

# Energy Management Energy Analyzer Type EM26 96



- M-bus communication by means of VMU-B adapter
- Application adaptable display and programming procedure (Easyprog function)
- Easy connections management
- Certified according to MID Directive (option PF only): see "how to order" below
- Other versions available (not certified, option XX): see "how to order" on the next page

- Class 1 (kWh) according to EN62053-21
- Class B (kWh) according to EN50470-3
- Class 2 (kvarh) according to EN62053-23
- Accuracy  $\pm 0.5\%$  RDG (current/voltage)
- Dual colour backlight: no backlight, blue or white (selectable)
- Energy analyzer
- Instantaneous variables readout: 4 DGT
- Energies/gas/water readout: 8 DGT
- System variables: VLL, VLN, Admd, VA, VAdmd, VAdmd max, W, Wdmd, Wdmd max, var, PF, Hz, Phase-sequence.
- Single phase variables: VLL, VLN, A, VA, W, var, PF
- Energy measurements: total and partial kWh and kvarh or based on 4 different tariffs; single phase measurements
- Gas, cold water, hot water, kWh remote heating measurements
- Hour counter (6+2 DGT)
- Harmonic analysis (FFT) up to 15th harmonic (current/voltage)
- TRMS measurements of distorted sine waves (voltages/currents)
- Universal power supply: 90 to 260AC/VDC
- 3 digital inputs for tariff selection, DMD synch or gas/water (hot-cold) and remote heating metering (on request)
- 3 digital outputs for pulses or for alarms or as a mix of them (on request)
- Front dimensions: 96x96mm
- Protection degree (front): IP50
- RS485 serial output (on request) (MODBUS-RTU), iFIX SCADA compatibility

## Product Description

Three-phase energy analyzer with built-in configuration joystick and LCD data displaying; particularly indicated for active and reactive energy metering

and for cost allocation. Housing for panel mounting with IP50 (front) protection degree. External Current and potential transformers connection. More-

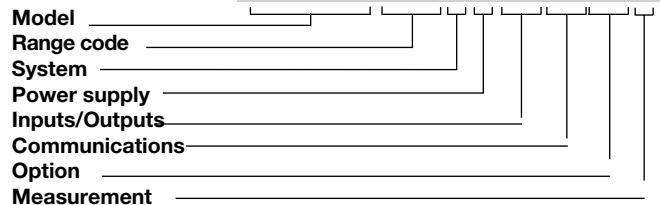
over the meter can be provided with digital outputs that can be used: for pulses proportional to the active and reactive energy being measured or for alarm

outputs, or for remote control. RS485 communication port and 3 digital inputs are available as an option.



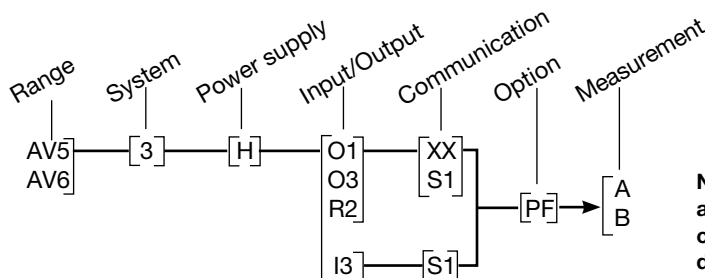
Certified according to MID Directive, Module B and Module D of Annex II, for legal metrology relevant to active electrical energy meters (see Annex V, MI003, of MID). Can be used for fiscal (legal) metrology. Only the total positive energy meter is certified according to MID.

## How to order EM26 96 AV5 3 H O3 S1 PF A



## Type Selection

Range codes	System	Communication	Options
<b>AV5:</b> 230 $V_{LN}$ /400 $V_{LL}$ 1/5(10)A $V_{LN}$ : 160 V to 480 $V_{LN}$ $V_{LL}$ : 277 V to 830 $V_{LL}$	<b>3:</b> 3-phase, 4-wire;	<b>XX:</b> none <b>S1:</b> RS485 port	<b>PF:</b> Certified according to MID Directive. Can be used for fiscal (legal) metrology.
<b>AV6:</b> 120 $V_{LN}$ /208 $V_{LL}$ 1/5(10)A $V_{LN}$ : 40 V to 144 $V_{LN}$ $V_{LL}$ : 70 V to 250 $V_{LL}$	<b>Power supply</b> <b>H:</b> 90 to 260VAC/DC (48 to 62Hz)	<b>Input/Output</b> <b>O1:</b> single open collector type (pulse or alarm) <b>O3:</b> 3 open collector type (mixed combination of pulse, alarm and/or remote output) <b>R2:</b> dual relay type (functions as per "O3") <b>I3:</b> 3 digital inputs for tariff selection or Gas/water/energy/remote heating metering	



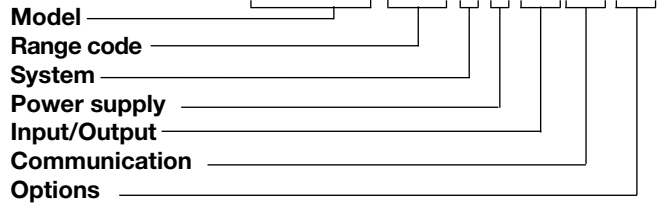
**NOTE:** please check the availability of the needed code on the verification path diagram on left before order.



**STANDARD**

Not certified according to MID directive. Cannot be used for fiscal (legal) metrology.

**How to order** **EM26 96 AV5 3 H O3 S1 XX**



**Type Selection**

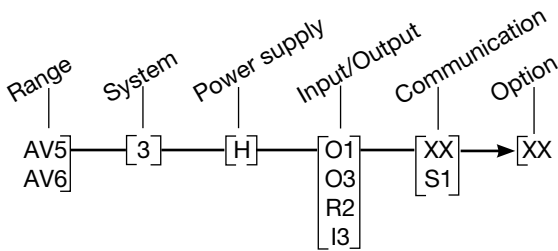
Range codes	System	Power supply	Input/Output
<b>AV5:</b> 230 V <sub>LN</sub> /400V <sub>LL</sub> 1/5(10)A V <sub>LN</sub> : 160 V to 480 V <sub>LN</sub> V <sub>LL</sub> : 277 V to 830 V <sub>LL</sub>	<b>3:</b> balanced and unbalanced load: 3-phase, 4-wire; 3-phase, 3-wire; 2-phase, 3-wire; 1-phase, 2-wire	<b>H:</b> 90 to 260VAC/DC (48 to 62Hz)	<b>O1:</b> single open collector type (pulse or alarm) <b>O3:</b> 3 open collector type (mixed combination of pulse, alarm and/or remote output) <b>R2:</b> dual relay type (functions as per "O3") <b>I3:</b> 3 digital inputs for tariff selection or Gas/water/energy/remote heating metering
<b>AV6:</b> 120 V <sub>LN</sub> /208V <sub>LL</sub> 1/5(10)A V <sub>LN</sub> : 40 V to 144 V <sub>LN</sub> V <sub>LL</sub> : 70 V to 250 V <sub>LL</sub>			

