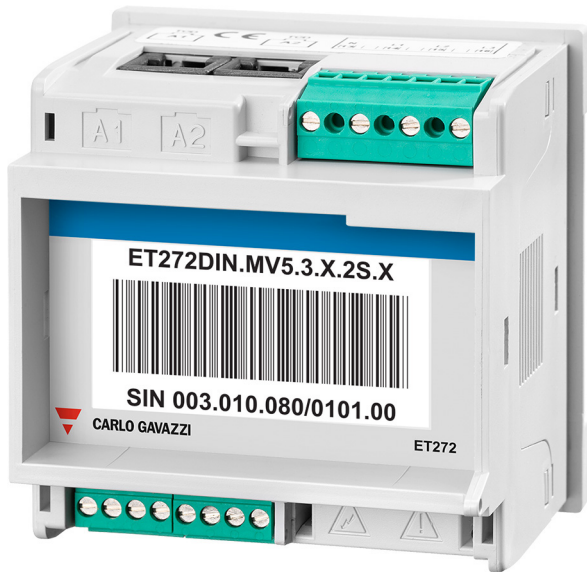


ET272



Multi-channel power analyzer



Description

Multi-load power analyzer for single or three-phase systems installable on DIN rails. Manages current input via one or two groups of split-core current sensors connected with RJ-11 connectors. The ET272 is equipped with RS485 ports for daisy chain connections.

Applications

ET272 is connected directly to current sensors in switchboards for simultaneous monitoring of multiple single- or three-phase loads in low voltage systems. It's created for both commercial and industrial environments, such as Data Centers: in these contexts, ET272 with VMU-C ensure that an entire Power Distribution Unit (PDU) is monitored. Moreover, this device guarantees a quick installation thanks to its automatic addressing and configuration through the dedicated function available in the WEB interface of the VMU-C. Suitable for retro-fit applications and for new installations where more flexibility is required.

