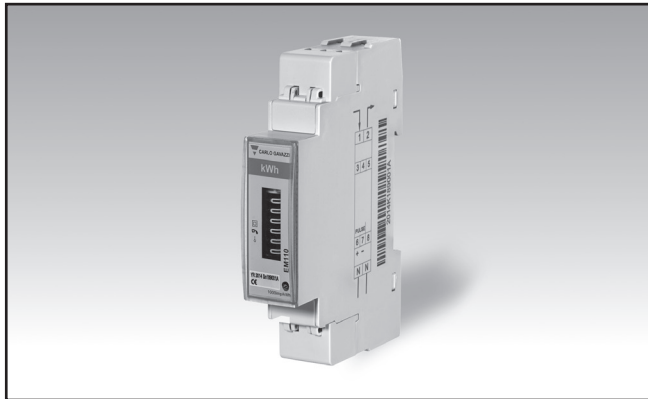


# Energy Management Energy Meter Type EM110



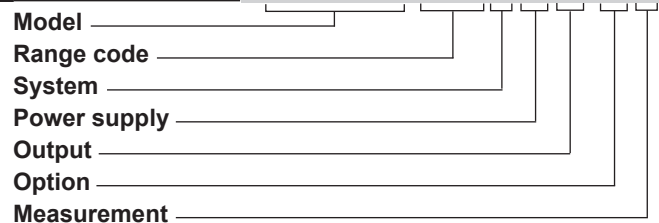
- Single phase energy meter
- Class 1 (kWh) according to EN62053-21
- Class B (kWh) according to EN50470-3
- Electro-mechanical display
- Energy readout on display: 6+1 digit
- Measurements on display: total kWh
- Direct current measurement up to 32 AAC
- Self power supply
- Dimensions: 1-DIN module
- Protection degree (front): IP51
- Pulse output (by open collector PNP)
- Detects wrong current direction
- Compliant with the international accuracy standard IEC/EN62053-21, and the IEC/EN61557-12 performance requirements (active energy)
- 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**



## Type Selection

| Range code  | System   | Power supply   | Output                  |
|---|--|--|-------------------------|
| <b>AV8:</b> 230VLN AC - 5(45)A (Direct connection up to 32 A)                             | <b>1:</b> 1-phase 2-wire   | <b>X:</b> Self power supply -30% +20% of the rated measuring input voltage, 45 to 65Hz | <b>O1:</b> pulse output |
| Option  | Measurement  |  |                         |
| <b>PF:</b> Certified according to MID Directive. Can be used for fiscal(legal) metrology. | <b>B:</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   | System                   | Power supply  | Output                  |
|--|--------------------------|---|-------------------------|
| <b>AV8:</b> 230VLN AC - 5(45)A<br>(Direct connection up to 32 A)                                     | <b>1:</b> 1-phase 2-wire | <b>X:</b> Self power supply<br>-30% +20% of the rated measuring input voltage, 45 to 65Hz | <b>O1:</b> pulse output |
| <b>AV7:</b> 120VLN AC - 5(45)A<br>(Direct connection up to 32 A). Available on request (MOQ 100 pcs) |                          |   |                         |

