



EMDX³

Single Phase Din Rail Energy Meter 1 module
Installation Guide



Version	Model
BASIC	700040
PULSE	700041 700042

Version	Model
MODBUS	700043 700044



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DESCRIPTION

The EMDX³ 45A series is an advanced multifunction single phase energy monitoring solution with optional outputs such as pulses, RS485 RTU Modbus, Mbus and KWh meter. Equipped with scroll display button for ease of navigation through the various parameters. Housed for DIN rail mounting, IP51 protection.

Certified in the UK according to EU Directive 2014/32/EU.

MID certificate number 0120 / SGS0141.

Model	Version	Display	Measurement	Outputs
700040	Basic	LCD	kWh	No
700041	Pulse	LCD with Backlight	kWh	Pulse
700043	ModBus	LCD with Backlight	Multi-parameters	Pulses & RS485



Model	Version	Display	Measurement	Outputs
700042	Pulse	LCD with Backlight	kWh	Impulso
700044	ModBus	LCD with Backlight	Multi-parameters	Pulses & RS485

APPLICATION

The energy-meters are used to measure single-phase applications like residential, utility and Industrial.

The unit measures and displays various important electrical parameters. It equipped with a white back-lighted LCD screen for perfect reading (only LCD for Basic version). Bi-directional energy measurement makes it a good choice for solar PV energy metering. The compact design and din rail installation provides an easy and economical solution for your metering demand.

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■ DANGERS AND WARNINGS

Information for your own safety

This manual does not contain all of the safety measures for operation of the equipment (module, device), because special operating conditions, and local code requirements or regulations may necessitate further measures. However, it does contain information which must be read for your personal safety and to avoid material damages. This information is highlighted by a warning triangle and is represented as follows, depending on the degree of potential danger.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up ground and label devices, systems and circuits according to safety and regulatory standards.

Warning



This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution



This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Proper handling

The equipment (device, module) may only be used for the application specified in the catalogue and the user manual, and only be connected with devices and components recommended and approved by LEGRAND.

- Use only insulating tools
- Do not connect while circuit is live (hot)
- Place the meter only in dry surroundings
- Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects
- Make sure the used wires are suitable for the maximum current of this meter
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter
- Do not connect the meter to a 3 phase - 400VAC - network
- Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you may get an electrical shock
- Make sure the protection cover is placed after installation
- Installation, maintenance and reparation should only be done by qualified personnel
- Never break the seals and open the front cover as this might influence the functionality of the meter, and will void any warranty
- Do not drop or allow physical impact to the meter as there are high precision components inside that may break

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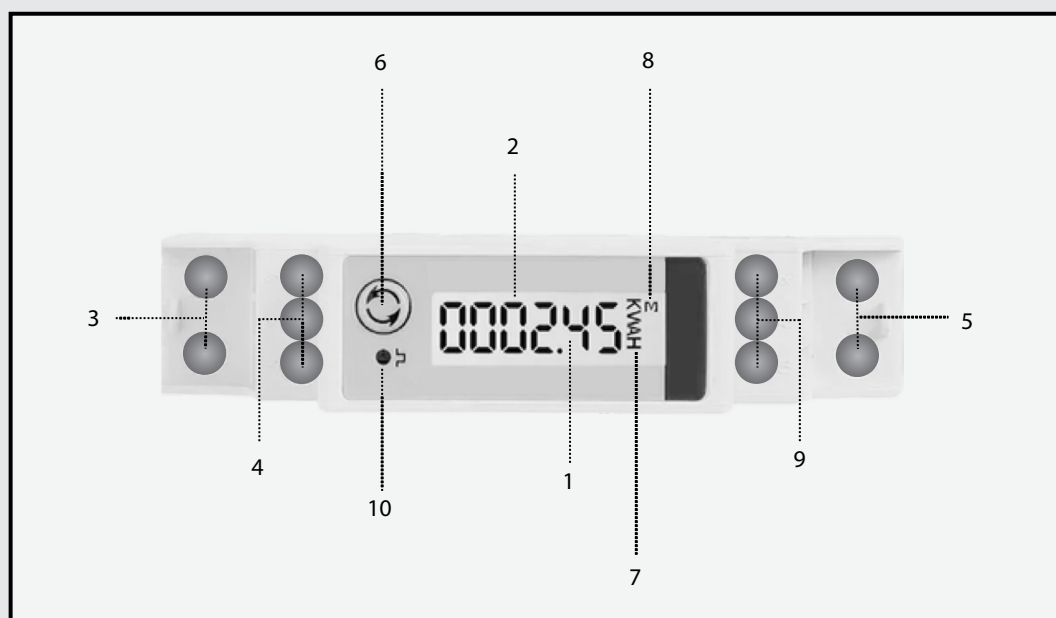
PRELIMINARY OPERATIONS

