

# 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: 6 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): 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-

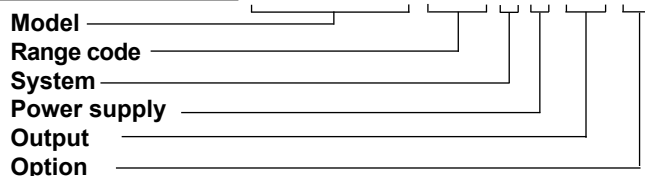
portional to the active energy being measured.

**MID**

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.

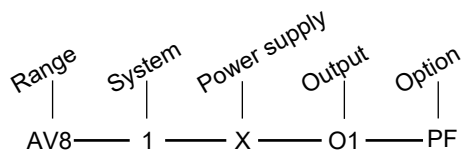
## How to order

**EM10 DIN AV8 1 X O1 PF**



## Type Selection

Range code	System	Power supply	Option
<b>AV8:</b> 230V <sub>LN</sub> AC - 5(32)A (direct connection)	<b>1:</b> 1-phase	<b>X:</b> Self power supply (from 48 to 62Hz). The instrument works on the range from -20% to +20% of the measuring nominal input voltage.	<b>PF:</b> Certified according to MID Directive. Can be used for fiscal (legal) metrology.
	<b>Output</b>		
	<b>O1:</b> 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

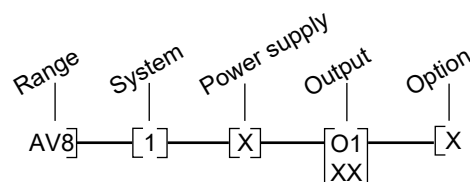
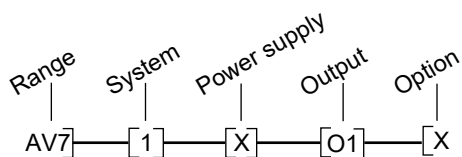
**EM10 DIN AV7 1 X O1 X**

Model \_\_\_\_\_  
 Range code \_\_\_\_\_  
 System \_\_\_\_\_  
 Power supply \_\_\_\_\_  
 Output \_\_\_\_\_  
 Option \_\_\_\_\_

## Type Selection

Range code	System	Power supply	Option
<b>AV7:</b> 120V <sub>LN</sub> AC - 5(32) (direct connection)	<b>1:</b> 1-phase	<b>X:</b> Self power supply (from 48 to 62Hz). The instrument works on the range from -20% to +20% of the measuring nominal input voltage.	<b>X:</b> none
<b>AV8:</b> 230V <sub>LN</sub> AC - 5(32)A (direct connection)	<b>Output</b>		
	<b>XX:</b> None		
	<b>O1:</b> Pulse type (open collector output)		

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



## Input specifications

<b>Rated inputs</b>	System: 1	0.1 Ib: 0.5A
Current range (by shunt)	AV7 and AV8: 5(32) A	20mA
Voltage range	AV7: 120 VLN AC AV8: 230 VLL AC	
<b>Accuracy (Display)</b> (@25°C ±5°C, R.H. ≤60%, 48 to 62Hz)		
AV7 model	Ib: 5A, Imax: 32A; Un: 120VLN (-20% +20%)	
AV8 model	Ib: 5A, Imax: 32A; Un: 230VLN (-20% +20%)	
Active energy	Class 1 according to EN62053-21 and Class B according to EN50470-3.	
Reference values	Ib: 5A, Imax: 32A,	
	<b>Start up current:</b>	
	<b>Energy additional errors</b>	
	Influence quantities	According to EN62053-21,
	<b>Temperature drift</b>	≤200ppm/°C
	<b>Sampling rate</b>	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
	<b>Display</b>	
	Type	1 line (max: 6 DGT)
	Energie indication	LCD, h 7mm Total: 6 DGT
	<b>LEDs</b>	Red LED (Energy consumption), 1000 pulses/kWh (Max Frequency 16 Hz) according to EN62053-11
	<b>Measurements</b>	kWh from 0.01 to 999999,

