

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

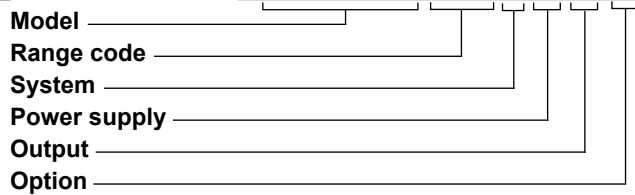
Range code	System	Power supply	Output
AV2: 208 to 400 VLL AC - 5(65)A (Direct connection)	3: 3-phase, 3 or 4 wire; 2-phase 3 wire	X: Self power supply -20% +20% of the rated measuring input voltage, 45 to 65Hz	O1: pulse output S1: RS485 Modbus port M1: M-bus port
Option	Measurement		
PF: Certified according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

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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)
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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 Tx segment on display is shown when a valid Modbus reply is sent back to the master	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		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

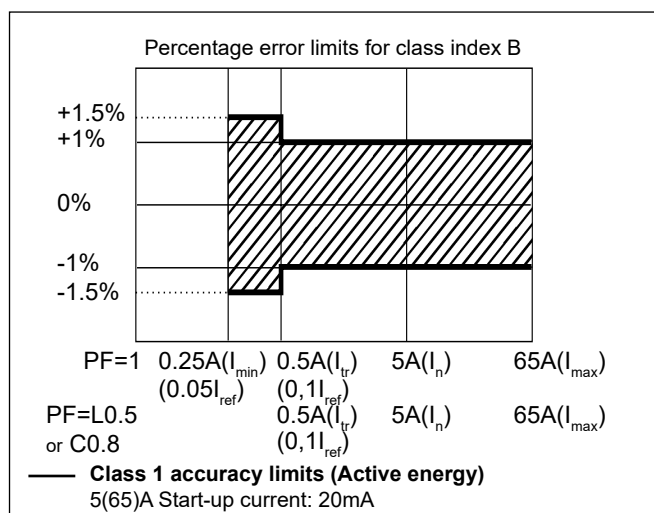
 $\leq 1W, \leq 10VA$

Insulation (for 1 minute) between inputs and outputs

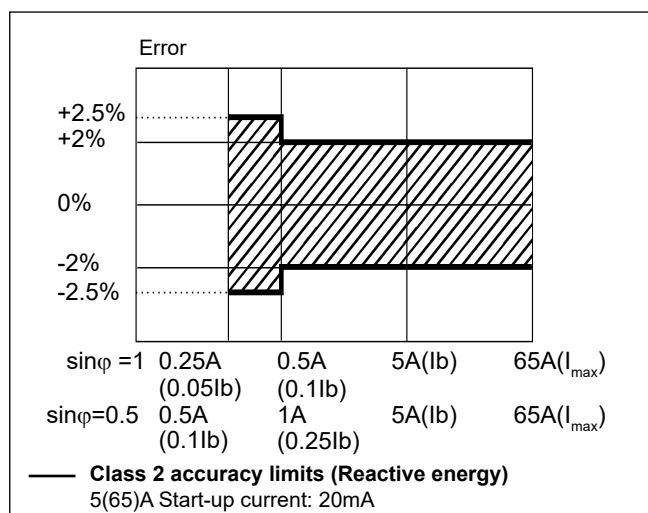
	Measuring input	Digital or serial output	Digital input
Measuring input	-	4 kV	4 kV
Digital or serial output	4 kV	-	0 kV
Digital input	4 kV	0 kV	-