**Communication**

**XX:** none  
**S1:** RS485 port

**Options**

**XX:** none



**NOTE:** please check the availability of the needed code on the verification path tables on left before order.

## Input specifications

<b>Rated inputs</b>	System type: 3	Overload status	EEEE indication when the value being measured is exceeding the "Continuous inputs overload" (maximum measurement capacity)
Current type	Galvanic insulation by means of built-in CT's		
Current range (by CT)	AV5 and AV6: 1/5(10) A	Max. and Min. indication	Max. instantaneous variables: 9999; energies: 99 999 999. Min. instantaneous variables: 0; energies 0.00
Voltage by direct connection or VT/PT	AV5: 230 V <sub>LN</sub> /400V <sub>LL</sub> ; AV6: 120 V <sub>LN</sub> /208V <sub>LL</sub>		
<b>Accuracy</b> (Display + RS485) (@25°C ±5°C, R.H. ≤60%, 50±5Hz/60±5Hz)	lb: see below, Un: see below	<b>LEDs</b>	Red LED (Energy consumption), according to EN50470-3, EN62052-11 0.001 kWh/kvarh by pulse if CT ratio by VT ratio is ≤7; 0.01 kWh/kvarh by pulse if CT ratio by VT ratio is > 7.1 ≤ 70.0; 0.1 kWh/kvarh pulse if CT ratio by VT ratio is > 70.1 ≤ 700.0; 1 kWh/kvarh by pulse if CT ratio by VT ratio is > 700.1; 1000 imp./kWh/kvarh. Max frequency: 16Hz
AV5 model	In: 5A, I <sub>max</sub> : 10A; Un: 160 to 480V <sub>LN</sub> (277 to 830V <sub>LL</sub> )		
AV6 model	In: 5A, I <sub>max</sub> : 10A; Un: 40 to 144V <sub>LN</sub> (70 to 250V <sub>LL</sub> )		
Current	From 0.002I <sub>n</sub> to 0.2I <sub>n</sub> : ±(0.5% RDG +3DGT)	<b>Measurements</b>	See "List of the variables that can be connected to:" TRMS measurements of distorted wave forms. By means of external CT's
AV5, AV6 models	From 0.2I <sub>n</sub> to I <sub>max</sub> : ±(0.5% RDG +1DGT).	Method	
Phase-neutral voltage	In the range Un: ±(0,5% RDG +1DGT)	Coupling type	
Phase-phase voltage	In the range Un: ±(1% RDG +1DGT)	<b>Crest factor</b>	≤3 (15A max. peak)
Frequency	±0.1Hz (50±5Hz/60±5Hz)	<b>Current Overloads</b>	Continuous For 500ms
Active and Apparent power	±(1%RDG +2DGT)	<b>Voltage Overloads</b>	Continuous For 500ms
Power Factor	±[0.001+1%(1.000 - "PF RDG")]	<b>Input impedance</b>	208VL-L (AV6) >1MΩ 400VL-L (AV5) >1MΩ 1/5(10) A (AV5-AV6) < 0.3VA
Reactive power	±(2%RDG +2DGT)	<b>Frequency</b>	50±5Hz/60±5Hz
Active Energy	Class 1 according to EN62053-21; class B according to EN50470-3.	<b>Joystick</b>	For variable selection: programming of the instrument working parameters and Wdmd max reset
Reactive Energy	Class 2 according to EN62053-23		
AV5, AV6 models	In: 5A, I <sub>max</sub> : 10A; 0.1 In: 0.5A.		
Harmonic distortion	Start up current: 10mA THD up to 15th harmonic ±3% reading		
<b>Energy additional errors</b>			
Influence quantities	According to EN62053-21, EN62053-23		
<b>Temperature drift</b>	≤200ppm/°C		
<b>Sampling rate</b>	1600 samples/s @ 50Hz 1900 samples/s @ 60Hz		
<b>Display refresh time</b>	750 msec		
<b>Display</b>	3 lines (1 x 8 DGT; 2 x 4 DGT)		
Type	LCD, h 9.5mm, dual colour backlight (selectable)		
Instantaneous variables read-out	4 DGT		
Energies	Exported: Total 6+1DGT or 7DGT (with "-" sign). Imported: 6+2, 7+1 or 8DGT		

## Output specifications

<b>Digital outputs</b>		<b>Relay output</b>	
Pulse type		Physical outputs	Max. 2
Number of outputs	Up to 3, independent. Programmable from 0.001 to 10.00 kWh/kvarh per pulse.	Purpose	For alarm output, pulse output or remote control.
Type	Outputs connectable to the energy meters (Wh/varh)	Type	Relay, SPST type AC 1-5A @ 250VAC DC 12-5A @ 24VDC AC 15-1.5A @ 250VAC DC 13-1.5A @ 24VDC
Pulse duration	T <sub>ON</sub> selectable (30 ms or 100 ms) according to EN62053-31 T <sub>OFF</sub> : ≥120ms, according to EN62052-31	Insulation	4000 VRMS outputs to measuring input. 4000 VRMS outputs to power supply input.
Alarm type		<b>RS485</b>	
Number of outputs	Up to 3, independent	Type	Multidrop, bidirectional (static and dynamic variables)
Alarm modes	Up alarm, down alarm (see the table "List of the variables that can be connected to")	Connections	2-wire Max. distance 1000m (without amplifier) Termination directly on the instrument
Set-point adjustment	From 0 to 100% of the display scale	Addresses	247, selectable by means of the front joystick
Hysteresis	From 0 to full scale	Protocol	MODBUS/JBUS (RTU)
On-time delay	0 to 255s	Data (bidirectional)	
Output status	Selectable: normally de-energized or normally energized	Dynamic (reading only)	System and phase variables: see table "List of variables..."
Min. response time	≤ 700ms, filters excluded. Set-point on-time delay: "0 s"	Static (reading and writing)	All the configuration parameters.
Remote control	The digital outputs status can be managed by means of serial communication RS485, if programmed as remote.	Data format	1 start bit, 8 data bit, no parity, 1 stop bit
<b>Note</b>	The 3 digital outputs can also work as a triple pulse output, triple alarm output, or in any other combination.	Baud-rate	4800, 9600 bits/s
		Driver input capability	1/5 unit load
<b>Static output</b>		Insulation	Maximum 160 transceivers on the same bus, which can be expanded with signal amplifiers. By means of optocouplers, 4000 VRMS output to measuring input. 4000 VRMS output to power supply input
Physical outputs	Max. 3		
Purpose	For pulse output, alarm output or remote control.		
Signal	V <sub>ON</sub> 1.2 VDC/ max. 100 mA V <sub>OFF</sub> 30 VDC max.		
Insulation	By means of optocouplers, 4000 VRMS output to measuring inputs, 4000 VRMS output to power supply input.		

