

Energy Management Energy Analyzer Type EM280-72D

CARLO GAVAZZI



- Equivalent to Class 1 (kWh) of EN62053-21 (EM280 base only)
- Equivalent to Class 2 (kvarh) of EN62053-23 (EM280 base only)
- Virtual meter (sum of two 3-phase or six 1-phase loads)
- Energy meter with 6+1 DGT readout
- Current measurement up to 32 A with external TCD06B current transformers block
- Instantaneous variables readout: 3-DGT (power: 3-DGT, current and voltage: 3-DGT)
- Single phase variables: V, A, kW
- Total energy measurements: total kWh and kvarh
- TRMS measurements of distorted sine waves (voltages/currents)
- Self power supply
- RS485 serial communication port (standard)
- RS485 dual port for daisy chain connection (optional)
- 2 programmable pulsating outputs (optional)
- Easy connections management (selectable) disabled by default
- Fast installation system by:
 - Detachable dual voltage terminal blocks
 - Daisy-chain of max 20 EM280 by dual voltage terminal blocks
 - Detachable serial and pulse outputs terminal blocks
 - RJ11 connections for external TCD06B current transformers
- Overall dimensions: 72x72 mm
- Protection degree (front): IP50

Product description

Multiple energy analyser with built-in configuration key-pad and LCD data displaying capable to measure the consumed energy (and other electrical parameters) by up to two three-phase loads or by up to six single-phase loads. Housing for both DIN-rail and panel mount-

ing with IP50 (front) protection degree. The voltage connections are carried out by a couple of detachable terminals so to allow a very fast daisy chain installation of multiple meters. Measurement of the current up to 32A with external solid-core current transformer block

(TCD06BX), linked by RJ11 cables to the EM280 base unit. Moreover the meter is provided either with two pulsating outputs proportional to the active energy being measured (e.g. one for lighting load and one for power load) and a serial RS485 port or with a dual serial RS485

port based on detachable terminals for a fast installation. A virtual energy meter can be enabled to provide the total consumptions data of the two 3-phase loads (or of the six 1-phase ones).



How to order

EM280-72D MV5 3 X OS X

Model	_____
Range code	_____
System	_____
Power supply	_____
Output	_____
Option	_____

Type Selection

Range code	System	Power supply	Outputs
MV5: 230VLN/400VLL AC)	3: 3-phase 3-wire, 3-phase 4-wire, or 1-phase 2-wire	X: Self power supply from 40V to 460VAC, 45 to 65Hz	OS: dual static output (opto-mosfet) and serial port
MV6: 120VLN/230VLL AC Note: for both the models, the current measurement is carried out by the external triple current transformers, model TCD06B			2S: dual RS485 serial communication port

Option

X: none

N: naked version for panel builders

naked version for panel builders

Note. N option is:

- not including 2 voltage terminal blocks
- not including 2 output terminals blocks (code 2S.N)
- including 2 output terminals blocks (code OS.N)
- including protection cover for voltage terminal
- including mounting brackets and terminal seal covers

Accessories: how to order

EM270-WS V 2T 80

Accessory model _____

Type _____

Terminal/spare part type _____

Cable length _____

Accessories Type Selection

Type	Terminal type	Length
V: Voltage cables	2T: EM27x detachable terminal at both sides	Accessory cable length in cm
S: RS485 cables	1T: EM27x terminal at one side. Available only for voltage cables (V type)	
T: spare terminals	V: set of 20 voltage terminals	
	C: set of 20 voltage protection covers	
	S: set of 20 serial terminals	

Available combinations

EM270 – WS. V.1T.60	EM270 – WS. V.2T.30	EM270 – WS. S.2T.60	EM270 – WS.T.V
EM270 – WS. V.1T.100	EM270 – WS. V.2T.60	EM270 – WS. S.2T.90	EM270 – WS.T.C
EM270 – WS. V.1T.150	EM270 – WS. V.2T.90	EM270 – WS. S.2T.120	EM270 – WS.T.S
EM270 – WS. V.1T.200	EM270 – WS. V.2T.150	EM270 – WS. S.2T.180	
	EM270 – WS. V.2T.200	EM270 – WS. S.2T.230	