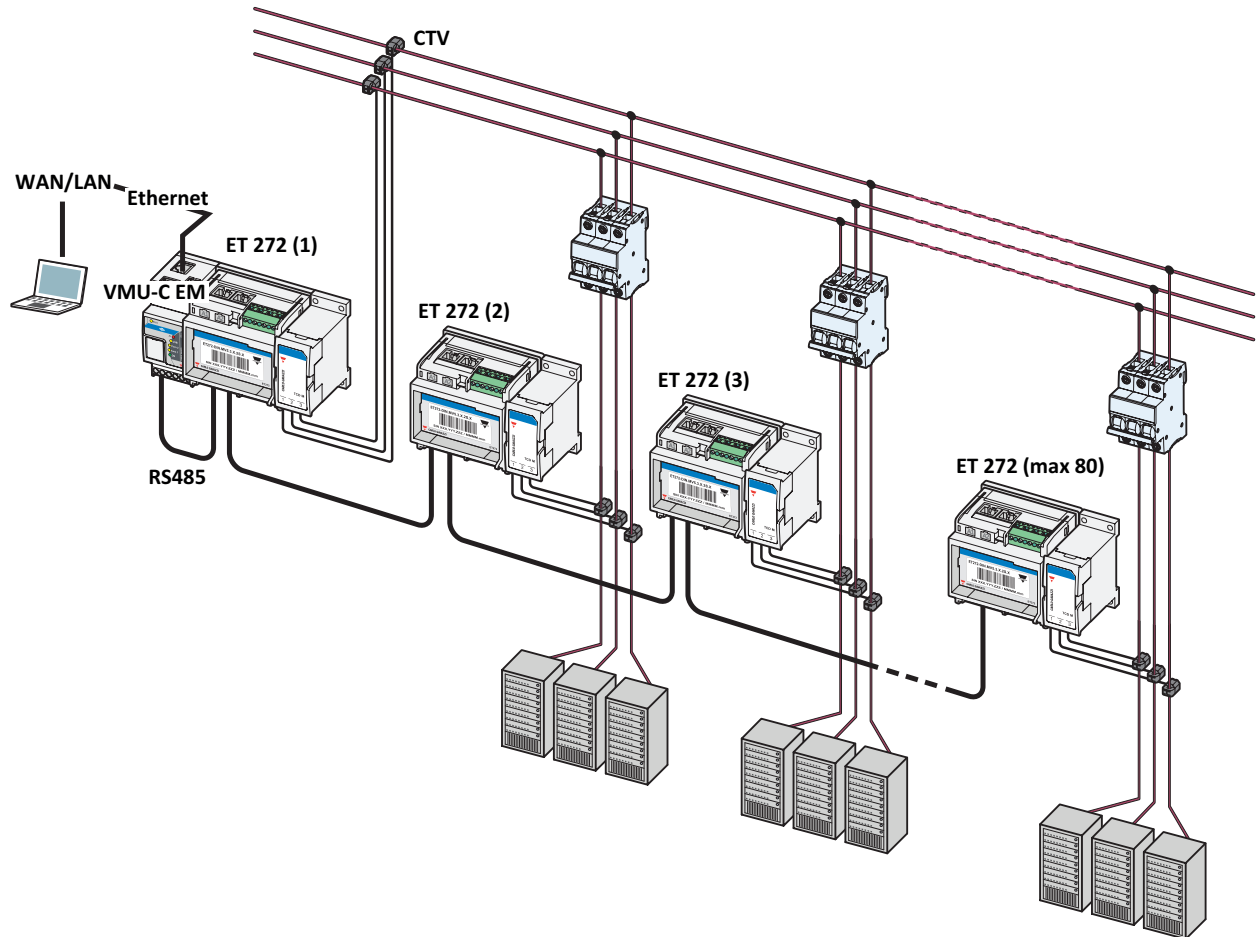
Main functions

- Measurement of energy consumption and main electrical variables of single- or three-phase loads.
- Single-phase and three-phase measurements.
- Transmission of data via serial communication.
- Automatic addressing via VMU-C.

Benefits

- **Reduced installation time and errors.** Equipped with detachable terminals for all connections. Connected to two groups of split-core current sensors with two cables fitted with RJ-11 connectors. For connections in cascade of multiple ET272s the voltage reference is required only once.
- **Installation flexibility.** It can be installed in new or existing single- and three-phase systems. Suitable for DIN rail mounting .
- **Granular analysis.** It provides single-phase or three-phase measurements (up to 2 three-phase loads or up to 6 single-phase loads).
- **Tamper-proof.** The terminals and display can be sealed.
- **Self detection** of primary current of the TCDxM (the dedicated current transformers).
- **Easy identification.** The labels supplied with the instrument guarantee a quick identification and the subsequent commissioning (powered by VMU-C).
- **Quick installation.** The ET272s automatic addressing (via VMU-C) and configuration guarantee a quick installation. In a Data Center with server racks using power bus-bar trunking system, costly commissioning time can be reduced up to 94%.

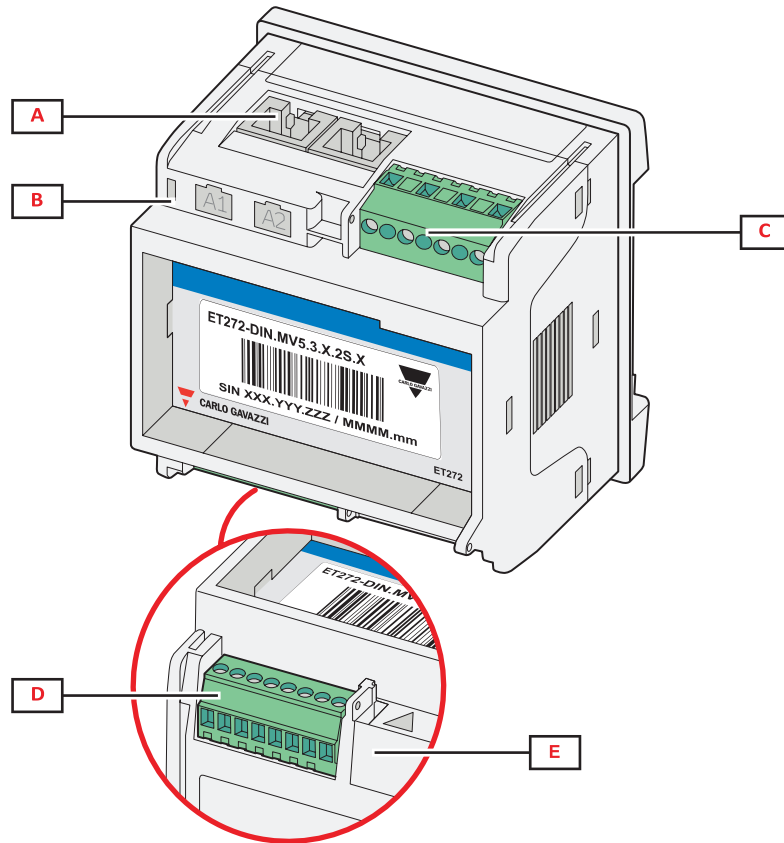
Architecture



Main features

- Up to 2 three-phase loads or 6 single-phase loads managed simultaneously.
- Up to 400 A input current via pre-cabled groups of current sensors (TCDxM) or any primary current of current up to 10000 A sensor with 0.333 V secondary output (via connection adapter TCDMM).
- Single-phase or three-phase measurements: V, A, W/VA/var, kWh, kvarh, PF.
- Accuracy: better than a combination of a class 1 meter and a class 0.5 current transformer.
- *Easy connection* function.
- Up to 80 ET272 connected to a VMU-C
- Additional RS485 port for chain connection.
- Self power supply via voltage inputs.
- Detachable terminals and sealable terminal caps.

