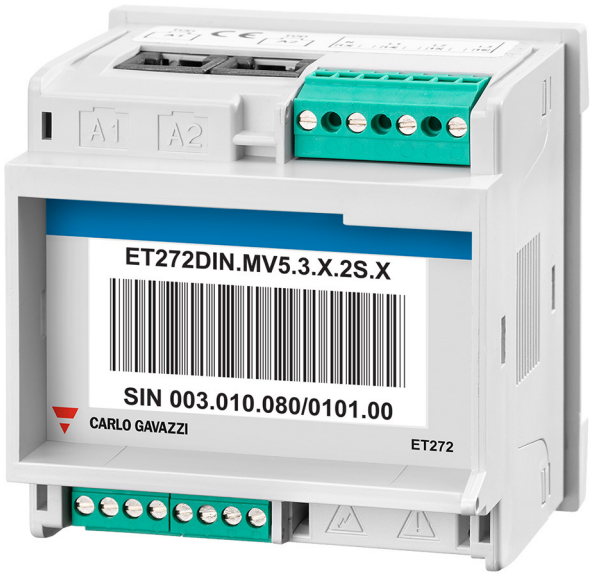
ET272

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.

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%.

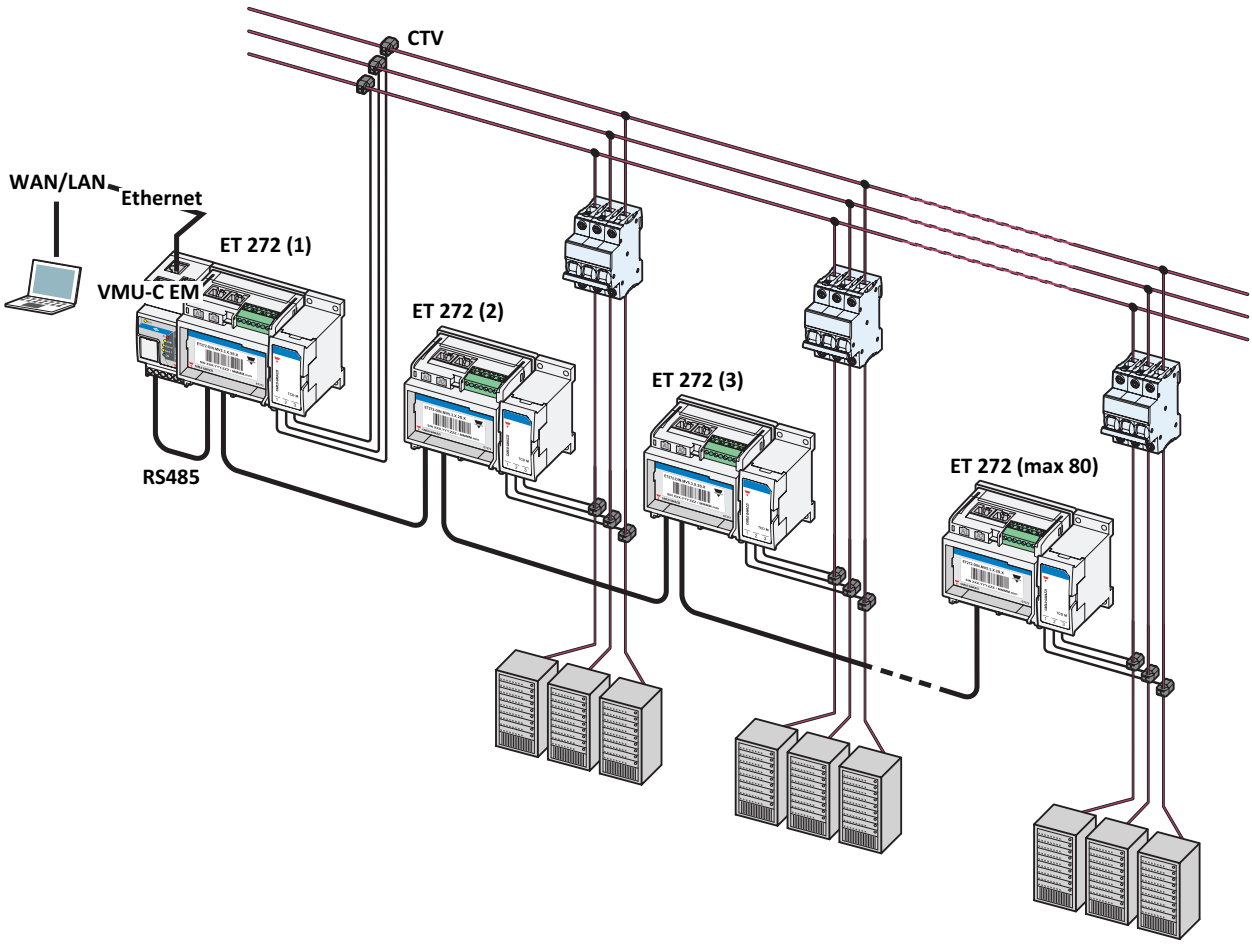
Applications

