

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

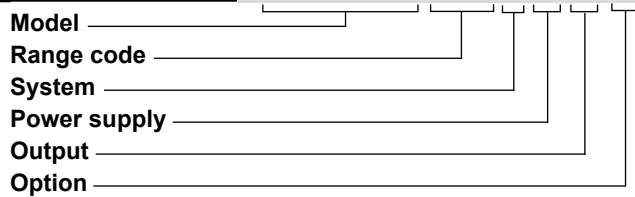
Range code	System	Power supply	Output
AV2: 208 to 400 VLL AC - 5(65)A (Direct connection)	3: 3-phase, 3 or 4 wire; 2-phase 3 wire	X: Self power supply -20% +20% of the rated measuring input voltage, 45 to 65Hz	O1: pulse output S1: RS485 Modbus port M1: M-bus port
Option	Measurement		
PF: Certified according 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	120VL-N	1.2Mohm
	Self-consumption is not measured.	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)
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Digital input specifications

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

Output specifications

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

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

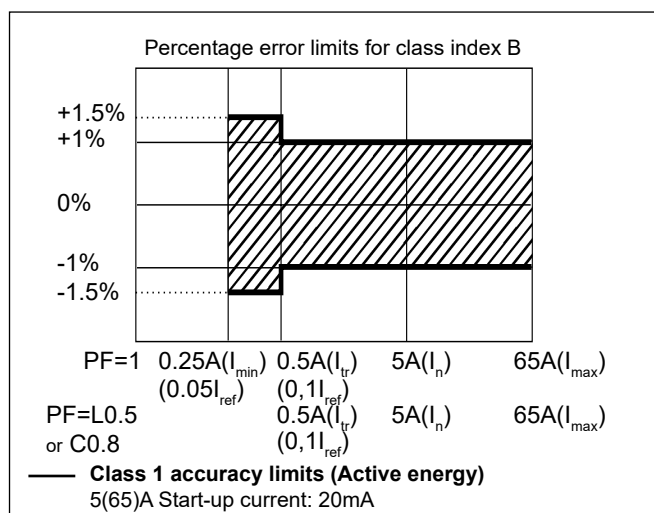
 $\leq 1W, \leq 10VA$

Insulation (for 1 minute) between inputs and outputs

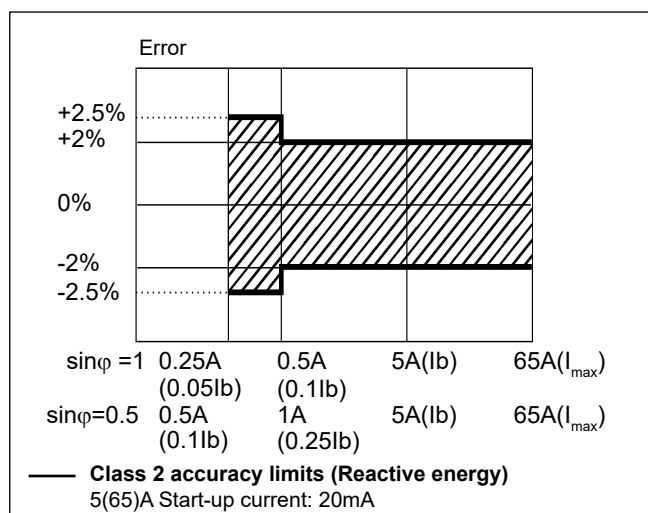
	Measuring input	Digital or serial output	Digital input
Measuring input	-	4 kV	4 kV
Digital or serial output	4 kV	-	0 kV
Digital input	4 kV	0 kV	-

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

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



Display pages

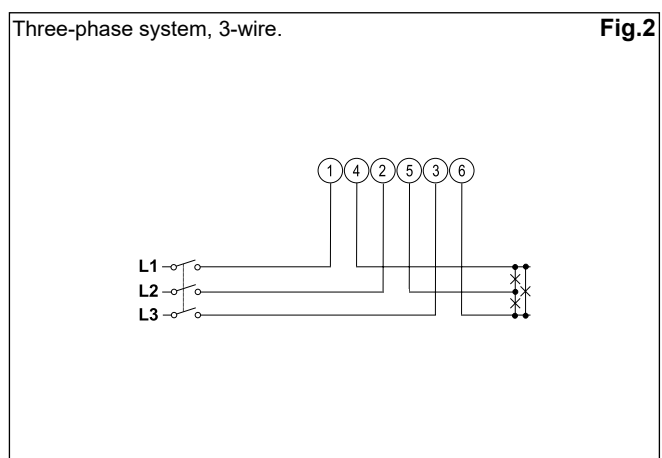
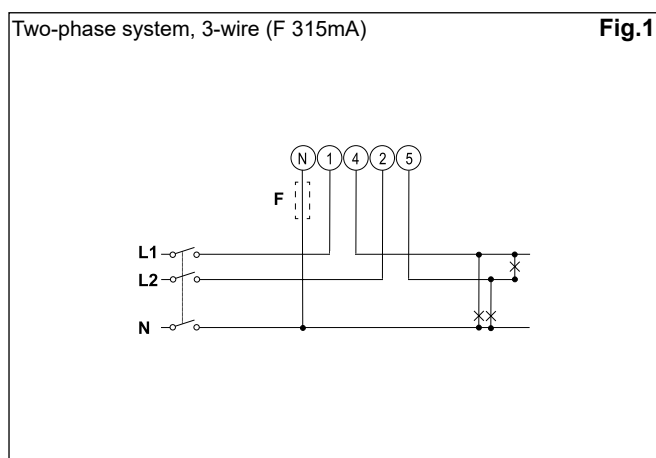
No	1 st row	2 nd row	3 rd row	“Full” mode	“Easy” mode	Note
0	kWh+ (imported)		kW system	X	X	In PF version (MID) this is the only certified energy meter. In PFA version and in X version with Measurement menu set to “A”, this is considering the total energy without considering the current direction.
1	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