## Digital input specifications

Number of inputs	3	Working modes	Selectable:
Input frequency	20Hz max, duty cycle 50%		• total and partial energy meters (kWh and kvarh)
Prescaler adjustment	From 0.001 to 999.9 m <sup>3</sup> or kWh/pulse		managed by time periods (t1-t2-t3-t4), W dmd
Contact measuring voltage	5VDC +/- 5%		synchronisation (the synchronisation is made every time the tariff changes) and GAS (m <sup>3</sup> )
Contact measuring current	10mA max		or WATER (hot-cold m <sup>3</sup> )
Input impedance	680Ω		
Contact resistance	≤100Ω, closed contact ≥500kΩ, open contact		

## Digital input specifications (cont.)

or remote heating (kWh) meters or external kWh meter;

- total and partial energy meters (kWh and kvarh) managed by time periods (t1-t2), W dmd synchronisation (the synchronisation is made independently of the tariff selection) and GAS (m<sup>3</sup>) or WATER (hot-cold m<sup>3</sup>) or remote heating (kWh) meters or external kWh meter;

Note

Insulation

- total energy (kWh, kvarh) and GAS, WATER (hot-cold m<sup>3</sup>) and remote heating meters or external kWh meter, 3 choices only. The energy metering is only made by means of the analogue inputs. By means of optocouplers, 4000 VRMS digital inputs to measuring inputs. 4000 VRMS digital inputs to power supply input.

## Software functions

<b>Password</b>	Numeric code of max. 4 digits; 2 protection levels of the programming data:	current) being measured cannot exceed 66 MW for AV5_X models and 62 MW for AV6_X models. If the currents and/or voltages being measured exceed their maximum limits, the display shows the error message "EEEE". For EN50470-3 compliant applications the maximum power being measured is 25 MW.
1st level	Password "0", no protection;	
2nd level	Password from 1 to 9999, all data are protected	
<b>System selection</b>		
System 3-Pn unbalanced load	3-phase (4-wire); 3-phase (3-wire).	
System 3-P 1 balanced load	3-phase (3-wire) one current and 3-phase to phase voltage measurements. 3-phase (4-wire) one current and one-phase (L1) to neutral voltage measurement.	
System 2-P	2-phase (3-wire).	
System 1-P	1-phase (2-wire).	
<b>Transformer ratio</b>		
VT (PT)	1.0 to 999.9 / 1000 to 6000.	
CT	1.0 to 999.9 / 1000 to 9999 / 10.00k to 60.00k. Transformer ratio: VT (PT): 1.0 to 999.9 / 1000 to 6000, CT: 1.0 to 999.9 / 1000 to 9999 / 10.00k to 60.00k (only AV5_X and AV6_X). VT (PT) = 1.0 (fixed) for AV5_PF models. The maximum VT by CT ratio is 3150 for AV5_PF models, 4629 for AV5_X models. The maximum VT by CT ratio is 5448 for AV6_PF models, 14529 for AV6_X models. Note 1: for MID complaint applications the maximum power being measured is 25 MW for AV5_PF models. Note 2: for non-MID complaint applications the maximum power (calculated as maximum input voltage and	
<b>Filter</b>		
Operating range	0 to 100% of the input display scale	
Filtering coefficient	1 to 32	
Filter action	Measurements, serial output (fundamental variables: V, A, W and their derived ones).	
<b>Displaying</b>		
	Up to 3 variables per page See « Display pages » 8 different set of variables available (see « Display pages ») according to the application being selected	
<b>Alarm highlight</b>		
	In case of alarm and if the relevant function is enabled, the display changes the colour alternatively from white backlight to blue backlight and vice versa.	
<b>Reset</b>		
	By means of the front joystick: - dmd and max. dmd; - total energies and gas/water: kWh, kvarh; - partial energies and tariffs: kWh, kvarh	
<b>Harmonic analysis</b>		
	Up to the 15th harmonics on single current and voltage	



## Software functions (cont.)

### Easy connection function

For all the display selections, both energy and power measurements are independent of the current direction. The displayed energy is always “imported” with the only exception of “F” and “H” types (see “display pages” table).

For these latter selections the energies can be either “imported” or “exported” depending on the current direction.

## General specifications

<b>Operating temperature</b>	-25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN62053-21 and EN62053-23	<b>Immunity to conducted disturbances</b>	10V/m from 150KHz to 80MHz
<b>Storage temperature</b>	-30°C to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C) according to EN62053-21 and EN62053-23	<b>Surge</b>	On current and voltage measuring inputs circuit: 4kV; According to CISPR 22
<b>Installation category</b>	Cat. III (IEC60664, EN60664)	<b>Radio frequency suppression</b>	According to CISPR 22
<b>Insulation (for 1 minute)</b>	4000 VRMS between measuring inputs and power supply. 4000 VRMS between power supply and RS485 digital outputs	<b>Standard compliance</b>	
<b>Dielectric strength</b>	4000 VRMS for 1 minute	<b>Safety</b>	IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11
<b>Noise rejection CMRR</b>	100 dB, 48 to 62 Hz	<b>Metrology</b>	EN62053-21, EN50470-3, EN62053-23.
<b>EMC</b>	According to EN62052-11	<b>Pulse output Approvals</b>	DIN43864, IEC62053-31 CE, cULus listed, MID (PF option only)
Electrostatic discharges	15kV air discharge;	<b>Connections</b>	Screw-type
Immunity to irradiated	Test with current: 10V/m from 80 to 2000MHz;	<b>Cable cross-section area</b>	Max. 1.5 mm <sup>2</sup>
Electromagnetic fields	Test without any current: 30V/m from 80 to 2000MHz;	<b>Housing</b>	
Burst	On current and voltage measuring inputs circuit: 4kV	<b>Dimensions (WxHxD)</b>	96 x 96 x 63 mm
		<b>Material</b>	ABS, self-extinguishing: UL 94 V-0
		<b>Mounting</b>	Panel mounting
		<b>Protection degree</b>	
		<b>Front</b>	IP50
		<b>Screw terminals</b>	IP20
		<b>Weight</b>	Approx. 400 g (packing included)

