

Energy Management Energy Meter Type EM340

CARLO GAVAZZI



- Digital input (for tariff management)
- Easy connection or wrong current direction detection
- 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

- Three phase energy meter
- Class 1 (kWh) according to EN62053-21
- Class B (kWh) according to EN50470-3
- Accuracy $\pm 0.5\%$ RDG (current/voltage)
- Direct current measurement up to 65AAC
- Backlit LCD display (3x 8-digit) with integrated touch key-pad
- Energy readout on display: 8 digit
- Variable readout on display: 4 digit
- Energy measurement: kWh and kvarh (imported/exported); kWh+ by 2 tariffs; kWh per phase
- System variables: kW, kvar, kVA, VLL, VLN, PF, Hz, kWdmd, kWdmd peak
- Phase variables: kW, kvar, kVA, VLL, VLN, A, PF
- Self power supply
- Dimensions: 3-DIN module
- Protection degree (front): IP51
- Pulse output (optional, by open collector NPN)
- RS485 Modbus port (optional)
- M-bus port (optional)

Product description

Three-phase energy meter with backlit LCD display with integrated touch keypad. Particularly indicated for active energy metering and for cost allocation in

applications up to 65 A (direct connection), with dual tariff management availability. It can measure imported and exported energy or be programmed to consider only

the imported one. Housing for DIN-rail mounting, with IP51 front degree protection. The meter is optionally provided with pulse output proportional to the active energy being

measured, RS485 Modbus port or M-bus port. Available for legal metrology (PF option, only for imported energy).

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 EM340 DIN AV2 3 X O1 PF B

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

Type Selection

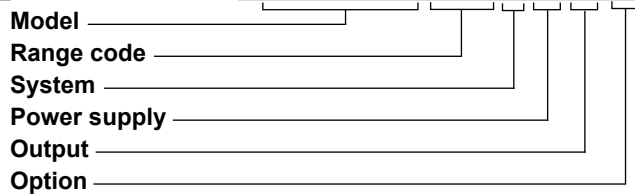
| Range code | System | Power supply | Output |
|--|---|---|--|
| AV2: 208 to 400 VLL AC - 5(65)A (Direct connection) | 3: 3-phase, 3 or 4 wire; 2-phase 3 wire | X: Self power supply -20% +20% of the rated measuring input voltage, 45 to 65Hz | O1: pulse output S1: RS485 Modbus port M1: M-bus port |
| Option | Measurement | | |
| PF: Certified according to MID Directive. Can be used for fiscal (legal) metrology. | A: The power is always integrated (both in case of positive imported and negative exported power) and the total energy meter is certified according to MID. B: Only the total positive energy meter is certified according to MID. | | |



STANDARD

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

How to order **EM340-DIN AV2 3 X O1 X**



Type Selection

| Range code | System | Power supply | Output |
|--|---|--|--|
| AV2: 208 to 400 VLL AC - 5(65)A (Direct connection) | 3: 3-phase, 3- or 4-wire; 2-phase 3-wire | X: self power supply -20% +20% of the rated measuring input voltage, 45 to 65Hz | O1: pulse output S1: RS485 Modbus port M1: M-bus port |

