MC3-125**	**M73122**
250	150/200/250	0,25 VA	1 phase	20 mm		**MC1-20-150/200/250**	**M73113**
250	-	0,25 VA	1 phase	26 mm		**MC3-250**	**M73123**
500	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 95...300 Vdc					C
			20...120 V c.c.					5*

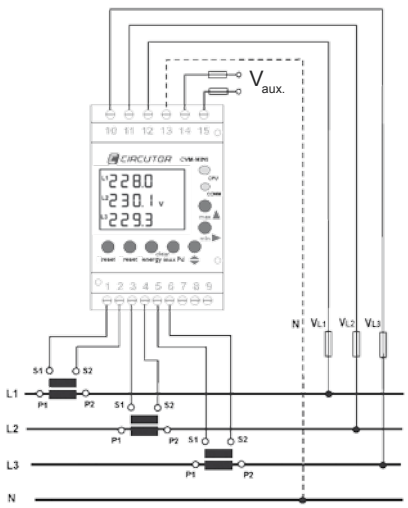
* **MC** transformer's connection

Dimensions

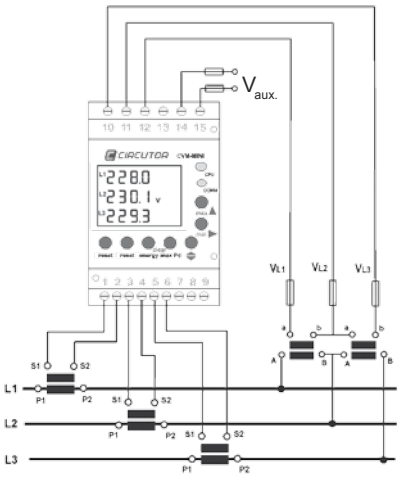


Connections

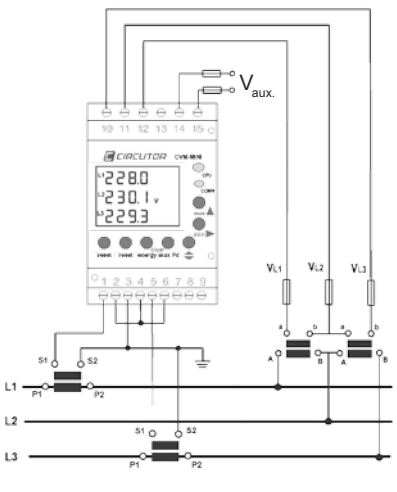
CVM MINI, 3 or 4 wires (low voltage)



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 (balanced and unbalanced) for DIN rail mounting - without display

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

Power circuit	
Nominal voltage	230 V_{AC}
Power supply frequency	50 - 60 Hz
Maximum power consumption	3.0 V·A
Measurement circuit	
Nominal voltage	300 V_{AC} / 520 V_{AC}
Frequency	45 - 65 Hz
Nominal current	I_n / 5 A or / 250 mA
Overload (permanent)	
Communications	
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
Output transistors	
Type: Isolated transistor	Open NPN collector
Maximum voltage of operation	24 V_{DC}
Maximum current of operation	50 mA
Maximum frequency	5 imp/s
Impulse duration	100 ms
Build features	
Metering module	Assembly on **DIN rail 46277 (EN 50022)**
Number of modules	3
Environmental conditions	
Operating temperature	-10 – +50°C
Protection degree	IP
Humidity (without condensation)	5 – 95% (without condensation)
Maximum altitude	2000 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

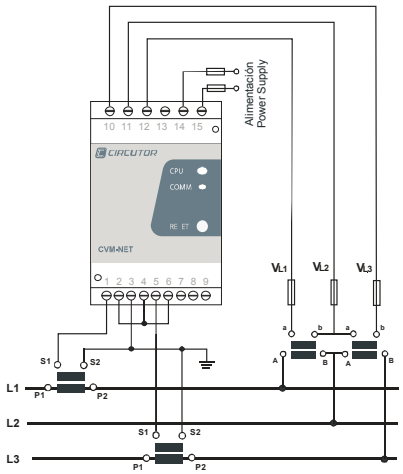
Three-phase power analyzer

References

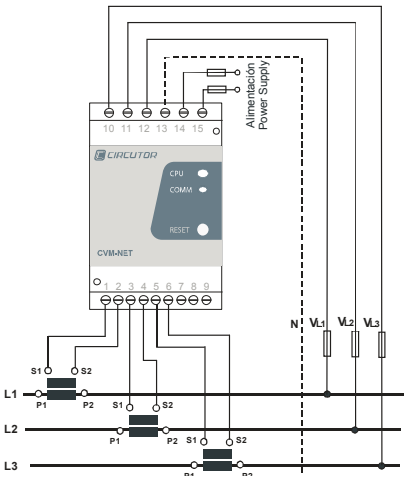
Quadrants	Communications Protocol MODBUS / RTU	Digital output	Measurement	Transformer type	Type	Code
4	RS-485	2	3 Phases	/ 5 A	**CVM NET-ITF-RS-485-C2**	**M54B21**
4	RS-485	2	3 Phases	/ 250 mA (type **MC**)	**CVM NET-ITF-MC-RS-485-C2**	**M54B31**