## Power supply specifications

### Auxiliary power supply

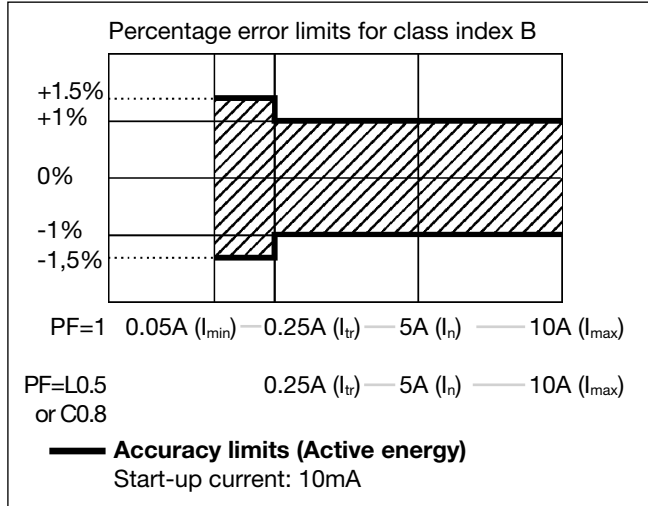
H: 90 to 260VAC/DC  
(48 to 62Hz)

### Power consumption

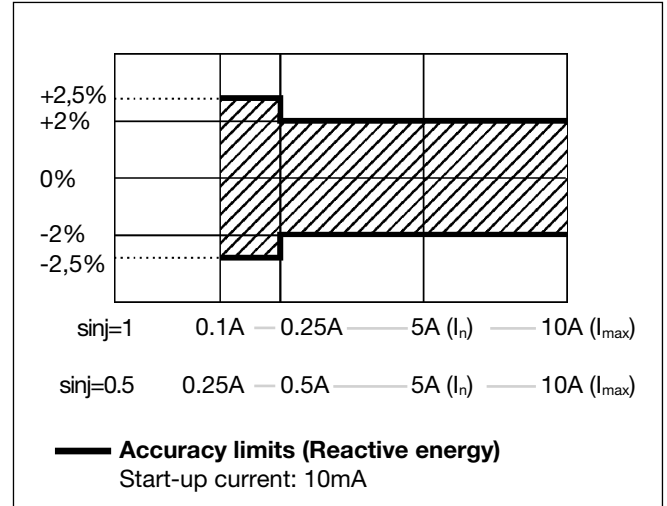
AC: 6VA  
DC: 3.5 W

## Accuracy (according to EN50470-3 and EN62053-23)

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



## MID compliance (PF option only)

<b>Accuracy</b>	0.9 $U_n \leq U \leq 1.1 U_n$ ; 0.98 $f_n \leq f \leq 1.02 f_n$ ; fn: 50Hz; cosj: 0.5 inductive to 0.8 capacitive. Class B. I st: 0.01A; I min: 0.05A; I tr: 0.25A; I n: 5A; I max: 10A	<b>EMC compliance</b>	E2
AV5-AV6 models		<b>Mechanical compliance</b>	M2
<b>Operating temperature</b>	-25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C)	<b>Protection degree</b>	in order to achieve the protection against dust and water required by the norms harmonized to MID, the meter must be used only installed in IP51 (or better) cabinets.

## Used calculation formulas

### Phase variables

Instantaneous effective voltage

$$V_{1N} = \sqrt{\frac{1}{n} \cdot \sum_{i=1}^n (V_{1N})_i^2}$$

Instantaneous active power

$$W_1 = \frac{1}{n} \cdot \sum_{i=1}^n (V_{1N})_i \cdot (A_1)_i$$

Instantaneous power factor

$$PF = \frac{W_1}{VA_1}$$

Instantaneous effective current

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

Instantaneous apparent power

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

Instantaneous reactive power

$$var_1 = \sqrt{(VA_1)^2 - (W_1)^2}$$

Where: n= sample number

### System variables

Equivalent three-phase voltage

$$V_{\Sigma} = \frac{V_1 + V_2 + V_3}{3}$$

Three-phase reactive power

$$var_{\Sigma} = (var_1 + var_2 + var_3)$$

Three-phase active power

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

Three-phase apparent power

$$VA_{\Sigma} = \sqrt{W_{\Sigma}^2 + var_{\Sigma}^2}$$

Three-phase power factor

$$\cos\phi_{\Sigma} = \frac{W_{\Sigma}}{VA_{\Sigma}} \quad (TPF)$$

### Energy metering

$$kWh_1 = \int_{t_1}^{t_2} P_1(t) dt \cong \Delta t \sum_{j=n_1}^{n_2} P_1(j)$$

$$kvarh_1 = \int_{t_1}^{t_2} Q_1(t) dt \cong \Delta t \sum_{j=n_1}^{n_2} Q_1(j)$$

Where:

**P**= active power;

**Q**= reactive power;

**t<sub>1</sub>, t<sub>2</sub>** =starting and ending time points of consumption recording;

**nj**= time unit;

**Δt**= time interval between two successive power consumptions;

**n<sub>1</sub>, n<sub>2</sub>** = starting and ending discrete time points of consumption recording

## List of the variables that can be connected to:

- RS485 communication port
- Alarm outputs (“max” variable”, “energies” and “hour counter” excluded)
- Pulse outputs (only positive “energies”)