Input specification

Rated Input		Reactive power	
Current type	Galvanic insulation carried out by means of external TCD current transformer accessories	From 0.02In to 0.05In, within Un range, $\sin(\phi)=1$: $\pm(3\% \text{ RDG} + 2\text{DGT})$	
Current range	6-channel 32 A (by relevant current transformer block)	From 0.05In to 0.2In, within Un range, $\sin(\phi)=1$: $\pm(2.5\% \text{ RDG} + 1\text{DGT})$	
Voltage	230VLN/400VLL (MV5), 120VLN /230VLL (MV6)	From 0.2In to I _{max} , within Un range, $\sin(\phi)=1$: $\pm(2.25\% \text{ RDG} + 1\text{DGT})$	
Accuracy		From 0.05In to 0.1In, within Un range, $\sin(\phi)=0.5$ (L or C): $\pm(3.5\% \text{ RDG} + 2\text{DGT})$	
(Display, serial communication) (@25°C $\pm 5^\circ\text{C}$, R.H. $\leq 60\%$, 45 to 65 Hz)		From 0.1In to 0.2In, within Un range, $\sin(\phi)=0.5$ (L or C): $\pm(3\% \text{ RDG} + 1\text{DGT})$	
Current range	In: 32A (TCD06B primary current)	From 0.2In to I _{max} , within Un range, $\sin(\phi)=0.5$ (L or C): $\pm(2.5\% \text{ RDG} + 1\text{DGT})$	
Current	From 0.02In to 0.05In: $\pm(1.25\% \text{ RDG} + 3\text{DGT})$ From 0.05In to 0.2In: $\pm(1\% \text{ RDG} + 2\text{DGT})$ From 0.2In to I _{max} : $\pm(0.75\% \text{ RDG} + 1\text{DGT})$	kWh: better than the combination of a class 1 of EN62053-21 meter (EM280 base) and class 0.5 of EN60044-1 CTs (TCD current transformer) considering the whole measurement chain.	
Voltage range	Un: 160 to 260VLN (277 to 450VLL)	kvarh: better than the combination of a class 2 of EN62053-23 meter (EM280 base) and class 0.5 of EN60044-1 CTs (TCD current transformer) considering the whole measurement chain.	
MV5 range	Un: 40 to 144VLN (70 to 250VLL)	0.002In.	
MV6 range	In the range Un: $\pm(0.5\% \text{ RDG} + 1\text{DGT})$	Start-up current	
Phase-neutral voltage	In the range Un: $\pm(1\% \text{ RDG} + 1\text{DGT})$	Temperature drift	
Phase-phase voltage	Range: 45 to 65Hz. Resolution: 1Hz	Sampling rate	
Frequency	From 0.02In to 0.05In, within Un range, PF=1: $\pm(2\% \text{ RDG} + 2\text{DGT})$	Display	
Active power	From 0.05In to 0.2In, within Un range, PF=1: $\pm(1.5\% \text{ RDG} + 1\text{DGT})$	Type	
	From 0.2In to I _{max} , within Un range, PF=1: $\pm(1.25\% \text{ RDG} + 1\text{DGT})$	Instantaneous variables readout	
	From 0.05In to 0.1In, within Un range, PF=0.5L to 0.8C: $\pm(2.5\% \text{ RDG} + 2\text{DGT})$	Energies	
	From 0.1In to 0.2In, within Un range, PF=0.5L to 0.8C: $\pm(2\% \text{ RDG} + 1\text{DGT})$	Overload status	
	From 0.2In to I _{max} , within Un range, PF=0.5L to 0.8C: $\pm(1.5\% \text{ RDG} + 1\text{DGT})$	Max. and Min. indication	
		2 lines (1 x 7-DGT + 1 x 3-DGT)	
		LCD, h 7 mm	
		3-DGT (Power: 3-DGT, currents: 3-DGT)	
		Imported Total: 6+1DGT	
		EEE indication when the value being measured is exceeding the "Continuous inputs overload" (maximum measurement capacity)	
		Max. instantaneous variables: 999; energies: 9 999	

Input specification (cont.)

Refresh time	999. Min. instantaneous variables: 0; energies 0.0 1 second	Crest factor	3@In
		Voltage Overloads Continuous	2 Un (except power supply terminals)
LEDs	Red LED (Energy consumption only, relevant to the sum of the consumption of any load connected to the meter, 1 imp./kWh according to EN50470-1. Green LED for Power-on (steady) and communication status: RX-TX (blinking in case of RS485 option only).	For 500ms	1.2 Un (only power supply terminals)
		Voltage input impedance Self-power supply	Power Consumption: < 4VA / 2W
Measurements	See "List of the variables that can be connected to:" TRMS measurements of distorted wave forms. By means of the external current transformer accessories.	Frequency	45 to 65 Hz
		Keypad	2 pushbuttons for variable selection and programming of the digital output parameters
Method			
Coupling type			

Output specifications

Pulse output	2, Programmable from 0.01 to 9.99 kWh per pulse. Output connectable to the energy meters (kWh) Detachable screw terminal connectors	Protocol	MODBUS/JBUS (RTU)
		Data (bidirectional) Dynamic (reading only)	System and phase variables: see table "List of the variables that can be connected to:".
Connection type	Detachable screw terminal connectors	Static (reading and writing)	All the configuration parameters.
Pulse duration	Selectable, 40ms or 100ms (ON), according to EN62052-31. Static: opto-mosfet	Data format	1 start bit, 8 data bit, no or even parity, 1 stop bit
Output	$V_{ON} 2.5 V_{AC/DC}$ max. 70 mA	Baud-rate	9.6, 19.2, 38.4 kbaud
Load	$V_{OFF} 40 V_{AC/DC}$ max.	Driver input capability	1/5 unit load. Maximum 160 transceivers on the same bus.
Insulation	4kVp/2,5kVAC output to measuring inputs.	Insulation	By means of opto-couplers, 4kVp/2,5kVAC output to measuring input.
RS485			
Type	Multidrop, bidirectional (static and dynamic variables)		
Connections	2-wire max. distance 1000m		
Connection type	Detachable screw terminal connectors		
Termination	Termination by using a proper jumper in the terminal block.		
Addresses	247, selectable by means of the front keypad		

