

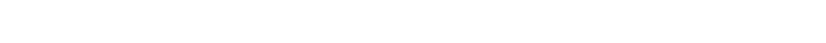
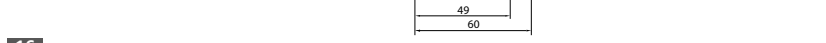
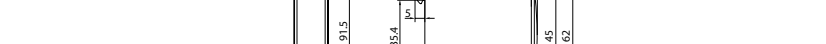
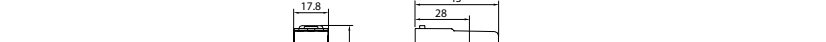
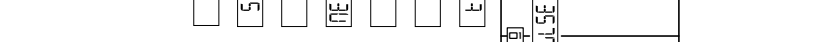
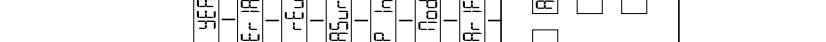
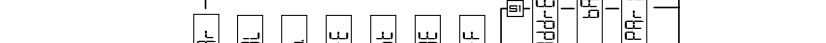
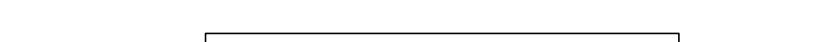
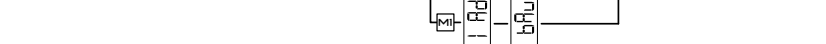
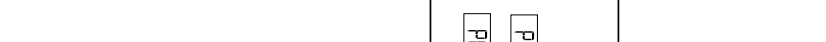
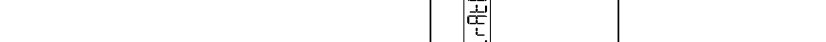
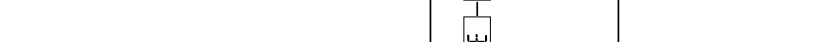
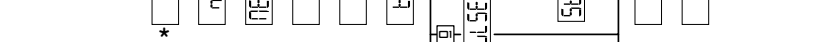
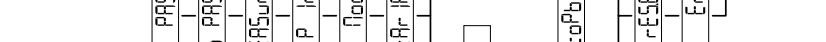
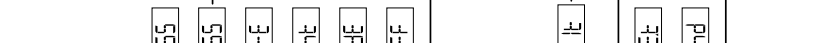
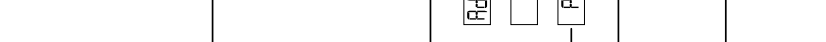
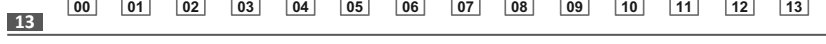
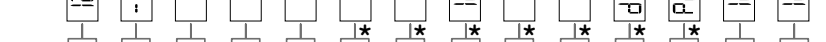
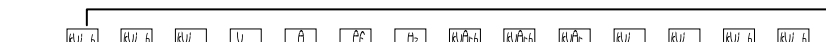
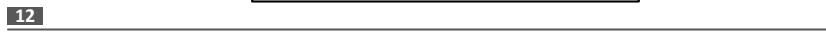
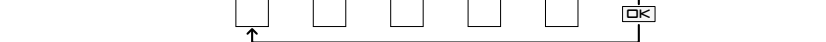
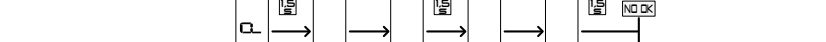
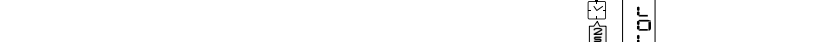
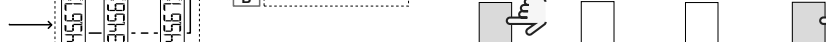
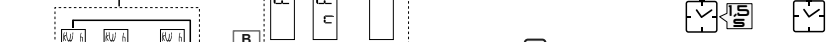
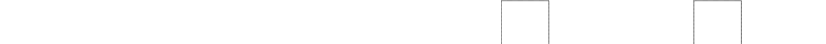
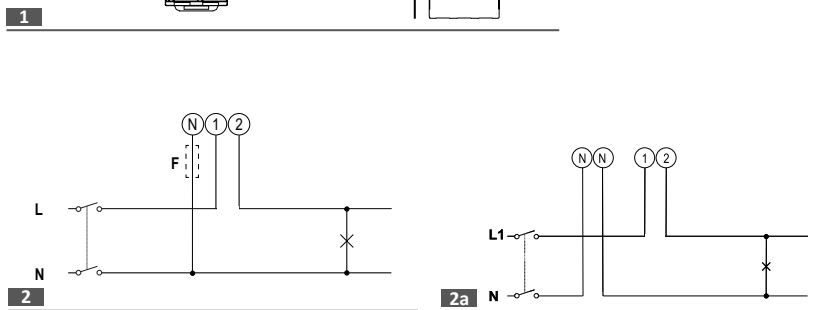
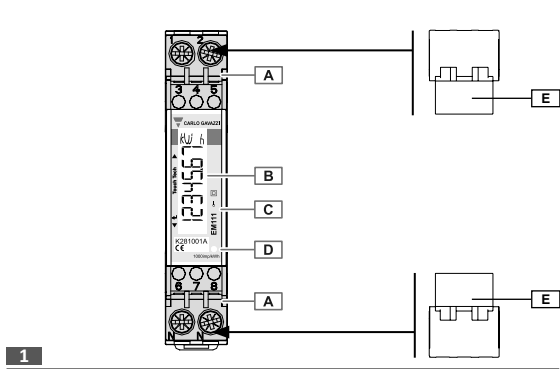
## EM111