Option

X: none

Input specifications

| | | | |
|---|--|-----------------------------------|---|
| Rated Inputs | | Temperature drift | ≤200ppm/°C |
| Current type | 3-phase loads, direct connection | Sampling rate | 4096 samples/s @ 50Hz 4096 samples/s @ 60Hz |
| Current range | 5(65)A | Display and touch key-pad | |
| Nominal voltage | 208 to 400 VLL AC | Type | Backlit LCD, 3 rows by 8-digit each, h 7 mm |
| Accuracy (@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz) | | Read-out | Energy: 8 digit. Variables: 4 digit |
| | Imin=0.25A; Ib: 5A, Imax: 65A; Un: 113 to 265VLN (196 to 460VLL) | Touch key | 3 (DOWN, Enter and UP). |
| | Imin=0.25A; Ib: 5A, Imax: 65A; from 208 to 400 VLL AC | Max. and Min. indication | |
| Current | From 0.04Ib to 0.2Ib: ±(0.5%RDG+1DGT) | Energies | Max. 99 999 999 Min. 0.01 |
| | From 0.2Ib to Imax: ±(0.5%RDG) | Variables | Max. 9999 Min. 0.01 |
| Phase-neutral voltage | In the range Un: ±(0.5% RDG) | Memory | |
| Phase-phase voltage | In the range Un: ±(1% RDG) | Energy | 10 ¹² cycles. Energy value is saved every time the less significant digit increases. |
| Frequency | Range: 45 to 65Hz. | Programming parameters | 10 ¹² cycles. When a parameter is modified, only the relevant memory cell is overwritten |
| Active power | From 0.05 In to Imax, within Un range, PF=1: ±(1% RDG) | LEDs | Flashing red light pulses according to EN50470-3, EN62052-11, 1000 imp./kWh (min. period: 90ms) Fix orange light: wrong current direction (only with PFB option or with "B" measurement selection in case of X option) |
| | From 0.1 In to Imax, within Un range, PF=0.5L or 0.8C: ±(1% RDG) | Current overloads | |
| Power factor | ±[0.001+1%(1.000 - "PF RDG")] | Continuous | 65A, @ 50Hz |
| Reactive power | From 0.05 In to Imax, within Un range, sinphi=1: ±(2% RDG) | For 10ms | 8450 A |
| | From 0.1 In to Imax, within Un range, sinphi=0.5L or 0.8C: ±(2% RDG) | Voltage Overloads | |
| Energies | | Continuous | 1.2 Un |
| Active energy | Class 1 according to EN62053-21 Class B (Class B (kWh) according to EN50470-3) | For 500ms | 2 Un |
| | Class 2 according to EN62053-23 | Input impedance | |
| Reactive energy | | 230VL-N | 1.2Mohm |
| Start-up current: | 20mA Self-consumption is not measured. | 120VL-N | 1.2Mohm |
| | | 5(65) A | < 1.25VA |
| Start-up voltage | 90VLN | Wrong connection detection | Installation guide to indicate if connections are correctly carried out. Can be disabled. |
| Resolution | Display/serial communication | | Indicates if the phase sequence is not the correct one (L1-L2-L3) |
| Current | 0.1/0.001 A | Phase sequence | |
| Voltage | 0.1/0.1 V | | Indicates if the current direction is not the right one (only with PFB option or with type "B" measurement selection in case of X option). |
| Power | 0.01 kW or kVar/ 0.1 W or var | Correct current direction | |
| Frequency | 0.1 Hz/0.1Hz | | |
| PF | 0.01/ 0.001 | | |
| Energies (positive) | 0.01 kWh or kvarh / 0.1 kWh or kvarh | | |
| Energies (negative) | 0.01 kWh or kvarh / 0.1 kWh or kvarh | | |
| Energy additional errors | | | |
| Influence quantities | According to EN62053-21 | | |



Input specifications (cont.)

| | | |
|-----------------|--|---|
| Load conditions | The wrong connection detection works in case of loads with: - PF>0.766 (<40°) power factor if inductive or PF>0.996 (<5°) if capacitive | - a current at least equal to 10% rated current (primary current transformer) |
|-----------------|--|---|

Digital input specifications

| | | | |
|-----------------------------------|---|----------|--|
| Digital inputs Function | Free of voltage contact Tariff management (switch between t1-t2) | Overload | In case a voltage is erroneously applied to the digital input, the input is not damaged up to 30 VAC/DC. |
| Number of inputs | 1 | | |
| Contact measurement voltage | 5 V | | |
| Input impedance | 1kohm | | |
| Contact resistance | ≤1kohm, close contact ≥100kohm, open contact | | |

Output specifications

| | | | |
|--------------------------|---|-----------------------------|---|
| RS485 serial port | RS485 by screw connection. For communication of measured data, programming parameters | Protocol | measured data M-bus according to EN13757-1 |
| Function | ModBus RTU (slave function) | Baud rate | 0.3, 2.4, 9.6 kbaud |
| Protocol | 9.6, 19.2, 38.4, 57.6, 115.2 kbaud, even or no parity, 1 to 247 (default: 01) | Meters in the M-bus network | 250 |
| Baud rate | 1/8 unit load. Maximum 247 devices on the same bus. | Primary address | Selectable |
| Data format | 1sec | Secondary address | Univocally defined in each unit |
| Address | 50 words available in 1 read command | Identification number range | from 9000 0000 to 9999 9999 |
| Driver input capability | Rx segment on display is shown when a valid Modbus command is sent to that specific meter | Other | Available functions: wild card, header, initialisation SND_NKE, and req_udr management. Management of primary address modification via M-bus and reset of partial energy via M-bus available. VIF, VIFE, DIF and DIFE: see protocoll |
| Data refresh time | Tx segment on display is shown when a valid Modbus reply is sent back to the master | Static output | |
| Read command | | Purpose | For pulse output proportional to the active energy (kWh) |
| Rx/Tx indication | | Pulse rate | Selectable in multiple of 100 Max 500 or 1500 kWh according to pulse ON duration |
| M-bus port | M-bus by screw connection. For communication of | | |
| Function | | | |

