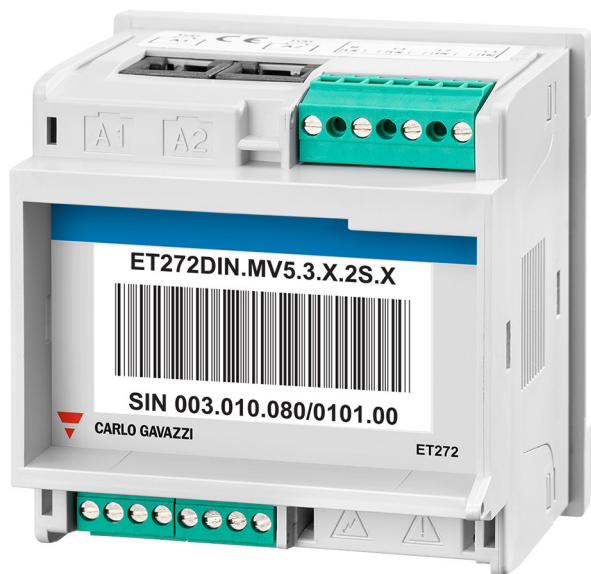


ET272



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.

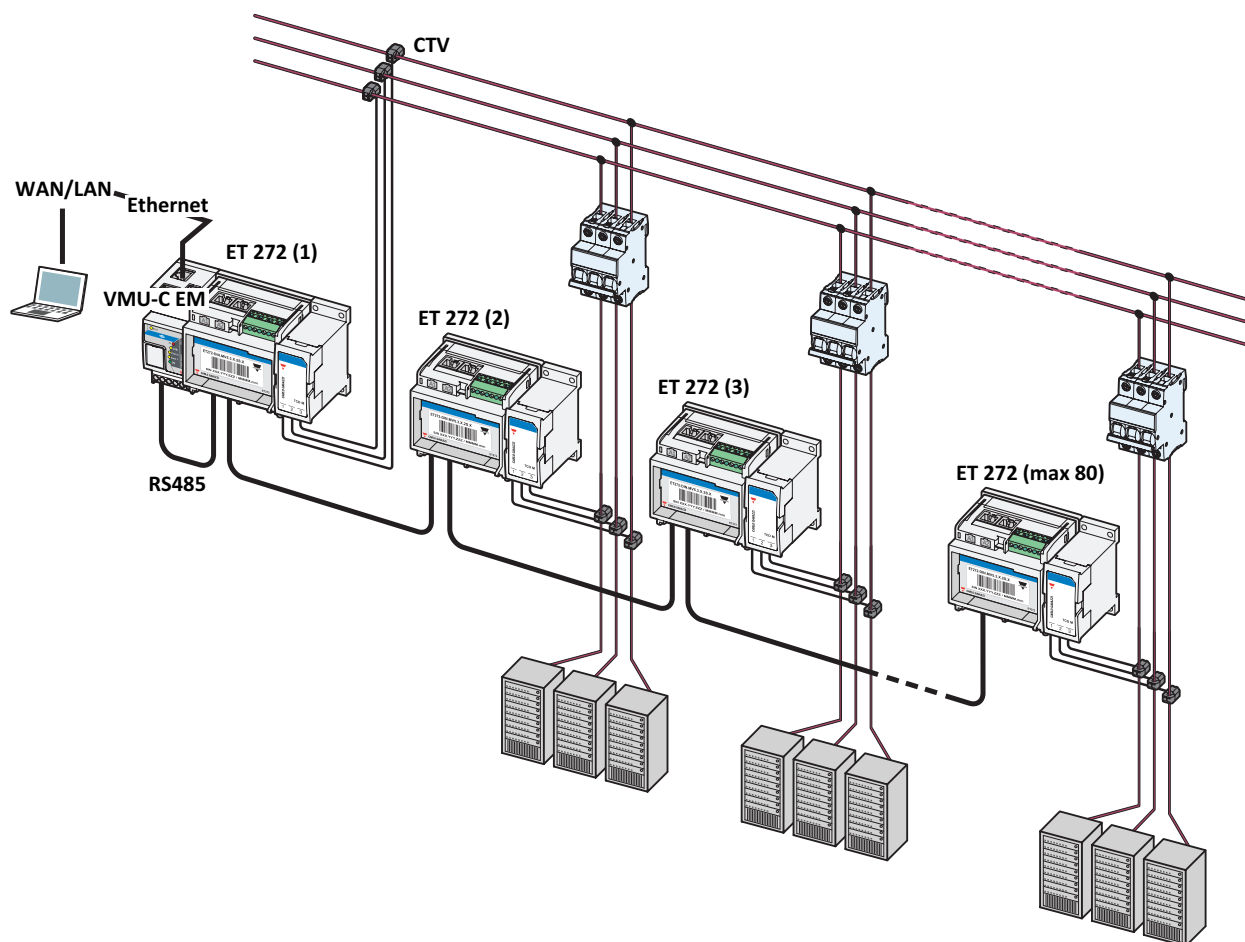
Main functions

- 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%.