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.

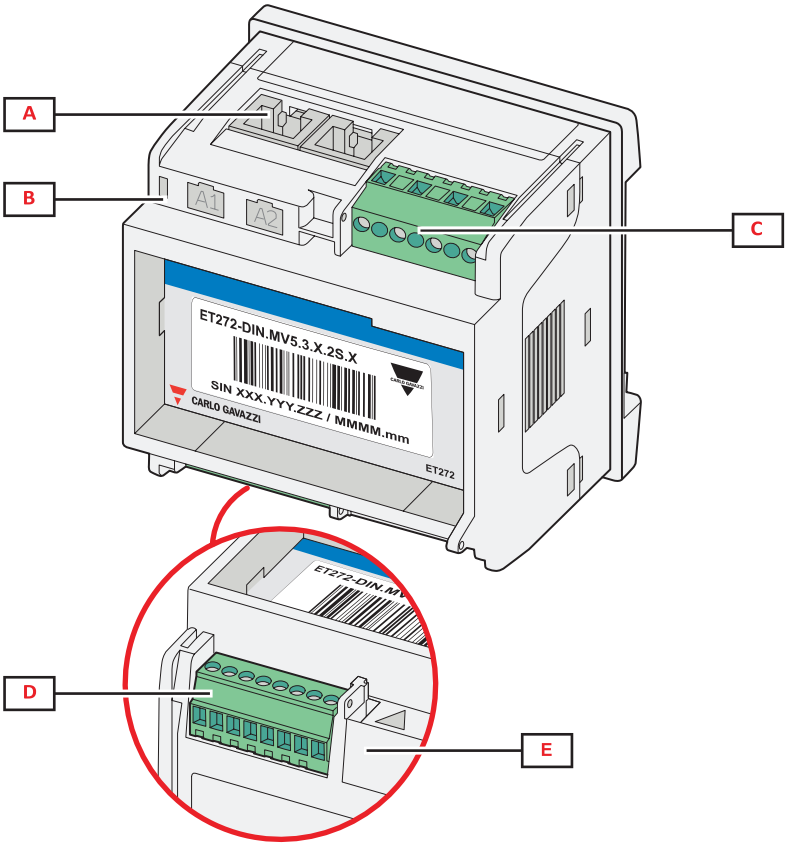
Architecture



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 mm², 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)