Connections *

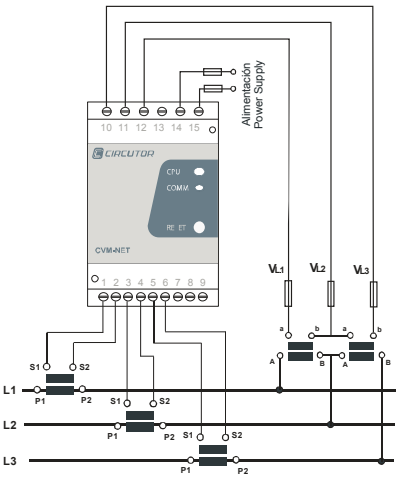
Single-phase connection



Single-phase connection

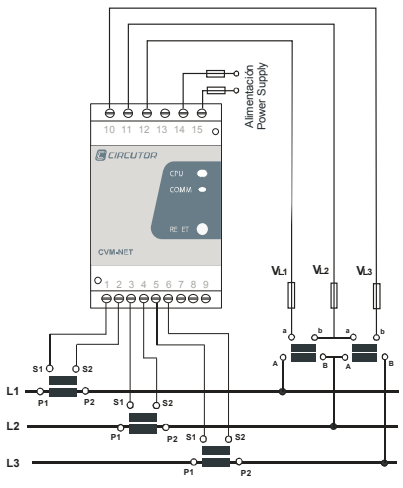


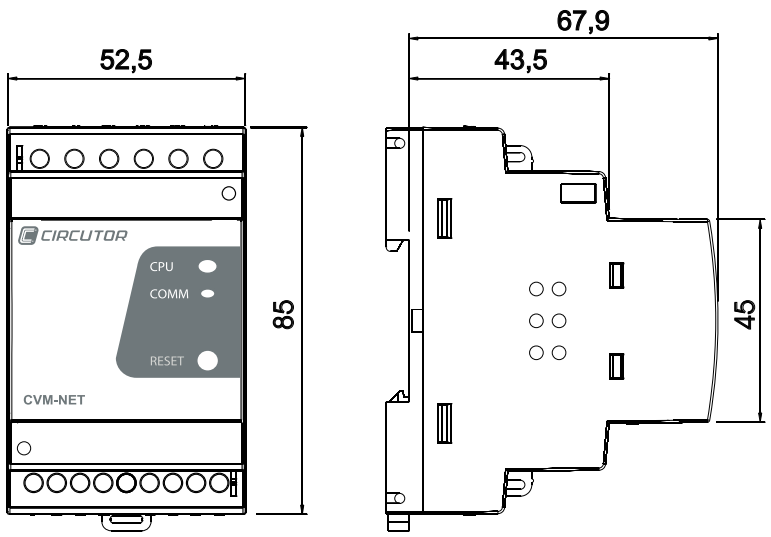
Single-phase connection



Dimensions

Single-phase connection





* To see more connections, see CVM-MINI

CVM-NET-4

4 Three-phase power analyzers in one, for DIN rail mounting - without display

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 $V_{a.c.}$ / 95...300 $V_{d.c.}$
Power supply frequency	50-60 Hz (AC mode)
Maximum power consumption	6,0 V·A
Measurement circuit	
Nominal voltage	300 $V_{c.a.}$ / 520 $V_{a.c.}$
Frequency	45 ~ 65 Hz
Nominal current	I_n / 250 mA
Overload (permanent)	1,3 I_n
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 $V_{c.c.}$
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

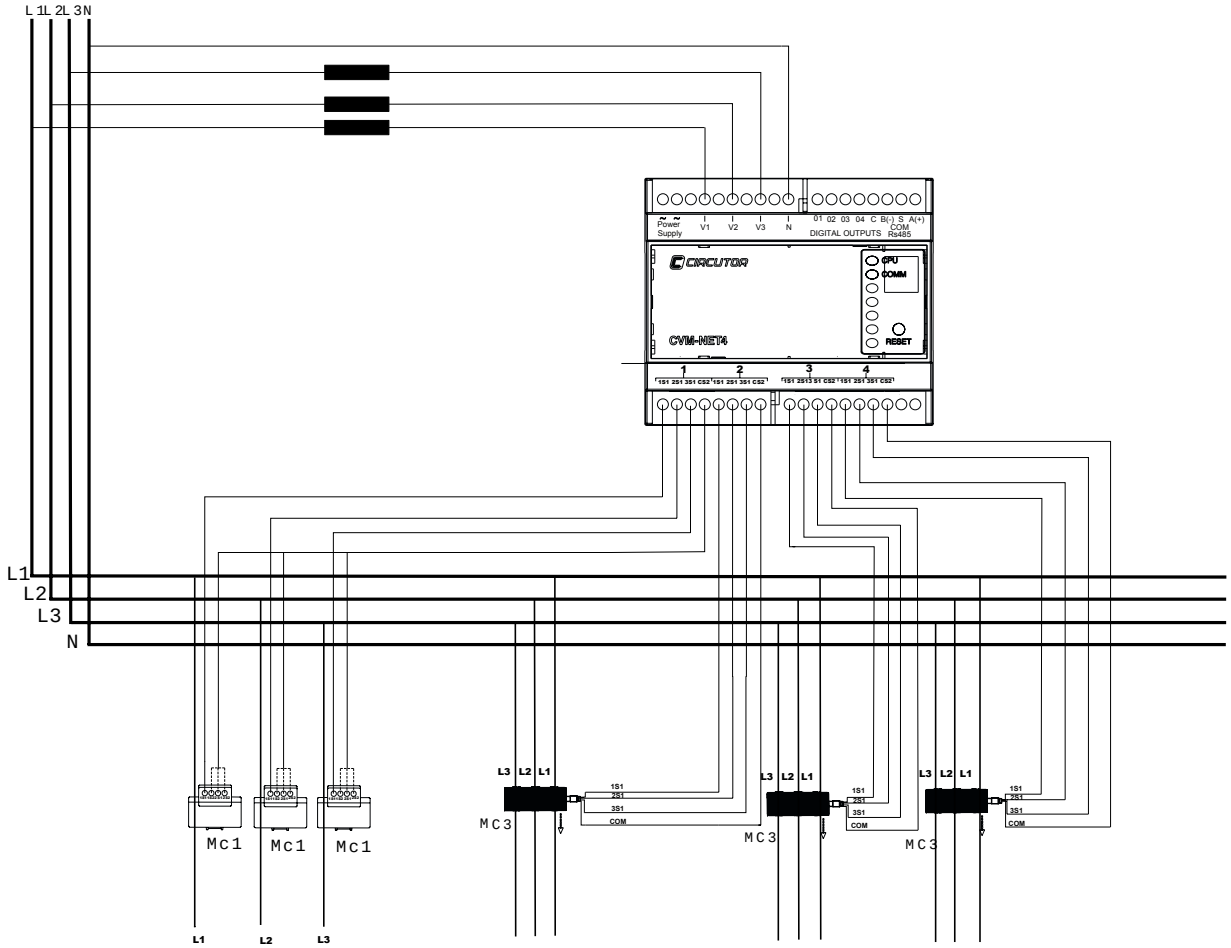
Three-phase power analyzer

References

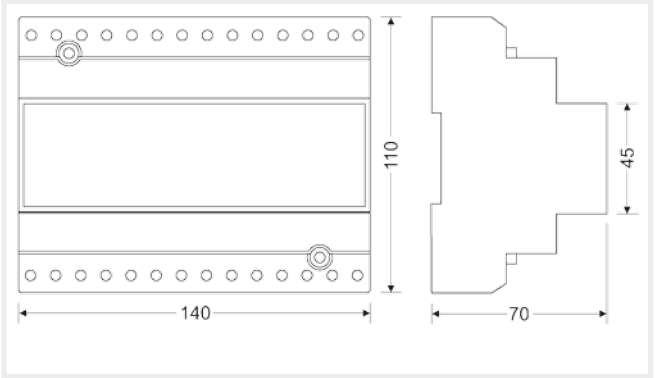
Quadrants	Communications Protocol MODBUS / RTU	Digital output	Measurement	Transformer type	Type	Code
4	RS-485	4	4 three-phase channels	../ 250 mA (type **MC**)	**CVM-NET4-MC-RS-485-C4 M**	**M55732**

Connections

4 three-phase channels connection



Dimensions



CIRCUTOR

CVM-1D

Single-phase power analyzer for DIN rail mounting

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

Power circuit	
Single-phase power supply	230 V_{AC} ±20%
Power supply frequency	50 / 60 Hz
Power supply use	1.5 VA
Measurement circuit	
Phase – Neutral nominal voltage	184 V_{AC} to 276 V_{AC}
Frequency	50 / 60 Hz
Nominal current	32 A
Minimum current	20 mA
Maximum current	32 A
Output transistor features	
Type	Optoinsulated transistor (commutator open) NPN
Maximum voltage of operation	35 V_{DC}
Maximum current of operation	50 mA
Maximum frequency	5 impulses / s
Impulse duration	100 ms (configurable)
Insulation	3.7 kV_{RMS} / 1 min
Communications	
Port	RS-485
Protocol	Modbus / RTU
Build features	
Measuring module	Assembly on **DIN rail 46277 (EN 50022)**
Number of modules	1
Environmental conditions	
Operating temperature	-10 – +50 °C
Protection degree	IP 31
Humidity (without condensation)	5% - 95%
Maximum altitude	2000 m
Safety	
Type of insulation	**EN 61010** double-insulated electric shock protection class II
Standards	
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