### Installation and use instructions

#### 45 A direct connection single-phase energy analyzer with Modbus, pulse or M-Bus interface

Codice 8021760

The analyzer measures active and reactive energy, summing (easy connection mode only) or separating imported energy from exported energy. It manages two energy tariffs using a digital input or Modbus command. It can be equipped with a backlit LCD display to communicate measurements: pulse output, RS485 Modbus port or M-Bus port. It measures one DIN module, with backlit LCD display with sensitive touch screen areas for page scrolling and parameters setting.



### GENERAL WARNINGS

**DANGER:** Live parts. Heart attack, burns and other injuries. Disconnect the power supply and load before installing the analyzer.

The energy analyzer should only be installed by qualified/authorized personnel.

These instructions are an integral part of the product. They should be consulted for all situations tied to installation and use. They should be kept within easy reach of operators, in a clean place and in good conditions.

**Code key (analyzer side) EM111-DIN**

AVx	1	X	a1	X
AVx: 230 V ac, (4/5) A	Single-phase current	Self-powered (via measured voltage)	Output type: O1: pulse S1: Modbus RS485 port M1: M-Bus port	No option included PFA: total energy (sum of + and -) certified according to MID PFB: only positive energy certified according to MID.
AV7: (only X option): direct connection	two-wire			

**Note:** only AV7 option is UL certified

**Product (Fig. 1)**

- A** Current and communication connection terminals.
- B** Backlit LCD display with sensitive touch screen areas.
- C** Model, feature summary and serial number.
- D** LED:

  - blinking red: 1 pulse = 1 Wh
  - orange on current connected in opposite direction. Control only run if the imported and exported energies are measured separately (**Measure = b**).

- E** Sealable terminal caps.

In case you want to mount the sealing terminal caps (Fig. 1) remember to lock them with the appropriate cable sealing.

**Connection diagrams**

- Fig. 2** Single-phase system 315 mA fuse (F), if required by local law.
- Fig. 3** Single-phase system 315 mA fuse (F), if required by local law.
- Fig. 4** Digital input. Open contact = tariff 1, closed contact = tariff 2.
- Fig. 5** Pulse output (two possible connections)
- Fig. 6** External voltage (direct current)
- Fig. 7** Open output contact (transistor PNP open collector)
- Fig. 8** GND: ground output contact (transistor PNP open collector)
- Fig. 9** Open output contacts: the load resistance (R<sub>L</sub>) must be designed so that the closed contact current is under 100 mA (V<sub>cc</sub> = equal to 1 V dc). DC voltage (V<sub>cc</sub>) must be less than or equal to 80 V.
- Fig. 10** RS485 Modbus with Master
- Fig. 11** Note: additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and I. For connections longer than 1000 m use a signal repeater.
- Fig. 12** M-Bus with Master
- Fig. 13** Note: Maximum 250 transceivers on the same bus (1 M-Bus load).

**Menu map (Fig. 7)**

- A** Measurement menu. Measurements displayed by default when turned on. Pages are characterized by the reference unit of measure.
- B** Parameter menu. Parameter settings pages. Require login password.
- C** Information menu. The pages display information and set parameters without having to enter a password.

**Commands**

Navigation	Command	Parameter settings	Command
Operate	Fig. 8	Operation	Fig. 8
View the next page	Fig. 8	Increase a parameter value	Fig. 8
View the previous page	Fig. 9	View the next value option	Fig. 8
Open the parameter menu	Fig. 9	Decrease a parameter value	Fig. 9
Exit the parameter menu	Fig. 10 (page End)	View the previous value option	Fig. 9
Open the information menu	Fig. 11	Confirm a value	Fig. 10
Open the information menu	Fig. 11	Open the parameter settings page	Fig. 10
Open the information menu	Fig. 11	Quickly confirm the 0000 default password	Fig. 11

**NOTE:** after 120s of disuse, the measurement home page is displayed and the command only works if touched twice. Upon first touch of the touch command area, the display lock light turns on.

**Setting a parameter (Fig. 12)**

Procedure example: how to set P Int=24.

**NOTE:** The first displayed value is the current one. Settings are applied when the value is confirmed. The set value is out of range if Error appears. After 120 s of disuse on a value being set, the title page is displayed (P Int in the figure). After another 120 s, the initial measurement page is displayed.