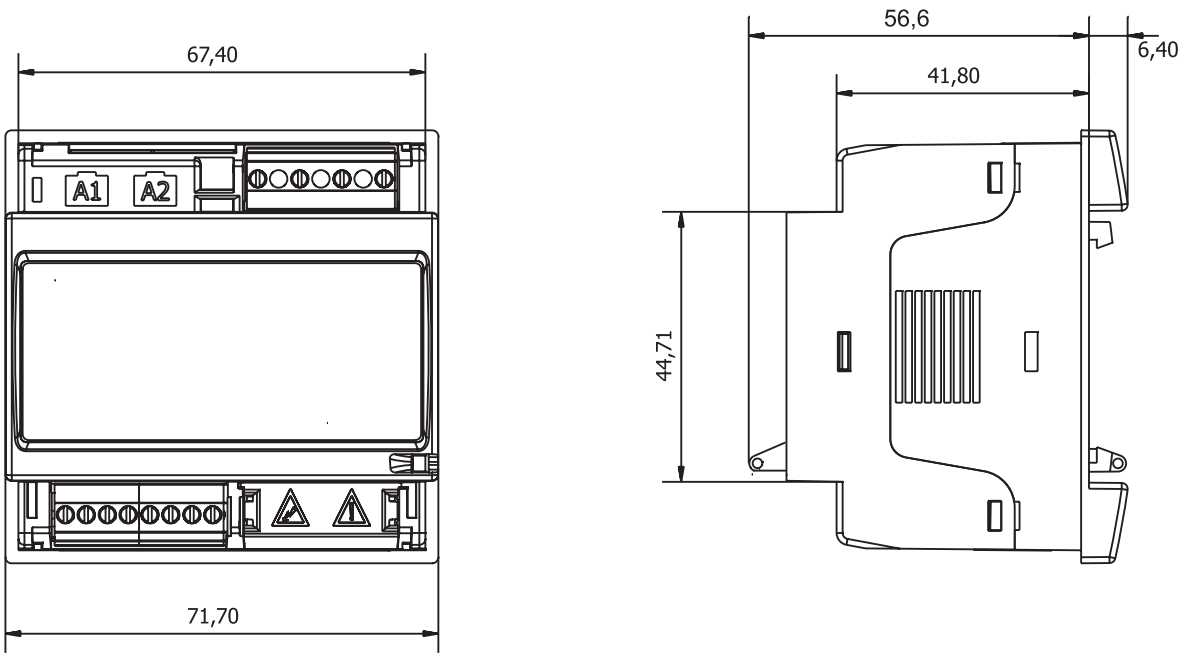


Fig. 1 *DIN rail*

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 µs)+ 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	CE c UL us LISTED

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 kΩ
Frequency	From 45 to 65 Hz

Current inputs

Current connection	Only via transformer block TCDxM or TCDMM
Rated current (In)	60 A: TCD0M 100 A: TCD1M 200 A: TCD2M 400 A: TCD3M Up to 10000 A: TCDMM
Minimum current (Imin)	0.02 In
Maximum current (Imax)	1.2 In
Start-up current (Ist)	0.002 In
Overload	Continuous: 1.2 In For 500 ms: 2 In
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 In to Imax	±(0.5% rdg)
From 0.02 In to 0.05 In	±(1.0% rdg)
Phase-phase voltage	
From (Un min -10%) to (Un max +10%)	±(0.5% rdg)
Phase-neutral voltage	
From (Un min -10%) to (Un max +10%)	±(1% rdg)
Active power (PF=1)	
From 0.05 In to Imax	±(1% rdg)
From 0.02 In to 0.05 In	±(1.5% rdg)
Active power (PF=0.5L, 0.8C)	
From 0.1 In to Imax	±(1% rdg)
From 0.05 In to 0.1 In	±(1.5% rdg)

ET272+TCD0M, TCD1M, TCD2M or TCD3M

Current	
From 0.2 In to Imax	±(0.75% rdg)
From 0.05 to 0.2 In	±(1% rdg)
From 0.02 In to 0.05 In	±(1.25% rdg)
Active power (PF=1)	
From 0.2 In to Imax	±(1.25% rdg)
From 0.05 to 0.2 In	±(1.5% rdg)
From 0.02 In to 0.05 In	±(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.