To ensure the safety of personnel and equipment, it is imperative to thoroughly review the contents of this booklet prior to operating the machine.

Upon receipt of the box containing the device, it is essential to verify the following points:

- the condition of the packaging
- the lack of damage or breakage resulting from transportation
- the correlation between the appliance code and the ordered code
- the inclusion of both the item and the instruction sheet in the packaging

PRESENTATION



- | | |
|----|------------------|
| 3 | Line |
| 2 | Values |
| 7 | Measurement unit |
| 4 | Pulse Output |
| 1 | LCD |
| 6 | Scroll display |
| 5 | Neutral |
| 8 | Energy type |
| 9 | Communication |
| 10 | Metrological LED |

Note: For further information on other meter variants - models with pulse output only or without any features - please see the 'Wiring diagrams' section

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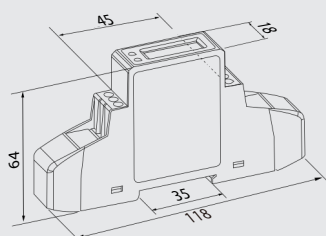
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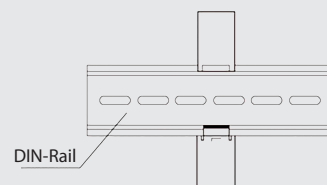
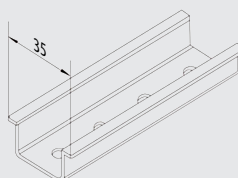
■ INSTALLATION

Dimensions and Prescriptions

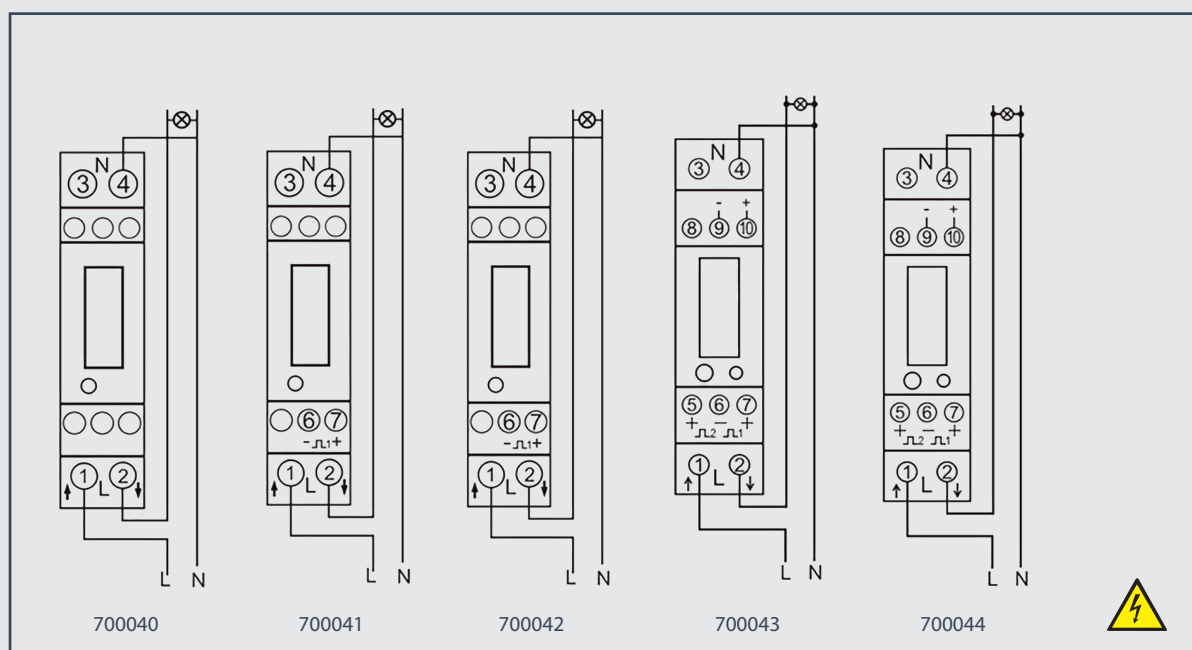
Maintain distance from systems that produce electromagnetic disturbances.