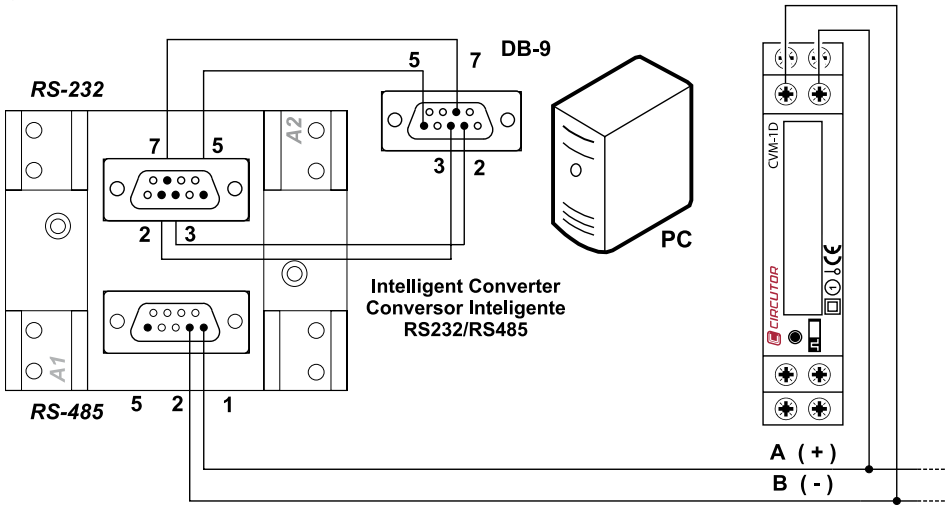
References

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**

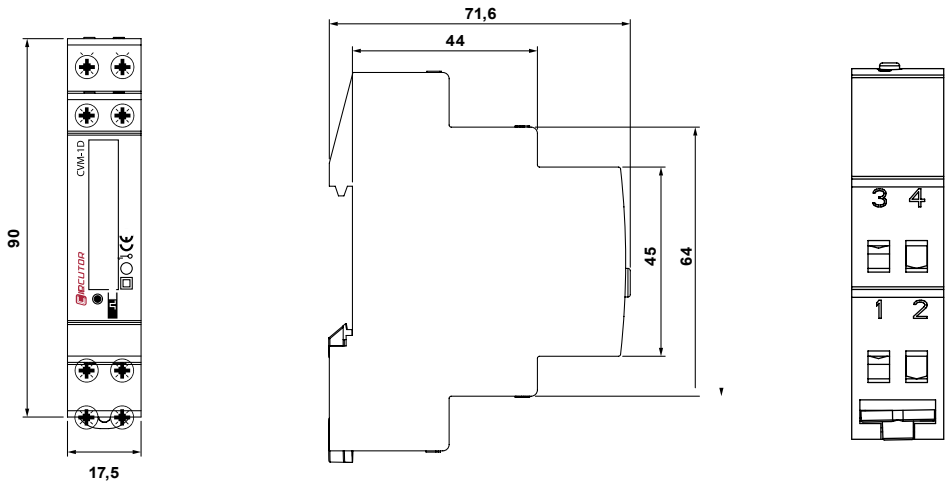
Connections

RS-485 connection communication through Intelligent Converter RS-232 / RS-485

(only model with RS-485 communications)



Dimensions



CIRCUTOR

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 inputs, depending on the type
- Maximeter function (A / A III / kW III / kV·A III)
- Default page selection
- Metering ranges: 110, 520, 866 Vf-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

Power supply circuit	230 Vac (-15...+10%). For other values, see the coding table
Consumption	5 V·A
Frequency	45..0.65 Hz
Metering circuit	
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_n
Class/Accuracy	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power ratings	1 % ± 2 digits
Type of output	Relay
Maximum switching voltage	250 Vac
Maximum switching current	3 A
Mechanical working life	3 x 10^7 operations
Maximum impulse frequency	1 impulse / s
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity (non-condensing)	5 ... 95%
Build features	
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.
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010** Double-insulated electric shock protection, class II	
Standards	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

CVM 96

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

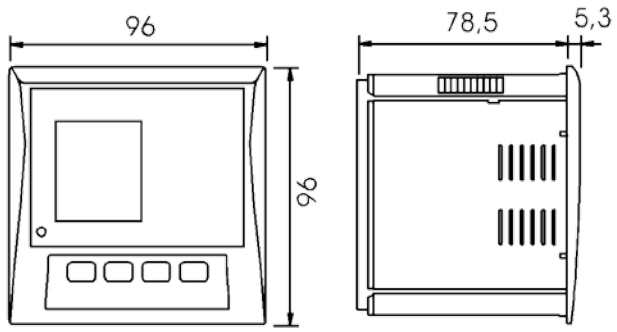
References

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-RS-485-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 (31º)	Yes	**CVM 96-F- ITF-RS-485-C2-HAR-IN**	**M51513**

Coding table

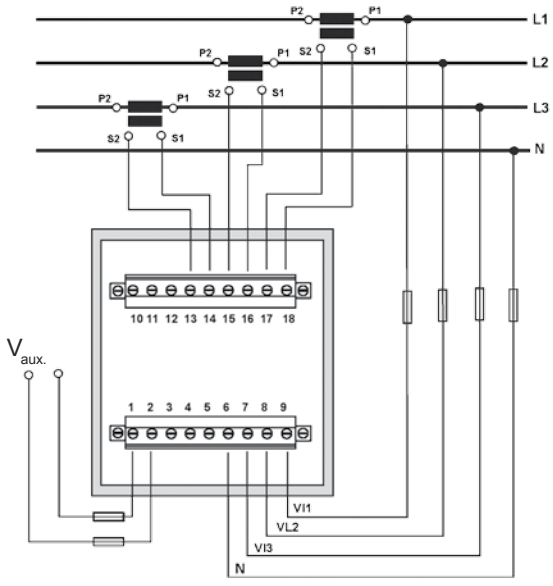
M	5	X	X	X	X	0	0	X	X	X
Code						Internal Code				
Power Supply Voltage (PSV)								Standard (230 V ac)	0	
								110 V ac	1	
								400 V ac	3	
								480 V ac	4	
								24..0.120 V dc	5	
Voltage metered (VM)								Standard (300 V_{ph-n}/ 520 V_{ph-ph})		0
								63.5 V_{ph-n} / 110 V_{ph-ph}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

