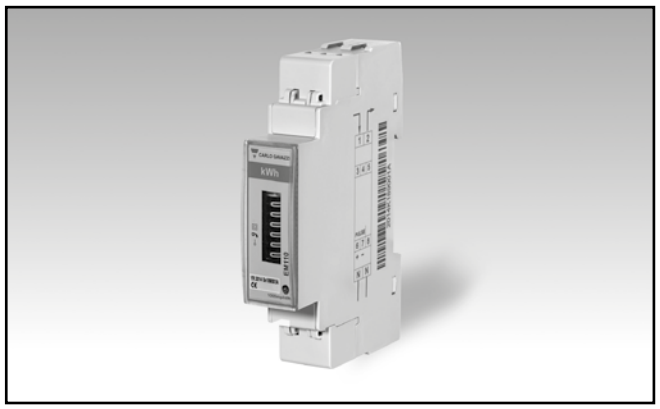
Energy Management
Energy Meter
Type EM110

CARLO GAVAZZI



- **Single phase energy meter**
- **Class 1 (kWh) according to EN62053-21**
- **Class B (kWh) according to EN50470-3**
- **Electro-mechanical display**
- **Energy readout on display: 6+1 digit**
- **Measurements on display: total kWh**
- **Direct current measurement up to 32 AAC**
- **Self power supply**
- **Dimensions: 1-DIN module**
- **Protection degree (front): IP51**
- **Pulse output (by open collector PNP)**
- **Detects wrong current direction**
- **Certified according to MID Directive (option PF only): see "how to order" below**

Product description

Single-phase energy meter with electro-mechanical data displaying; particularly indicated for active energy metering and for cost allocation in applications up to 32 A (direct connection), especially when energy reading is necessary during power down. Housing for DIN-rail mounting, with IP51 front degree protection. The meter is provided with pulse output proportional 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

EM110-DIN AV8 1 X O1 PF B

- **Model**
- **Range code**
- **System**
- **Power supply**
- **Output**
- **Option**
- **Measurement**

Type Selection

Range code

AV8: 230VLN AC - 5(45)A (Direct connection up to 32 A)

AV7: 120VLN AC - 5(45)A (Direct connection up to 32 A)

System

1: 1-phase 2-wire

Power supply

X: Self power supply -30% +20% of the rated measuring input voltage, 45 to 65Hz

Output

O1: pulse output

Option

PF: Certified according to MID Directive. Can be used for fiscal(legal) metrology.

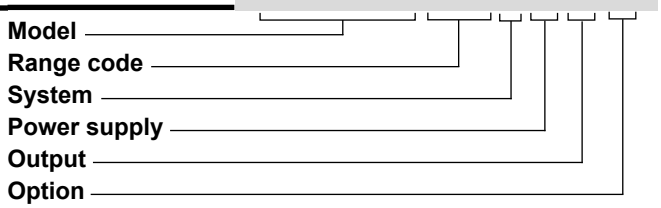
Measurement

B: Only the total positive energy meter is certified according to MID. Negative energy is not measured.

STANDARD

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

How to order EM110-DIN AV8 1 X O1 X



Type Selection

Range code

AV8: 230VLN AC - 5(45)A (Direct connection up to 32 A)

AV7: 120VLN AC - 5(45)A (Direct connection up to 32 A)

System

1: 1-phase 2-wire

Power supply

X: Self power supply -30% +20% of the rated measuring input voltage, 45 to 65Hz

Output

O1: pulse output

Option

X: none

CARLO GAVAZZI

Input specifications

Rated Inputs	
Current type	1-phase loads, direct connection up to 32 A
Nominal current range	5(45)A Ib 5 A Imax 45 A
Nominal voltage	230VLN AC (AV8 option), 120 VLN (AV7 option)
Accuracy (@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)	
AV7	Imin=0.25A; Ib: 5A, Imax: 45A; Un: 120VLN -30% +30%
AV8	Imin=0.25A; Ib: 5A, Imax: 45A; Un: 230VLN -30% +20%
Energies	Class 1 according to EN62053-21 Class B (Class B (kWh) according to EN50470-3)
Start-up current:	20mA (AV7, AV8) Self-consumption is not measured.
Start-up voltage	84V (AV7), 161V (AV8)
Resolution	
Energy	0.1 kWh
Energy additional errors	
Influence quantities	According to EN62053-21
Temperature drift	≤200ppm/°C

Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
Display	
Type	Electro-mechanical, h 5 mm
Energies read-out	Total: 6+1 digit Only positive energy is integrated
Max. and Min. indication	Max. 999 999.9 Min. 0.0
LEDs	Flashing red light pulses according to EN50470-3, EN62052-11, 1000 imp./ kWh (min. period: 90ms, max. frequency: 11 Hz) Fix orange light: wrong current direction
Current overloads	
Continuous	45A, @ 50Hz
For 10ms	1350 A
Voltage Overloads	
Continuous	1.2 Un
For 500ms	2 Un
Input impedance	
Voltage input 230VL-N	> 750 Kohm
Voltage input 120VL-N	> 750 Kohm
Current inputs: 5(45) A	< 0.5 VA