Password 1st level 2nd level Lock knob	Numeric code of max. 3 digits; 2 protection levels of the programming data: Password “0”, no protection; Password from “1” to “999”, all data are protected Programming (by keypad or serial commands) is not possible with the lock knob located behind the display unit is on lock position	Easy connection Function (EC)	ON: measurement independent on current direction. OFF: measurement dependent on current direction (default). When NOT active, energies (kWh and kvarh) and power (kW) measurements are dependent from the current direction (if negative, A, P, Q are shown with the “-“ sign). The displayed energy values are only relevant to the “imported” energies.
System selection System 3P/1.3P System 3P/2.3P System 3P/3.1P System 3P/6.1P System 1P/3.1P System 1P/6.1P	3-phase (3- or 4-wire) supply. Management of one 3-phase load. 3-phase (3- or 4-wire) supply. Management of two 3-phase loads. 3-phase (3- or 4-wire) supply. Management of three 1-phase loads. 3-phase (3- or 4-wire) supply. Management of six 1-phase loads. 1-phase (2-wire) supply. Management of three 1-phase loads. 1-phase (2-wire) supply. Management of six 1-phase loads.	Transformer ratio CT primary current Integration time For dmd power calculation Displaying Reset	32 A (automatically set when TCD06B is connected). Selectable, from 1 to 60 min Up to 3 variables per page. See «Display pages» By means of the front keypad: - total energies (function SUM on): kWh and kvarh - partial energies: single load energy (kWh and kvarh) and demanded power (Wdmd) - Max demand (Md) of active and apparent power.
Function selection Function SUM TCD phase order	ON: each single system and total data (A, W, kWh) available. OFF: each single system data available without total data 123: Phase L1 is in the top (looking at the installed TCD with the output cables on the right). From the top: Phases L1, L2, L3 of load 2, the phases L1, L2, L3 of load 1. 321: Phase L3 is in the top (looking at the installed TCD with the output cables on the right). From the top: Phases L3, L2, L1 of load 2, the phases L3, L2, L1 of load 1.		

General specifications

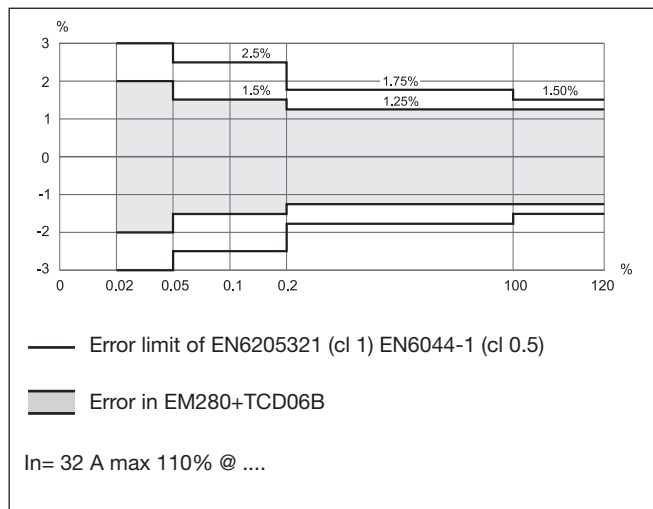
Operating temperature	Operating temperature -25 to +55°C (-13°F to +131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN62052-11	Standard compliance Safety	IEC60664, EN60664, IEC61010-1, EN61010-1 EN62052-11, EN50470-1 DIN43864, IEC62053-31
Storage temperature	-30 to +70°C (-22°F to +158°F) (R.H. < 90% non-condensing @ 40°C) according to EN62052-11	Pulse output	
Overvoltage category	Cat. III (IEC 60664, EN60664)	Approvals	CE
Dielectric strength	4000VAC RMS for 1 minute (all terminals to front panel)	Connections Voltage	Detachable dual screw terminals. Max wire cross section 1.5 mm ² (14 AWG). Min./max. screws tightening torque: 0.2/0.25 Nm 2x RJ11 (female) for current connections
Noise rejection CMRR	100 dB, 48 to 62 Hz	Current inputs	
EMC	According to EN62052-11 and EN50470-1 (E2)	Outputs (pulse and RS485 port)	Detachable screw terminals. Max wire cross section 1.5 mm ² (14 AWG). Min./max. screws tightening torque: 0.2/0.25 Nm.
Electrostatic discharges	15kV air discharge, 8kV contact discharge;	Housing Dimensions (WxHxD)	72 x 72 x 65 mm
Immunity to irradiated electromagnetic fields	Test with current: 10V/m from 80 to 2000MHz Test without any current: 30V/m from 80 to 2000MHz;	Material	Noryl, self-extinguishing: UL 94 V-0
Burst	On current (TCD primary) and voltage measuring inputs circuit: 4kV	Mounting	DIN-rail or Panel mounting
Immunity to conducted disturbances	10V/m from 150kHz to 80Mhz	Protection degree Front	IP50
Surge	On current (TCD primary) and voltage measuring inputs circuit: 4kV;	Screw terminals	IP20
Radio frequency suppression	According to CISPR 22	Weight	Approx. 400g (packing included)

Power supply specifications

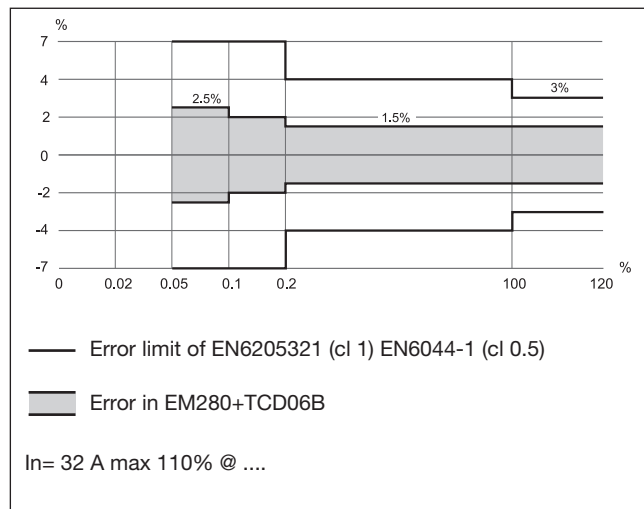
Self supplied version	From 40V to 460VAC, 45 to 65Hz, between L2 and L3 (in case of 1-phase supply N is connected to L2, L to L3)	Power consumption	≤4VA/2W
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Accuracy