Structure



Area	Description
A	RJ-11 connector for connection to transformer block.
B	Power supply status LED.
C	Detachable voltage input terminals.
D	Detachable RS485 port terminals.
E	Plastic protection cover or terminals for voltage connection in cascade.

Features

General

Material	Noryl, self-extinguishing V-0 (UL 94)
Protection degree	Front: IP40, Terminals: IP20
Terminals	Type: detachable Maximum section: 1.5 mm ² , Torque: 0.2/0.25 Nm
Overvoltage category	Cat. III
Pollution degree	2
Noise rejection (CMRR)	100 dB, from 48 to 62 Hz
Insulation	See "Input and output insulation"
Mounting	DIN rail
Weight	400 g (packaging included)

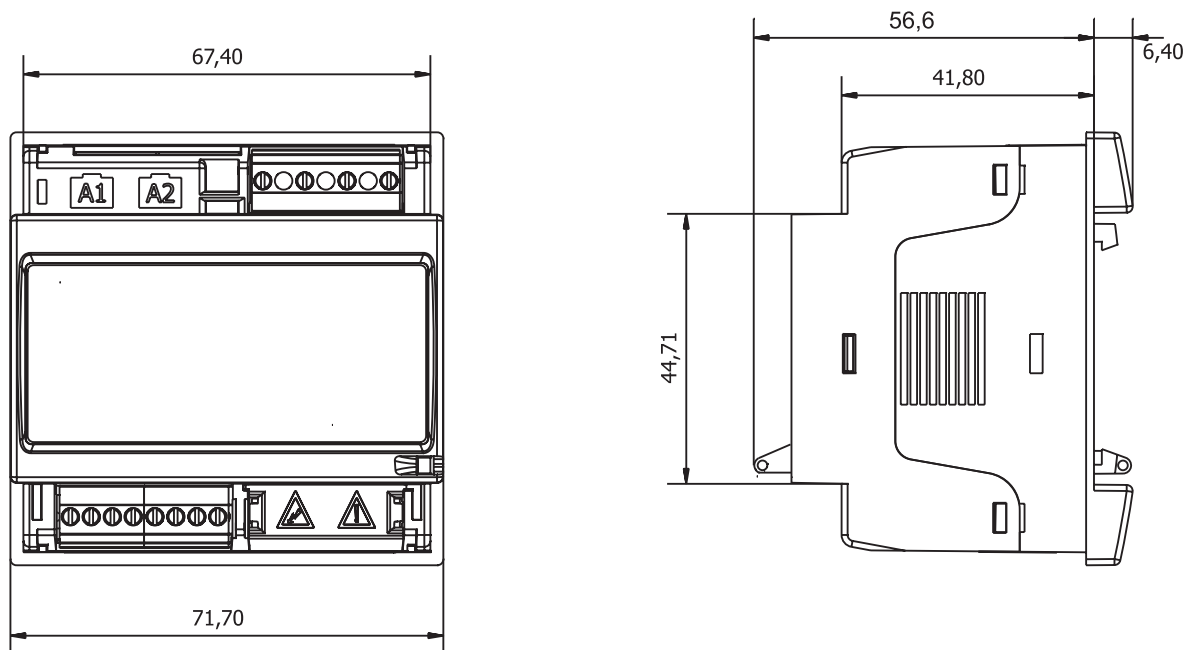


Fig. 1 DIN rail

Environmental specifications

Operating temperature	From -25 to +55 °C/from -13 to +131 °F
Storage temperature	From -30 to +70 °C/from -22 to +158 °F

NOTE: R.H. < 90 % non-condensing @ 40 °C / 104 °F.



