

Energy Management

Energy Meter

Type EM340

CARLO GAVAZZI



- Compliant with the international accuracy standard IEC/ EN62053-21, and the IEC/EN61557-12 performance requirements (active power and active energy).
- 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 PNP)
- RS485 Modbus port (optional)
- M-bus port (optional)
- 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

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

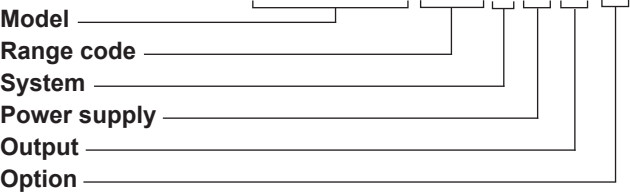
Range code	System	Power supply	Output
AV2: 208 to 400 VLL AC - 5(65)A (Direct connection)	3: 3-phase, 3 or 4 wire	X: Self power supply -20% +20% of the rated measuring input voltage, 50Hz	O1: pulse output S1: RS485 Modbus port M1: M-bus port
Option	Measurement		
PF: Certified according to MID Directive. 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. Operating temperature: from -25°C to +70°C/ from -13°F to +158°F. B: Only the total positive energy meter is certified according to MID. Operating temperature: from -25°C to +70°C/ from -13°F to +158°F.		



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		Energy additional errors	
Current type	3-phase loads, direct connection	Influence quantities	According to EN62053-21
Current range	5(65)A	Temperature drift	≤200ppm/°C
Nominal voltage	208 to 400 VLL AC	Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
Accuracy (@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)		Display and touch key-pad	
Current	Imin=0.25A; Ib: 5A, Imax: 65A; Un: 113 to 265VLN (196 to 460VLL)	Type	Backlit LCD, 3 rows by 8-digit each, h 7 mm
	Imin=0.25A; Ib: 5A, Imax: 65A; from 208 to 400 VLL AC	Read-out	Energy: 8 digit. Variables: 4 digit
	From 0.04Ib to 0.2Ib: ±(0.5%RDG+1DGT)	Touch key	3 (DOWN, Enter and UP).
Phase-neutral voltage	From 0.2Ib to Imax: ±(0.5%RDG)	Max. and Min. indication	
Phase-phase voltage	In the range Un: ±(0.5% RDG)	Energies	Max. 99 999 999 Min. 0.01
Frequency	In the range Un: ±(1% RDG)	Variables	Max. 9999 Min. 0.01
Active power	Range: 45 to 65Hz.	Memory	
Power factor	From 0.05 In to Imax, within Un range, PF=1: ±(1% RDG)	Energy	10 ¹² cycles. Energy value is saved every time the less significant digit increases.
	From 0.1 In to Imax, within Un range, PF=0.5L or 0.8C: ±(1% RDG)	Programming parameters	10 ¹² cycles. When a parameter is modified, only the relevant memory cell is overwritten
	±[0.001+1%(1.000 - "PF RDG")]	LEDs	Flashing red light pulses according to EN50470-3, EN62052-11, 1000 imp./kWh (min. period: 90ms)
Reactive power	From 0.05 In to Imax, within Un range, sinphi=1: ±(2% RDG)	Current overloads	Fix orange light: wrong current direction (only with PFB option or with "B" measurement selection in case of X option)
Energies	From 0.1 In to Imax, within Un range, sinphi=0.5L or 0.8C: ±(2% RDG)		
Active energy	Class 1 according to EN62053-21 Class B (Class B (kWh) according to EN50470-3)	Continuous	65A, @ 50Hz
Reactive energy	Class 2 according to EN62053-23	For 10ms	1950 A
Start-up current:	20mA	Short circuit withstand	4.5kA 10 ms according to IEC62052-31:2015
Start-up voltage	Self-consumption is not measured.	Voltage Overloads	
Resolution	90VLN	Continuous	1.2 Un
		For 500ms	2 Un
		Input impedance	
Current	Display	230VL-N	1.88Mohm
Voltage	0.1 A	120VL-N	1.88Mohm
Power	0.1 V	5(65) A	< 1.5 VA per channel
Frequency	0.1 kW or kvar or kVA	Wrong connection detection	Installation guide to indicate if connections are correctly carried out. Can be disabled.
PF	0.1 Hz	Phase sequence	Indicates if the phase sequence is not the correct one (L1-L2-L3)
Energies (positive)	0.01		Indicates if the current direction is not the right one (only with PFB option or with type "B" measurement selection in case of X)
Energies (negative)	0.01 kWh or kvarh		
Current	Serial communication	Correct current direction	
	0.001 A		
	0.1 V		
Voltage	0.1 W or var		
Power	0.1 Hz		
Frequency	0.001		
PF	0.001 kWh or kvarh		
Energies (positive)	0.001 kWh or kvarh		
Energies (negative)	0.001 kWh or kvarh		