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

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



Display pages

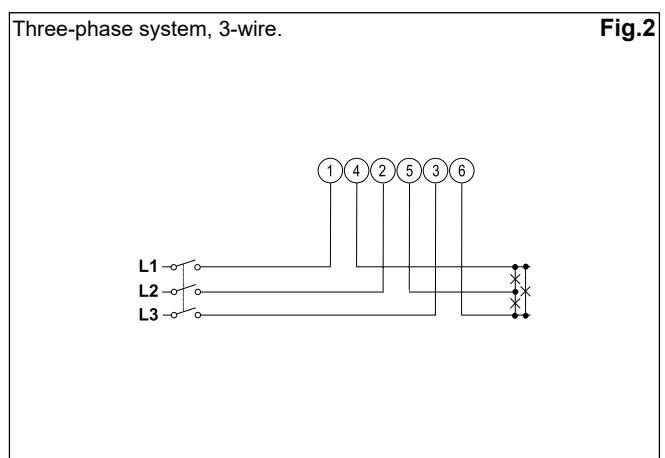
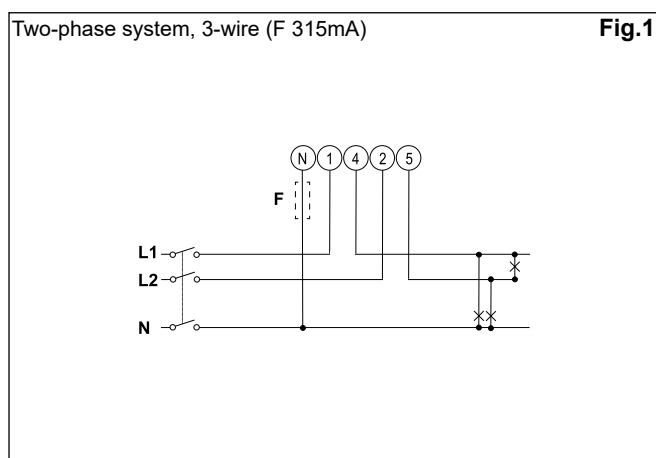
No	1 st row	2 nd row	3 rd row	“Full” mode	“Easy” mode	Note
0	kWh+ (imported)		kW system	X	X	In PF version (MID) this is the only certified energy meter. In PFA version and in X version with Measurement menu set to “A”, this is considering the total energy without considering the current direction.
1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