No	Variable	1-phase system	2-phase system	3-ph. 4-wire balanced sys.	3-ph. 4-wire unbal. sys.	3 ph. 3-wire bal. sys.	3 ph. 3-wire unbal. sys.	Notes
1	V L-N sys		x	x	x	x	x	sys=system
2	V L1	x	x	x	x	x	x	
3	V L2	o	x	x	x	x	x	
4	V L3	o	o	x	x	x	x	
5	V L-L sys	o	x	x	x	x	x	sys=system
6	V L1-2	o	x	x	x	x	x	
7	V L2-3	o	o	x	x	x	x	
8	V L3-1	o	o	x	x	x	x	
9	A dmd max		x	x	x	x	x	Highest “dmd” current among the phases (1)
10	A L1	x	x	x	x	x	x	
11	A L2	o	x	x	x	x	x	
12	A L3	o	o	x	x	x	x	
13	VA sys	x	x	x	x	x	x	sys=system
14	VA sys dmd	x	x	x	x	x	x	sys=system (1)
15	VA L1	x	x	x	x	x	x	
16	VA L2	o	x	x	x	x	x	
17	VA L3	o	o	x	x	x	x	
18	var sys	x	x	x	x	x	x	sys=system
19	var L1	x	x	x	x	x	x	
20	var L2	o	x	x	x	x	x	
21	var L3	o	o	x	x	x	x	
22	W sys	x	x	x	x	x	x	sys=system
23	W sys dmd	x	x	x	x	x	x	sys=system (1)
24	W L1	x	x	x	x	x	x	
25	W L2	o	x	x	x	x	x	
26	W L3	o	o	x	x	x	x	
27	PF sys	x	x	x	x	x	x	
28	PF L1	x	x	x	x	x	x	
29	PF L2	o	x	x	x	x	x	
30	PF L3	o	o	x	x	x	x	
31	Hz	x	x	x	x	x	x	
32	Phase seq.	o	o	x	x	x	x	
33	Hours	x	x	x	x	x	x	
34	kWh (+)	x	x	x	x	x	x	Total or by user
35	kvarh (+)	x	x	x	x	x	x	Total or by user
36	kWh (+)	x	x	x	x	x	x	Partial or by tariff
37	kvarh (+)	x	x	x	x	x	x	Partial or by tariff
38	kWh (-)	x	x	x	x	x	x	Total
39	kvarh (-)	x	x	x	x	x	x	Total
40	m <sup>3</sup> Gas	x	x	x	x	x	x	Total
41	m <sup>3</sup> Cold H <sub>2</sub> O	x	x	x	x	x	x	Total
42	m <sup>3</sup> Hot H <sub>2</sub> O	x	x	x	x	x	x	Total
43	kWh H <sub>2</sub> O	x	x	x	x	x	x	Total
44	kWh out	x	x	x	x	x	x	Total
45	A L1 THD	x	x	x	x	x	x	
46	A L2 THD	o	x	x	x	x	x	
47	A L3 THD	o	o	x	x	x	x	
48	V L1 THD	x	x	x	x	x	x	
49	V L2 THD	o	x	x	x	x	x	
50	V L3 THD	o	o	x	x	x	x	
51	V L1-2 THD	x	x	x	x	x	x	
52	V L2-3 THD	o	x	x	x	x	x	
53	V L3-1 THD	o	o	x	x	x	x	

(x) = available; (o) = not available (zero indication on the display); (1) Max. value with data storage.



## Display pages

Sel. pos.	No	1st variable (1st line)	2nd variable (2nd line)	3rd variable (3rd line)	Note	Applications							
						A	B	C	D	E	F	G	H
	1	Total kWh (+)	W sys dmd	W sys dmd max		x	x	x		x	x	x	x
	2	kWh (+)	A dmd max	"PArT"	"PArT" = Partial kWh (+)						x	x	x
	3	Total kvarh (+)	VA sys dmd	VA sys dmd max			x	x			x	x	x
	4	kvarh (+)	VA sys	"PArT"	"PArT" = Partial kvarh (+)						x	x	x
	5	Totalizer 1 (2)	W sys	(text) (3)	(1)			x			x	x	x
	6	Totalizer 2 (2)	W sys	(text) (3)	(1)			x			x	x	x
	7	Totalizer 3 (2)	W sys	(text) (3)	(1)			x			x	x	x
	8	kWh (+)	t1 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	9	kWh (+)	t2 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	10	kWh (+)	t3 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	11	kWh (+)	t4 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	12	kvarh (+)	t1 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	13	kvarh (+)	t2 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	14	kvarh (+)	t3 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	15	kvarh (+)	t4 (text) (4)	W sys dmd	(1) digital input enabled			x			x	x	x
	16	kWh (+) X	W X	User X	(1) specific function enabled				x				
	17	kWh (+) Y	W Y	User Y	(1) specific function enabled				x				
	18	kWh (+) Z	W Z	User Z	(1) specific function enabled				x				
	19	Total kvarh (-)	VA sys dmd	VA sys dmd max							x		x
	20	Total kWh (-)	W sys dmd	W sys dmd max						x	x		x
	21	Hours	W sys	PF sys						x	x	x	x
	22	Hours	var sys	PF sys						x	x	x	x
	23	W L1	W L2	W L3						x		x	x
	24	VA L1	VA L2	VA L3								x	x
	25	var L1	var L2	var L3								x	x
	26	PF L1	PF L2	PF L3								x	x
	27	V L1	V L2	V L3			x		x	x		x	x
	28	V L1-2	V L2-3	V L3-1								x	x
	29	A L1	A L2	A L3						x		x	x
	30	Phase seq.	V LN sys	Hz		x	x	x		x	x	x	x
	31	Phase seq.	V LL sys	Hz							x	x	x
	32	ASY	V LL sys	%							x	x	x
	33	ASY	V LN sys	%							x	x	x
	34	THD A1	THD A2	THD A3								x	x
	35	THD V1	THD V2	THD V3								x	x
	36	THD V12	THD V23	THD V 31								x	x
	37	Lot number	Year	DMD time		x	x	x	x	x	x	x	x
	38	CT ratio	Value of CT	System		x	x	x	x	x	x	x	x
	39	VT/PT ratio	Value of VT	Connection		x	x	x	x	x	x	x	x
	40 a	Alarm 1 status	Set-point value	Variable type				x		x		x	x
	41 a	Alarm 2 status	Set-point value	Variable type				x		x		x	x
	42 a	Alarm 3 status	Set-point value	Variable type				x		x		x	x
	40 b	Pulse 1 status	Output pulse			x	x	x	x	x	x	x	x
	41 b	Pulse 2 status	Output pulse			x	x	x	x	x	x	x	x
	42 b	Pulse 3 status	Output pulse			x	x	x	x	x	x	x	x
	43	Serial port	Address	RS485 status		x	x	x	x	x	x	x	x
<b>0</b>	Selector position which can be linked to any of the variable combinations listed above (No. from 1 to 36)												
<b>1</b>	Selector position which can be linked to any of the variable combinations listed above (No. from 1 to 36)												
<b>2</b>	Selector position which can be linked to any of the variable combinations listed above (No. from 1 to 36)												
<b>3</b>	Selector position which can be linked to any of the variable combinations listed above (No. from 1 to 36). In this position the front LED blinks proportionally to the reactive energy (kvarh) being measured												

(1) The page is available according to the enabled measurement. (2) m<sup>3</sup> Gas, m<sup>3</sup> Water, kWh remote heating, external kWh counter. (3) Hot or Cold (water), gas, ENE (external energy meter). (4) The active tariff is displayed with an "A" before the "t1-t2-t3-t4" symbols.

