

Energy Management Energy Meter Type EM10 DIN



- Class 1 (kWh) according to EN62053-21
- Class B (kWh) according to EN50470-3
- Energy meter
- Energy readout: 5+1 DGT
- Energy measurements: total kWh
- TRMS measurements of distorted sine waves (voltages/currents)
- Self power supply
- Dimensions: 1-DIN module
- Protection degree (front): IP40
- 1 pulse output on request
- Certified according to MID Directive (option PF only): see "how to order" below
- Other versions available (not certified, option X and P): see "how to order" on the next page

Product Description

One-phase energy meter with LCD data displaying; indicated for active energy metering. Housing for DIN-rail mounting, IP40 (front) protection degree. Direct

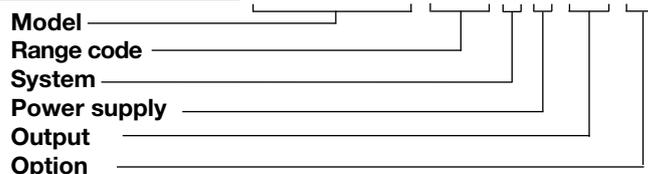
connection up to 32A. More over the meter can be provided with pulse output pro-

portional to the active energy being measured.



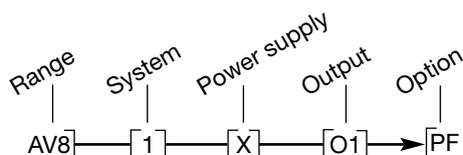
Certified according to MID Directive, Annex "B" + Annex "D" or Annex "B" + Annex "F" for legal metrology relevant to active electrical energy meters (see Annex MI-003 of MID). Can be used for fiscal (legal) metrology.

How to order **EM10 DIN AV8 1 X O1 PF**



Type Selection

Range code	System	Power supply	Option
AV8: 230V _{LN} AC - 5(32)A (direct connection)	1: 1-phase	X: Self power supply (from 48 to 62Hz). The instrument works on the range from -20% to +20% of the measuring nominal input voltage.	PF: Certified according to MID Directive, Annex "B" + Annex "D" or Annex "B" + Annex "F" for legal metrology relevant to active electrical energy meters (see Annex MI-003 of MID). Can be used for fiscal (legal) metrology.
	Output		
	O1: Pulse type (open collector output)		



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.

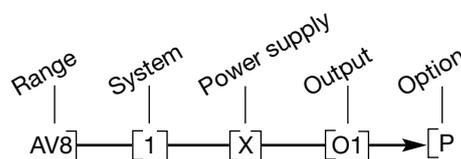
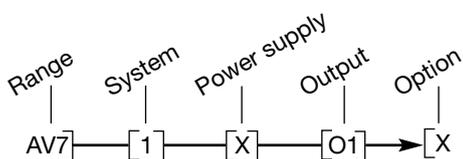
How to order EM10 DIN AV7 1 X O1 X

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

Type Selection

Range code	System	Power supply	Option
AV7: 120V _{LN} AC - 5(32) (direct connection) AV8: 230V _{LN} AC - 5(32)A (direct connection)	1: 1-phase Output O1: Pulse type (open collector output)	X: Self power supply (from 48 to 62Hz). The instrument works on the range from -20% to +20% of the measuring nominal input voltage.	X: none P: Bearing EC "Type examination" (annex B of MID) relevant to active electrical energy meters (see Annex MI-003).

NOTE: please check the availability of the needed code on the verification path diagrams below before order.



Input specifications

Rated inputs

Current range (by shunt)
Voltage range

System: 1
AV7 and AV8: 5(32)A
AV7: 120 VLN AC
(The option "P" is not available)
AV8: 230 VLL AC

Active energy

Class 1 according to EN62053-21 and Class B according to EN50470-3. MID (Annex MI-003) Class B.
I_b: 5A, I_{max}: 32A,
0.1 I_b: 0.5A
20mA

Reference values

Start up current:

Energy additional errors

Influence quantities

According to EN62053-21,
≤200ppm/°C

Temperature drift

Sampling rate

4096 samples/s @ 50Hz
4096 samples/s @ 60Hz

Accuracy (Display)

(@25°C ±5°C, R.H. ≤60%, 48 to 62Hz)

AV7 model

I_b: 5A, I_{max}: 32A;
Un: 120VLN (-20% +20%)
I_b: 5A, I_{max}: 32A;
Un: 230VLN (-20% +20%)

AV8 model

Input specifications (cont.)