**Measurement menu (Fig. 13)**

**NOTE:** only displayed if full display mode is set (**Mode = Full**).

Page	Description
00	Home page: Total imported active energy. If easy connection is on ( <b>Measure = A</b> ), it indicates total active energy without considering the direction.
01	Only if imported and exported energy are measured separately ( <b>Measure = b</b> ). Total exported active energy.
02	Active power
03	Voltage
04	Current
05	Power factor (L = inductive, C = capacitive)
06	Frequency
07	Home page: Total imported reactive energy. If easy connection is on ( <b>Measure = A</b> ), it indicates total reactive energy without considering the direction.
08	Only if imported and exported energy are measured separately ( <b>Measure = b</b> ). Total imported reactive energy.
09	Reactive power
10	Requested average power (P <sub>d</sub> = demand) calculated for the set interval. The value remains the same for the entire interval. It is = 0 during the first start up interval.
11	Maximum requested power (Pd = Peak demand) reached since last reset
12	Active energy imported with tariff 1. tar 1 appears after 5 s and remains displayed for 2 s. Displayed if tariff management is on (Tariff = on).
13	Active energy imported with tariff 2. tar 2 appears after 5 s and remains displayed for 2 s. Displayed if tariff management is on (Tariff = on).

**Measurement faults**

If the measured signal exceeds the admitted analyzer limits, a specific message appears:

- **EE** blinking: the measured value is out of limits
- **EE** on: the measurement depends on a value that is out of limits
- **EE** Hsso: la misura dipende da un valore che risulta fuori dai limiti

**NOTE:** the misure dell'energia attiva e reattiva sono visualizzate ma non variano.

**Parameter menu (Fig. 14)**

**NOTE:** the value settings page automatically opens after 3 s.

Shared pages	Description	Values **
PASS	Enter current password	Current password
CHANG	Change password	Four digits (0000-9999)
MEASur	Measurement type (only X option)	A: easy connection, measures total energy without considering the direction/ b: separately measures imported and exported energy
P Int	Average power calculation interval (minutes)	1-30
MODE	Display mode	Full: complete model/ Easy: reduced mode. Measure not displayed are still sent via serial port.
TARIFF	Tariff management	On: enabled/ Off: disabled
RESET	Enable reset power (Pd = Peak demand) reached since last reset	On: enabled/ Off: disabled
End	Return to the initial measurement page	-

**Pages specific to the S1 version**

Page	Description	Values **
Address	Modbus address	1-247
bAUD	Baud rate (kbits)	3/6/ 19.2/ 38.4/ 57.6/ 115.2
PARITY	Parity	Even/ No
STOP bit	Only if no parity. Stop bit.	1/ 2

**Pages specific to the O1 version**

Page	Description	Values **
PULSE	Pulse time (ON time, milliseconds)	30/ 100
PulseAIE	Pulse weight. Multiples of 100 impulses/kWh.	For 30 ms: 100-3000 (1000) For 100 ms: 100-1000

**Pages specific to the M1 version**

Page	Description	Values **
Pr I Add	M-Bus primary address	1-250 (0)
bAUD	Baud rate (kbits)	0.3/ 2,3/ 9.6

**NOTE:** \*\* default values are underlined.

**Information menu (Fig. 15)**

**NOTE:** the value automatically alternates every 2 s with the page title.

Shared pages	Description	Values **
YEAR	Year of manufacture	Year
SERIAL n	Serial number, corresponds to the one indicated on the front print, without the initial 'K'	Serial number
rEV.	Firmware revision - Xr:n	Firmware revision
• X: A= uscita impulsiva, B= seriale Modbus C= seriale M-Bus serial		
• Y: none-standard, A-MID PFA, B-MID PFB		
• n: numero progressivo di revisione (i.e.: 00, 01, 02)		
MEASurE	Measurement type (only X option)	A: easy connection, measures total energy without considering the direction/ b: separately measures imported and exported energy
P Int	Intervallo per calcolo potenza media richiesta	1-30
MODE	Modalità display	Full: modalit� completa/ Easy: modalit� ridotta. Le misure non visualizzate sono comunque trasmesse via porta seriale.
TARIFF	Abilitazione gestione delle tariffe ed eventuale tariffa corrente	On: abilitata/ Off: disabilitata
RESET	Abilitazione azzeramento tariffe di energia, potenza	No: annulla azzeramento/ Yes: abilita azzeramento
MEASurE	Abilitazione gestione delle tariffe ed eventuale tariffa corrente	On: abilitata/ Off: disabilitata
MODE	Modalit� display	Full: modalit� completa/ Easy: modalit� ridotta. Le misure non visualizzate sono comunque trasmesse via porta seriale.
TARIFF	Abilitazione gestione delle tariffe ed eventuale tariffa corrente	On: abilitata/ Off: disabilitata

**Pages specific to the S1 version**