kWh, PF=1, compared with a cl 1 meter EN62053-2 plus a cl 0.5 CT EN60044-1



kWh, PF=0.5L, compared with a cl 1 meter EN62053-23 plus a cl 0.5 CT EN60044-1



Used calculation formulas

Phase variables

Instantaneous effective current

$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (A_1)_i^2}$$

Instantaneous apparent power

$$VA_1 = V_{1N} \cdot A_1$$

Instantaneous reactive power

$$\text{var}_1 = \sqrt{(VA_1)^2 - (W_1)^2}$$

System variables

Three-phase reactive power

$$\text{var}_\Sigma = (\text{var}_1 + \text{var}_2 + \text{var}_3)$$

Three-phase active power

$$W_\Sigma = W_1 + W_2 + W_3$$

Three-phase apparent power

$$VA_\Sigma = \sqrt{W_\Sigma^2 + \text{var}_\Sigma^2}$$

Three-phase power factor

$$\cos \varphi_\Sigma = \frac{W_\Sigma}{VA_\Sigma}$$

Energy metering

$$k \text{ var hi} = \int_{t1}^{t2} Qi(t) dt \cong \Delta t \sum_{n1}^{n2} Qnj$$

Where:

i= considered phase (L1, L2 or L3)
P= active power; **Q**= reactive power;
t1, t2=starting and ending time points of consumption recording; **n**= time unit; **Δ t**= time interval between two successive power consumptions;
n1, n2 = starting and ending discrete time points of consumption recording

List of the variables that can be connected to:

RS485 communication port

All the variables listed in the "Display pages" table, when available (according to the selected system), can be read via serial communication

Pulse outputs

Pulse out 1

Pulse out 2

kWh load 1 (3-phase load 1 or sum of 1-phase loads 1, 2, 3)
kWh load 2 (3-phase load 2 or sum of 1-phase loads 4, 5, 6)

Display pages

No	A (1st line)	B (1st line)	(2nd line)	SYS 1.3P	SYS 2.3P	SYS 3.1P	SYS 6.1P	SYS 1P.3.1P	SYS 1P.6.1P	Note
1	kWh		kW (Σ)		S	S	S	S	S	Σ = Total
2	dMd		kW (Σ)		S	S	S	S	S	Σ = Total, dMd = dmd
3	Pd		kW (Σ)		S	S	S	S	S	Σ = Total, Pd = maximum (peak) demand
4	A L1 (Σ)	A L2 (Σ)	A L3 (Σ)		S	S	S			Σ (Total) single phase currents
5	kvarh		kvar (Σ)		S	S	S	S	S	Σ = Total
6	dMd		kVA (Σ)		S	S	S	S	S	Σ = Total, demand = dmd
7	Pd		kVA (Σ)		S	S	S	S	S	Σ = Total, Pd = maximum (peak) demand
8a	kWh (Load A1)		kW (Load A1)	X	X					
8b	kWh (Load A1)		L1			X	X	X	X	Relevant to 1-ph load 1
8c	kWh (Load A1)		L2			X	X	X	X	Relevant to 1-ph load 2
8d	kWh (Load A1)		L3			X	X	X	X	Relevant to 1-ph load 3
8e	kW L1 (Load A1)	kW L2	kW L3			X	X	X	X	Relevant to 1-ph load 1, 2, 3
9a	dMd (Load A1)		kW (Load A1)	X	X					
9b	dMd L1 (Load A1)		kW (Load A1 L1)			X	X	X	X	Relevant to 1-ph load 1
9c	dMd L2 (Load A1)		kW (Load A1 L2)			X	X	X	X	Relevant to 1-ph load 2
9d	dMd L3 (Load A1)		kW (Load A1 L3)			X	X	X	X	Relevant to 1-ph load 3
10a	Pd (Load A1)		kW (Load A1)	X	X					Md = maximum demand
10b	Pd L1 (Load A1)		kW (Load A1 L1)			X	X	X	X	Relevant to 1-ph load 1
10c	Pd L2 (Load A1)		kW (Load A1 L2)			X	X	X	X	Relevant to 1-ph load 2
10d	Pd L3 (Load A1)		kW (Load A1 L3)			X	X	X	X	Relevant to 1-ph load 3
11	A L1 (Load A1)	A L2 (Load A1)	A L3 (Load A1)	X	X	X	X	X	X	In case of system 3P: load 1 single phase currents. In case of system 1P AL1 is the current of 1-ph load 1, AL2 of load 2, AL3 of load 3.
12	kvarh (Load A1)		kvar (Load A1)	X	X					
13	dMd (Load A1)		kVA (Load A1)	X	X					
14	Pd (Load A1)		kVA (Load A1)	X	X					Pd = maximum (peak) demand
15a	kWh (Load A2)		kW (Load A2)		X					

Display pages (cont.)