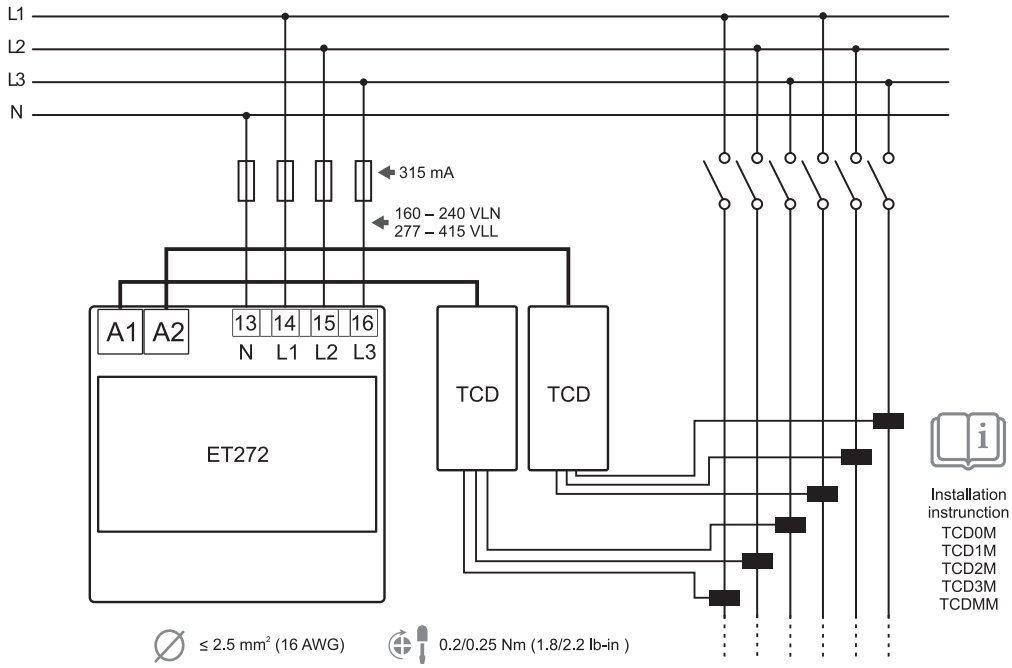


Fig. 2 *Voltage and current input connection diagram*

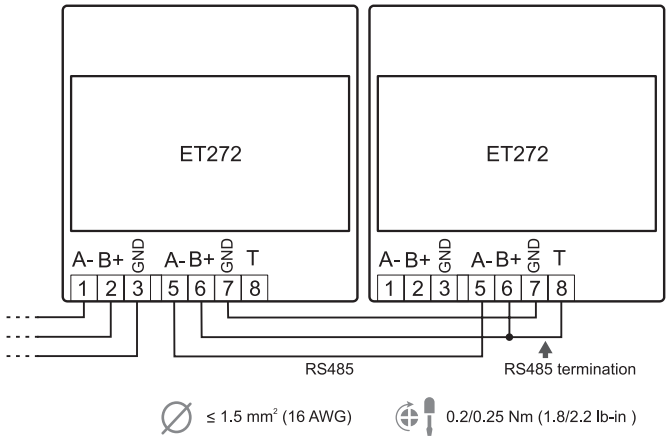


Fig. 3 *RS485 serial port connection diagram*

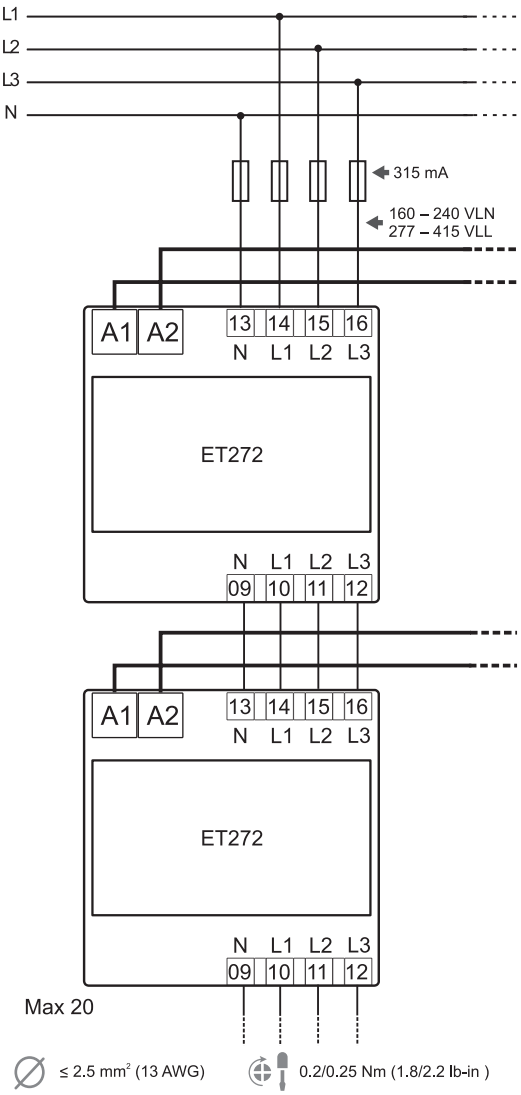


Fig. 4 *Voltage input cascade connection diagram*

References

Order code

ET272DINMV53X2SX (16 total characters)

Accessories: order codes

Code	Options	Description
EM270WS V 1T ☐	Replacing the symbol ☐ with the cable length. Lengths available: **30, 60, 90, 150, 200** cm.	Pre-wired cables for voltage connection (one terminal block).
EM270WS V 2T ☐	Replacing the symbol ☐ with the cable length. Lengths available: **30, 60, 90, 150, 200** cm.	Pre-wired cables for voltage connection (two terminal blocks).
EM270WS S 2T ☐	Replacing the symbol ☐ 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