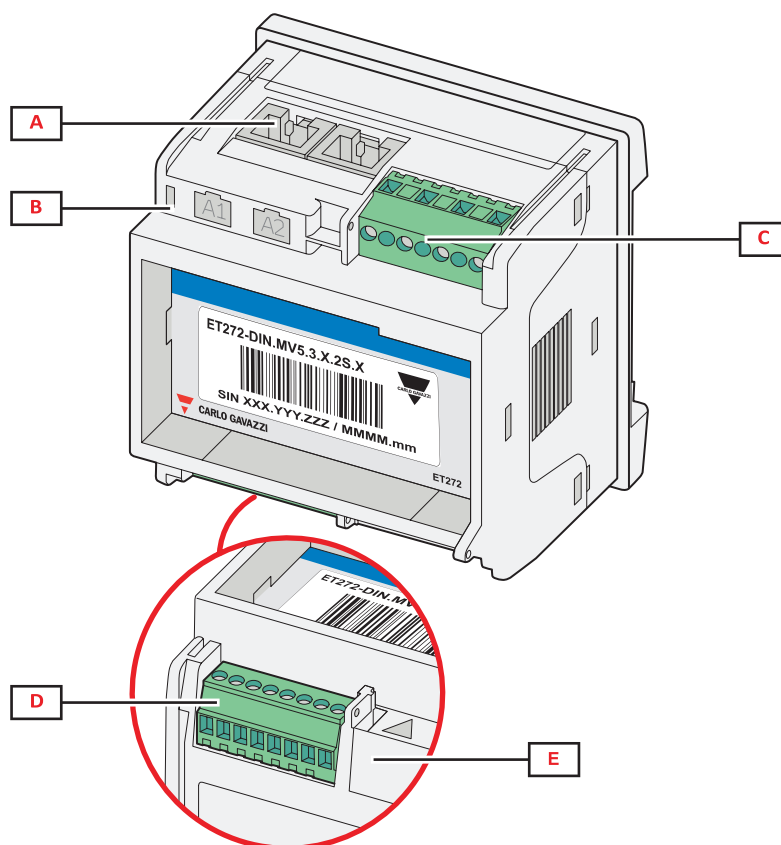
Architecture



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) |

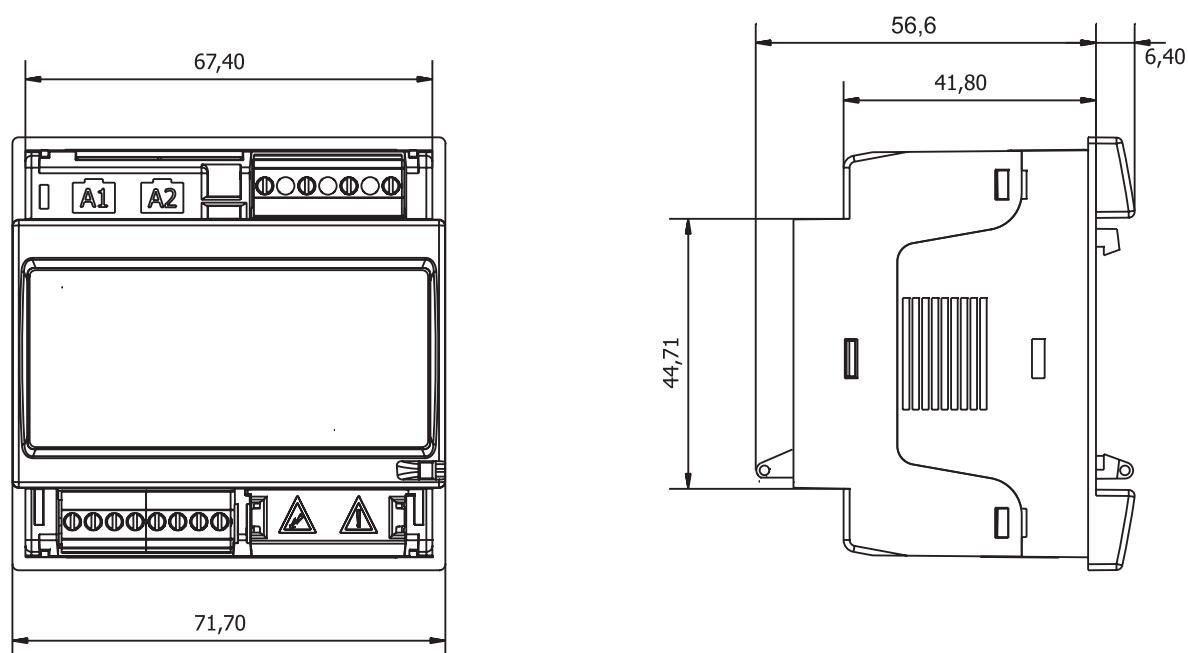


Fig. 1 DIN rail

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 In to I _{max} | ±(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 I _{max} | ±(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 I _{max} | ±(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 I _{max} | ±(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 I _{max} | ±(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)

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.





