Energy Management
Energy Meter
Type EM12 DIN

CARLO GAVAZZI

- **Single phase energy meter**
- **Class 1 (kWh) according to EN62052-11 and EN62053-21**
- **2-tariff management (by serial communication)**
- **Energy readout on display: 6+0 digit**
- **Variables readout on display: 4 DGT**
- **Measurements on display: kWh, V, A, kW, kvar, kVA, PF, kvarh**
- **Measurements via serial communication: same on the display**
- **Direct current measurement up to 100AAC**
- **Self power supply**
- **Dimensions: 18mm wide**
- **Protection degree (front): IP51**
- **RS485 Modbus RTU port**
- **Backlight display**
- **Easy-connection management**

Product description

Single-phase energy meter with LCD data displaying; particularly indicated for active energy metering and for cost allocation in applications up to 100 A (direct connection). Housing for DIN-rail mounting; Modbus RS485 port. Dual tariff meters, instantaneous values of current, voltage, power and active/reactive energy.

How to order

EM12-DIN AV0 1 X S1 X

- **Model**
- **Range code**
- **System**
- **Power supply**
- **Output**
- **Option**

Type Selection

Range code		System		Power supply		Output	
AV0:	230VLN AC 10(100)A (Direct connection)	**1:**	1-phase, 2-wire	**X:**	self power supply, -20% +20% of the rated measuring input voltage, 50 to 60HZ ± 2%	**S1:**	RS485 port

Option

X: none

Input specification

Rated Input	
Current type	1-phase loads, direct
Current range	10(100)A
Nominal voltage	230VLN AC ±20%
Accuracy (@25°C 5°C, R.H. ≤75%, 50 to 60Hz ± 2%)	
AV0	Ib: 10A, Imax: 100A; Un: 230VLN -20% +20%
Current	From 0.04Ib to 0.2Ib: ±(1%RDG) From 0.2Ib to Imax: ±(0.5%RDG)
Phase-neutral voltage	In the range Un: ±(0,5% RDG)
Frequency	Range: 50 to 60Hz ± 2%
Active power	From 0.04 In to 0.2Ib, within Un range, PF=1: ±(2% RDG +1DGT) From 0.2 In to Imax, within Un range, PF=0.5L or 0.8C: ±(1% RDG +1DGT)
Reactive power	From 0.05 In to 0.2Ib, within Un range, PF=1:

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Input specification

	±(3% RDG +1DGT). From 0.2 In to Imax, within Un range, PF=0.5L or 0.8C: ±(2% RDG +1DGT)
Active energy	Class 1 according to EN62052-11 and EN62053-21
Reactive energy	Class 2 according to EN62053-23
Start up current	40mA Self consumption not to be measured
Resolution (display and via serial port)	
Current	0.1A
Voltage	0.1V
Power	0.01kW, kvar, kVA
Energies	1kWh/1kvarh 0.01kWh/kvarh (serial communication)
Energy additional errors	
Influence quantities	According to EN62053-21
Temperature drift	≤200ppm/°C
Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
Display	1 line: 6 DGT
Type	Backlight LCD, h 7 mm

Energies read-out	Total: 6+0 digit Energy is always integrated (independently on the current direction)
Instantaneous variables readout	4 DGT, automatic scroll
Backlight	ON by pressing the key button
Max. and Min. indication	
Energies	Max. 999 999 Min. 0
Instantaneous variables (optional)	Max. 999.9 or 99.99 Min. 0.0 or 0.00
LEDs	red LED (Energy consumption), 1000 imp./kWh (min. period: 90ms) according to EN62053-21.
Current Overloads	
Continuous	100A, @ 50Hz
For 10ms	3000 A
Voltage Overloads	
Continuous	1.2 Un
For 500ms	2 Un
Input impedance	
230VL-N	>720Kohm
10(100) A	<3VA

Output specifications

RS485 serial port	RS 485 by screw connection.
Function	For communication of measured data and tariff/ time programming
Protocol	ModBus RTU (slave function)

Baud rate	1.2, 2.4, 4.8, 9.6 kbaud,
Default baud rate	9.6 Mb
Data	(8 data bit, 1 stop bit, no parity)
Address	1 to 247
Default address	Last 2 digits of the serial number

General specifications

Operating temperature	-20 to +65 °C, indoor, (R.H. from 0 to 90% noncondensing @ 40°C)
Storage temperature	-30°C to +70°C (R.H. <90% noncondensing @ 40°C)
Installation category	Cat. III (IEC 60664, EN60664)
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output 4000 VAC RMS
Dielectric strength	4000VAC RMS for 1 minute

EMC	According to EN62052-11
Electrostatic discharges	15kV air discharge;
Immunity to irradiated electromagnetic fields	Test with current: 10V/m from 80 to 2000MHz; Test without any current: 30V/m from 80 to 2000MHz;
Burst	On current and voltage measuring inputs circuit: 2500VAC
Immunity to conducted disturbances	10V/m from 150kHz to 80Mhz

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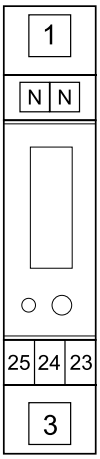
General specifications (cont.)

Surge	On current and voltage measuring circuit: 4kV;
Radio frequency	According to CISPR 22
Standard compliance	
Safety	IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11
Metrology	EN62053-21
Approvals	CE
Connections	
Cable cross-section area	Measuring inputs: max. 16mm², min. 5mm² with metallic cable lug;
	Max. screw tightening torque: 2.2 Nm
Other terminals	1.5 mm²
Housing	
Dimensions (WxHxD)	18 x 90 x 72 mm
Material	ABS, self-extinguishing
Sealing covers	Included
Protection degree	
Front	IP51
Weight	Approx. 130g (packing included)
RTC accuracy (for tariff management)	≤0.5 s/day

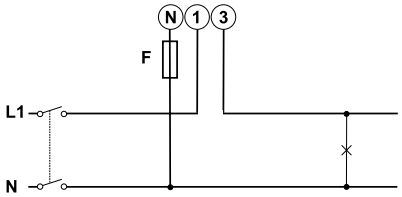
Power supply specifications

Self supplied version	230VAC VL-N, -20% +20% 50/60Hz
Power consumption	≤0.4W, ≤8VA

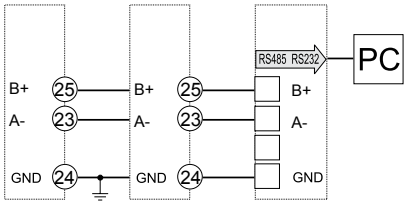
Wiring diagrams



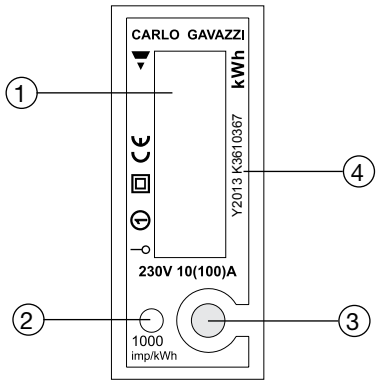
1-ph, 2-wire **Fig.1**



RS485 serial port **Fig.2**



Frontal panel



1. **Displays**
   LCD-type with alphanumeric indications and blue backlight

2. **LED**
   LED is blinking proportional to kWh reading (1000imp/kWh width 90ms)

3. **Push button**
   Push button: to scroll among the display page in measurement mode

4. **Serial number + production year**
   Last 2 digits of the serial number indicate the serial communication address (default).

Dimensions