Output specifications (cont.)

| | | | |
|-------------------|--|------|---------------------------|
| Pulse ON duration | Selectable: 30ms or 100 ms according to EN62052-31 | Load | V_{ON} 1 VDC max. 100mA |
| Output type | Open collector NPN | | V_{OFF} 80 VDC max. |

General specifications

| | | | |
|---|---|----------------------------|--|
| Operating temperature | From -25 to +55°C/from -13 to +131°F (PF option) From -25 to +65°C/from -13 to +149°F (X option), indoor, (R.H. from 0 to 90% non-condensing @ 40°C) | Standard compliance | EN62052-11 |
| Storage temperature | From -30 to +80°C/from -22 to +176°F (R.H. < 90% non-condensing @ 40°C) | Safety | EN62053-21, EN50470-3 |
| Overvoltage category | Cat. III | Metrology | CE, MID (PF option only) |
| Insulation (for 1 minute) | 4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS | Approvals | |
| Dielectric strength | 4000 VAC RMS for 1 minute | Connections | |
| EMC | According to EN62052-11 | Cable cross-section area | Measuring inputs: max. 16 mm ² , min. 2.5 mm ² with/without metallic cable ferrule; Max. screw tightening torque: 2.8 Nm |
| Electrostatic discharges | 15kV air discharge; | Other terminals | 1.5 mm ² , Min./Max. screws tightening torque: 0.4 Nm |
| Immunity to irradiated electromagnetic fields | Test with current: 10V/m from 80 to 2000MHz; | Housing | |
| Electromagnetic fields | Test without any current: 30V/m from 80 to 2000MHz; | Dimensions (WxHxD) | 54 x 90 x 63 mm |
| Burst | On current and voltage measuring inputs circuit: 4kV | Material | Noryl, self-extinguishing: UL 94 V-0 |
| Immunity to conducted disturbances | 10V/m from 150KHz to 80MHz | Sealing covers | Included |
| Surge | On current and voltage measuring inputs circuit: 4kV; | Mounting | DIN-rail |
| Radio frequency | According to CISPR 22 | Protection degree | |
| | | Front | IP51 |
| | | Screw terminals | IP20 |
| | | Weight | Approx. 240 g (packing included) |