Installation
instruction

TCD0M
TCD1M
TCD2M
TCD3M
TCDMM



Fig. 3 RS485 serial port connection diagram

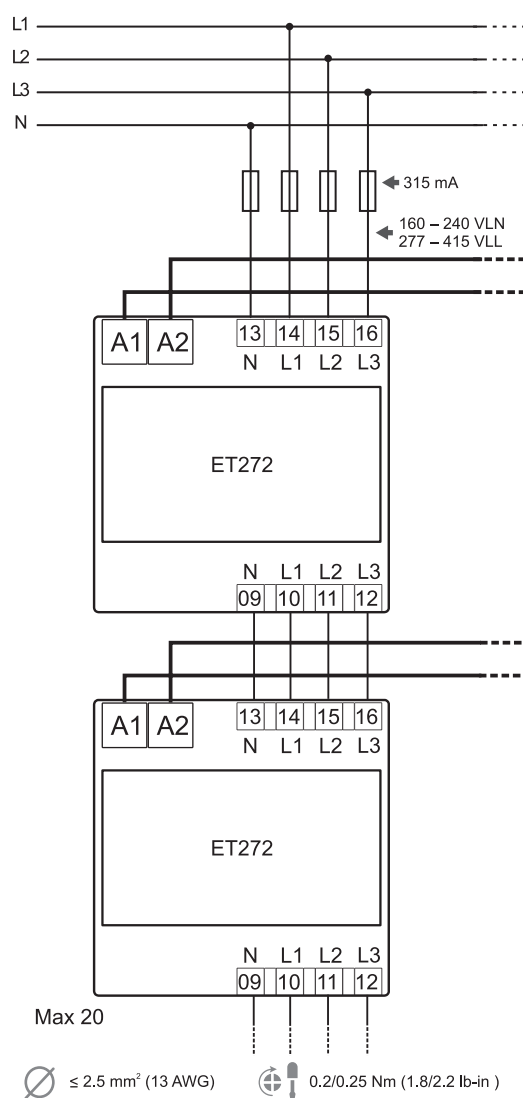


Fig. 4 Voltage input cascade connection diagram

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

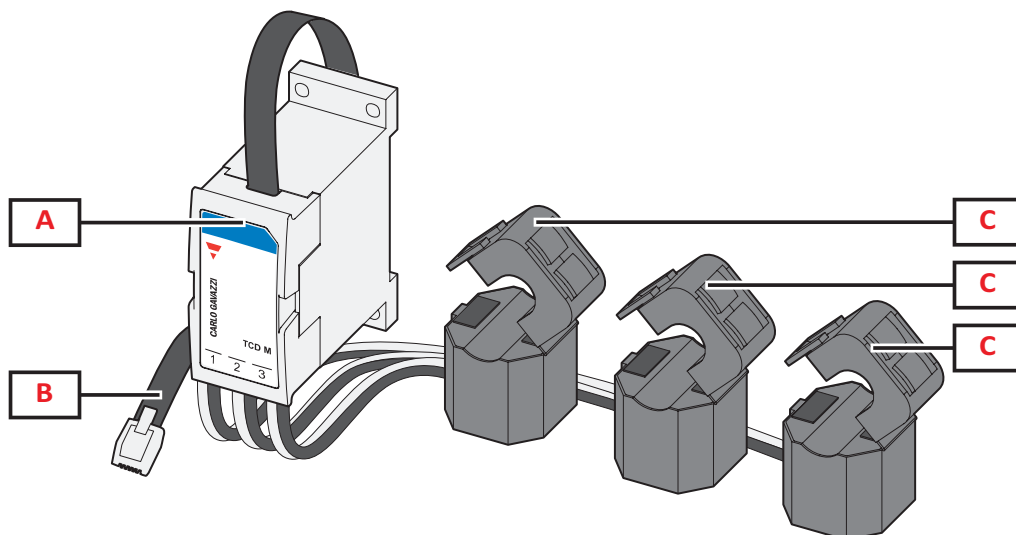
Description