Height: 118 mm
Width: 18 mm
Depth: 64 mm
Weight: 0,1 Kg



Wiring diagrams



 1 - 2 3 - 4	 8 mm	MAX 1 x 2,5 mm ² 1 x 2,5 mm ² 1 x 10 mm ²	max 1,5 Nm 4mm PZ1
	 5 mm	MAX 1 x 0,5 mm ² 1 x 0,5 mm ² 1 x 1,5 mm ²	max 0,2 Nm 3mm PZ0
	 5 - 6 - 7 8 - 9 - 10		

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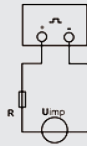
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■ COMMUNICATION

The meter is equipped with pulse output, which is fully isolated from the inside circuit. That generates pulses in proportion to the measured energy. The pulse output is polarity dependent, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage shall be 5-27VDC, and the maximum input current shall be 27mA DC.



ATTENTION: Pulse output must be fed as shown in the wiring diagram on the left. Scrupulously respect polarities and the connection mode. Opto-coupler with potential-free SPST-NO Contact.

Contact Range: 5-27 V DC Max.
Current input: 27 mA DC

Pulse output for CE1D45AP/CE1DMID45AP:

Pulse constant: 1000imp/kWh; Pulse width: 80ms

Pulse Output for CE1D45AMB/CE1DMID45AMB/CE1D45AM/ CE1DMID45AM:

Mbus and ModBus vers. provide two pulse outputs. Both pulse outputs are passive type. Pulse output 1 is configurable. The pulse output can be set to generate pulses to represent total/import/export kWh or kVAh.

The default is export kWh. Pulse width: 50(default)/100/200 ms.

The pulse constant can be set to: 1000(default)/100/10/1imp/kWh/kVAh.

Pulse output 2 is non-configurable. It is fixed to import kWh.

The constant is 1000imp/kWh. Pulse width: 100ms.

RS485 Output for CE1D45AMB/CE1DMID45AMB:

The meter provides a RS485 port for remote communication. Modbus RTU is the protocol applied.

For Modbus RTU, the following RS485 communication parameters can be configured via Modbus communication or from the Set-up Mode.

- Baud rate: 2.4k, 4.8k, 9.6k, 19.2k, 38.4k bps
- Parity: None/Even/Odd
- Stop bits: 1 or 2
- Modbus Address: 001 to 247

Default parameters for communication:

- Baud rate: 19.2k bps
- Parity: Even
- Stop bit: 1
- Modbus address: 0x05

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Key Guide



Keep pressing the button for 3 seconds,
the meter will enter set-up mode

Settings Screens

- | | |
|----|--------------------------|
| 01 | ModBus Address |
| 02 | ModBus Baud Rate |
| 03 | Parity (ModBus vers.) |
| 04 | Stop Bits (ModBus vers.) |

ModBus vers.	ModBus Address
01	Under this menu, long press this button for 3 seconds enter to the address setting → Adr 001
	The leftmost digit will flash, press this button to increase or decrease number and then waiting for 2 seconds, the next digits will flash, press this button again to increase number, and waiting for 2 seconds, repeat above options until all the digits are set → Adr 001
	After the setting of final digit, waiting for 2 seconds, the information will be stored automatically and the display will show 'Good' before returning to the setting mode → Adr 101
	Address Options • von 001 bis 247