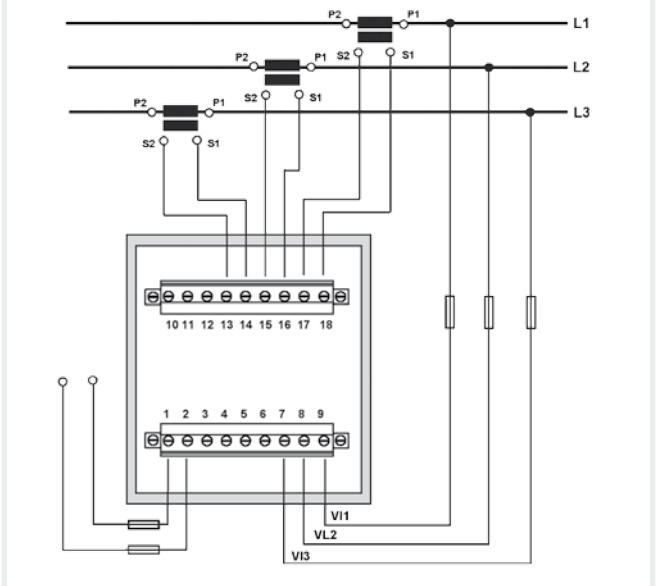
Dimensions



Window: $92^{+0.8}$ x $92^{+0.8}$ mm

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

Power supply circuit		230 Vac (-15...+10%). For other values, see the coding table
Consumption		5 V·A
Frequency		45..0.65 Hz
Metering circuit		
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_n
Class/Accuracy		
Voltage		0.5 % ± 2 digits
Current		0.5 % ± 2 digits
Power ratings		1 % ± 2 digits
Type of output		Relay
Maximum switching voltage		250 V ac
Maximum switching voltage		750 V·A
Maximum switching current		3 A
Mechanical working life		3 x 10^7 operations
Maximum impulse frequency		1 impulse / s
Ambient conditions		
Operating temperature		-10 ... +50 ºC
Relative humidity (non-condensing)		5 ... 95%
Build features		
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
Safety		
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010** Double-insulated electric shock protection, class II		
Standards		
IEC 664, VDE 0110, UL 94, IEC 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
EXPANDABLE EQUIPMENT											
2	0,5	-	-	-	-	-	-	-	-	**CVM 144**	**M50600**
2	0,5	-	-	-	-	-	-	-	-	**CVM 144-ITF**	**M50700**
2	0,5	-	-	-	-	-	-	U/I (31º)	-	**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-RS-485-C2 Module**	**M51010**
-	-	RS-485	Modbus / RTU	2	-	-	-	-	Yes	**CVM 144-RS-485-C2-Currents Module**	**M51011**
-	-	RS-485	Modbus / RTU	2	-	4	-	-	-	**CVM 144-RS-485-C2-Digital Module**	**M51016**
-	-	RS-232	Modbus / RTU	2	-	-	-	-	-	**CVM 144-RS-232-C2 Module**	**M51020**
COMPLETE EQUIPMENT											
2	0,5	RS-485	Modbus / RTU	2	-	-	-	-	-	**CVM 144-ITF-RS-485-C2**	**M50710**
2	0,5	RS-485	Modbus / RTU	2	4	-	-	-	-	**CVM 144-ITF-RS-485-C2-A4O**	**M50A14**
2	0,5	RS-485	Modbus / RTU	2	2	-	2	-	-	**CVM 144-ITF-RS-485-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/20**	**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

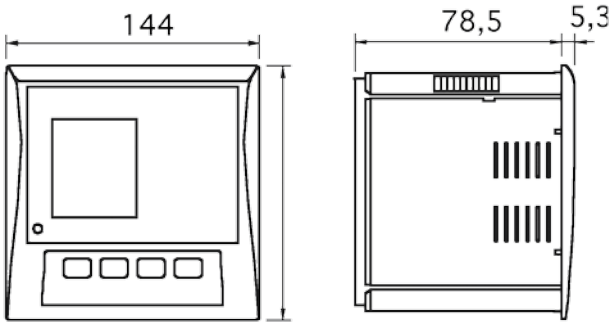
Three-phase power analyzer
(balanced and unbalanced) for panel mounting

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_{ph-n}/520 V_{ph-ph})		0
	63.5 V_{ph-n} / 110 V_{ph-ph}		1
	500 V_{ph-n} / 866 V_{ph-ph}		3
Current input (CI)	Standard (.../ 5 A)		0
	.../ 1 A (Only ITF)		1

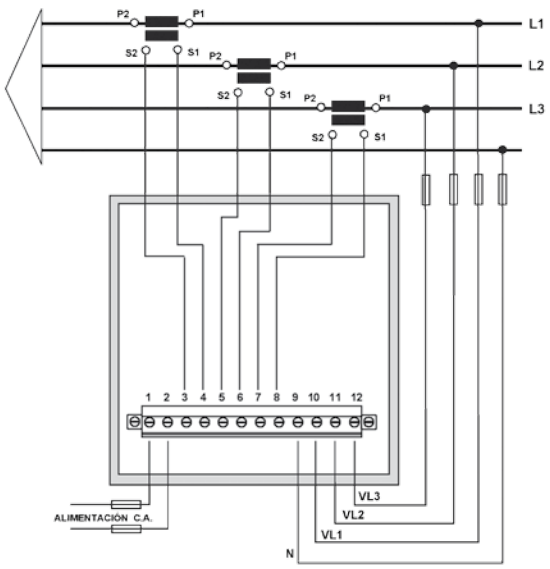
Dimensions



Window: 138$^{+0.8}$ x 138$^{+0.8}$ mm

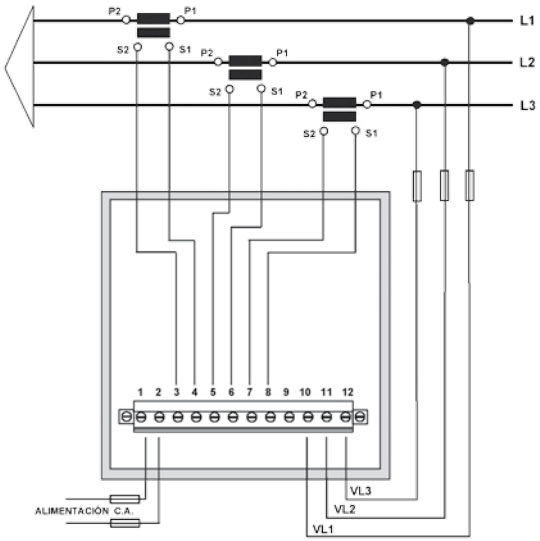
Connections

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

Power supply circuit	230 Vac (-15...+10%) For other values, see the coding table
Consumption	6 V·A
Frequency	45..0.65 Hz
Metering circuit	
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
Class/Accuracy	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power rating	1 % ± 2 digits
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity (non-condensing)	5 ... 95%
Build features	
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
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010** Double-insulated electric shock protection, class II	
Standards	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