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 |

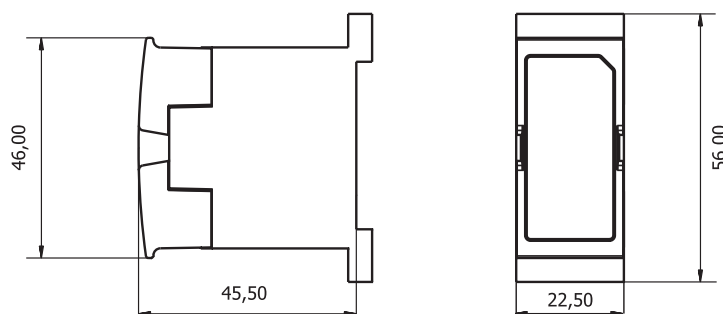


Fig. 5 Integrator (mm)

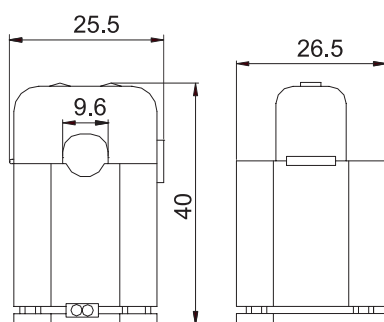


Fig. 6 TCD0M (mm)

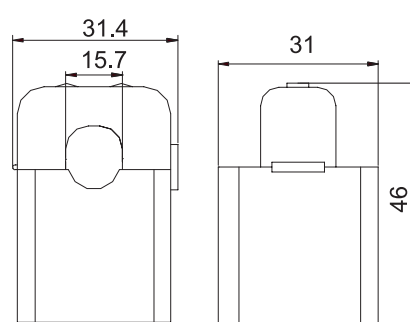


Fig. 7 TCD1M (mm)

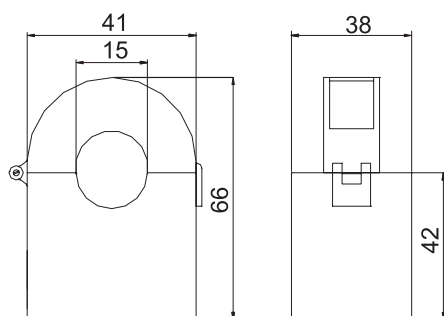


Fig. 8 TCD2M (mm)