**Option**

**X:** none

## Input specifications

|  |  |                                 |   |
|--|--|---------------------------------|---|
| <b>Rated Inputs</b>  |  | <b>Sampling rate</b>            | 4096 samples/s @ 50Hz<br>4096 samples/s @ 60Hz  |
| Current type   | 1-phase loads, direct connection up to 32 A  | <b>Display</b>                  |   |
| Nominal current range                                      | 5(45)A<br>Ib 5 A   | Type                            | Electro-mechanical, h 5 mm  |
| Nominal voltage  | I <sub>max</sub> 45 A<br>230VLN AC (AV8 option),<br>120 VLN (AV7 option)                         | Energies read-out               | Total: 6+1 digit<br>Only positive energy is integrated  |
| <b>Accuracy</b><br>(@25°C ±5°C, R.H. ≤60%,<br>45 to 65 Hz) |  | <b>Max. and Min. indication</b> | Max. 999 999.9<br>Min. 0.0  |
| AV7  | I <sub>min</sub> =0.25A; I <sub>b</sub> : 5A, I <sub>max</sub> :<br>45A; Un: 120VLN -30%<br>+30% | <b>LEDs</b>                     | Flashing red light pulses<br>according to EN50470-3,<br>EN62052-11, 1000 imp./<br>kWh (min. period: 90ms,<br>max. frequency: 11 Hz) |
| AV8  | I <sub>min</sub> =0.25A; I <sub>b</sub> : 5A, I <sub>max</sub> :<br>45A; Un: 230VLN -30%<br>+20% |                                 | Fix orange light: wrong<br>current direction  |
| Energies   | Class 1 according to<br>EN62053-21 Class B<br>(Class B (kWh) according<br>to EN50470-3)          | <b>Current overloads</b>        |   |
| Start-up current:  | 20mA (AV7, AV8)<br>Self-consumption is not<br>measured.  | Continuous                      | 45A, @ 50Hz   |
| Start-up voltage   | 84V (AV7), 161V (AV8)  | For 10ms                        | 1350 A  |
| <b>Resolution</b>  |  | <b>Voltage Overloads</b>        |   |
| Energy   | 0.1 kWh  | Continuous                      | 1.2 Un  |
| <b>Energy additional errors</b>                            |  | For 500ms                       | 2 Un  |
| Influence quantities                                       | According to EN62053-21  | <b>Input impedance</b>          |   |
| <b>Temperature drift</b>                                   | ≤200ppm/°C   | Voltage input 230VL-N           | > 750 Kohm  |
|  |  | Voltage input 120VL-N           | > 750 Kohm  |
|  |  | Current inputs: 5(45) A         | < 0.5 VA  |

## Output specifications

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

## General specifications

|   |  |                                |  |
|---|--|--------------------------------|--|
| <b>Operating temperature</b>                  | -25 to +65 °C, indoor, (R.H. from 0 to 90% non-condensing @ 40°C)                                | <b>Standard compliance</b>     | EN62052-11<br>EN62053-21, EN50470-3<br>IEC/EN61557-12 (active energy, MID models only)   |
| <b>Storage temperature</b>                    | -30°C to +80°C (R.H. < 90% noncondensing @ 40°C)   | <b>Approvals</b>               | CE, MID (PF option only), cULus (AV7 option only)  |
| <b>Overvoltage category</b>                   | Cat. III   | <b>Connections</b>             |  |
| <b>Insulation (for 1 minute)</b>              | 4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS         | Cable cross-section area       | Measuring inputs:<br>min: 1 mm <sup>2</sup> , max: 6 mm <sup>2</sup> , with/without metallic cable ferrule; Max. screw tightening torque: 1.1 Nm<br>1.5 mm <sup>2</sup> , Min./Max. screws tightening torque: 0.4 Nm |
| <b>Dielectric strength</b>                    | 4000 VAC RMS for 1 minute  | Other terminals                |  |
| <b>EMC</b>                                    |  | <b>Housing</b>                 |  |
| Electrostatic discharges                      | According to EN62052-11 15kV air discharge;  | Dimensions (WxHxD)             | 17.5 x 63 x 90 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 and voltage measuring inputs circuit: 4kV   | Sealing covers                 | Included   |
| Immunity to conducted disturbances            | 10V/m from 150KHz to 80MHz   | <b>Mounting</b>                | DIN-rail   |
| Surge   | On current and voltage measuring inputs circuit: 4kV;  | <b>Protection degree</b>       |  |
| Radio frequency                               | According to CISPR 22  | Front                          | IP51   |
|   |  | Screw terminals (cable inputs) | IP20   |
|   |  | <b>Weight</b>                  | Approx. 75 g (packing included)  |