CVM BD

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

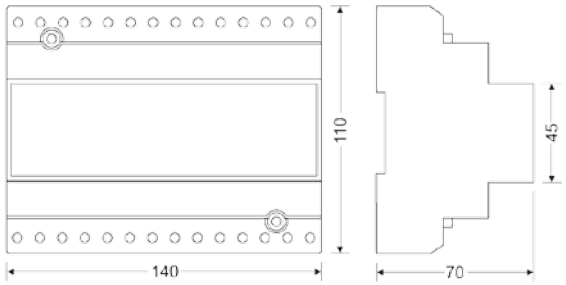
References

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

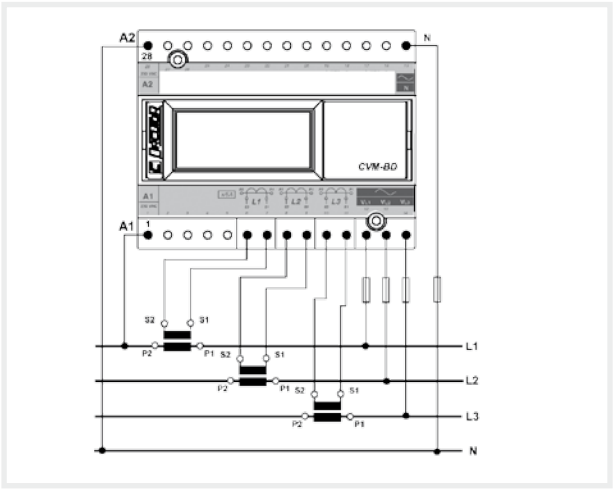
M	5	X	X	X	X	0	0	X	X	X	X	X
Code						Internal Code						
Power Supply Voltage (PSV)			Standard (230 Vac)				0					
			110 Vac				1					
			24..0.120 Vdc				5					
Voltage metered (VM)			Standard (300 V_{ph-n}/520 V_{ph-ph})					0				
			110 V_{ph-n} / 190 V_{ph-ph}					1				
			500 V_{ph-n} / 866 V_{ph-ph}					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

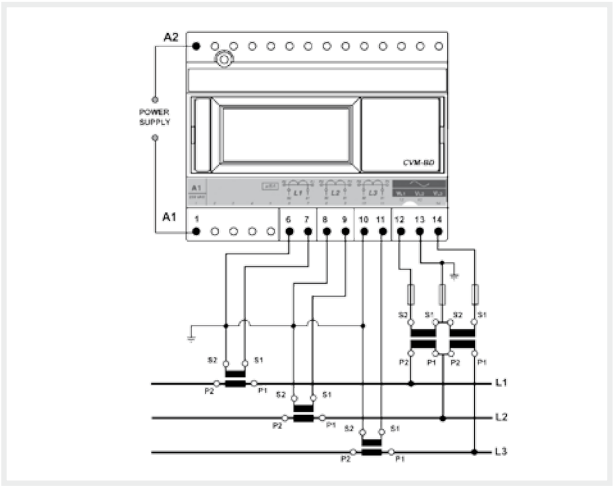


Connections

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

Power supply circuit	230 Vac (-15...+10%). For other values, see the coding table
Consumption	6 V·A
Frequency	45..0.65 Hz
Metering circuit	
Nominal voltage	500 Vac (ph-n) / 866 Vac (ph-ph)
Frequency	40...65 Hz
Current consumption of the circuit	0.6 V·A
Nominal current	... / 5 A
Overload (permanent)	1.2 I_n
Class/Accuracy	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power rating	1 % ± 2 digits
Internal memory	1 MB
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity (non-condensing)	5 ... 95%
Build features	
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
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010**. Double-insulated electric shock protection, class II	
Standards	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

CVM BDM

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

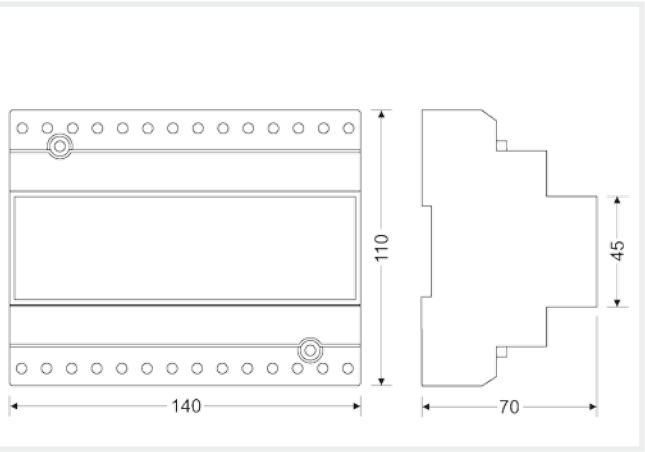
References

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

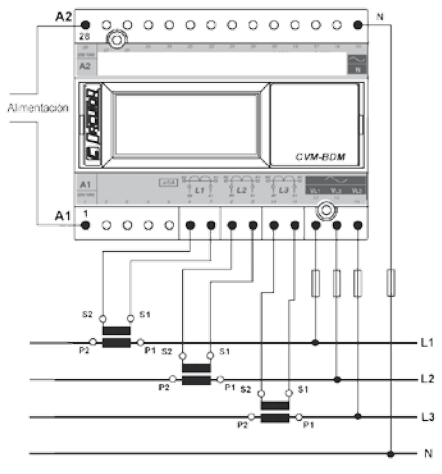
M	5	X	X	X	X	0	0	X	X	X	X	X	
Code						Internal Code							
Power Supply Voltage (PSV)								Standard (230 V ac)		0			
								110 V ac		1			
								24..0.120 Vdc		5			
Voltage measurement (VM)									Standard (300 V_{ph-n}/520 V_{ph-ph})		0		
									110 V_{ph-n} / 190 V_{ph-ph}		1		
									500 V_{ph-n} / 866 V_{ph-ph}		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

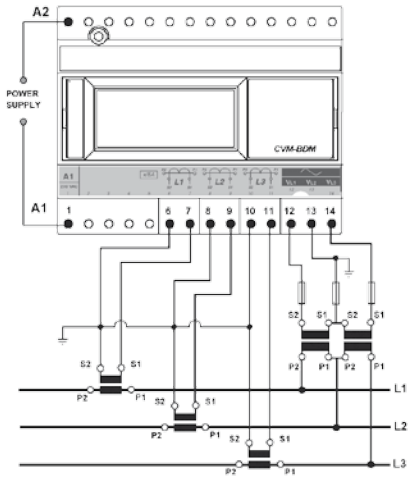


Connections

Three-phase network (low voltage)

