

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

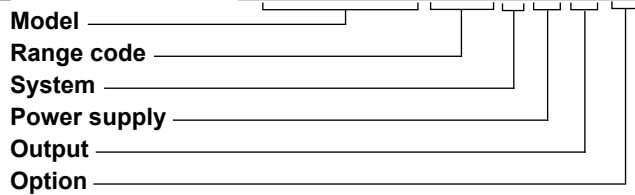
Range code	System	Power supply	Output
AV2: 208 to 400 VLL AC - 5(65)A (Direct connection)	3: 3-phase, 3 or 4 wire; 2-phase 3 wire	X: Self power supply -20% +20% of the rated measuring input voltage, 45 to 65Hz	O1: pulse output S1: RS485 Modbus port M1: M-bus port
Option	Measurement		
PF: Certified according 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		Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
Current type	3-phase loads, direct connection	Display and touch key-pad	
Current range	5(65)A	Type	Backlit LCD, 3 rows by 8-digit each, h 7 mm
Nominal voltage	208 to 400 VLL AC	Read-out	Energy: 8 digit. Variables: 4 digit
Accuracy (@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)		Touch key	3 (DOWN, Enter and UP).
	Imin=0.25A; Ib: 5A, Imax: 65A; Un: 113 to 265VLN (196 to 460VLL) 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) From 0.2Ib to Imax: ±(0.5%RDG)	Energies	Max. 99 999 999 Min. 0.01
Phase-neutral voltage	In the range Un: ±(0.5% RDG)	Variables	Max. 9999 Min. 0.01
Phase-phase voltage	In the range Un: ±(1% RDG)	Memory	
Frequency	Range: 45 to 65Hz.	Energy	10 ¹² cycles. Energy value is saved every time the less significant digit increases.
Active power	From 0.05 In to Imax, within Un range, PF=1: ±(1% RDG) 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
Power factor	±[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) From 0.1 In to Imax, within Un range, sinphi=0.5L or 0.8C: ±(2% RDG)	Fix orange light: wrong current direction (only with PFB option or with "B" measurement selection in case of X option)	
Energies		Current overloads	
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	8450 A
Start-up current:	20mA Self-consumption is not measured.	Voltage Overloads	
Start-up voltage	90VLN	Continuous	1.2 Un
Resolution	Display/serial communication	For 500ms	2 Un
Current	0.1/0.001 A	Input impedance	
Voltage	0.1/0.1 V	230VL-N	1.2Mohm
Power	0.01 kW or kVar/ 0.1 W or var	120VL-N	1.2Mohm
Frequency	0.1 Hz/0.1Hz	5(65) A	< 1.25VA
PF	0.01/ 0.001	Wrong connection detection	Installation guide to indicate if connections are correctly carried out. Can be disabled.
Energies (positive)	0.01 kWh or kvarh / 0.1 kWh or kvarh	Phase sequence	Indicates if the phase sequence is not the correct one (L1-L2-L3)
Energies (negative)	0.01 kWh or kvarh / 0.1 kWh or kvarh	Correct current direction	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).
Energy additional errors		Load conditions	The wrong connection detection works in case of loads with: - PF>0.766 (<40°) power factor if inductive
Influence quantities	According to EN62053-21		
Temperature drift	≤200ppm/°C		



Input specifications (cont.)

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

Number of inputs

Contact measurement voltage

Input impedance

Contact resistance

Free of voltage contact
Tariff management (switch
between t1-t2)
1
5 V
1kohm
≤1kohm, close contact
≥100kohm, open contact

Overload

In case a voltage is
erroneously applied to the
digital input, the input is not
damaged up to 30 VAC/
DC.

Output specifications

RS485 serial port

Function

Protocol

Baud rate

Data format

Address

Driver input capability

Data refresh time

Read command

Rx/Tx indication

RS485 by screw
connection.
For communication
of measured data,
programming parameters
ModBus RTU (slave
function)
9.6, 19.2, 38.4, 57.6, 115.2
kbaud,
even or no parity,
1 to 247 (default: 01)
1/8 unit load. Maximum 247
devices on the
same bus.
1sec
50 words available in 1
read command
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

Protocol

Baud rate

Meters in the M-bus network

Primary address

Secondary address

Identification number range

Other

measured data
M-bus according to
EN13757-1
0.3, 2.4, 9.6 kbaud
250
Selectable
Univocally defined in each
unit
from 9000 0000 to 9999
9999
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

Static output

Purpose

Pulse rate

For pulse output
proportional to the active
energy (kWh)
Selectable in multiple of
100
Max 500 or 1500 kWh
according to pulse ON
duration

M-bus port

Function

M-bus by screw
connection.
For communication of

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	-20 to +65 °C, indoor, (R.H. from 0 to 90% non-condensing @ 40°C)	Standard compliance	EN62052-11
Storage temperature	-30°C to +80°C (R.H. < 90% noncondensing @ 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