Display	1 line (max: 5+1 DGT) LCD, h 7mm Total: 5+1 DGT	Crest factor	Ib 5A ≤4 (45A max. peak)
Type		Current Overload	
Energie indication		Continuous	32A, @ 50Hz
LEDs	Red LED (Energy consumption), 1000 pulses/kWh (Max Frequency 16 Hz) according to EN62053-11	For 10ms	960A, @ 50Hz
Measurements	kWh from 0,0 to 99999,9 PF model: kWh from 0,01 to 999999 autorange	Voltage Overload	
Method	TRMS measurements of distorted wave forms	Continuous	1.2 Un
Coupling type	Direct	For 500ms	2 Un
		Input impedance	
		120VL-N (AV7)	>720KΩ
		230VL-N (AV8)	>720KΩ
		5(32) A (AV7-AV8)	< 0.5VA
		Frequency	48 to 62 Hz

Output specifications

Digital output	(on request)	Insulation	≥120ms (OFF), according to EN62052-31 By means of optocouplers, 4000 VRMS output to measuring inputs
Number of outputs	1		
Type	Open collector, 1000 pulses/kWh.		
Signal	V _{ON} 1.2 VDC/ max. 100 mA V _{OFF} 30 VDC max.		
Pulse duration	≥100ms < 120msec (ON),		

General specifications

Operating temperature	-25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN62053-21, EN50470-1 and EN62053-23	Surge	On current and voltage measuring input circuits: 4kV; According to CISPR 22
Storage temperature	-30°C to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C) according to EN62053-21 EN50470-1 and EN62053-23	Radio frequency suppression	
Installation category	Cat. III (IEC60664, EN60664)	Standard compliance	
Insulation (for 1 minute)	4000 VRMS between measuring inputs and digital output (O1).	Safety	IEC60664, IEC61010-1 EN60664, EN61010-1 (EN62052-11) EN50470-1 EN62053-21, EN62053-23, EN50470-3
Dielectric strength	4000 VRMS for 1 minute	Metrology	MID "annex MI-003" DIN43864, IEC62053-31
CMRR Noise rejection	100 dB, 48 to 62 Hz	Pulse output Approvals	CE, cULus, MID (PF option only)
EMC	According to EN62052-11 8kV air discharge;	Connections	Screw-type
Electrostatic discharges		Cable cross-section area	Measuring inputs: min. 2.5 mm ² , max. 10 mm ² ; Min./Max. screws tightening torque: 0.5 Nm / 1.1 Nm Other terminals: 1.5 mm ² Min./Max. screws tightening torque: 0.4 Nm/0.8 Nm
Immunity to irradiated electromagnetic fields	Test with applied current: 10V/m from 80 to 2000MHz; Test without any applied current: 30V/m from 80 to 2000MHz;	DIN Housing	
Burst	On current and voltage measuring input circuits: 4kV	Dimensions (WxHxD)	17.5 x 90 x 67.5 mm
Immunity to conducted disturbances	10V/m from 150KHz to 80MHz	Material	Nylon PA66, self-extinguishing: UL 94 V-0 DIN-rail
		Mounting	
		Protection degree	
		Front	IP40
		Screw terminals	IP20
		Weight	Approx. 100 g (packing included)



Power supply specifications

Self supplied version	120VLN, 230 VLN (-20% +20%) 48-62Hz	Power consumption	≤ 3VA
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MID "Annex MI-003" compliance (PF option only)

Accuracy	0.9 Un ≤ U ≤ 1.1 Un; 0.98 fn ≤ f ≤ 1.02 fn; fn: 50 or 60Hz; cosφ: 0.5 inductive to 0.8 capacitive. Class B I st: 0.02A; I min: 0.25A; I tr: 0.64A; I ref: 5A; I max: 32A.	131°F) (R.H. from 0 to 90% non-condensing @ 40°C)	
Operating temperature	-25°C to +55°C (-13°F to	EMC compliance	E2
		Protection degree	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 formula

Energy metering

$$kWh_i = \int_{t_1}^{t_2} P_i(t) dt \cong \Delta t \sum_{n_1}^{n_2} P_{nj}$$

Where:

i= considered phase (L1)

P= active power;

t₁, t₂ =starting and ending time points of consumption recording;

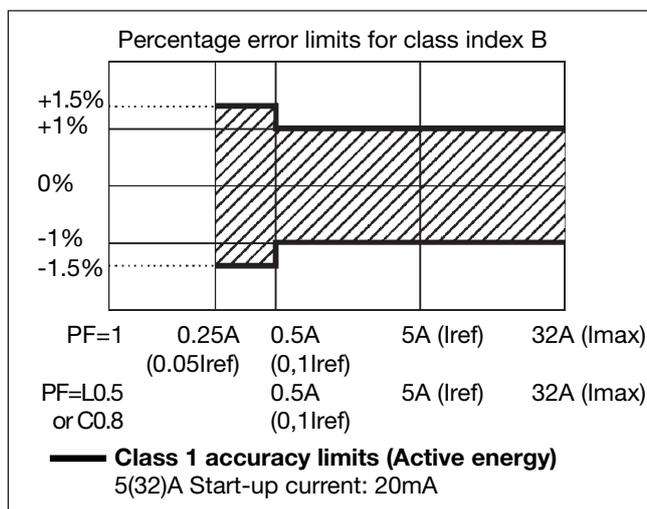
n= time unit;