ModBus vers.	ModBus Baud Rate
02	Under this menu, long press this button for 3 seconds enter to the set-up mode → br 384
	The digits will flash, press this button to choose 'Baud Rate Options', then waiting for 2 seconds → br 384
	After the setting of final digit, waiting for 2 seconds, the information will be stored automatically and the display will show 'Good' before returning to the setting mode → br 24
	Baud Rate Options • 24k, 4.8k, 9.6k, 19.2k, 38.4k bps

Modbus/Mbus vers.	Parity
03	Under this menu, long press this button for 3 seconds enter to the set-up mode → Prty n
	The digit will flash, press this button to choose 'Parity Options', then waiting for 2 seconds → Prty n
	After the setting of final digit, waiting for 2 seconds, the information will be stored automatically and the display will show 'Good' before returning to the setting mode → Prty o
	Parity Options • None (n) • Even (E) • Odd (o)

Modbus/Mbus vers.	Stop Bits
04	Under this menu, long press this button for 3 seconds enter to the set-up mode → Stop 1
	The digit will flash, press this button to choose 'Stop Bits Options', then waiting for 2 seconds → Stop 1
	After the setting of final digit, waiting for 2 seconds, the information will be stored automatically and the display will show 'Good' before returning to the setting mode → Stop 2
	Stop Bits Options • 1 • 2

USE

Display Start-up Screens

01.a	Inizialization-FullScreen (Basic and Pulse vers.)
01.b	Inizialization-FullScreen (ModBus and Mbus vers.)
02.a	Software Version (All models)
02.b	Software Version (Basic and Pulse vers.)
02.c	Software Version (All models)
03	CRC High Bit (Tutti i modelli)
04	CRC Low Bit (Tutti i modelli)
05.a	Active Energy (Basic and Pulse vers.)
05.b	Total Active Energy (ModBus and Mbus vers.)

Basic/Pulse vers.	Inizialization - FullScreen
01.a	 Inizialization - Full screen

ModBus/Mbus vers.	Inizialization - FullScreen
01.b	 Inizialization - Full screen

Tutti i modelli	Software Version
02.a	 Software Version

Basic/Pulse vers.	Software Version
02.b	 Software Version

Tutti i modelli	Software Version
02.c	 Software Version

Tutti i modelli	CRC high bit
03	 CRC high bit

Tutti i modelli	CRC Low Bit
04	 CRC low bit

Basic/Pulse vers.	Active Energy
05.a	 Active energy

ModBus/Mbus vers.	Total Active Energy
05.b	 Total active energy

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■ Display Screens

01.a	Active Energy (Basic and Pulse vers.)
01.b	Total Active Energy (ModBus and Mbus vers.)
02	Import Active Energy (ModBus and Mbus vers.)
03	Export Active Energy (ModBus and Mbus vers.)
04	Total Reactive Energy (ModBus and Mbus vers.)
05	Voltage (ModBus and Mbus vers.)
06	Current (ModBus and Mbus vers.)
07	Active Power (ModBus and Mbus vers.)
08	Frequency (ModBus and Mbus vers.)
09	Power Factor (ModBus and Mbus vers.)
10	Modbus Address
11	ModBus BaudRate
12	Parity (ModBus and Mbus vers.)

Basic/Pulse vers.	Active Energy
01.a	000 100 W_h Active energy

ModBus/Mbus vers.	Total Active Energy
01.b	057872 $\frac{kWh}{h}$ Total active energy

ModBus/Mbus vers.	Import Active Energy
02	00000 1 $\frac{kWh}{h}$ Import active energy

ModBus/Mbus vers.	Export Active Energy
03	000 100 $\frac{kWh}{h}$ Export active energy

ModBus/Mbus vers.	Total Reactive Energy
04	00000 1 $\frac{kVarh}{h}$ Total reactive energy

ModBus/Mbus vers.	Voltage
05	235.3 V_~ Voltage

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ModBus/Mbus vers.	Current	
06	20.18 [~]	Current

ModBus/Mbus vers.	Active Power	
07	000 ^{kW}	Active power

ModBus/Mbus vers.	Frequency	
08	50.04 ^{Hz}	Frequency

ModBus/Mbus vers.	Power Factor	
09	PF 100	Power factor

ModBus vers.	ModBus Address	
10	Adr-001	Modbus address

ModBus vers.	ModBus Baud Rate	
11	br 38.4 ^x	Baud rate

ModBus/Mbus vers.	Parity	
12	Prty n	Parity

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TECHNICAL SPECIFICATIONS

Display

Type

All devices are equipped with a LCD with backlit, except for model CE1D45A0, which features a standard LCD display.