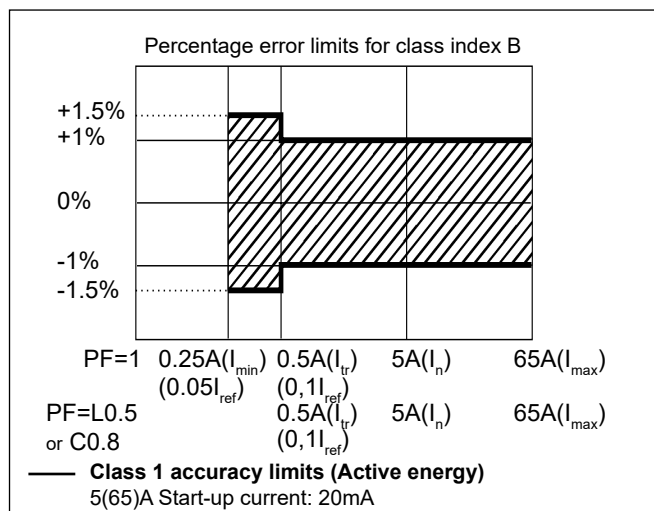
 $\leq 1W, \leq 10VA$

Insulation (for 1 minute) between inputs and outputs

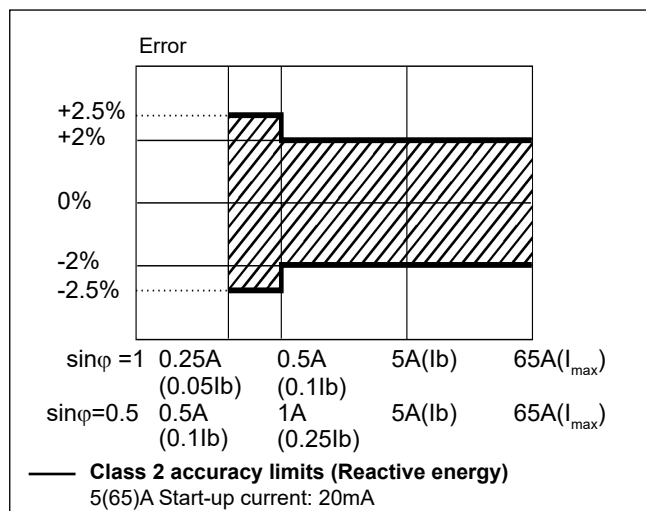
	Measuring input	Digital or serial output	Digital input
Measuring input	-	4 kV	4 kV
Digital or serial output	4 kV	-	0 kV
Digital input	4 kV	0 kV	-