## Input specifications (cont.)

Method	autorange TRMS measurements of distorted wave forms	Continuous For 500ms	1.2 Un 2 Un
Coupling type	Direct	<b>Input impedance</b> 120VL-N (AV7) 230VL-N (AV8) 5(32) A (AV7-AV8)	>720KΩ >720KΩ < 0.5VA
<b>Crest factor</b>	Ib 5A ≤4 (45A max. peak)	<b>Frequency</b>	48 to 62 Hz
<b>Current Overload</b> Continuous For 10ms	32A, @ 50Hz 960A, @ 50Hz		
<b>Voltage Overload</b>			

## Output specifications

<b>Digital output</b> Number of outputs Type Signal	(on request) 1 Open collector, 1000 pulses/kWh. V <sub>ON</sub> 1.2 VDC/ max. 100 mA V <sub>OFF</sub> 30 VDC max.	Pulse duration  Insulation	≥100ms < 120msec (ON), ≥120ms (OFF), according to EN62052-31 By means of optocouplers, 4000 VRMS output to measuring inputs
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## 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, EN50470-1 and EN62053-23	Radio frequency suppression	measuring input circuits: 4kV; According to CISPR 22
<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 EN50470-1 and EN62053-23	<b>Standard compliance</b> Safety	IEC60664, IEC61010-1 EN60664, EN61010-1 (EN62052-11) EN50470-1 EN62053-21, EN62053-23, EN50470-3
<b>Installation category</b>	Cat. III (IEC60664, EN60664)	Metrology	DIN43864, IEC62053-31 CE, cULus (X option only), MID (PF option only)
<b>Insulation (for 1 minute)</b>	4000 VRMS between measuring inputs and digital output.	Pulse output Approvals	
<b>Dielectric strength</b>	4000 VRMS for 1 minute	<b>Connections</b> Cable cross-section area	Screw-type Measuring inputs: min. 2.5 mm <sup>2</sup> , max. 10 mm <sup>2</sup> ; Min./Max. screws tightening torque: 0.5 Nm / 1.1 Nm Other terminals: 1.5 mm <sup>2</sup> . Screws tightening torque: 0.5 Nm
<b>CMRR Noise rejection</b>	100 dB, 48 to 62 Hz	<b>DIN Housing</b> Dimensions (WxHxD) Material	17.5 x 90 x 67.5 mm Nylon PA66, self-extinguishing: UL 94 V-0
<b>EMC</b> Electrostatic discharges Immunity to irradiated electromagnetic fields	According to EN62052-11 8kV air discharge;  Test with applied current: 10V/m from 80 to 2000MHz; Test without any applied current: 30V/m from 80 to 2000MHz;	Mounting DIN-rail	
Burst	On current and voltage measuring input circuits: 4kV	<b>Protection degree</b> Front Screw terminals	IP40 IP20
Immunity to conducted disturbances	10V/m from 150KHz to 80MHz	<b>Weight</b>	Approx. 100 g (packing included)
Surge	On current and voltage		



## Power supply specifications

### Self supplied version

120V LN (AV7), 230 V LN (AV8) (-20% +20%)  
48-62Hz

### Power consumption

≤ 3VA

## MID compliance (PF option only)

### Accuracy

$0.9 U_n \leq U \leq 1.1 U_n$ ;  
 $0.98 f_n \leq f \leq 1.02 f_n$ ;  
 $f_n$ : 50 or 60Hz;  
 $\cos\varphi$ : 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.

### 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.

### Operating temperature

-25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C)

## 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;

$t_1, t_2$  = starting and ending time points of consumption recording;

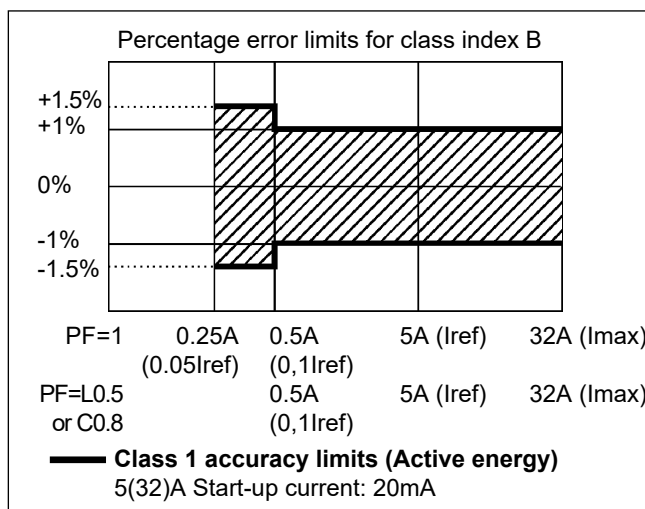
$n$  = time unit;