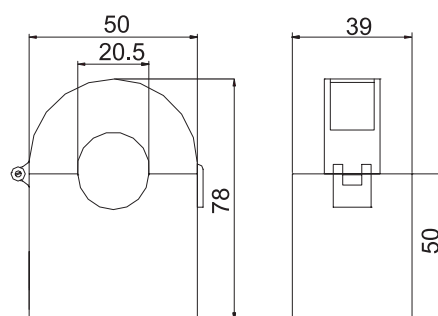


Fig. 9 TCD3M (mm)

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

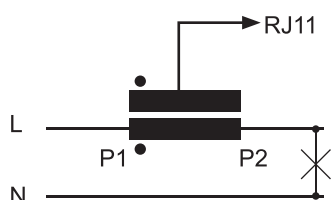


Fig. 10 Current connection

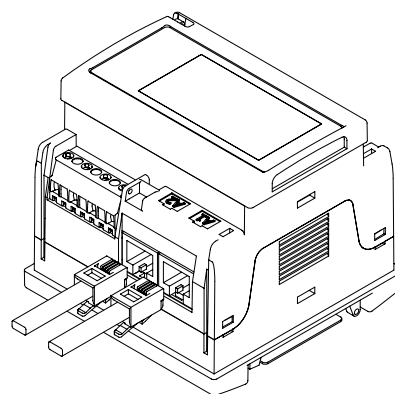


Fig. 11 RJ11 connections

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 | - | - |
| <input type="checkbox"/> | 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.

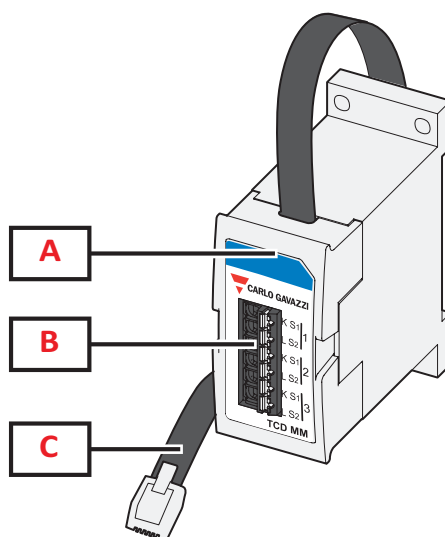
Description

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 |

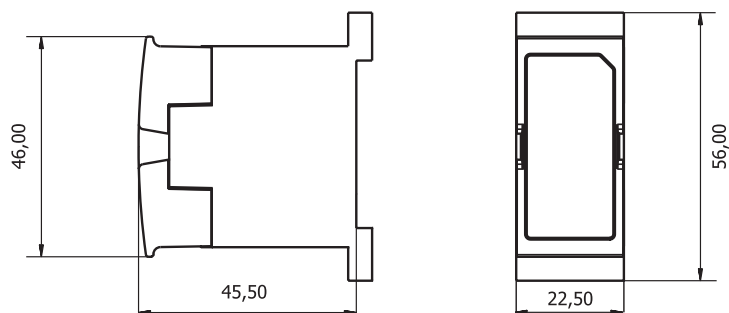


Fig. 12 (mm)

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

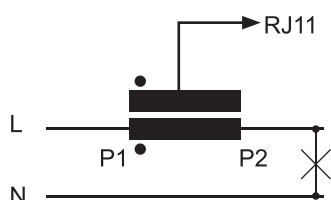


Fig. 13 Current connection

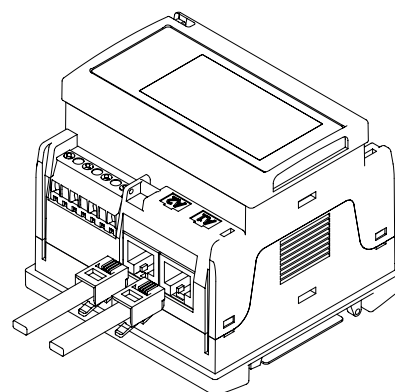


Fig. 14 RJ11 connections

References

Order code



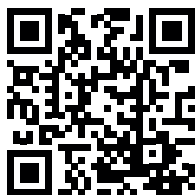
TCDMM XXX 80CM X

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 | - |



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