Input specifications (cont.)

Load conditions	option). 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)	are summed to increase the total positive energy totalizer (kWh+), while the others increase the total negative totalizer (kWh-). Ex. P L1= +2kW, P L2 . +2kW, P L3 = -3 kW Integration time = 1 hour +kWh = (2+2) x1h = 4 kWh -kWh = 3 x 1h= 3kWh
Energy metering	in every measuring interval the single phase energies with positive sign	

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		
Input impedance	1kohm		
Contact resistance	≤1kohm, close contact ≥100kohm, open contact		

Output specifications

RS485 serial port	RS485 by screw connection.	Protocol	M-bus according to EN13757-1
Function	For communication of measured data, programming parameters	Baud rate	0.3, 2.4, 9.6 kbaud
Protocol	ModBus RTU (slave function)	Meters in the M-bus network	250
Baud rate	9.6, 19.2, 38.4, 57.6, 115.2 kbaud,	Primary address	Selectable
Data format	even or no parity,	Secondary address	Univocally defined in each unit
Address	1 to 247 (default: 01)	Identification number range	from 9000 0000 to 9999 9999
Driver input capability	1/8 unit load. Maximum 247 devices on the same bus.	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.
Data refresh time	1sec		VIF, VIFE, DIF and DIFE: see protocol
Read command	125 words available in 1 read command	Static output	
Rx/Tx indication	Rx segment on display is shown when a valid Modbus command is sent to that specific meter Tx segment on display is shown when a valid Modbus reply is sent back to the master	Purpose	For pulse output proportional to the active energy (kWh)
M-bus port	M-bus by screw connection.	Pulse rate	Selectable in multiple of 100 Max 500 or 1500 kWh according to pulse ON duration
Function	For communication of measured data		

Output specifications (cont.)

Pulse ON duration	Selectable: 30ms or 100 ms according to EN62052-11	Load	V_{ON} 1 VDC max. 100mA V_{OFF} 80 VDC max.
Output type	Open collector PNP		

General specifications

Operating temperature		Standard compliance	
PF option	From -25 to +70°C/from -13 to +158°F	Safety	EN62052-11
X option	From -25 to +65°C/from -13 to +149°F indoor, (R.H. from 0 to 90% non-condensing @ 40°C)	Metrology	EN62053-21, EN50470-3. IEC/EN61557-12 (active power and active energy, MID models only).
Storage temperature	From -30 to +80°C/from -22 to +176°F (R.H. < 90% non-condensing @ 40°C)	Approvals	CE, MID (PF option only)
Overvoltage category	Cat. III	Connections	
Utilisation category	UC2	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
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS	Other terminals	1.5 mm ² , Min./Max. screws tightening torque: 0.4 Nm
Dielectric strength	4000 VAC RMS for 1 minute	Housing	
EMC	According to EN62052-11	Dimensions (WxHxD)	54 x 90 x 63 mm
		Material	Noryl, self-extinguishing: UL 94 V-0
		Sealing covers	Included
		Mounting	DIN-rail
		Protection degree	
		Front	IP51
		Screw terminals	IP20
		Weight	Approx. 340 g (packing included)



Power supply specifications

Self power supply	208 to 400VAC VLL, -20% +20% 50/60Hz	Power consumption	≤ 1W, ≤ 10VA
-------------------	---	-------------------	--------------