No	A (1st line)	B (1st line)	(2nd line)	SYS 1.3P	SYS 2.3P	SYS 3.1P	SYS 6.1P	SYS 1P.3.1P	SYS 1P.6.1P	Note
15b	kWh (Load A2)		L1				X		X	Relevant to 1-ph load 4
15c	kWh (Load A2)		L2				X		X	Relevant to 1-ph load 5
15d	kWh (Load A2)		L3				X		X	Relevant to 1-ph load 6
15e	kW L1(Load A2)	kW L2	kW L3				X		X	Relevant to 1-ph load 4, 5, 6
16a	dMd (Load A2)		kW (Load A2)		X					
16b	dMd L1 (Load A2)		kW (Load A2 L1)				X		X	Relevant to 1-ph load 4
16c	dMd L2 (Load A2)		kW (Load A2 L2)				X		X	Relevant to 1-ph load 5
16d	dMd L3 (Load A2)		kW (Load A2 L3)				X		X	Relevant to 1-ph load 6
17a	Pd (Load A2)		kW (Load A2)		X					Pd= maximum demand
17b	Pd L1 (Load A2)		kW (Load A2 L1)				X		X	Relevant to 1-ph load 4
17c	Pd L2 (Load A2)		kW (Load A2 L2)				X		X	Relevant to 1-ph load 5
17d	Pd L3 (Load A2)		kW (Load A2 L3)				X		X	Relevant to 1-ph load 6
18	A L1 (Load A2)	A L2 (Load A2)	A L3 (Load A2)		X		X		X	In case of system 2.3P: Load 2 single phase currents. In case of system 6.1P AL1 is the current of 1-ph load 4, AL2 of load 5, AL3 of load 6.
19	kvarh (Load A2)		kvar (Load A2)		X					
20	dMd (Load A2)		kVA (Load A2)		X					
21	Pd (Load A2)		kVA (Load A2)		X					Pd = max. demand
22	V L1N (L1)	V L2N (L2)	V L3N (L3)	X	X	X	X	X(*)	X(*)	(*) = VLn value
23	V12 (L1)	V23 (L2)	V31 (L3+triangle)	X	X					
24	kW (LoadA1)	kW (Load A2)	kW (Σ)		S		S		S	In case of system 6.1P load 1 is the sum of 1-ph loads 1, 2, 3 and load 2 is the sum of 1-ph loads 4, 5, 6.

Note: whatever page the user has selected, after 120s it goes back to page 1 (if available, otherwise page 8).

X: available;

S: available only if SUM function is ON;

S1: available only if SUM function is ON but TCD phase orders are the same (both 123 or both 321, see available menu table);

Empty: not available.

Additional available information on the display

Type	1st line	2nd line	Note
Meter information 1	Y. 2014	r.A0	Year of production and firmware release
Meter information 2	PuL_LEd (kWh)	[value]	kWh per pulses of the LED
Meter information 3	SYS [2.3P]		1.3P, 2.3P, 3.1P, 6.1P
Meter information 4	[value 1][value 2]**	tcd	Phase order (123 or 321) of TCD A1 and A2
Meter information 5	Ct Prin	[value]	Current transformer primary value
Meter information 6*	PuL 1 (kWh)	[value]	Pulse output: kWh per pulse Load A1
Meter information 7*	PuL 2 (kWh)	[value]	Pulse output: kWh per pulse Load A2
Meter information 8	AddrESS	[value]	Serial communication address
Md reset	rESEtuP	no/YES	Reset of maximum demand

(*) = in case of digital pulse output model

(**) = [value 2] is "----" in case of system 1.3P or 3.1P

Display resolution

Variable	Resolution	Range	
		From	To
Active and Apparent Power	0.1 W 1 W 0.01 kW 0.1 kW 1 kW	0.1 W 1 W 1.00 kW 10.0 kW 100 kW	99.9 W 999 W 9.99 kW 99.9 kW 999 kW
Energy (kWh and kvarh)	0.1 kWh / kvarh 1 kWh / kvarh	0.1 kWh/kvarh 1 000 000 kWh/kvarh	999 999.9 kWh/kvarh 9 999 999 kWh/kvarh
Voltage	1 V	1 V	999 V
Current	0.01 A 0.1 A 1 A	0.01 A 10.0 A 1A	9.99 A 99.9 A 999 A

Error message management

Description	Display message
1st load TCD06B RJ11 is not connected	[load 1] MISSInG tcd
2nd load TCD06B is enabled (systems 2.3P or 6.1P) but relevant RJ11 is not connected	[load 2] MISSInG tcd
1st and 2nd loads TCD06B RJ11s not connected	[load 1] [load 2] MISSInG tcd
Over-range condition of the measuring inputs (voltage and current)	E E E

List of available menus

Always available		Selection	Default setting
PASS ?	Password	From 0 to 999	0
PASS ? (100)	"rESEt UP" Reset of the max value of Wdmd and VAdmd (only for Total)	no / YES	No
CnG-_PASS	New Password	From 0 to 999	0
SYS	3-phase (3- or 4-wire). Management of one 3-phase load.	1.3P	1.3P
	3-phase (3- or 4-wire). Management of two 3-phase loads.	2.3P	
	1-phase (4-wire). Management of three 1-phase load.	3.1P	
	1-phase (4-wire). Management of six 1-phase loads.	6.1P	
SuM (**)	SUM function	On/OFF	On
EC (****)	Easy connection function	On/OFF	OFF
tCd ord (***)	TCD phase order	123/321	123
P.int ti	Integration time for "dmd" power calculation	From 1 to 60 min	15
PuL 1 (*)	Number of kWh per pulse Load A1	From 0.01 to 9.99	0.1
PuL 2 (*) (**)	Number of kWh per pulse Load A2	From 0.01 to 9.99	0.1
t.on (*)	TON time (milliseconds) (digital output)	40 or 100ms	100
AddrESS	Modbus address of the instrument	From 1 to 247	1
bAud	Modbus baud rate	9.6, 19.2, 38.4 kbps	9.6
PARitY	Modbus parity	No, EvEn	No
EnE PA.rE	Reset of the Load A1 and Load A2 energies (6 load in 1-phase system)	no / YES	No
EnE to.rE	Reset of the total energy	no / YES	No