Power supply specifications

Self power supply

208 to 400VAC VLL, -20%
+20% 50/60Hz

Power consumption

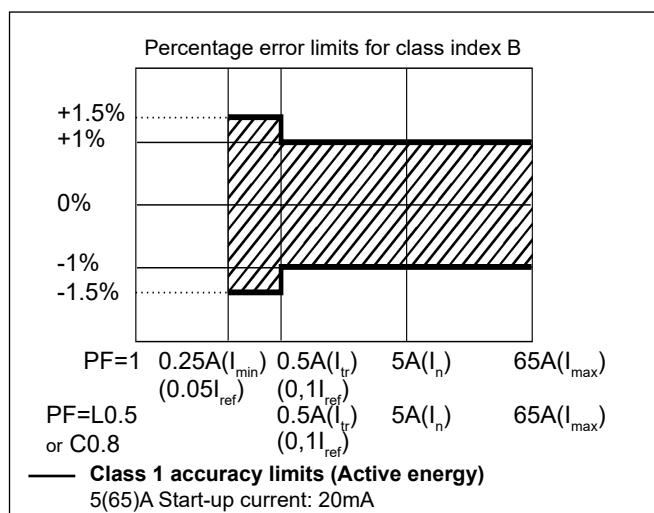
 $\leq 1W, \leq 10VA$

Insulation (for 1 minute) between inputs and outputs

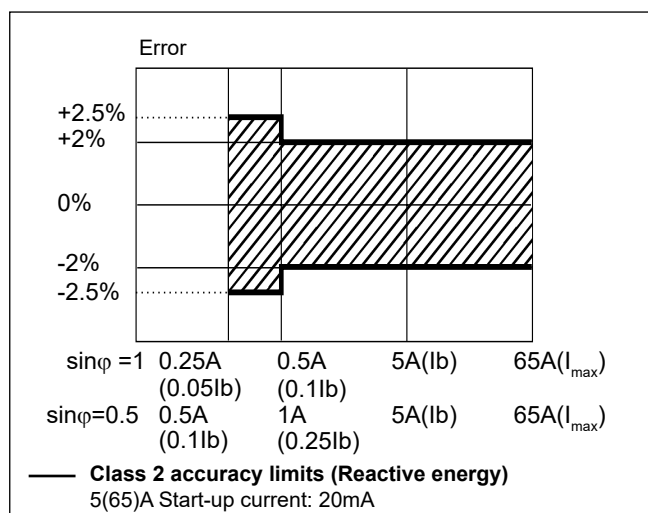
| | Measuring input | Digital or serial output | Digital input |
|--------------------------|-----------------|--------------------------|---------------|
| Measuring input | - | 4 kV | 4 kV |
| Digital or serial output | 4 kV | - | 0 kV |
| Digital input | 4 kV | 0 kV | - |

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

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



Display pages

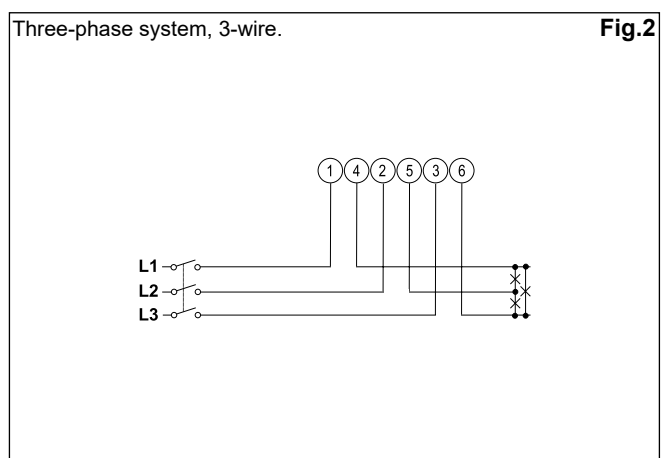
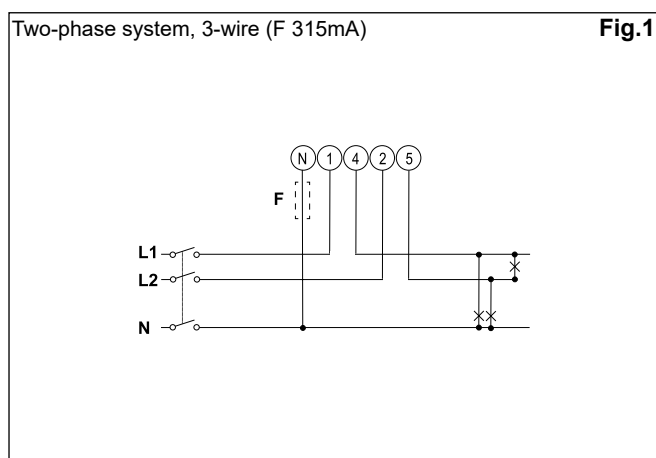
| No | 1 st row | 2 nd row | 3 rd row | “Full” mode | “Easy” mode | Note |
|----|---------------------|---------------------|---------------------|-------------|-------------|--|
| 0 | kWh+ (imported) | | kW system | X | X | In PF version (MID) this is the only certified energy meter. In PFA version and in X version with Measurement menu set to “A”, this is considering the total energy without considering the current direction. |
| 1 | kWh- (exported) | | kW system | X | X | Only in X version, with Measurement menu set to “B” |
| 2 | kWh+ (imported) | | V L-L system | X | X | |
| 3 | kWh+ (imported) | | V L-N system | X | X | |
| 4 | kWh+ (imported) | | PF system | X | | |
| 5 | kWh+ (imported) | | Hz | X | | |
| 6 | kvarh+ (imported) | | kvar system | X | X | In X version with Measurement menu set to “A”, this is considering the total positive reactive energy without considering the current direction. |
| 7 | kvarh- (exported) | | kvar system | X | X | Only in X version, with Measurement menu set to “B” |
| 8 | kWh+ (imported) | | kVA system | X | | |
| 9 | kWh+ (imported) | kWdmd peak | kWdmd | X | | |
| 10 | kWh (t1) | “t1” | kW system | X | X | Only relevant to kWh+, with Tariff menu set to ON. |
| 11 | kWh (t2) | “t2” | kW system | X | X | Only relevant to kWh+, with Tariff menu set to ON. |
| 12 | kWh L1 | kWh L2 | kWh L3 | X | | In X version with Measurement menu set to “A”, this is considering the total energy without considering the current direction. In PFB version and in X version with Measurement menu set to “B”, this is considering only the imported energy. |
| 13 | kVA L1 | kVA L2 | kVA L3 | X | | |
| 14 | kvar L1 | kvar L2 | kvar L3 | X | | |
| 15 | PF L1 | PF L2 | PF L3 | X | | |
| 16 | V L-N L1 | V L-N L2 | V L-N L3 | X | | |
| 17 | V L-L L1 | V L-L L2 | V L-L L3 | X | | |
| 18 | A L1 | A L2 | A L3 | X | X | |
| 19 | kW L1 | kW L2 | kW L3 | X | | |