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

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



Display pages

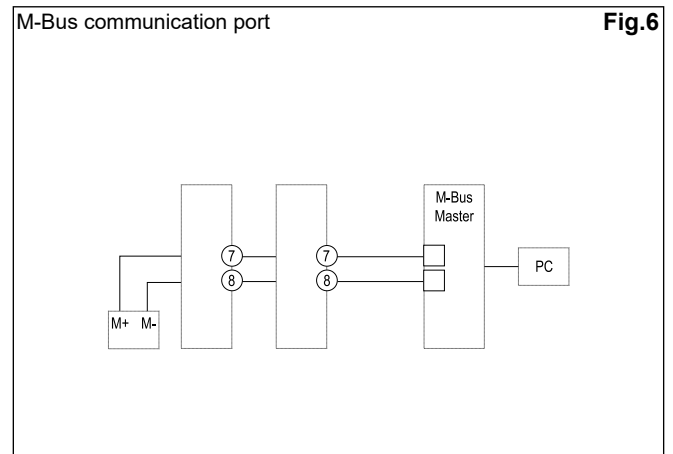
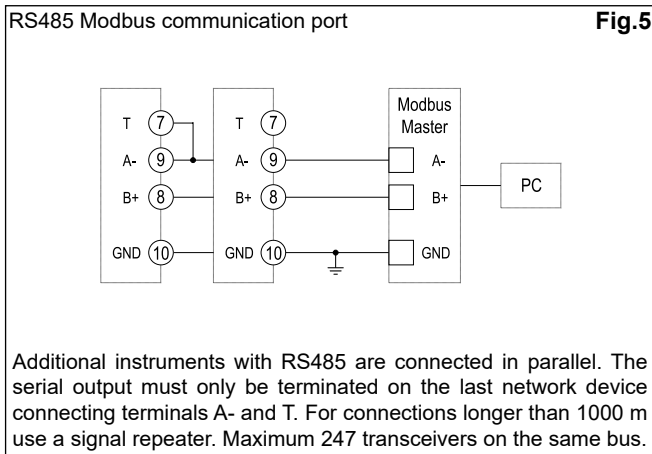
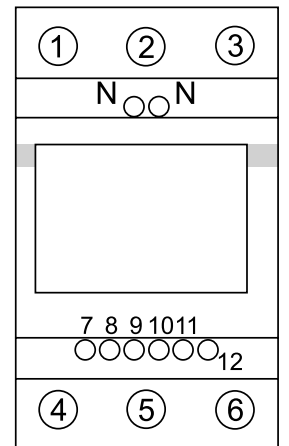
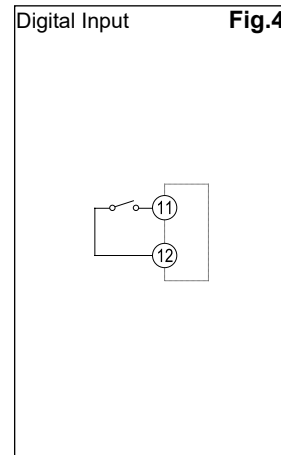
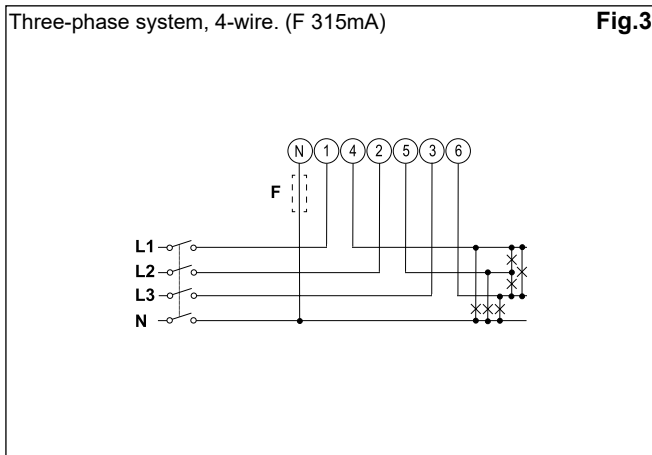
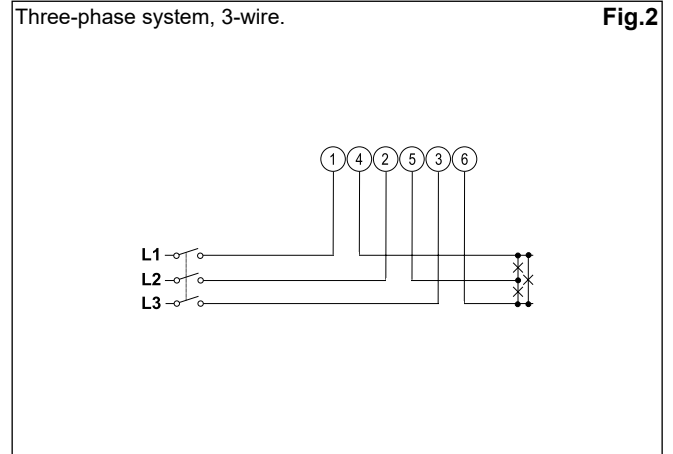
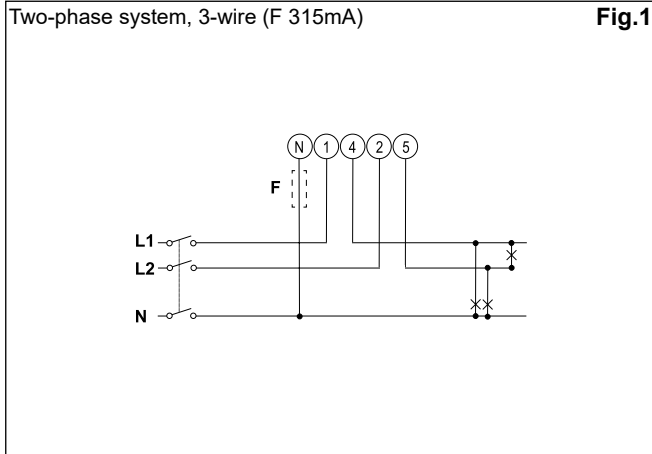
No	1 st row	2 nd row	3 rd row	“Full” mode	“Easy” mode	Note
0	kWh+ (imported)		kW system	X	X	In PF version (MID) this is the only certified energy meter. In PFA version and in X version with Measurement menu set to “A”, this is considering the total energy without considering the current direction.
1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

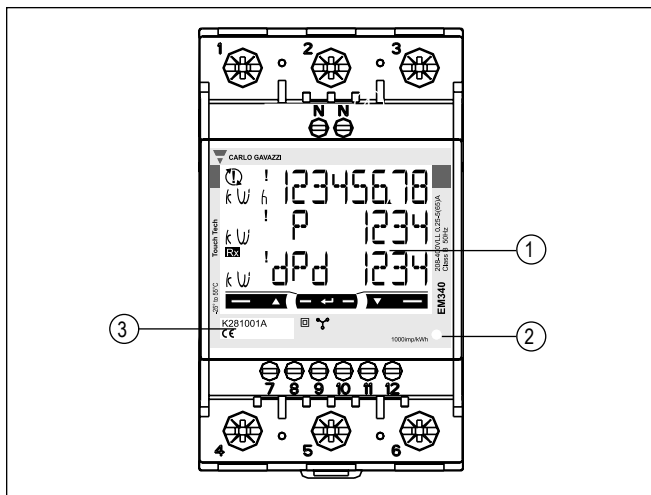
Additional available information on the display

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



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