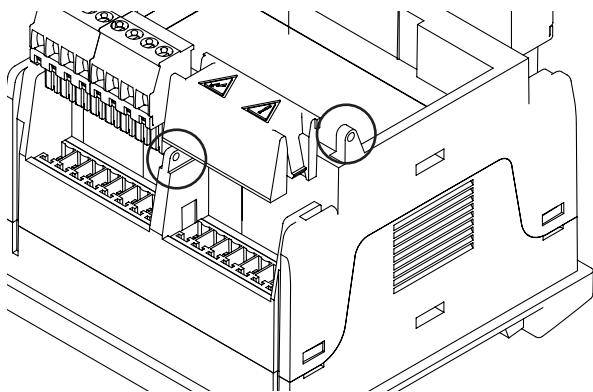
(*) = in case of digital pulse output, only 3-phase systems. In 1-phase system the pulse is relevant to the sum of the first three and second three 1-phase loads.

(**) = not present in case of 1.3P

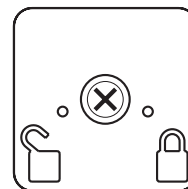
(***) = in case the phase order in one or both the TCD is not the same shown in the wiring diagram, it is possible to swap the phase order (from L1, L2, L3 to L3, L2, L1). If the phase order is not the same and SUM function is enabled, the current SUM page is not available.

(****) = in case of Easy connection disabled and imported power: A, kW are to be shown with negative sign; only kWh is not integrated; the negative instantaneous contribution to Wdmd calculation is not considered. In all the cases kvar is displayed with the actual sign.

Tamper proof capability



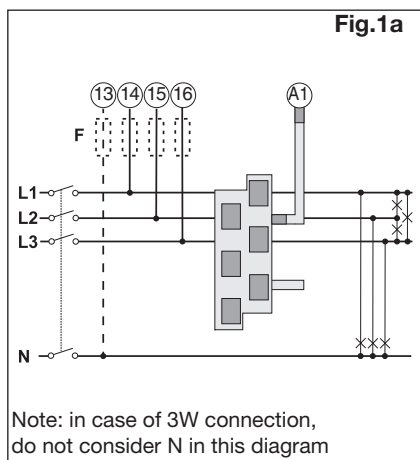
Position of the seals



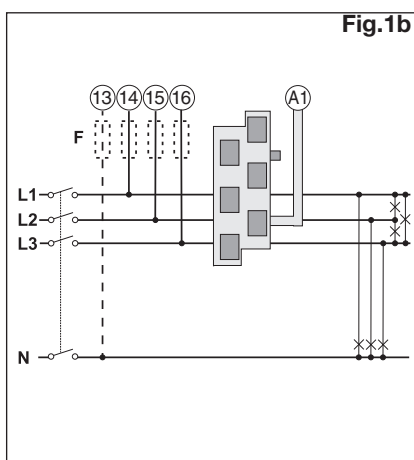
Rear view of the detached display unit with highlight of the programming lock.