Input and output insulation

Type	Voltage input and self power supply	Current inputs	RS485 port
Voltage input and self power supply	-	Reinforced *	Double **
Current inputs	Reinforced *	-	Double **
RS485 port	Double **	Double **	-

*By limiting impedance

**2.5 kV ac 1 min (4 kV pk 1.2/50 μ s)+ limiting impedance

Conformity

Directives	2014/30/EU (EMC - Electro Magnetic Compatibility) 2011/65/EU (Electric-electronic equipment hazardous substances)
Standards	Electromagnetic compatibility (EMC) - emissions and immunity: EN62052-11 Electrical safety: EN61010-1 Pulse outputs: IEC62053-31, DIN43864 Metrology: EN62053-21, EN62053-23
Approvals	 

Electrical specifications

Electrical system and loads

Managed electrical system	Three-phase with neutral (4-wire)
Number of loads managed	Up to 2 three-phase loads or up to 6 single-phase loads

Voltage inputs

	MV5
Voltage connection	Direct or via VT
Rated voltage L-N (from Un min to Un max)	From 160 to 240 V
Rated voltage L-L (from Un min to Un max)	From 277 to 415 V
Voltage tolerance	-10%, +10%
Overload	Continuous: 1.2 Un max For 500 ms: 2 Un max
Input impedance	1600 k Ω
Frequency	From 45 to 65 Hz



Current inputs

Current connection	Only via transformer block TCDxM or TCDMM
Rated current (I_n)	60 A: TCD0M 100 A: TCD1M 200 A: TCD2M 400 A: TCD3M Up to 10000 A: TCDMM
Minimum current (I_{min})	0.02 I _n
Maximum current (I_{max})	1.2 I _n
Start-up current (I_{st})	0.002 I _n
Overload	Continuous: 1.2 I _n For 500 ms: 2 I _n
Input impedance	< 0.2 VA

Power supply

Power supply	Self powered, between L2 and L3
Consumption	2 W, ≤ 4 VA

Measurements

Method	TRMS measurements of distorted waveforms
Sampling	1600 samples/s @50 Hz 1900 samples/s @60 Hz

Available measurements

Three-phase loads

Energy	Active imported
Current	Phase 1 Phase 2 Phase 3
Voltage	Phase-phase Phase-neutral
Active power	Phase 1 Phase 2 Phase 3 Total load
Power factor	Total load

Single-phase loads

Energy	Active imported
Current	Phase
Voltage	Phase-neutral
Active power	Total load

Measurement accuracy

ET272

Current	
From 0.05 I _n to I _{max}	±(0.5% rdg)
From 0.02 I _n to 0.05 I _n	±(1.0% rdg)
Phase-phase voltage	
From (U _n min -10%) to (U _n max +10%)	±(0.5% rdg)
Phase-neutral voltage	
From (U _n min -10%) to (U _n max +10%)	±(1% rdg)
Active power (PF=1)	
From 0.05 I _n to I _{max}	±(1% rdg)
From 0.02 I _n to 0.05 I _n	±(1.5% rdg)
Active power (PF=0.5L, 0.8C)	
From 0.1 I _n to I _{max}	±(1% rdg)
From 0.05 I _n to 0.1 I _n	±(1.5% rdg)

ET272+TCD0M, TCD1M, TCD2M or TCD3M

Current	
From 0.2 I _n to I _{max}	±(0.75% rdg)
From 0.05 to 0.2 I _n	±(1% rdg)
From 0.02 I _n to 0.05 I _n	±(1.25% rdg)
Active power (PF=1)	
From 0.2 I _n to I _{max}	±(1.25% rdg)
From 0.05 to 0.2 I _n	±(1.5% rdg)
From 0.02 I _n to 0.05 I _n	±(2% rdg)

RS485 port

Protocol	Modbus RTU
Devices on the same bus	Max 160 (1/5 unit load)
Communication type	Multidrop, bidirectional
Connection type	Detachable terminals, 2 wires, maximum distance 1000 m
Configuration parameters	Modbus address (from 1 to 247) Baud rate (9.6) Parity (None / Even)
Configuration mode	Via VMU-C self-addressing function

Special functions

- Measurements independent from direction of current (Easy connection function)

Connection Diagrams

Note: for three-phase systems without neutral (3 wires) do not consider the connection to neutral **N**.
 Note: fuses F of 315 mA, if required by local law.