$\Delta t$  = time interval between two successive power consumptions;

$n_1, n_2$  = starting and ending discrete time points of consumption recording

## Accuracy according to EN50470-3

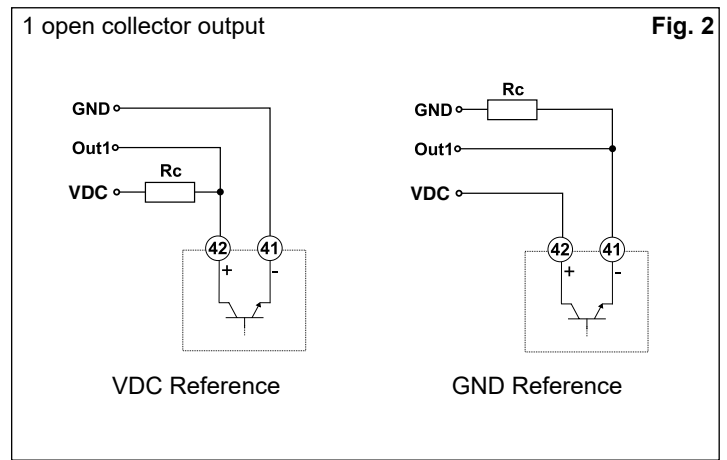
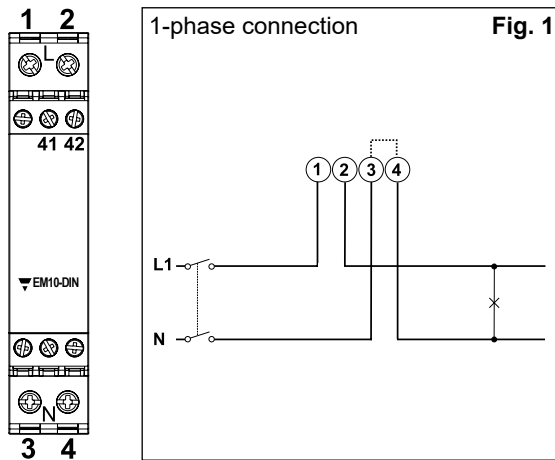
kWh, accuracy (RDG) depending on the current



## 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	-

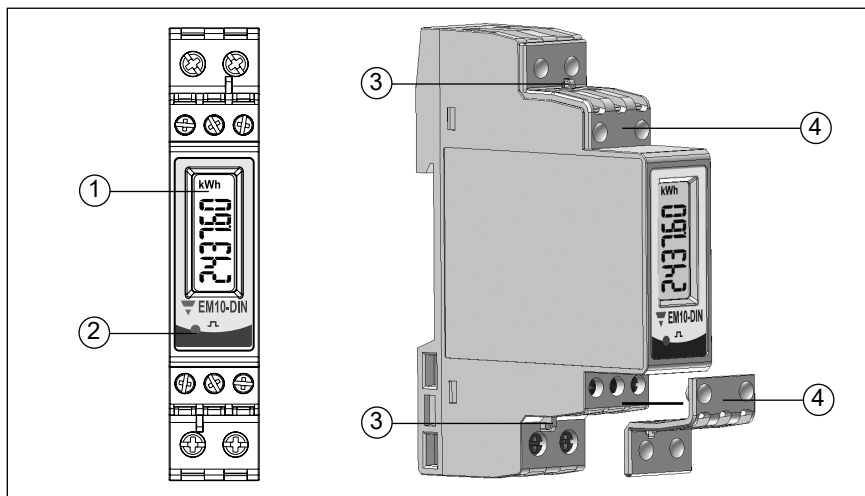
## Wiring diagram and open collector output (O1)



**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 "PF" option.

## Dimensions and panel cut-out