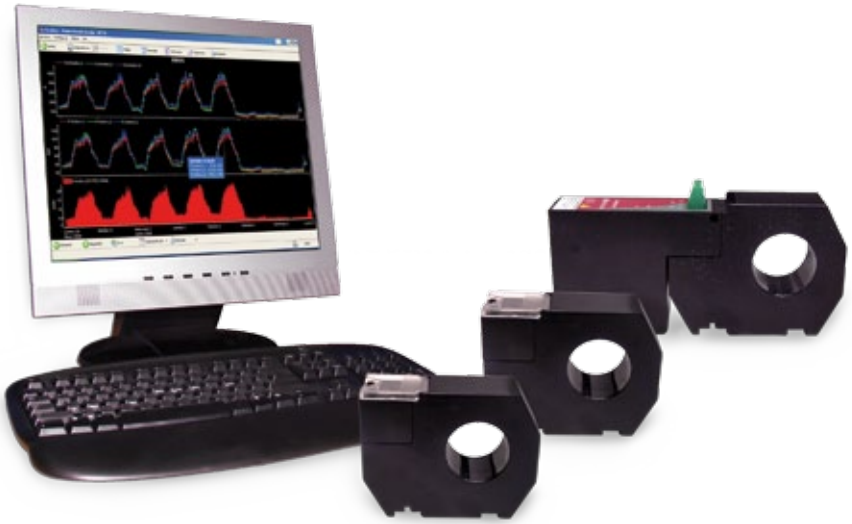


3 current transformers + 2 voltage transformers



Power Net

Three-phase power analyzer



Description

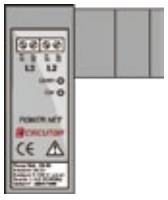
- Direct Current measuring, up to 1,000 Aac, depending on the type
- The measure points are composed of a PowerNet and 2 TC-PowerNet

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 - 0º

PowerNet - 90º



Features

Power supply circuit	400 Vac (-15...+10%) between L1-L2
Frequency	50...60 Hz
Consumption	4.2 V·A
Metering circuit	
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
Class/Accuracy	
Voltage	0.5 % ± 2 digits
Current	0.5 % ± 2 digits
Power rating	1 % ± 2 digits
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Relative humidity	5 ... 95%
Build features	
Type of box	VO self-extinguishing plastic
Degree of protection	IP 54
Dimensions	165 x 73 x 33 mm
Weight	220 g
Safety	
Designed for CAT III 300/520 Vac installations, in accordance with **EN 61010**. Double-insulated electric shock protection, class II	
Standards	
IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN 61010-1	

References

PowerNet Units

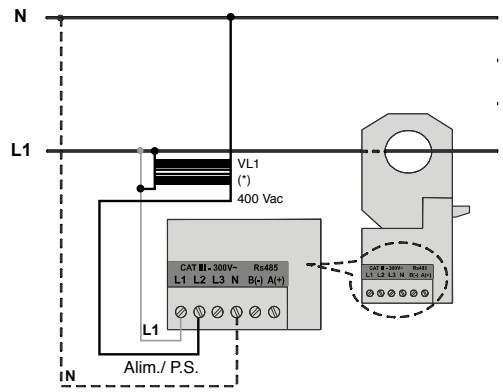
Metering current	Quadrants	Class	Communications	Protocol	Net section ∅ (mm)	Analyzer position with its TC	Type	Code
50 A	2	0,5	RS-485	Modbus/RTU	∅ 35 mm	0º	**Power Net-35-50**	**M52621**
100 A	2	0,5	RS-485	Modbus/RTU	∅ 35 mm	0º	**Power Net-35-100**	**M52622**
250 A	2	0,5	RS-485	Modbus/RTU	∅ 35 mm	0º	**Power Net-35-250**	**M52623**
500 A	2	0,5	RS-485	Modbus/RTU	∅ 70 mm	0º	**Power Net-70-500**	**M52624**
1 000 A	2	0,5	RS-485	Modbus/RTU	∅ 70 mm	0º	**Power Net-70-1000**	**M52625**

TC-PowerNet Units

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

Connections

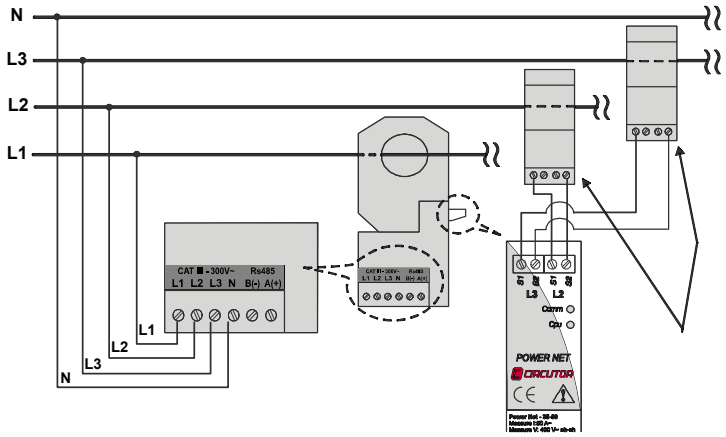
Single-phase system



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

Single-phase connection: 1 power Net

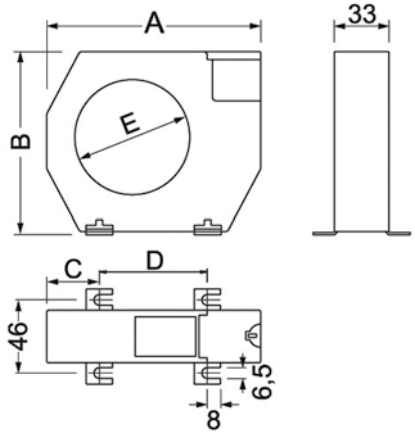
Unbalanced three-phase system



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 strings 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.

Aplication

- 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…+65ºC	
Relative humidity	5... 95% RH (non-condensing)	
Maximum operating altitude	2,000 metres	
Protection	IP 20	
TR8-RS-485 precision		
Linearity Error	± 0.1 %	Offset Error	0.075 % I_n
Total Error	± 0.5 % I_n	Range	2,5 .... 100% I_n
Resolution Error	± 0.075 % I_n	Voltage Error	1 %
Transformer precision		
Linearity Error (not including offset)	± 0.5%	Offset Drift / Temp.	±1 mV / ºC
Offset Error 25ºC	±10 mV a I_n=0	Thermal Gain Drift	±0.05 % / ºC
Safety		
Category III – 300 Vac (EN61010) Double-insulated electric shock protection class II		

TR8

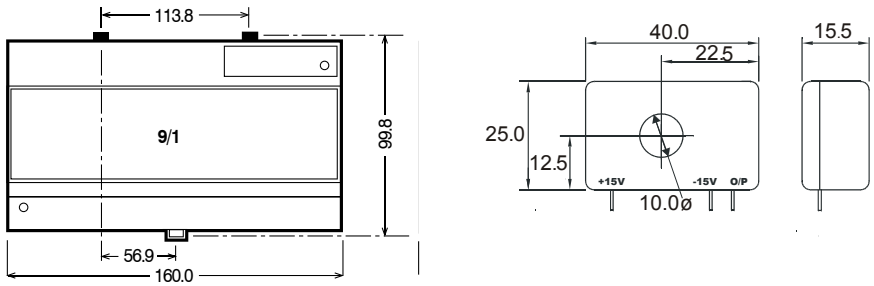
Multi-channel DC voltage and current analyzer