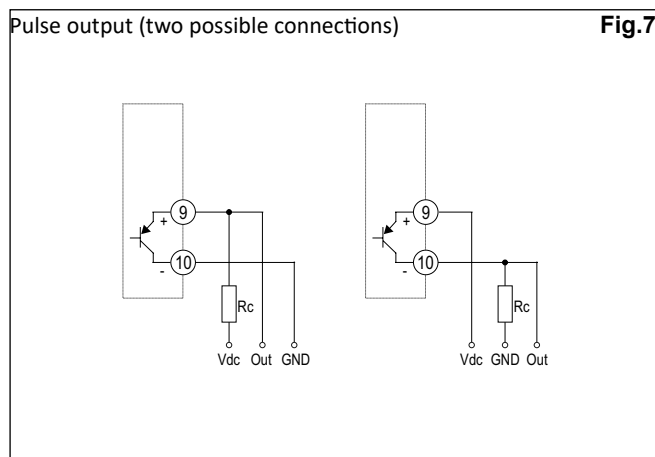
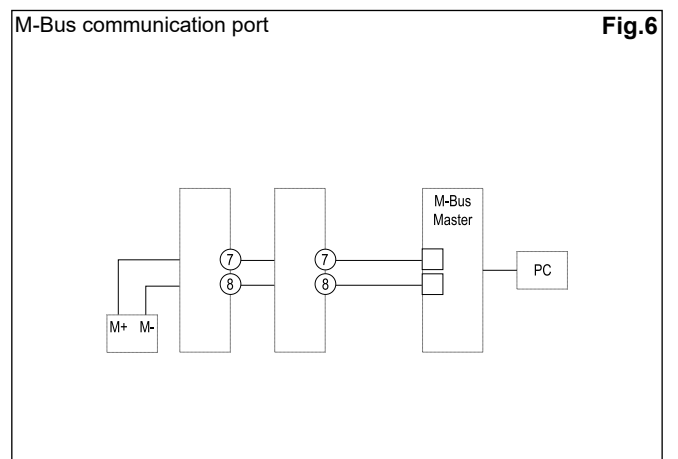
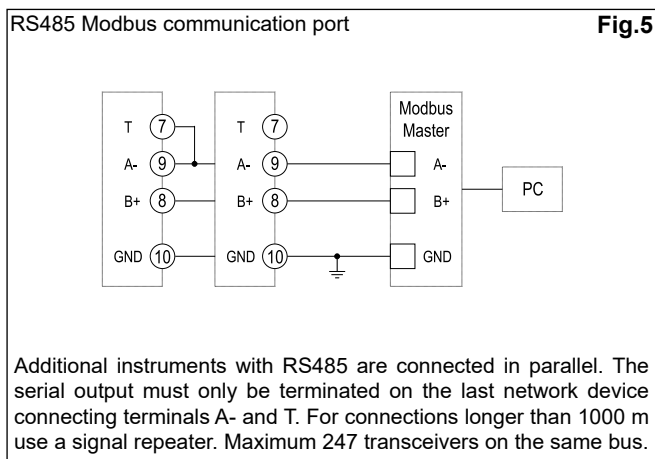
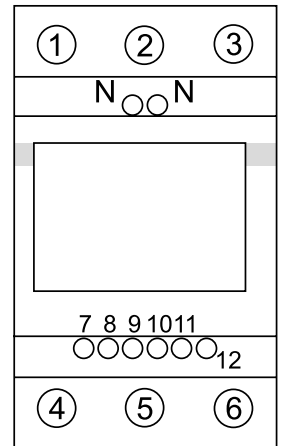
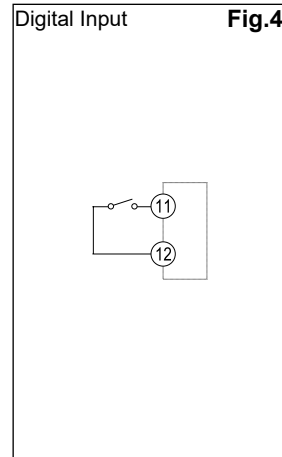
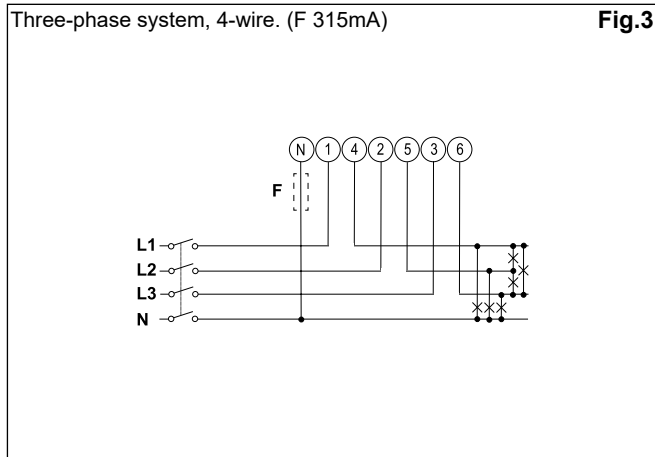
Additional available information on the display