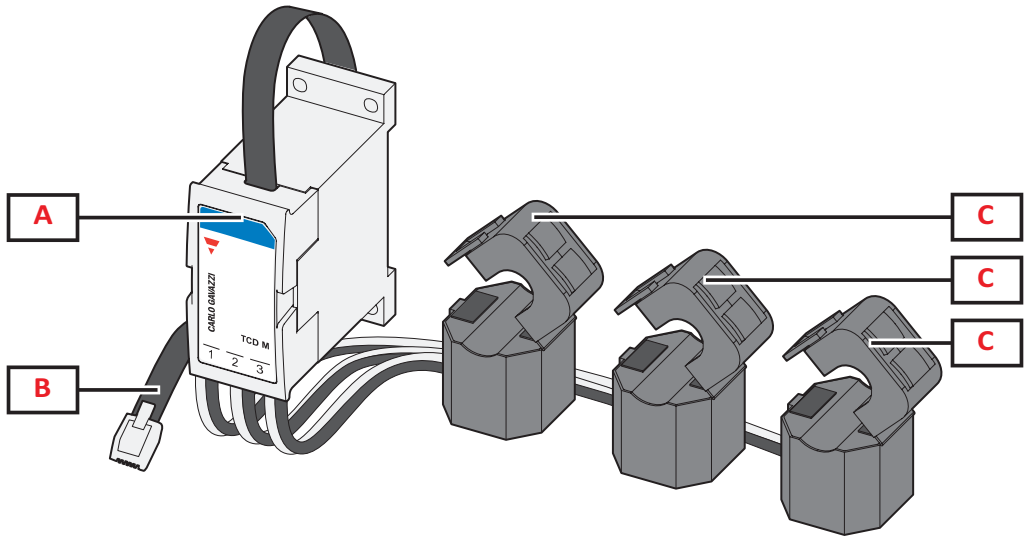
Description

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

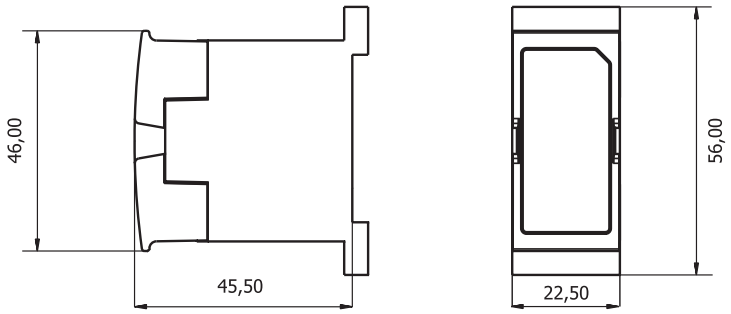


Fig. 5 *Integrator (mm)*

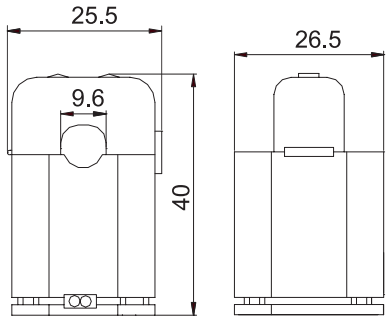


Fig. 6 *TCD0M (mm)*

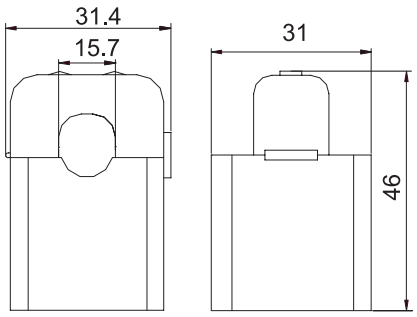


Fig. 7 *TCD1M (mm)*

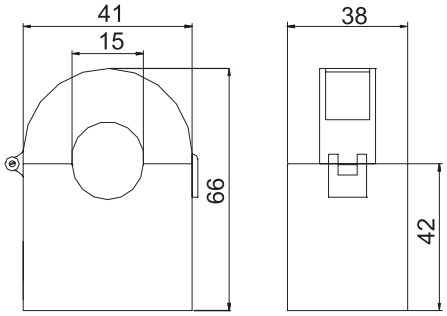


Fig. 8 *TCD2M (mm)*

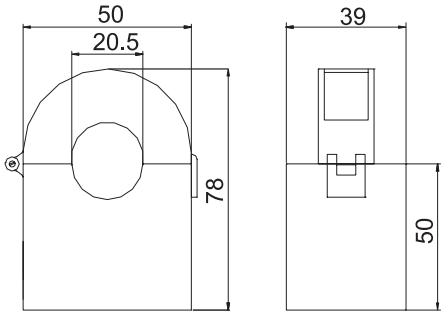


Fig. 9 *TCD3M (mm)*

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

Connection Diagrams

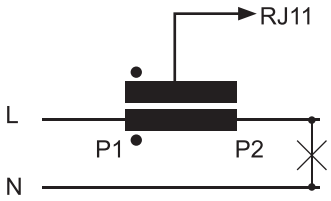


Fig. 10 *Current connection*

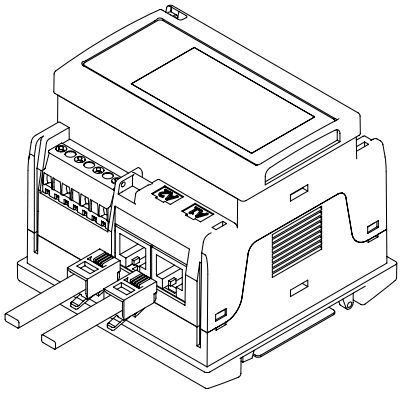