## Power supply specifications

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

## Insulation (for 1 minute) between inputs and outputs

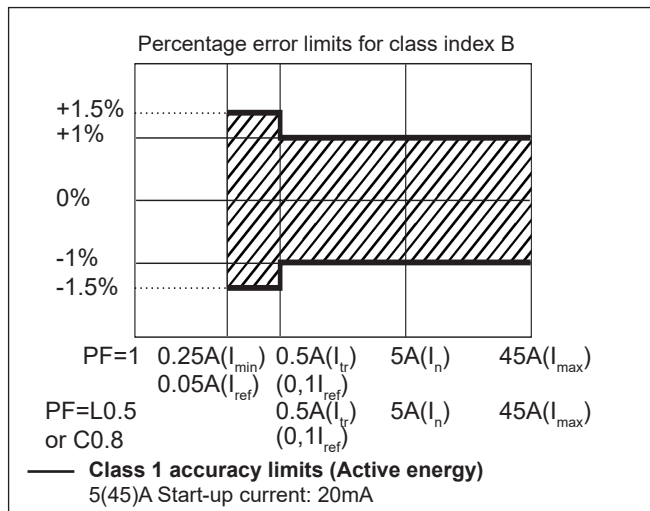
|                 | Measuring input | Digital output |
|-----------------|-----------------|----------------|
| Measuring input | -               | 4 kV           |
| Digital output  | 4 kV            | -              |

## MID compliance (PF option only)

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

## Accuracy according to EN50470-3

kWh, accuracy (RDG) depending on the current

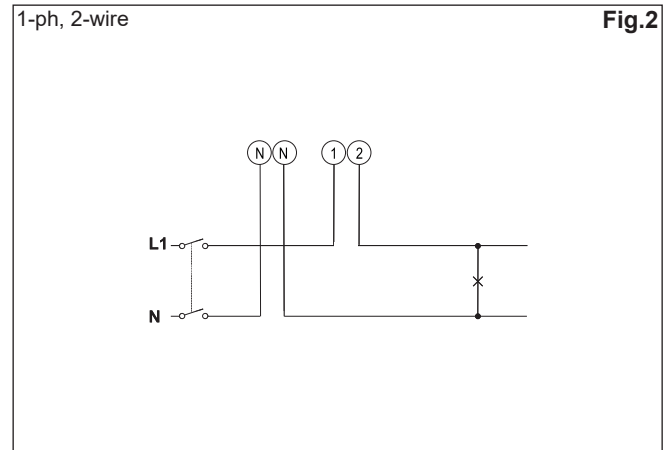
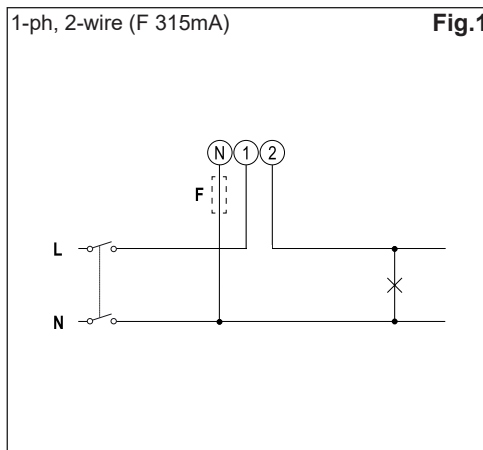


## Measurement accuracy according to IEC/EN61557-12 (MID versions)

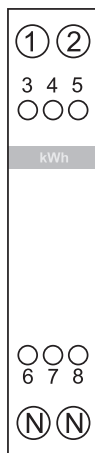
Active energy

Performance class 2

## Wiring diagrams

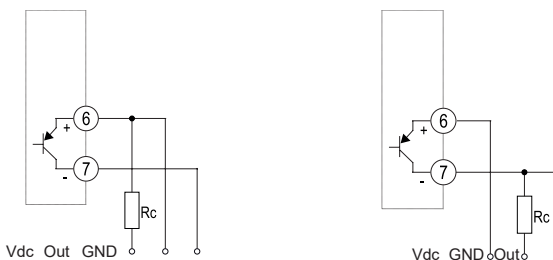


## Wiring diagrams (cont.)



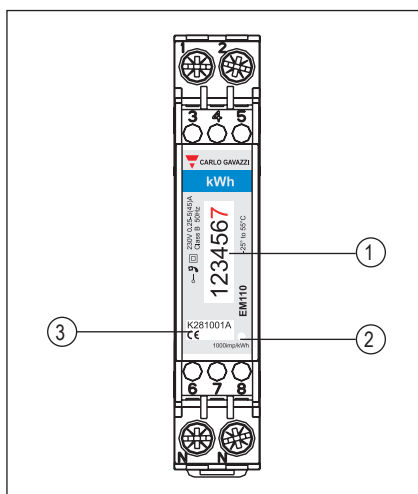
Pulse output

Fig.3



Open collector outputs: the load resistance ( $R_c$ ) 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