X= available

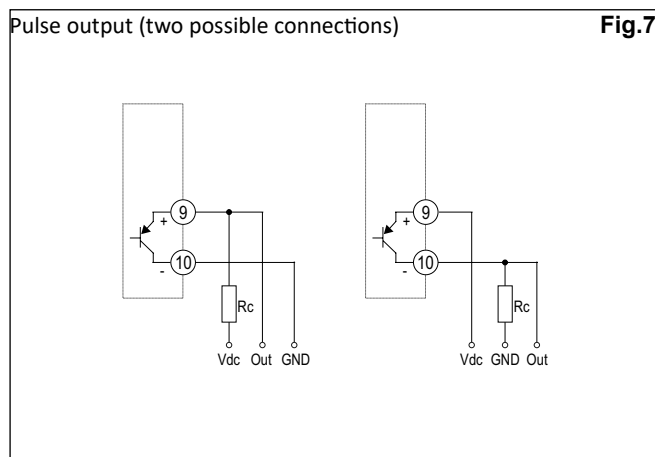
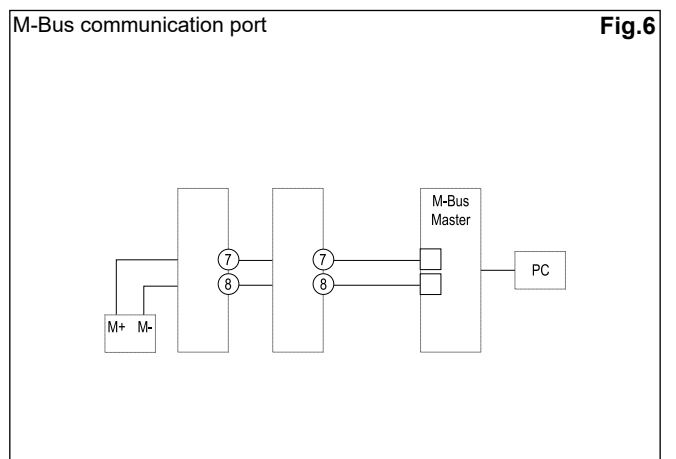
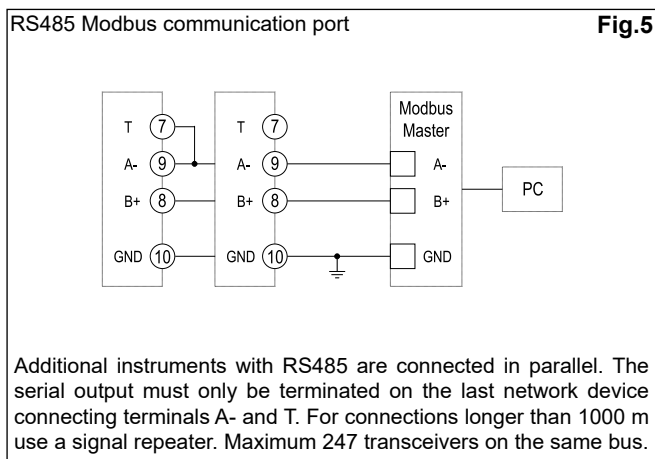
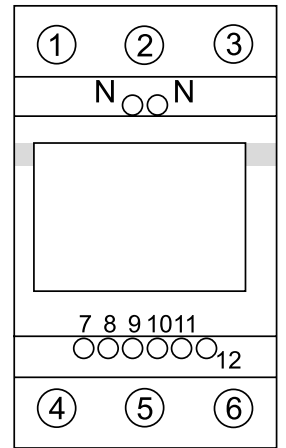
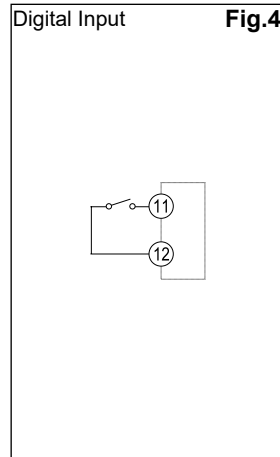
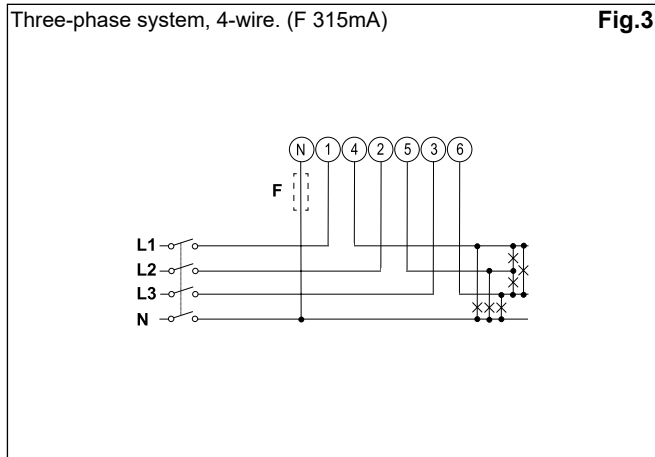
Additional available information on the display