Δt= time interval between two successive power consumptions;

n₁, n₂ = starting and ending discrete time points of consumption recording

Accuracy according to EN50470-3

kWh, accuracy (RDG) depending on the current



Insulation between inputs and outputs

	Measuring inputs	Open collector output	AC self-power supply
Measuring inputs	-	4kV	0kV
Open collector output	4kV	-	4kV
AC self-power supply	0kV	4kV	-

Wiring diagram and open collector output (O1)

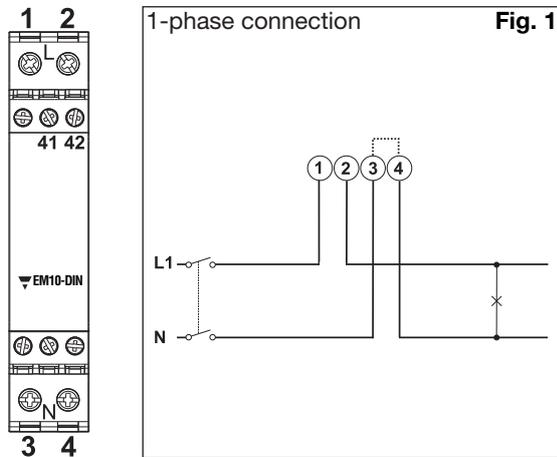


Fig. 1

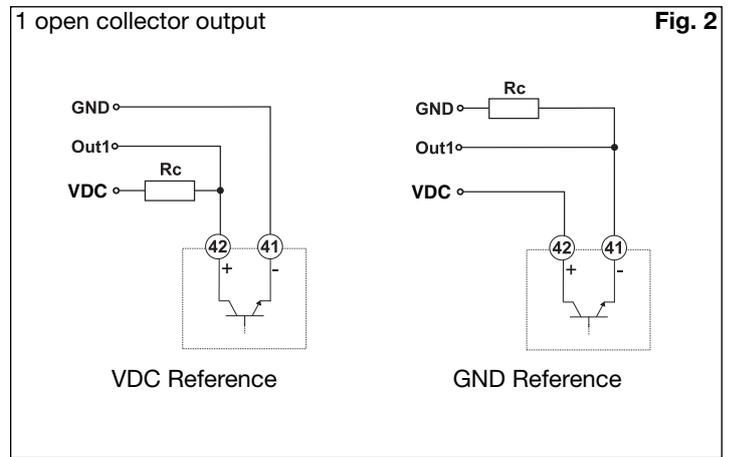
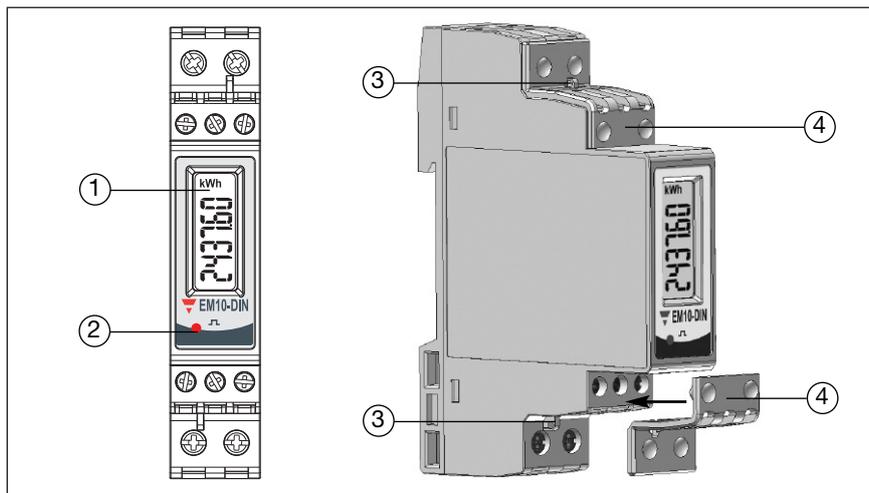


Fig. 2

NOTE: The 3 and 4 terminals, in the instrument, are wired together

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.

Frontal panel description and tamper proof



1. **Display**
LCD-type with energy indication.
2. **LED**
Red LED to show the consumed energy.
3. **Tamper proof**
The instrument can be sealed in two points: upper cover and lower cover.
4. **Protection covers for tamper proof**
The "tamper proof" kit is available with the "P" option.

Dimensions and panel cut-out