Insulation (for 1 minute) between inputs and outputs

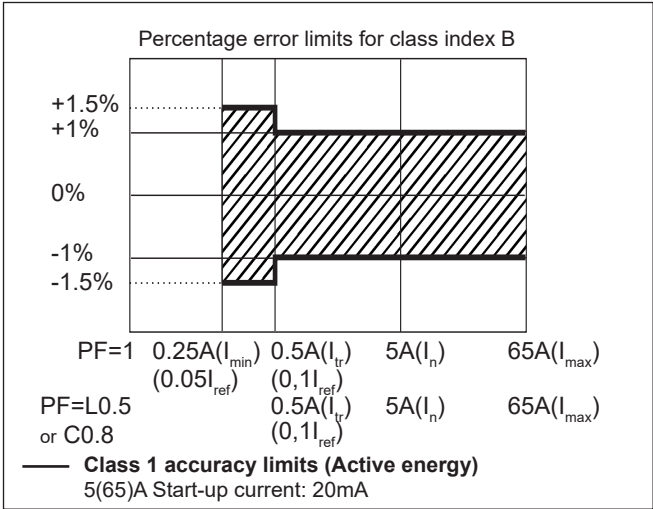
	Measuring input	Digital or serial output	Digital input
Measuring input	-	4 kV	4 kV
Digital or serial output	4 kV	-	0 kV
Digital input	4 kV	0 kV	-

MID compliance (PF option only)

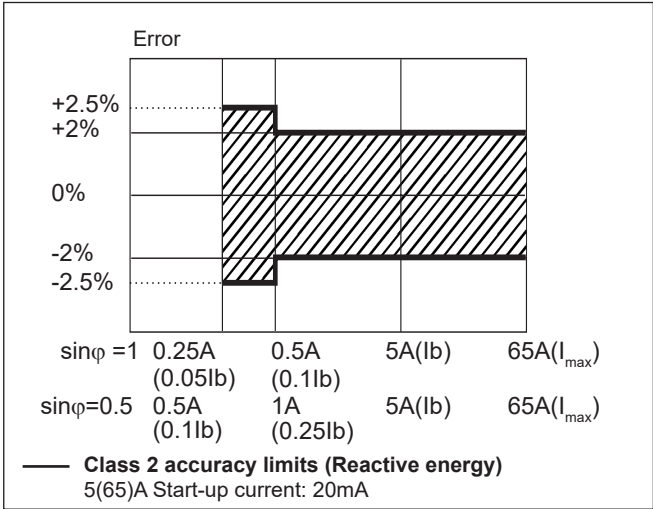
Accuracy	0.9 Un ≤ U ≤ 1.1 Un; 0.98 fn ≤ f ≤ 1.02 fn; fn: 50 Hz; cosφ: 0.5 inductive to 0.8 capacitive. Class B Considering listed Ib or In values
Operating temperature	PF option: from -25°C to +70°C/from -13°F to +158°F X option: from -25°C to +65°C/from -13°F to +149°F indoor (R.H. from 0 to 90% non-condensing @ 40°C)
EMC compliance	E2
Mechanical compliance	M2

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

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



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

Active power

Performance class 1

Active energy

Performance class 2

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 PFB or 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 L12	V L23	V L31	X		
18	A L1	A L2	A L3	X	X	
19	kW L1	kW L2	kW L3	X		

X= available

Specification are subject to change without notice EM340 DS 070726

Additional available information on the display (*)

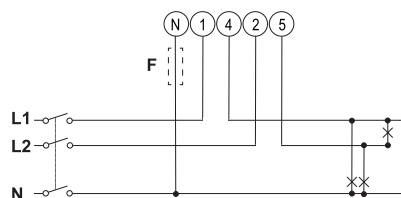
Type	Description	Note
Info 1	Year	Year of production
Info 2	Serial n (dddnnnA)	Serial number (ddd= day of the year; nnn=progressive number; A= production line, internal use only)
Info 3	Revision	Firmware revision
Info 4	Puls led	Led pulsed/kWh
P3	System	System type
P6	Measure	Measurement type
P7	Install	Wrong connection detection
P8	P int	Integration time for Wdmd calculation
P9	Mode	Set of variables on display
P10	Tariff	Enabled tariff
P11	Home	Page selected as 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	Baud	M-bus or Modbus baud rate
P16-1	Parity	Modbus parity
P16-2	Stop bit	Modbus stop bit
Info 5	Secondary address	M-bus secondary address
Info 6	Checksum	Firmware checksum