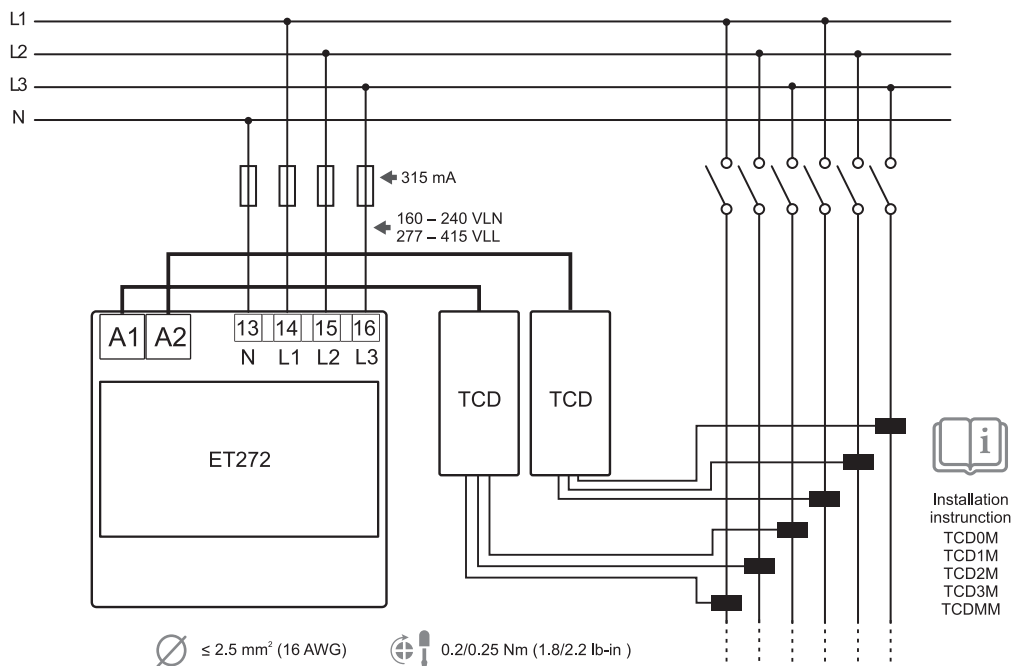


Fig. 2 Voltage and current input connection diagram

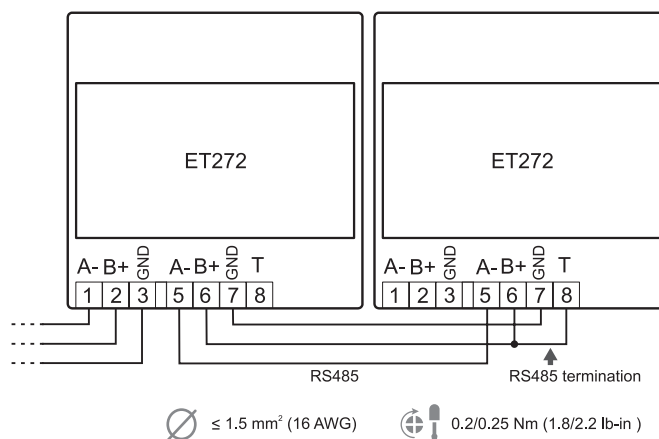


Fig. 3 RS485 serial port connection diagram

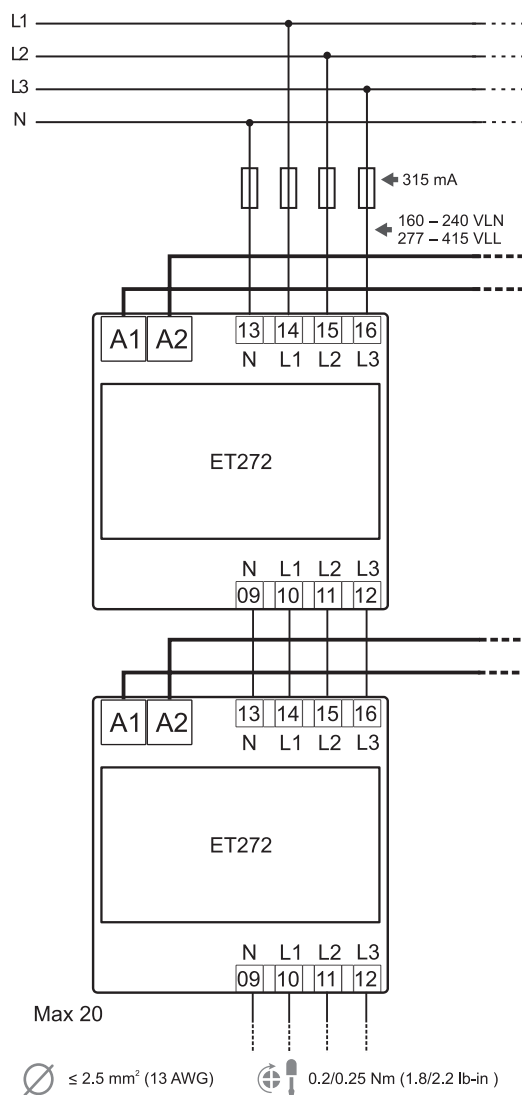


Fig. 4 Voltage input cascade connection diagram

References

Order code

 **ET272DINMV53X2SX (16 total characters)**

Accessories: order codes

Code	Options	Description
EM270WS V 1T <input type="checkbox"/>	Replacing the symbol <input type="checkbox"/> with the cable length. Lengths available: 30, 60, 90, 150, 200 cm.	Pre-wired cables for voltage connection (one terminal block).
EM270WS V 2T <input type="checkbox"/>	Replacing the symbol <input type="checkbox"/> with the cable length. Lengths available: 30, 60, 90, 150, 200 cm.	Pre-wired cables for voltage connection (two terminal blocks).
EM270WS S 2T <input type="checkbox"/>	Replacing the symbol <input type="checkbox"/> with the cable length. Lengths available: 60, 90, 120, 180, 230 cm.	Pre-wired cables for RS485 connection (two terminal blocks).
EM270WS T V	-	20 detachable terminal blocks for voltage connections.
EM270WS T C	-	20 plastic protection covers for voltage output.
EM270WS T S	-	20 detachable terminal blocks for daisy chain connection of RS485 port.