Wiring diagrams

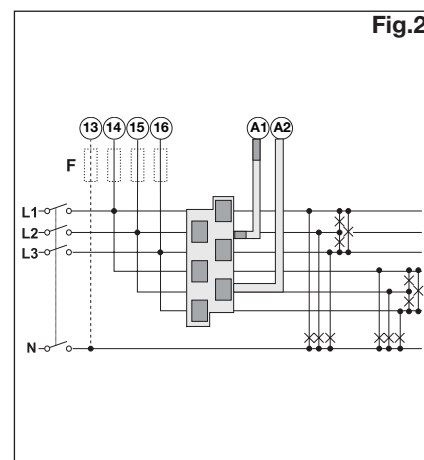
3-ph. system type selection 1.3P



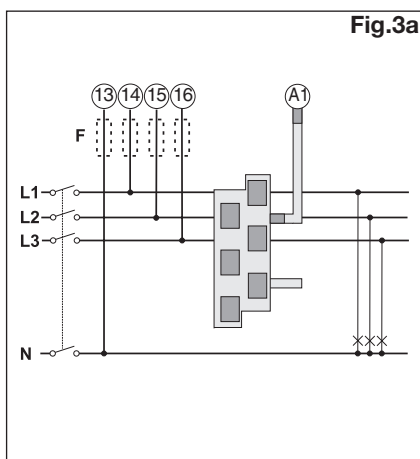
3-ph. system type selection 1.3P



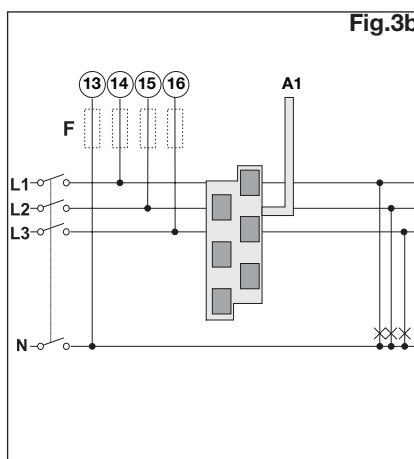
3-ph. system type selection 2.3P



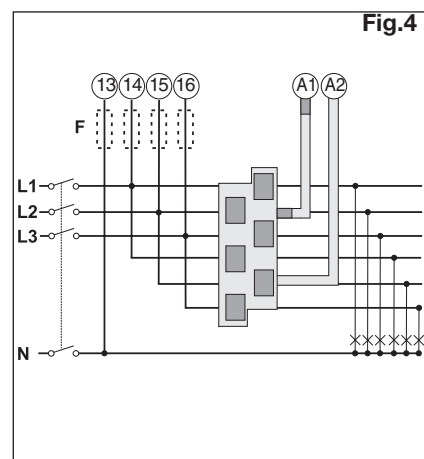
3-ph. system type selection 3.1P



3-ph. system type selection 3.1P



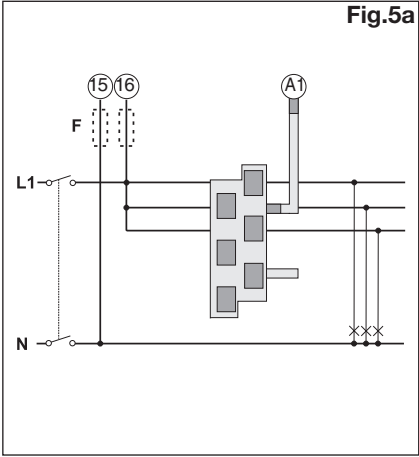
3-ph. system type selection 6.1P



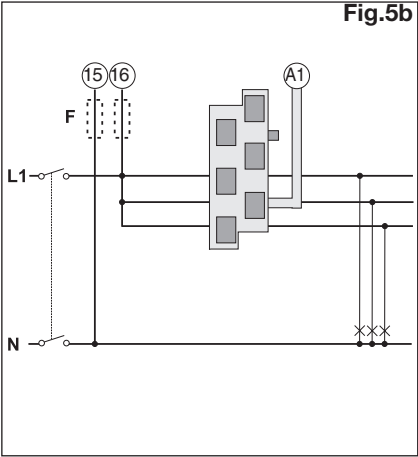


Wiring diagrams

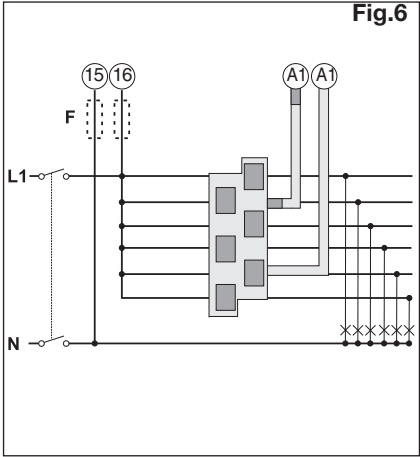
1-ph. system type selection 3.1P



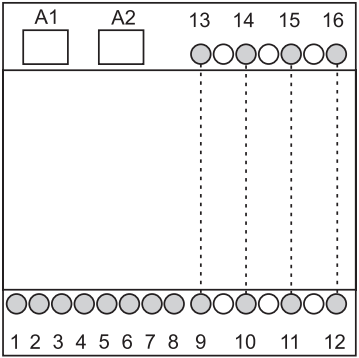
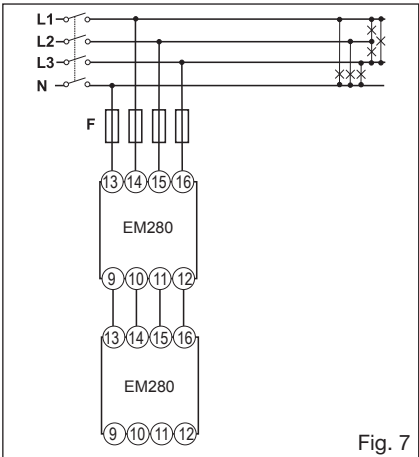
1-ph. system type selection 3.1P