## Additional available information on the display

Type	1st line	2nd line	3rd line
Meter information pag. 1	Firmware release	Year	Year of production
Meter information pag. 2	Pulse	LED	Value
Meter information pag. 3	System	2w, 3w or 4w	
Meter information pag. 4	CT ratio	Value of CT ratio	
Meter information pag. 5	PT ratio	Value of PT ratio	
In case of alarm output pag.6a	Alarm output 1, 2 or 3 status (ON/OFF)	Set-point value	Variable type
In case of pulse output pag. 6b	Pulse output 1,2 or 3 variable link (kWh/kvarh)	Output pulse weight (kWh/kvarh per pulse)	
In case of communication port pag.7	Serial port	Address	RS485 status (RX-TX)
In case of communication port pag.8	Secondary address (for M-bus protocol)	Sn	

## List of selectable applications

	Description	Notes
<b>A</b>	Basic domestic **	Main energy metering
<b>B</b>	Shopping centres **	Main energy metering
<b>C</b>	Advanced domestic**	Main energy metering (total and based on tariff), gas and water metering
<b>D</b>	Multi domestic (also camping and marinas) * / **	Main energy metering (3 by single phase)
<b>E</b>	Solar *	Energy meter with some basic power analyzer functions
<b>F</b>	Industrial *	Main energy metering
<b>G</b>	Advanced industrial **	Energy metering and power analysis
<b>H</b>	Advanced industrial for power generation *	Complete energy metering and power analysis

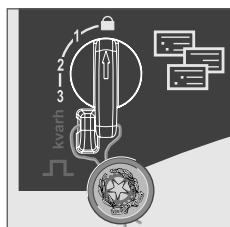
**Notes:** \* Not available with option PF A. \*\* Not available with option PF B

## Insulation between inputs and outputs

	Measuring Inputs	Relay output	Open collector outputs	Comm. port	Digital inputs	Auxiliary power supply
Measuring Inputs	-	4kV	4kV	4kV	4kV	4kV
Relay output	4kV	-	-	4kV	-	4kV
Open collector outputs	4kV	-	-	4kV	-	4kV
Comm. port	4kV	4kV	4kV	-	4kV	4kV
Digital inputs	4kV	-	-	4kV	-	4kV
Aux. power supply	4kV	4kV	4kV	4kV	4kV	-

**NOTE:** all the models with auxiliary power supply have, mandatory, to be connected to external current transformers because the insulation among the current inputs is just functional (100VAC).

## Tamper proof and display page selection



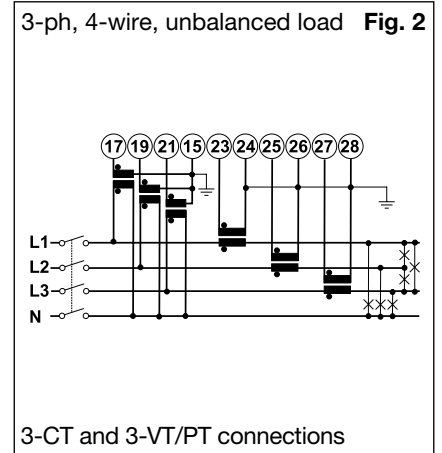
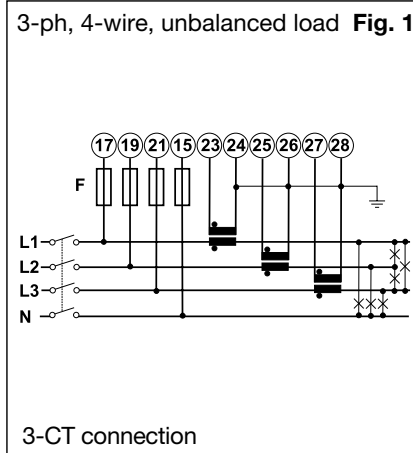
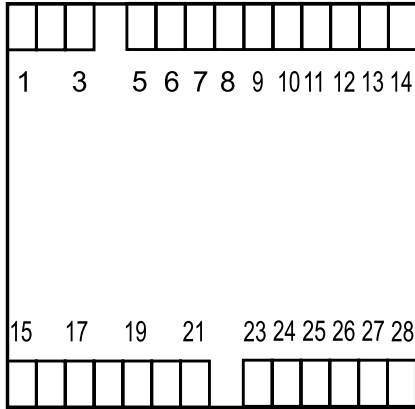
Lock of programming with seal.  
Selection of up to 4 main pages  
(programmable by the user).

Easy access to specific display pages.

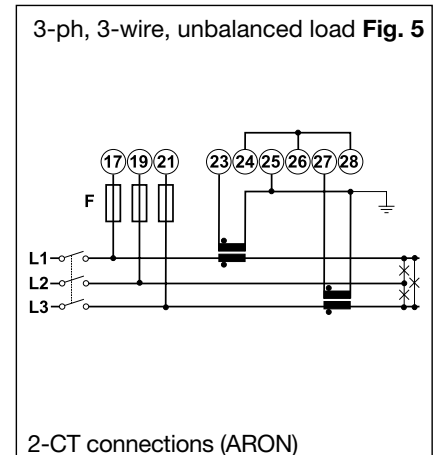
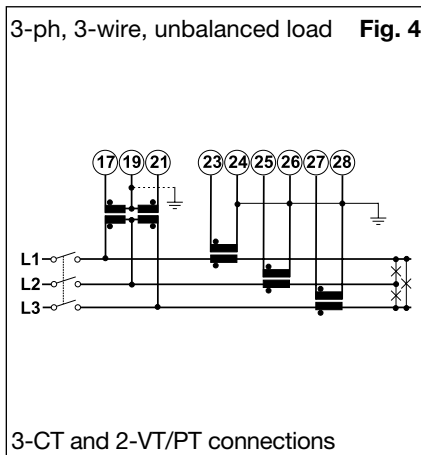
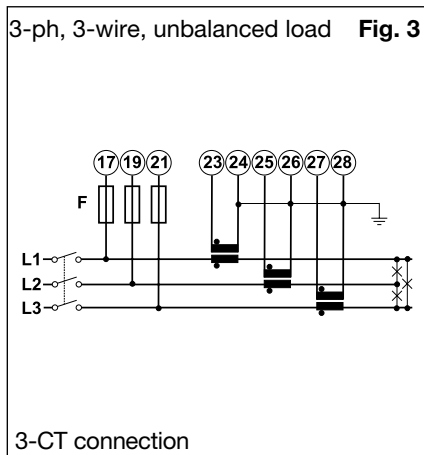