EM200-96 ADAPTER	-	Adapter to 96 x 96 panel mounting.

Further reading

Information	Document	Where to find it
Instruction manual	Instruction manual - ET272	www.productselection.net

CARLO GAVAZZI compatible components

Purpose	Component name/code key	Notes
Current measurement accessories (mandatory)	TCD0M TCD1M TCD2M TCD3M TCDMM	See next chapter
Monitor data from several analyzers	VMU-C EM	See relevant datasheet

TCD_M family



TCD0M, TCD1M, TCD2M, TCD3M for EM271/ET272



Main features

- 3 split core current sensors
- Primary current from 60 A to 400 A (depends on the model)
- Hole diameter from 9.6 mm to 20.5 mm (depends on the model)
- Connection to the EM271/ET272 with cable with RJ-11 connector
- DIN rail mounting
- Primary current self-detection

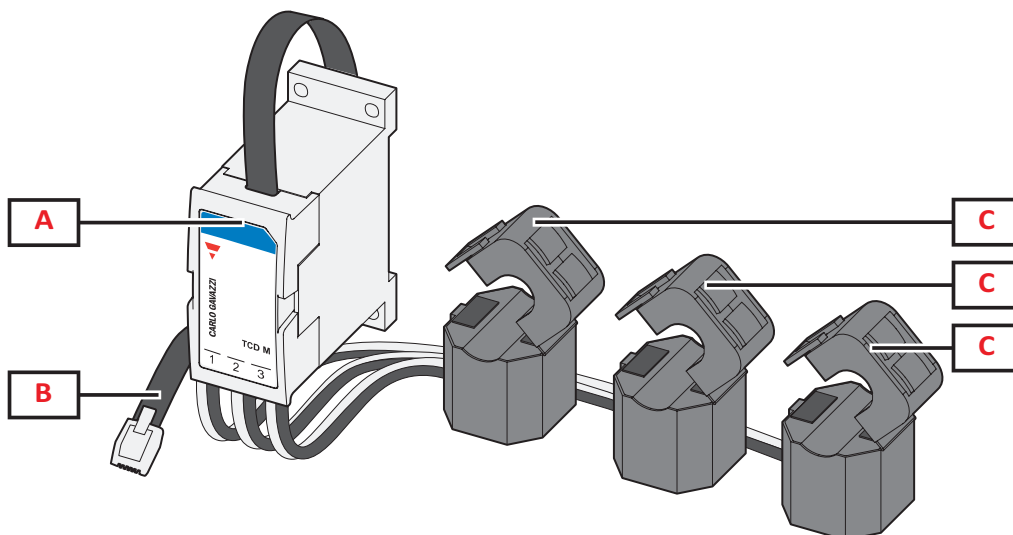
Description

3-channel split core current transformer block for power analyzer EM271/ET272. It manages primary current from 60 A to 400 A (depends on the model) and the value is read automatically by the EM271/ET272 to eliminate the need for configuration and calibration by the user. It is equipped with RJ-11 connectors for simple connection to the EM271/ET272.

Main functions

- Conversion of current for input to the power analyzer EM271/ET272.