| Type | Description | Note |
|--------|-------------------|---|
| Info 1 | Year (2016) | Year of production |
| Info 2 | Serial (dddnnnA) | Serial number (ddd= day of the year; nnn=progressive number; A= production line, internal use only) |
| Info 3 | Rev (A.01) | Firmware revision |
| Info 4 | Puls led | Led pulsed/kWh |
| P3 | System | System type |
| P6 | Measure | Measurement type |
| P7 | Install | Wrong connection detection |
| P8 | P int | Integration time for Wdmd calculation |
| P9 | Mode | Set of variables on display |
| P10 | Tariff | Tariff enabling |
| P11 | Home | Selected home page |
| P12-1 | Pulse duration | Pulse ON duration |
| P12-2 | Pulse rate | Pulse rate |
| P13 | Primary address | M-bus primary address |
| P14 | Address | Modbus serial address |
| P15 | Kbaud | M-bus or Modbus baud rate |
| P16 | Parity | Modbus parity |
| Info 5 | Secondary address | M-bus secondary address |

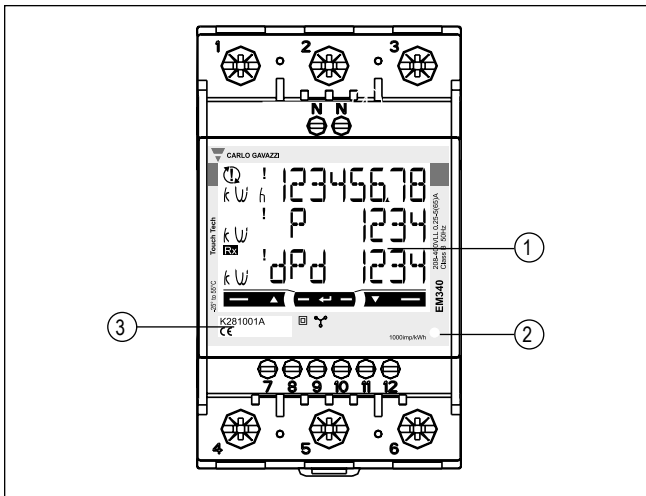
Wiring diagrams



Wiring diagrams (cont.)



Front panel description



1. **Display**
Backlit LCD display with touch key-pad.
2. **LED**
LED proportional to kWh reading
3. **Serial number**
Area reserved to serial number and MID-relevant data in PF versions

Dimensions