# Wiring diagrams

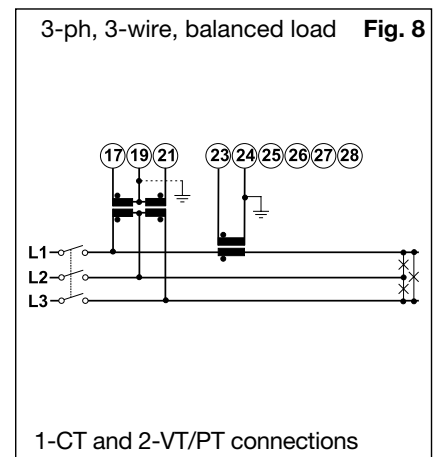
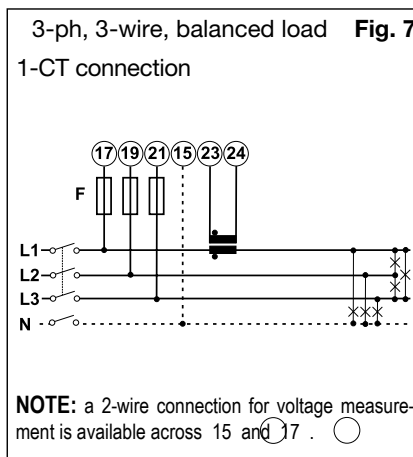
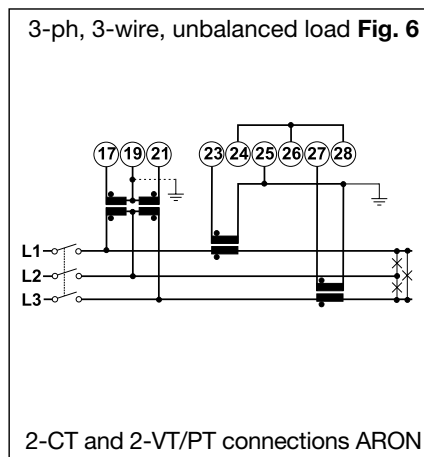
## System type selection: 3P.n



## System type selection: 3P.n

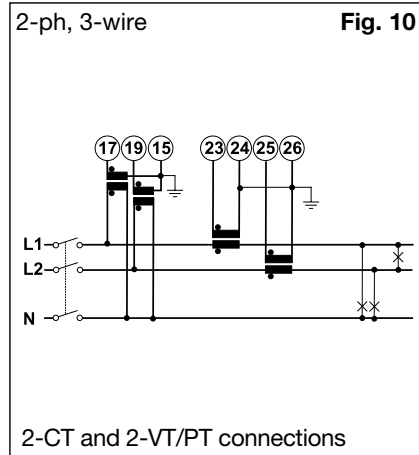
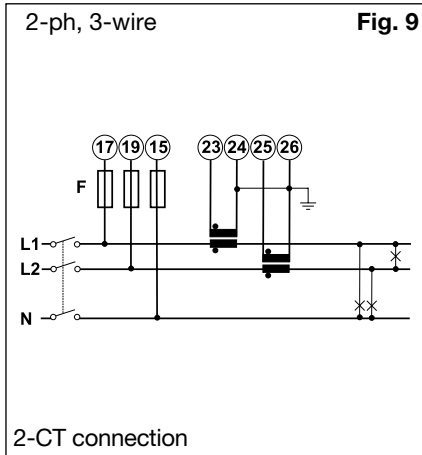


## System type selection: 3P.1

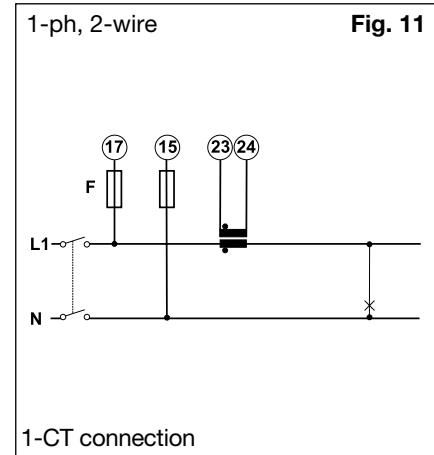


## Wiring diagrams

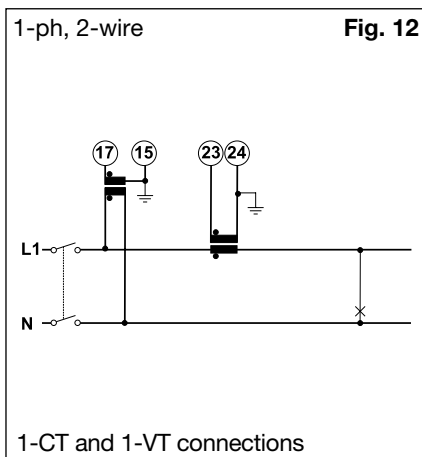
### System type selection: 2P



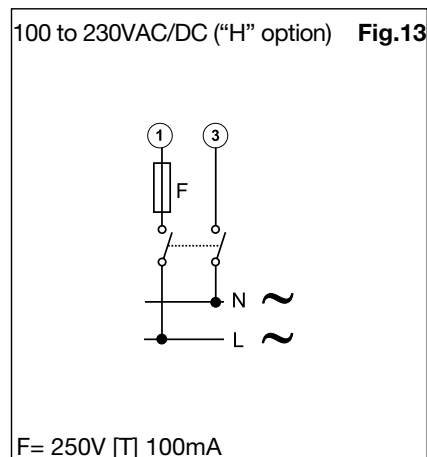
### System type selection: 1P



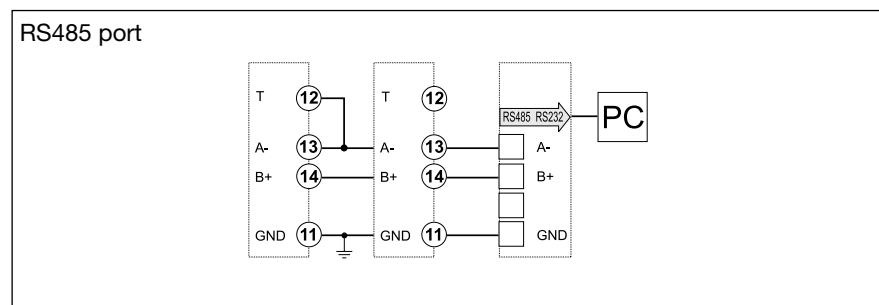
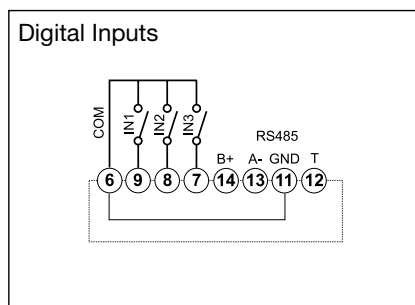
### System type selection: 1P