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

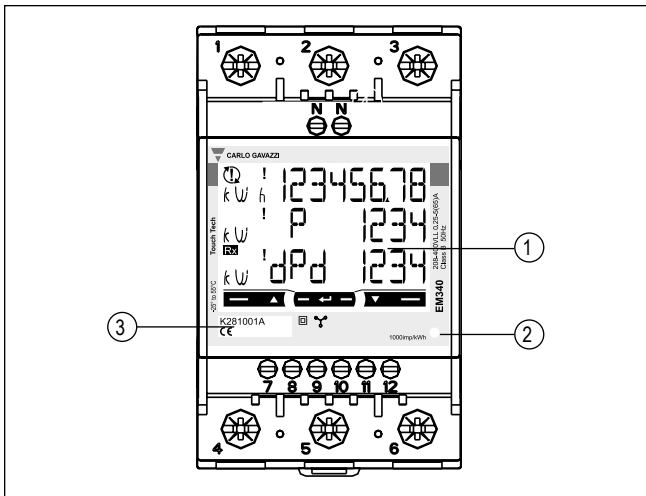
Wiring diagrams



Wiring diagrams (cont.)

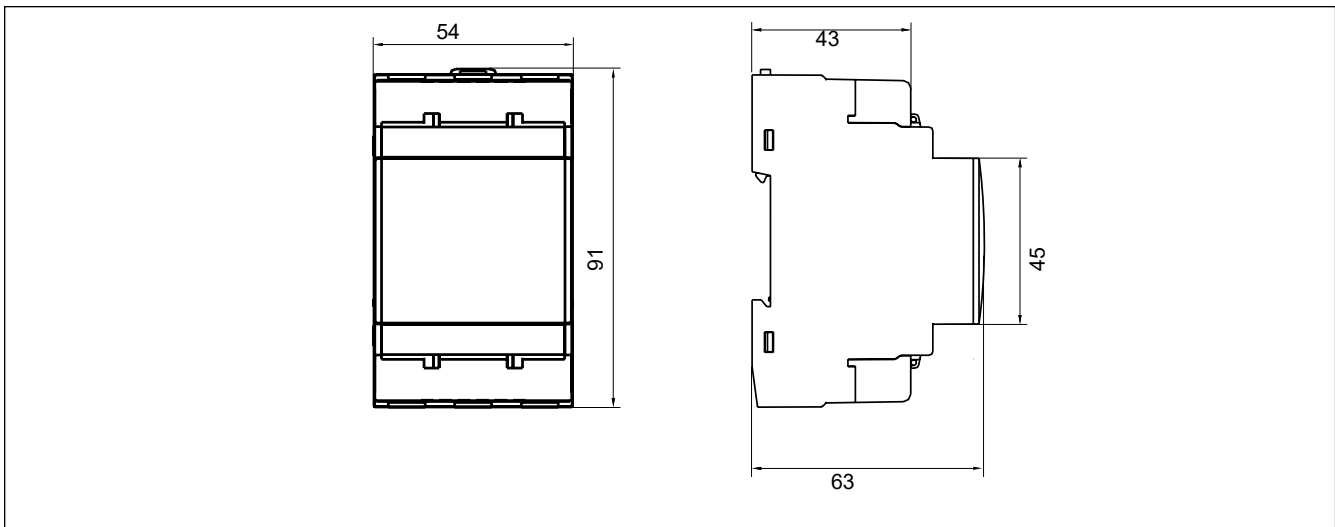


Front panel description



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



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