References

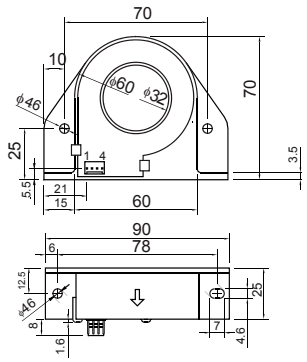
Current	Output	Communications	Description	Type	Code
Equipment, up to 25 A					
25 A	8	RS-485 Modbus/RTU	8 25 A_{dc} channels Connection of up to 2 M/TR8-25Ax4 (8 channels) Voltage measurement of 1000 V_{dc} 8 voltage-free digital inputs	**TR8-RS-485-25**	**M54600**
Equipment, up to 100 / 200 A					
Depends on transformer	8	RS-485 Modbus/RTU	8 100 A_{dc} channels Connection of up to 8 **M/TR8-100A** or **M/TR8-200A** One 1000 V_{dc} voltage input 8 voltage-free digital inputs	**TR8-RS-485-100/200**	**M54601**
Measurement modules					
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

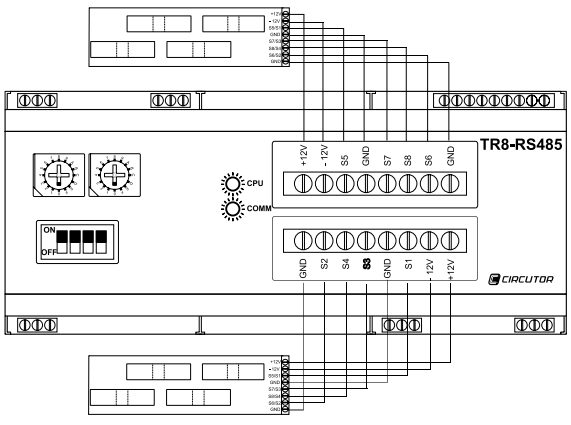


M/TR8-100/200

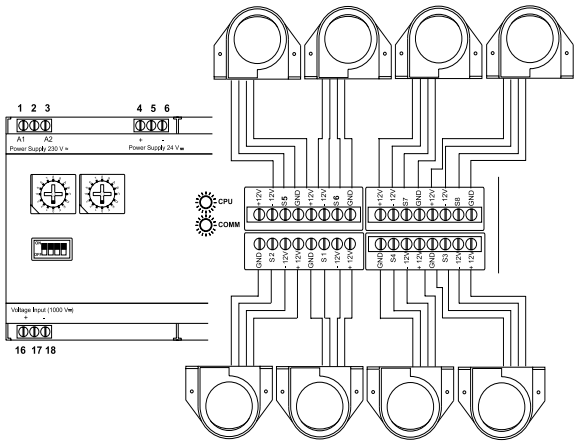


Conections

TR8-25

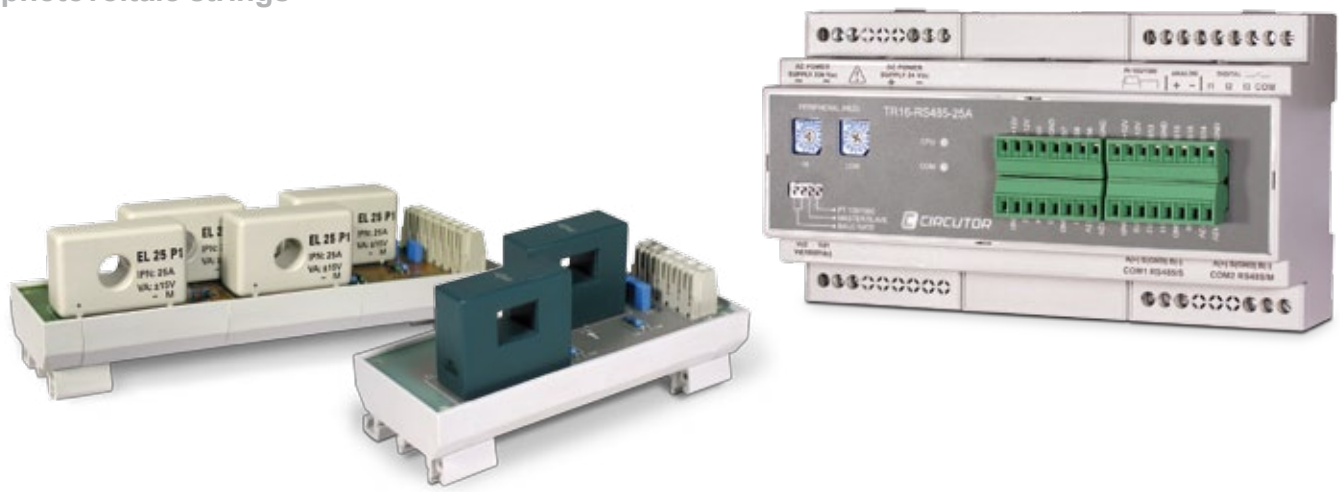


TR8-100/200



TR16

Multi-channel voltage and DC analyzer for photovoltaic strings



Description

TR16-RS-485 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

Power Supply	**AC**	**DC**
Nominal voltage	230 V ac ≈	24 Vdc =
Power supply tolerance	± 20%	± 10%
Frequency	50 Hz	-
Equipment consumption without transformers	2 V·A	2 W
Equipment consumption with 16 sensors (without load)	14 V·A	8 W
Equipment consumption with 16 sensors (without load)	24 V·A	14 W
Operating conditions		
Operating temperature	-10 ... 65 ºC	
Relative humidity	5...95 RH without condensation	
Maximum operating height	2,000 metres	
Protection	IP20	
TR16-RS485 accuracy		
Current measurement (without current sensor)	± 0.5 %	
Minimum current threshold	350 mA	
Voltage measurement	± 1 %	
Temperature input accuracy		
Pt100 / Pt1000 temperature probe	± 3 ºC	
Analogue input accuracy		
Input accuracy 0...20 mA	± 0.5 %	
Input impedance	165 Ω	
Resolution in dots	1024 dots	
Converter resolution	10 bits	
Safety		
Category III – 300 V AC (EN61010) Double-insulated electric shock protection class II		

TR16

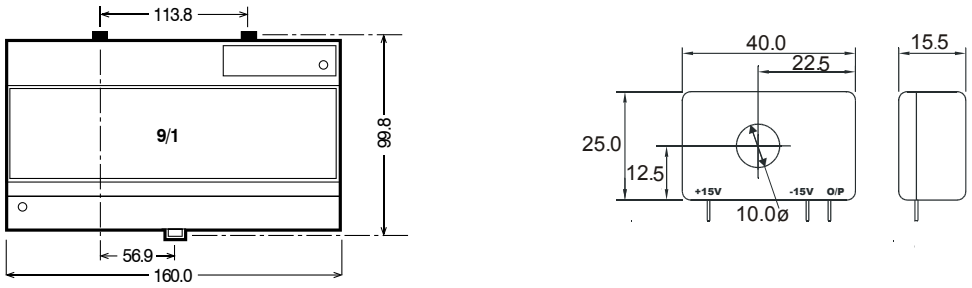
Multi-channel voltage and DC analyzer for photovoltaic strings