(*) can be reached by pressing simultaneously the “UP” and “DOWN” touch keys

Wiring diagrams

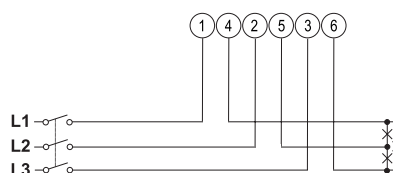
Two-phase system, 3-wire (F 315mA)

Fig.1



Three-phase system, 3-wire.

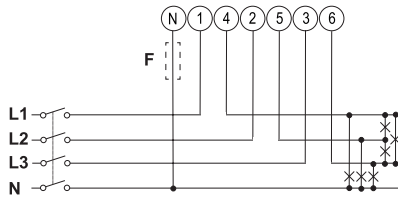
Fig.2



Wiring diagrams (cont.)

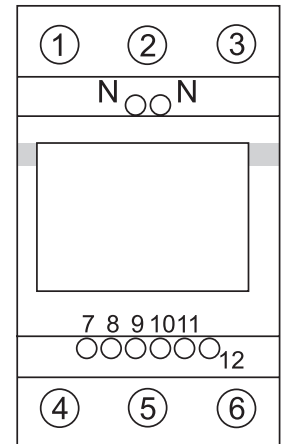
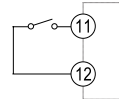
Three-phase system, 4-wire. (F 315mA)

Fig.3



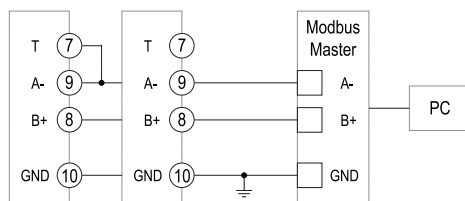
Digital Input

Fig.4



RS485 Modbus communication port

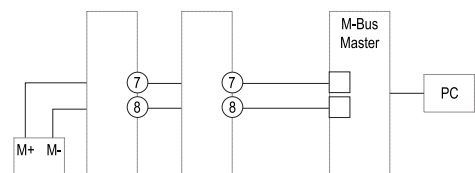
Fig.5



Additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and T. For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.

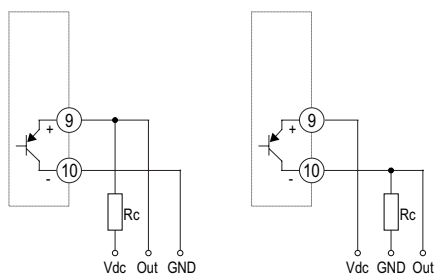
M-Bus communication port

Fig.6



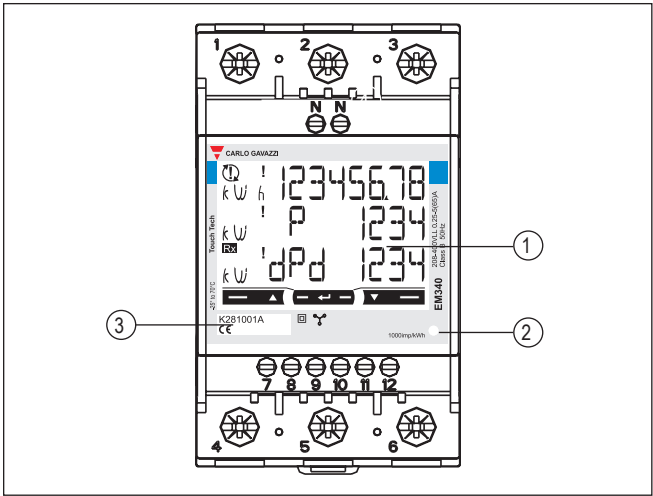
Pulse output (two possible connections)