Fig. 11 *RJ11 connections*

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

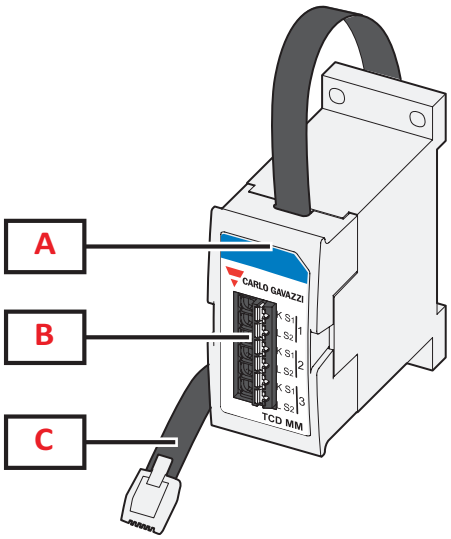
Main functions

- 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
Overvoltage category	Cat. III
Pollution degree	2
Mounting	DIN rail
Weight (packaging included)	80 g

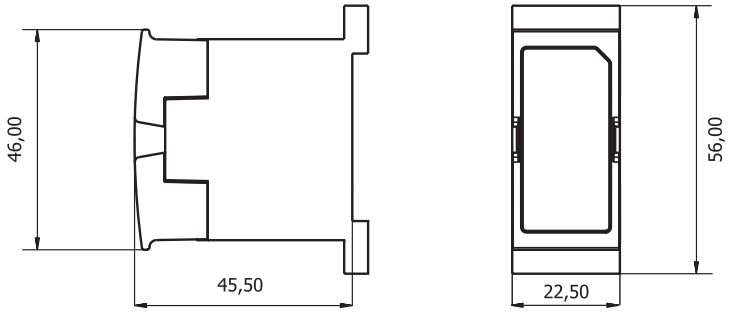


Fig. 12 *(mm)*

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

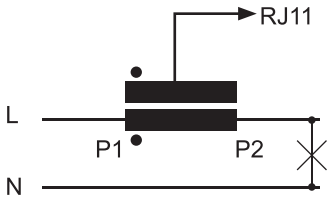


Fig. 13 *Current connection*

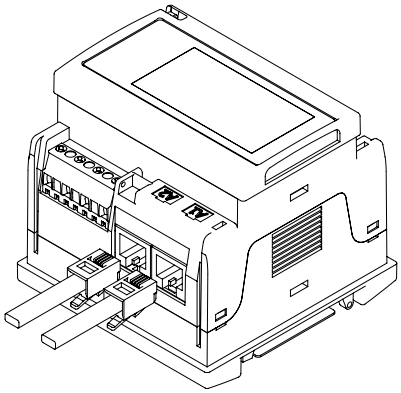


Fig. 14 *RJ11 connections*

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	-