Caratteristiche elettriche

Voltage AC (Un)

Voltage range

230V
176~276V AC (Basic/Pulse vers.)
100~277V AC (Modbus/Mbus vers.)
0.15-5(45)A (Max. 45A)

Current input

Voltage Circuit

Current Circuit

Frequency

AC voltage withstand

Impulse voltage withstand

Overcurrent withstand

Pulse output 1

Pulse output 2

Max. Reading

<2W/10VA
<1VA
50/60Hz
4KV for 1 minute
6KV~1.2uS waveform
30Imax for 0.01s
1000/100/10/1imp/kWh/kVArh (conf.)
1000imp/kWh (no conf.)
99999.9kWh/kVArh

Accuracy (IEC/EN61557-12)

Voltage

Current

Frequency

Power factor

Active power

Reactive power

Apparent power

cl. 0.5
cl. 0.5
cl. 0.2
cl. 1
cl. 1
cl. 1
cl. 1
cl. 1

Environment

Reference temperature

Installation category

Relative Humidity

Altitude

Location

Warm up time

23°C±2°C
CATIII
0 to 95%, non-condensing
Up to 2000m
Dry
3s

Mechanical characteristics

Weight

Din rail dimensions

Mounting

0.1 kg
18x118x64 (WxHxD) DIN 43880
DIN rail 35mm
(wall or Mounting cabinet mounting)

Protection class:

- Terminal protection index against solid bodies and liquids
- Housing protection index against solid bodies and liquids

Material

Class II

Level of pollution

Protection class against external mechanical impacts

Mechanical environment

Electromagnetic environment

IP20 (IEC/EN 60529).
IP51 (IEC/EN 60529).
Self-extinguishing UL94V-0
Front panel with cover plate
2
IK02 (IEC/EN 62052-31)
M1
E2

Climatic characteristics

Operating room temperatures

Storage room temperatures

T min. = - 40 °C; T max. = + 70 °C
T min. = - 40 °C; T max. = + 80 °C

Diagnostic

Current output diagnostic

Voltage output diagnostic

Open circuit
Low output load

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■ CONFORMITY AND CERTIFICATIONS

European Directives:

2014/30/EU

2014/32/EU

2014/35/EU

According to the standard:

Low voltage Directive IEC/EN 61010-1.

EMC compatibility: EN/IEC 62052-11 / EN 50470-3

Active energy: Class 0.5 Wh (EN 62053-21)

Class C (EN 50470-3) (MID version)

Reactive energy: Class 2 varh (EN 62053-23)

Respecting the environment - Conformity with CEE Directives: Compliance with the 2011/65/EU Directive, as modified by the 2015/863/EU Directive (RoHS), on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Conformity with the REACH Regulation (1907/2006): at the date of publication of this document no substance in the annex XIV is found in these products.

RAEE Directive (2012/19/EU): the sale of this product includes a contribution to the appointed environmental bodies of each European country in charge of handling, at the end of their life, the products falling within the scope of the EU Directive on Electrical and Electronic Equipment Waste.

Plastic materials:

Plastic materials without Halogens.

Parts marking according to standards ISO 11469 and ISO 1043.

Packaging:

Packaging designed and produced in accordance with Decree 98-638 of 20/07/98 and Directive 94/62/CE.



This image shows a full page of blank graph paper. The background is a solid light gray color. Overlaid on this background is a precise grid of thin, dark gray or black horizontal and vertical lines. These lines intersect to form a continuous pattern of small, identical squares across the entire surface of the page. There are no margins, text, or other markings present.

[illegible]



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