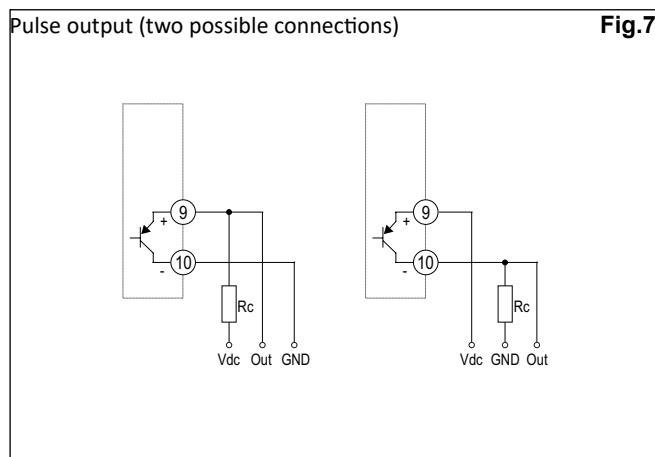
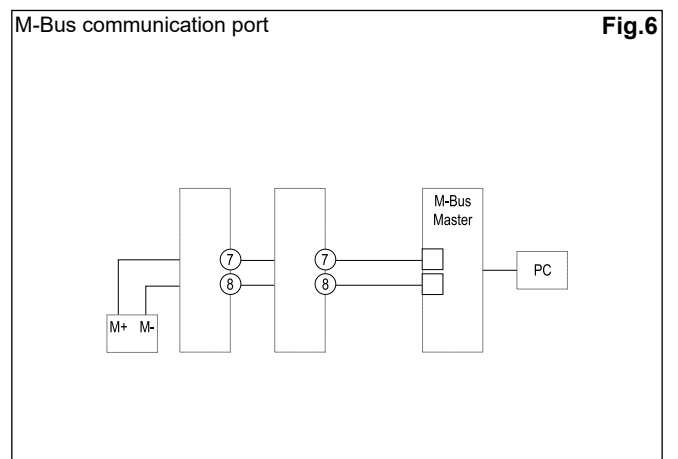
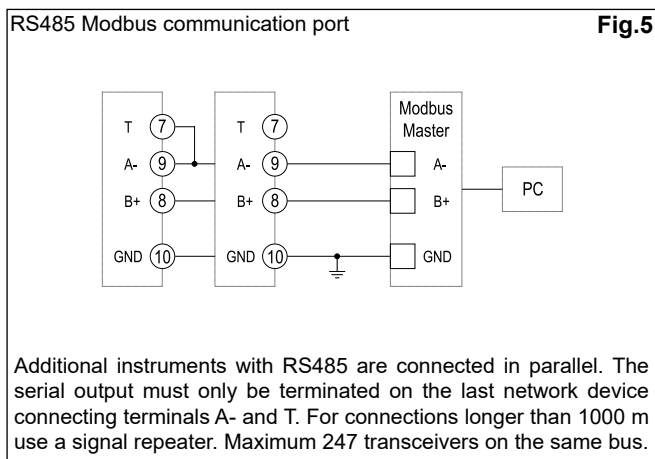
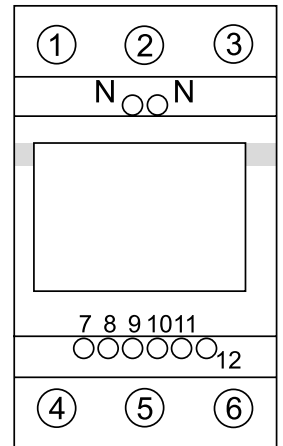
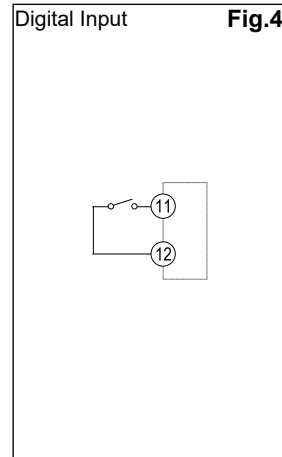
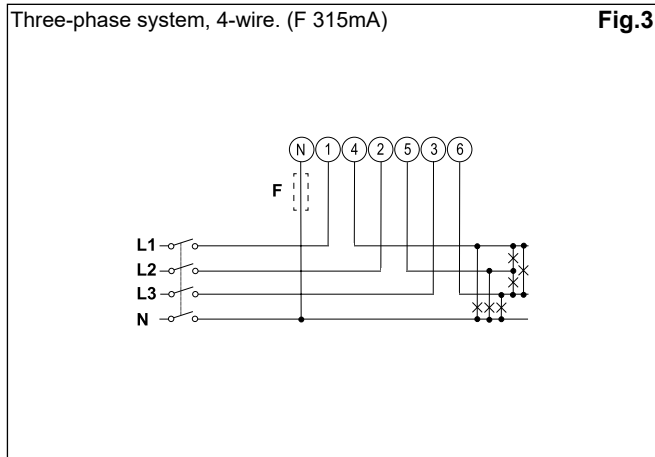
Additional available information on the display

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

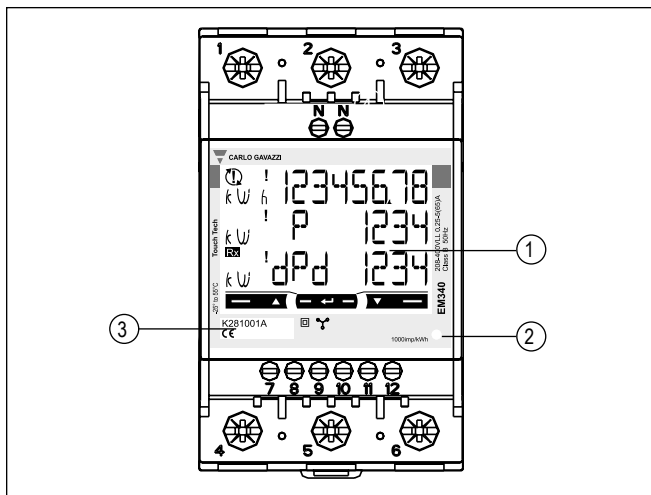
Wiring diagrams



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