### Auxiliary power supply wiring diagrams

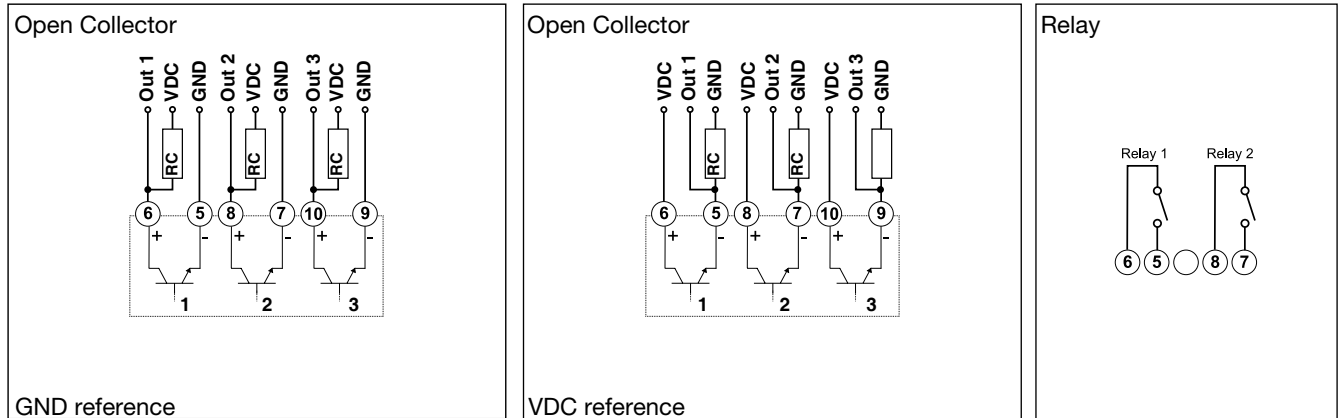


## Digital inputs and RS485 port wiring diagrams



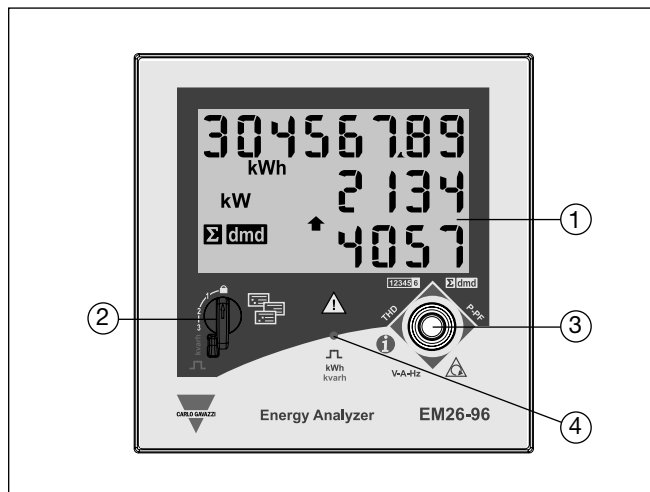
**RS485 NOTE:** additional devices provided with RS485 are connected in parallel. The termination of the serial output is carried out only on the last instrument of the network, by means of a jumper between (A-) and (T).

## Open collector and relay outputs wiring diagrams



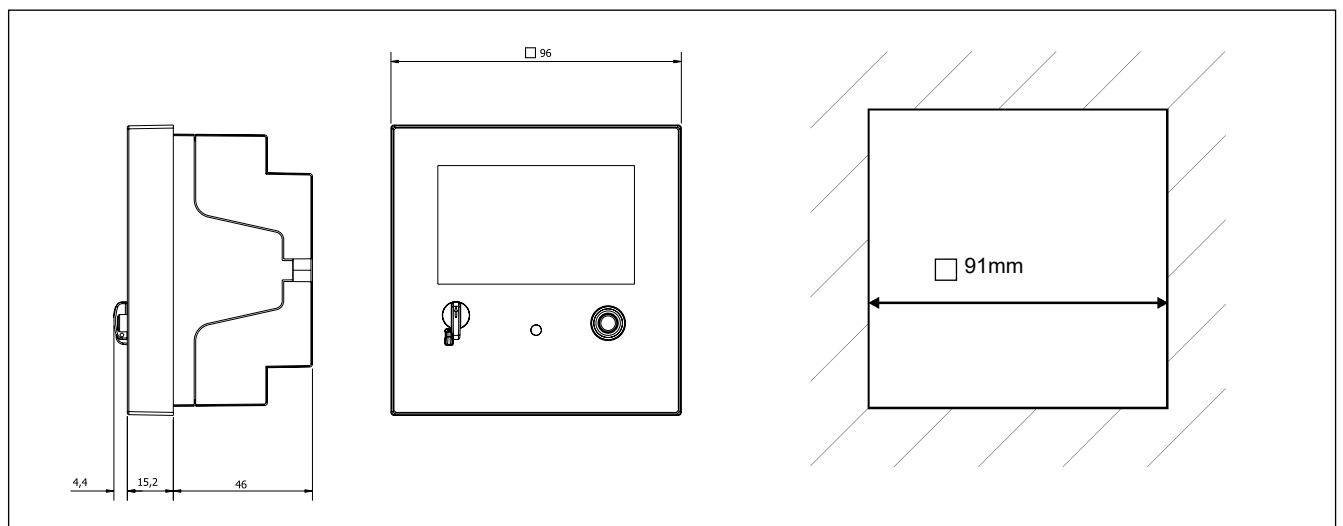
The load resistances (RC) must be designed so that the close contact current is lower than 100mA; the VDC voltage must be lower than or equal to 30VDC.

## Front panel description



- 1. Display**  
LCD-type with alphanumeric indications to:  
- display configuration parameters;  
- display all the measured variables.
- 2. Selector**  
To select the desired display pages and to lock the programming.
- 3. Joystick**  
To program the configuration parameters and scroll the variables on the display.
- 4. LED**  
Red LED blinking proportionally to the energy being measured.

## Dimensions and Panel Cut-out



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