Output specifications

Static output	
Purpose	For pulse output proportional to the active energy (kWh)
Pulse rate	1000 pulses per kWh
Pulse ON duration	30ms, according to EN62052-31
Pulse OFF duration	≥120ms, according to EN62052-31
Output type	open collector PNP
Load	V_{ON} 1 VDC; max. 100 mA V_{OFF} 80 VDC max

CARLO GAVAZZI

General specifications

Operating temperature	-25 to +65 °C, indoor, (R.H. from 0 to 90% non-condensing @ 40°C)
Storage temperature	-30°C to +80°C (R.H. < 90% noncondensing @ 40°C)
Overvoltage category	Cat. III
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS
Dielectric strength	4000 VAC RMS for 1 minute
EMC	According to EN62052-11
Electrostatic discharges	15kV air discharge;
Immunity to irradiated electromagnetic fields	Test with current: 10V/m from 80 to 2000MHz; Test without any current: 30V/m from 80 to 2000MHz;
Burst	On current and voltage measuring inputs circuit: 4kV
Immunity to conducted disturbances	10V/m from 150KHz to 80MHz
Surge	On current and voltage measuring inputs circuit: 4kV;
Radio frequency	According to CISPR 22

Standard compliance	
Safety	EN62052-11
Metrology	EN62053-21, EN50470-3
Approvals	CE, MID (PF option only), cULus (AV7 option only)
Connections	
Cable cross-section area	Measuring inputs: 6 mm^2, with/without metallic cable ferrule; Max. screw tightening torque: 1.1 Nm
Other terminals	1.5 mm^2, Min./Max. screws tightening torque: 0.4 Nm
Housing	
Dimensions (WxHxD)	17.5 x 63 x 90 mm
Material	Noryl, self-extinguishing: UL 94 V-0
Sealing covers	Included
Mounting	DIN-rail
Protection degree	
Front	IP51
Screw terminals (cable inputs)	IP20
Weight	Approx. 75 g (packing included)

Power supply specifications

Self power supply	
AV8	230VAC VL-N, -30% +20% 50/60Hz
AV7	120VAC VL-N, -30% +30% 50/60Hz
Power consumption	≤1.0W, ≤ 8VA

Insulation (for 1 minute) between inputs and outputs

	Measuring input	Digital output
Measuring input	-	4 kV
Digital output	4 kV	-

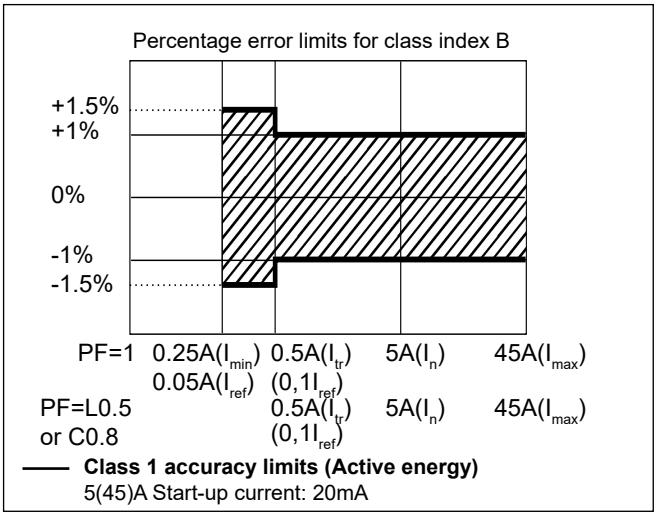
CARLO GAVAZZI

MID compliance (PF option only)

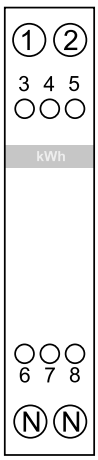
Accuracy	0.9 Un ≤ U ≤ 1.1 Un; 0.98 fn ≤ f ≤ 1.02 fn; fn: 50 Hz; cosφ: 0.5 inductive to 0.8 capacitive. Class B Considering listed Ib or In values
Operating temperature	-25 to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C)
EMC compliance	E2
Mechanical compliance	M2

Accuracy according to EN50470-3

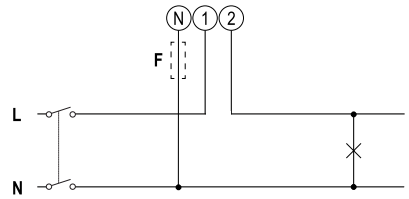
kWh, accuracy (RDG) depending on the current