Structure



Area	Description
A	Integrator
B	Cable with RJ-11 connectors for connection to the EM271/ET272
C	Split core current sensors

Features

General

Material	PC, PA66
Protection degree	IP20
Terminals	RJ-11 connector
Overvoltage category	Cat. III
Pollution degree	2
Insulation	60s 1500 V ac (RJ connectors to housing)
Mounting	DIN rail
Weight (packaging included)	TCD0M: 290 g TCD1M: 360 g TCD2M: 535 g TCD3M: 885 g

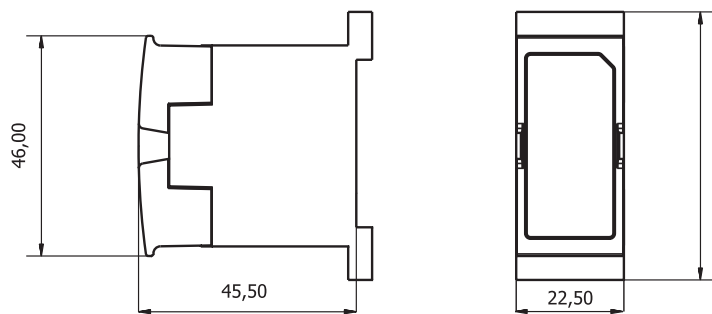


Fig. 5 Integrator (mm)

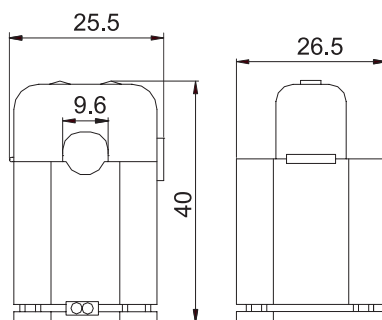


Fig. 6 TCD0M (mm)

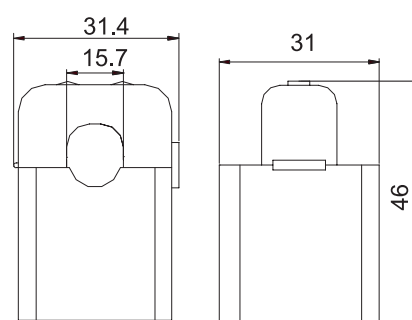


Fig. 7 TCD1M (mm)

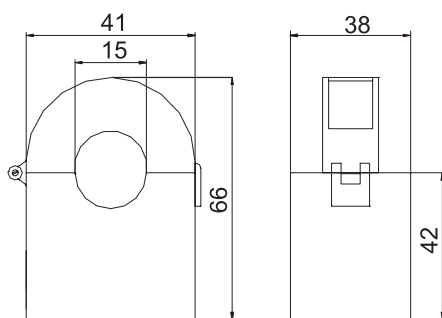


Fig. 8 TCD2M (mm)

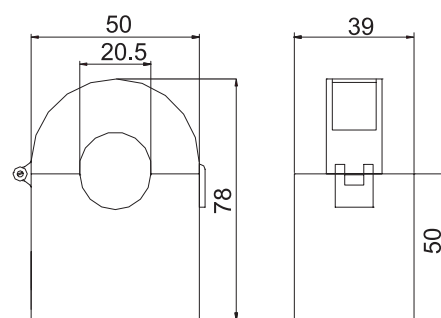


Fig. 9 TCD3M (mm)

Environmental specifications

Operating temperature	From -25 to +55 °C/from -13 to +131 °F
Storage temperature	From -30 to +70 °C/from -22 to +158 °F

Electrical specifications

Primary current (I _n)	60 A: TCD0M 100 A: TCD1M 200 A: TCD2M 400 A: TCD3M
Maximum current (continuous)	1.2 I _n
Maximum system voltage	0.72 kV ac
Frequency	From 45 to 65 Hz
Accuracy	0.5%
Phase error	≤4°

Connection Diagrams

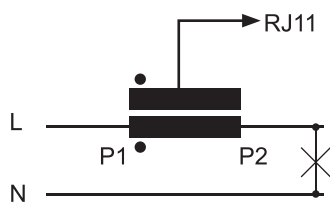


Fig. 10 Current connection

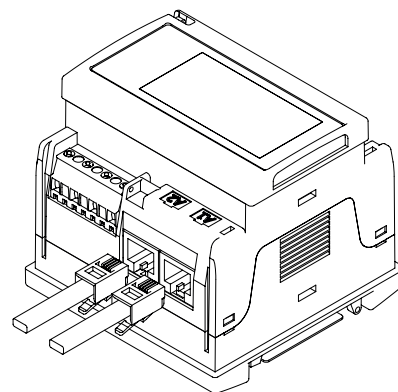


Fig. 11 RJ11 connections

References

Order code

TCD □ □ 80 CM X

Enter the code, replacing the symbol □ with the selected option (e.g.: TCD 0 M 60 80 CM X)

Code	Options	Description
T	-	-
C	-	-
D	-	-
□	0M60	60 A Primary current
	1M100	100 A Primary current
	2M200	200 A Primary current
	3M400	400 A Primary current
8	-	-
0	-	-
C	-	-
M	-	-
X	-	-

Further reading

Information	Document	Where to find it
Instruction manual	Instruction manual - TCD_M	www.productselection.net
Measure and display consumption of connected circuits	EM271	-
Measure consumption of connected circuits	ET272	-

CARLO GAVAZZI compatible components

Purpose	Component name/code key	Notes
Measure and display consumption of connected loads	EM271	-
Measure and display consumption of connected loads	ET272	-

TCDMM



3-phase adapter for EM271/ET272



Main features

- Suitable for 3 current sensors (0.333 V)
- Primary current up to 10000 A
- Connection to the EM271/ET272 with cable with RJ-11 connector
- DIN rail mounting
- Screwless terminals

Main functions

- Conversion of current for input to the power analyzer EM271/ET272.