References

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

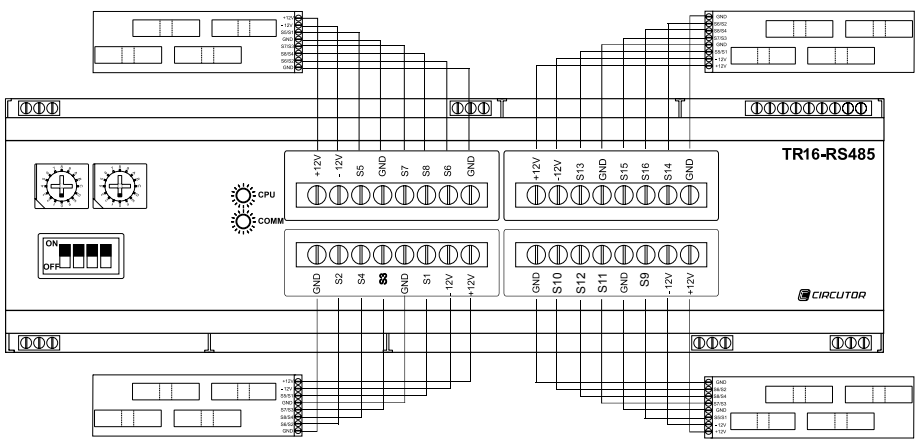
Dimensions

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 RS-232 or RS-485, or vice versa. The unit is fitted with a Web Server, from which the user can fully parametrize 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 RS-232/485 topologies on existing Ethernet infrastructures.

The selection of the network protocol series (RS-232 or RS-485) 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 V in alternating current, and from 120 to 410 V in direct current.

- Easy IP programming through the IP setup program (Windows)
- Easy access to the configuration Web Server once its IP is known
- RS-232 or RS-485 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 (RS-485)
- Compatible with any application on the market (**PowerStudio** / **PowerStudio SCADA**)

Application

Converting RS-2323 or RS-485 signals to Ethernet or viceversa

Features

Network protocols	TCP / UDP / MODBUS TCP / HTTP
Ethernet	10BaseT / 100BaseTX with autodetect (RJ45)
Serial port	RS-485/RS-232 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
Build features	
Box	Self-extinguishible polycarbonate UL94 PV0
Protection degree	IP20
Attachment	Can be attached to DIN rail 46277 (2 modules)
Environmental conditions	
Standard temperature	-10 / 60 °C B
Storage temperature	-40 / 85 °C
Humidity without condensation	5…95%
Safety	
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.	
Standards	
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 RS-232 / RS-485	**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..264 Vac / 2.5 VA / 47..63 Hz.
- LED Power, TX and RX
- Attachment. DIN 46277 (EN-50022)
- 3 Modules DIN 43 880
- Dimensions: 53 x 90 x 58 mm

Application

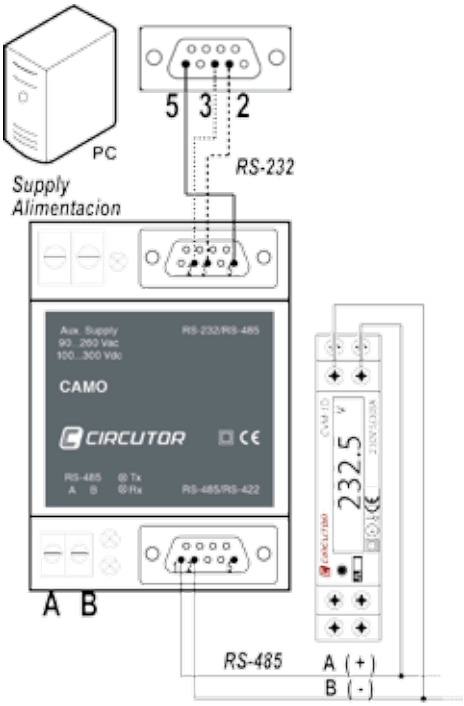
For any installation with various units connected to an RS-485 network and which must be monitored with an RS-232 connection.

Amplifier of Modbus RS-485 signals.

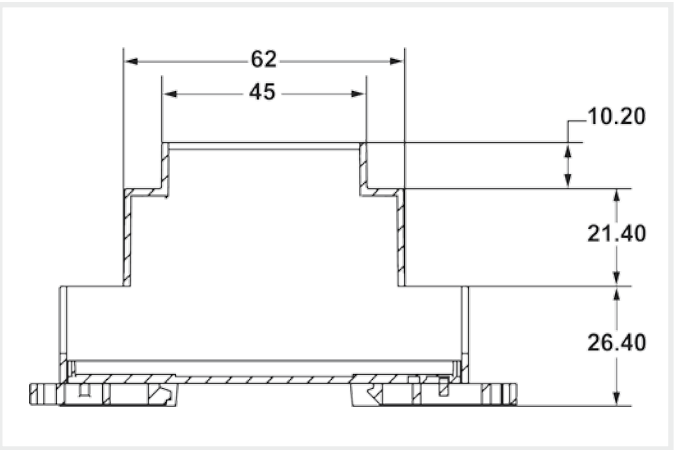
References

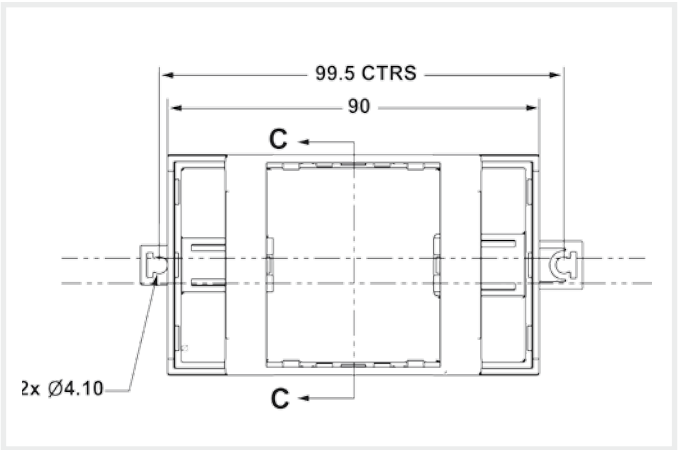
Type	Code
Amplifier / transducer	**M54090**

Connection



Dimensions





accessories

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

References

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

Application

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

CVM-MINI Adaptor

Front panel adaptor

Description

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

References

Type	Code
MINI panel adaptor	M5ZZF1

Application

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

Relation between products and accessories

		LM	TCP2RS+	CONVERTER	TP	POWER STUDIO	Adaptor panel
						software Power studio	
		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 M.3	M54032	M54020	depending on the type	M90231	M5ZZF1
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 accessori

PER ACTUALITZAR

		LM	TCP2RS+	CONVERTER	TP	POWER STUDIO	Adaptor panel
						software Power studio	
		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 M.3	M54032	M54020	depending on the type	M90231	M5ZZF1
CVM k2		•	•	•	•	•	-
MP3 / MP4							
CVM NRG 96		•	•	•	•	•	-
CVM MINI		•	•	•	•	•	•
CVM NET							
CVM 1D							
CVM 96		•	•	•	•	•	-
CVM 144		•	•	•	•	•	-
CVM BD		•	•	•	•	•	-
CVM BDM		•	•	•	•	-	-
POWER NET		-	•	•	-	•	-

CIRCUTOR