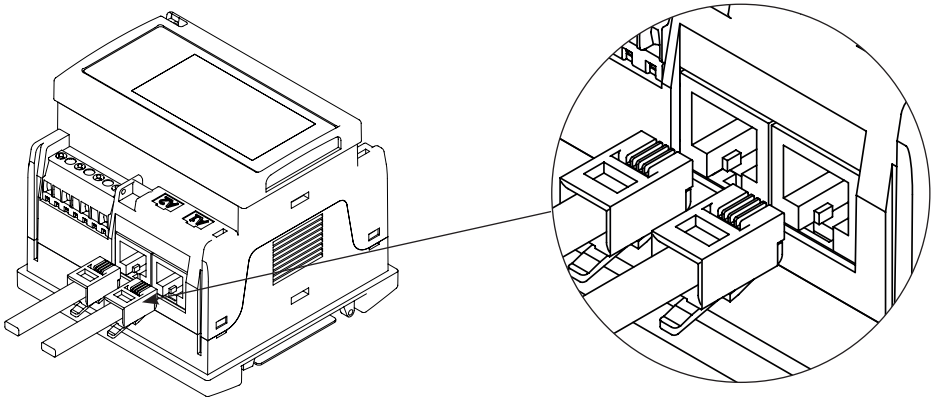
1-ph. system type selection 6.1P



Loom example

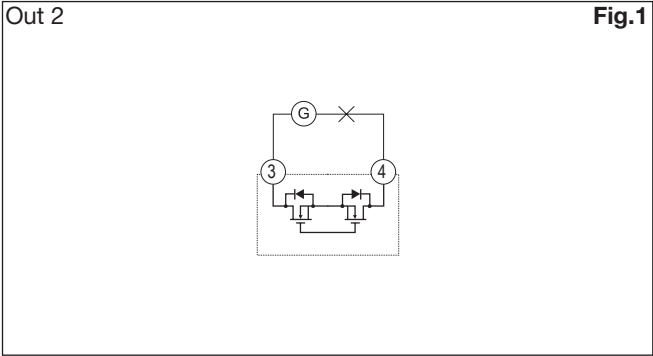
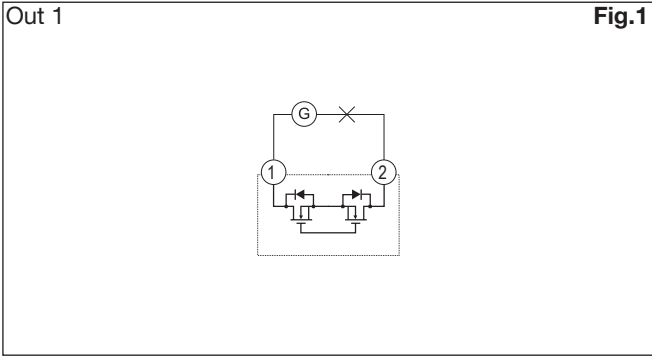


TCD current transformer connections

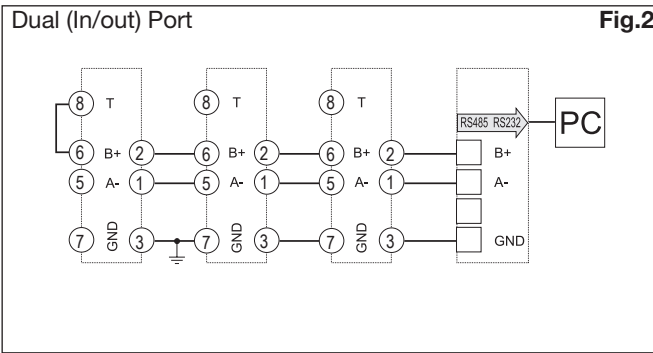
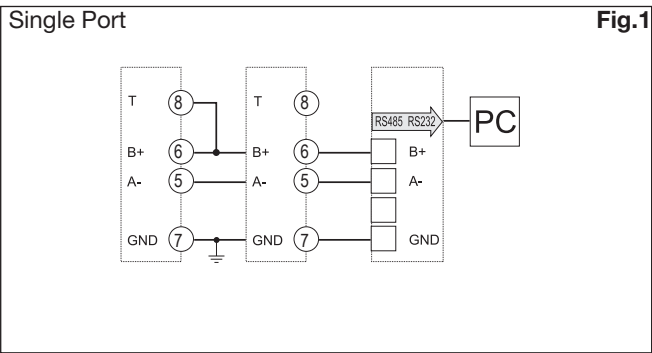


TCD06B

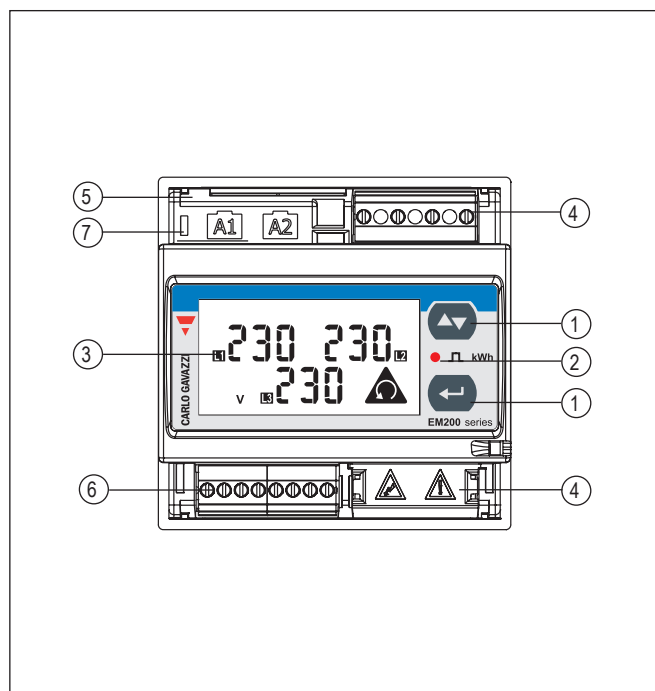
Static output connections



RS485 Serial Port



Front panel description



1. Keypad

2 push-buttons to program the configuration parameters and scroll the variables on the display

2. LED

Red LED blinking proportional to the total active energy being measured (Total= Load A1 + Load A2).

3. Display

LCD-type with alphanumeric indications to:
- display configuration parameters;
- display all the measured variables.

4. Detachable voltage screw terminals

Detachable screw terminal blocks for voltage wiring.
NOTE: max 20 EM280 connected in cascade. No other loads can be connected to voltage terminals.

5. Current RJ11 connectors

RJ11 connectors (female) for quick connection to up to TCD06B current transformers block.

6. RS485 or pulse screw terminals

Detachable screw terminal blocks for quick connection in daisy chain of the serial RS485 line or for connection if the 2 independent pulse output.

7. Power-On LED

Green LED lit when power supply is available.

Dimensions and panel cut-out (mm)