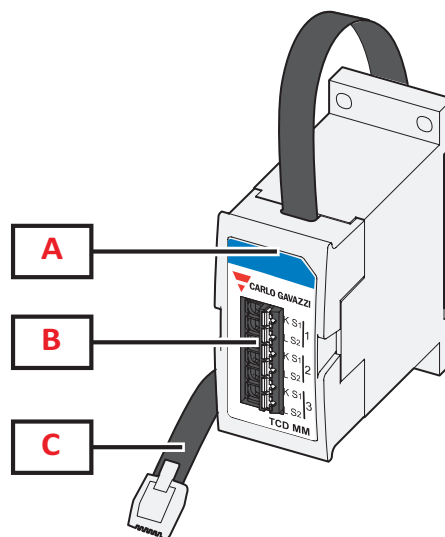
Description

3-phase adapter for power analyzer EM271/ET272.

This manages 3 current sensor (0.333 V output) and the primary value is set by the user via keypad or via software.

It is equipped with RJ-11 connectors for simple connection to the EM271/ET272.

Structure



Area	Description
A	Integrator
B	Push-in wire connector
C	Cable with RJ-11 connectors for connection to the EM271/ET272

Features

General

Material	PC, PA66
Protection degree	IP20
Terminals	RJ-11 connector
Overtoltage category	Cat. III
Pollution degree	2
Mounting	DIN rail
Weight (packaging included)	80 g

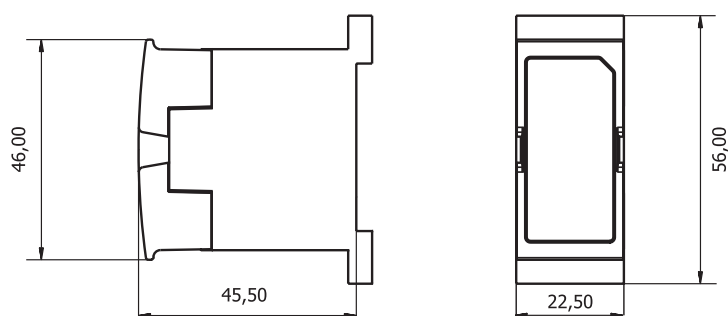


Fig. 12 (mm)

Environmental specifications

Operating temperature	From -25 to +55 °C/from -13 to +131 °F
Storage temperature	From -30 to +70 °C/from -22 to +158 °F

Electrical specifications

Primary current (In)	3x 0.333V
Maximum current (continuous)	1.2 In
Maximum system voltage	0.72 kV ac
Frequency	From 45 to 65 Hz

Connection Diagrams

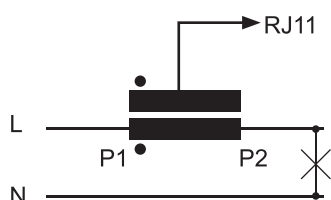


Fig. 13 Current connection

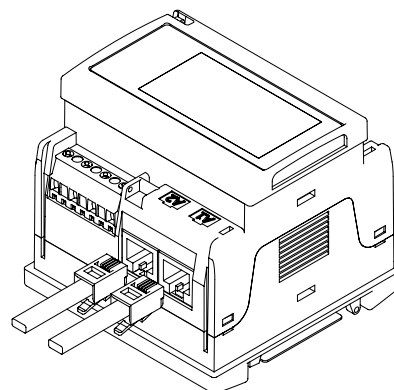


Fig. 14 RJ11 connections

References

Order code



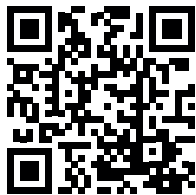
TCDMM XXX 80CM X

Further reading

Information	Document	Where to find it
Instruction manual	Instruction manual - TCDxM	www.productselection.net

CARLO GAVAZZI compatible components

Purpose	Component name/code key	Notes
Measure and display consumption of connected loads	EM271	-
Current sensors 0.333 V secondary output	CTV1X, CTV2X, CTV3X, CTV4X, CTV8X	-
Measure consumption of connected circuits	ET272	-



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