Fig.7



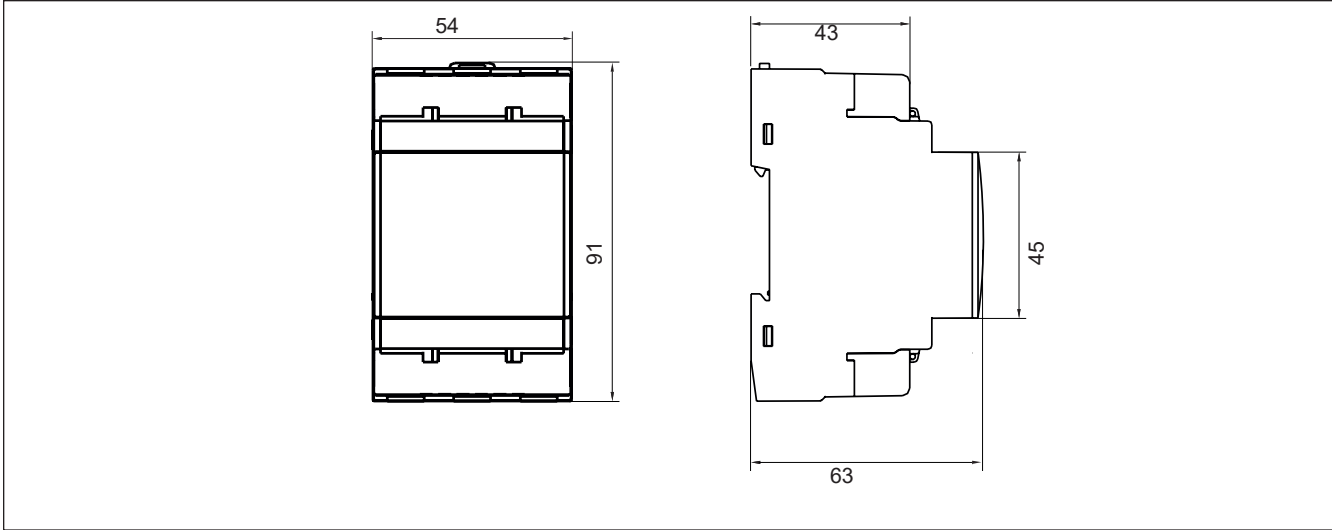


Front panel description



- 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



Annex A for EM340
(For product produced before June 2026)



Introduction

This Annex provides additional information regarding engineering changes introduced in the EM340 energy analyzer starting from June 2026 production series. It has been added to this document to help users identify the correct version of the device and understand the key differences between models. The distinction between the two product versions is based on the serial number:

- Devices with a serial number starting from **2026150000A** are considered the updated models with the engineering changes from June 2026.
- Devices with a lower serial number belong to the pre-June 2026 generation and follow the specifications outlined in the previous version of the datasheet (see below).

In the following section, only the technical specifications that were modified with the June 2026 update will be reported. All other specifications not explicitly mentioned remain unchanged and equally applicable to both versions.

Technical Specifications for EM340 Units Produced Before June 2026

Type Selection

Measurement	
A:	+55 °C
B:	+55 °C
A70:	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. Operating temperature: from -25 to +70 °C/from -13 to +158 °F.
B70:	Only the total positive energy meter is certified according to MID. operating temperature: from -25 to +70 °C/from -13 to +158 °F.

MID compliance (PF option only)

Operating temperature	PF option (standard or with suffixes from 01 to 60): from -25 to +55°C/from -13 to +131°F
-----------------------	--

Input specifications

Input impedance	
230VL-N	1.2 Mohm
120VL-N	1.2 Mohm

Output specifications

RS485 serial port	
Read command	50 words

General specifications

Operating temperature	
PF option (standard or with suffixes from 01 to 60)	From -25 to 55°C/from -13 to +131°F
Weight	240 g