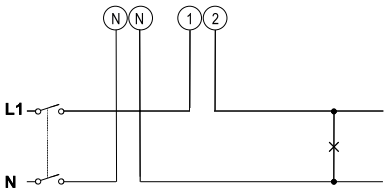
Wiring diagrams



1-ph, 2-wire (F 315mA) **Fig.1**

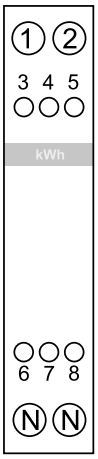


1-ph, 2-wire **Fig.2**

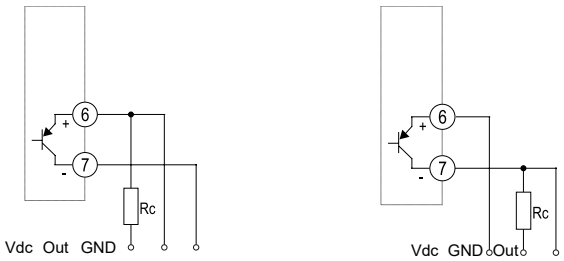


CARLO GAVAZZI

Wiring diagrams (cont.)

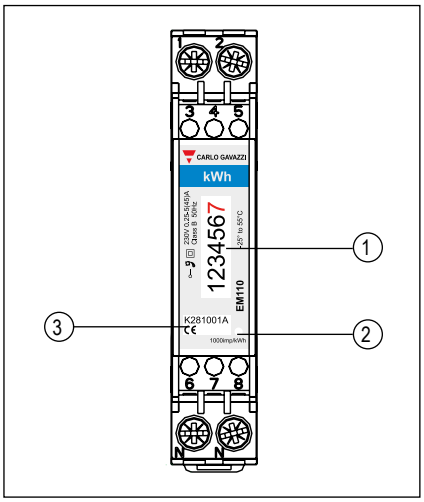


Pulse output **Fig.3**



Open collector outputs: the load resistance (Rc) must be designed so that the closed contact current is under 100 mA (V_{on} is equal to 1 V dc). DC voltage (V_{off}) must be less than or equal to 80 V.

Front panel description

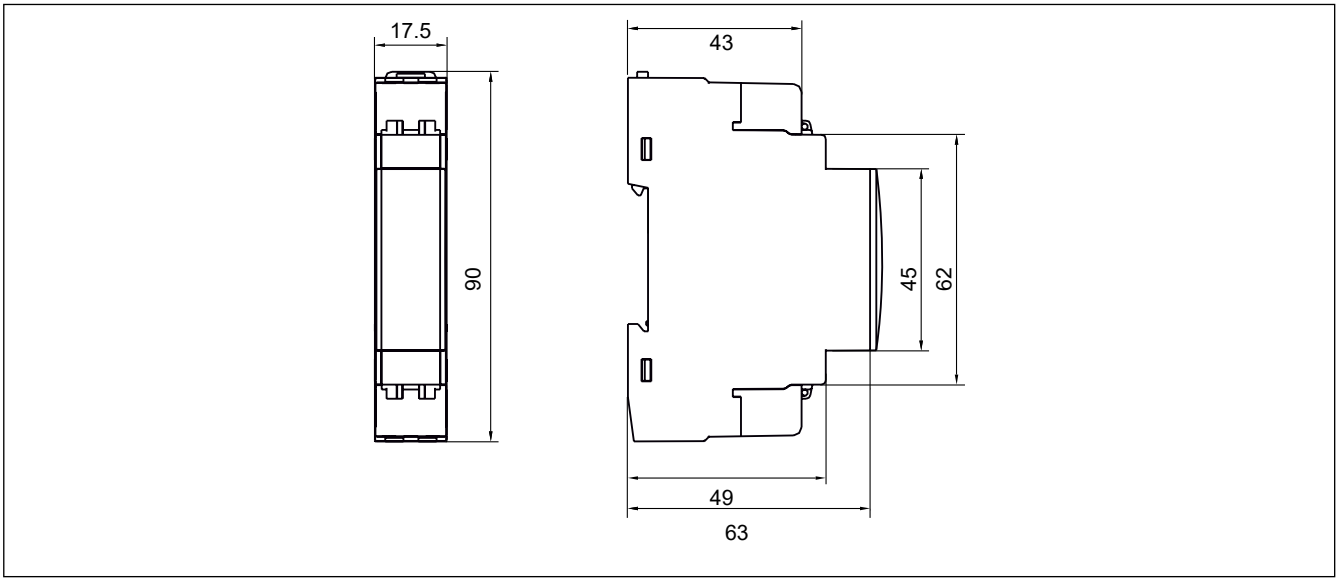


1. **Display**
   Electro-mechanical type with total kWh indication

2. **LED**
   LED proportional to kWh reading

3. **Serial number and MID data**
   Area reserved to serial number and MID-relevant data in PF versions

Dimensions



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Carlo Gavazzi:

EM111-40 EM110DINAV81XO1X EM110DINAV71XO1X