



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 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	Pulse
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 avoid any warranty
- Do not drop or allow physical impact to the meter as there are high precision components inside that may break

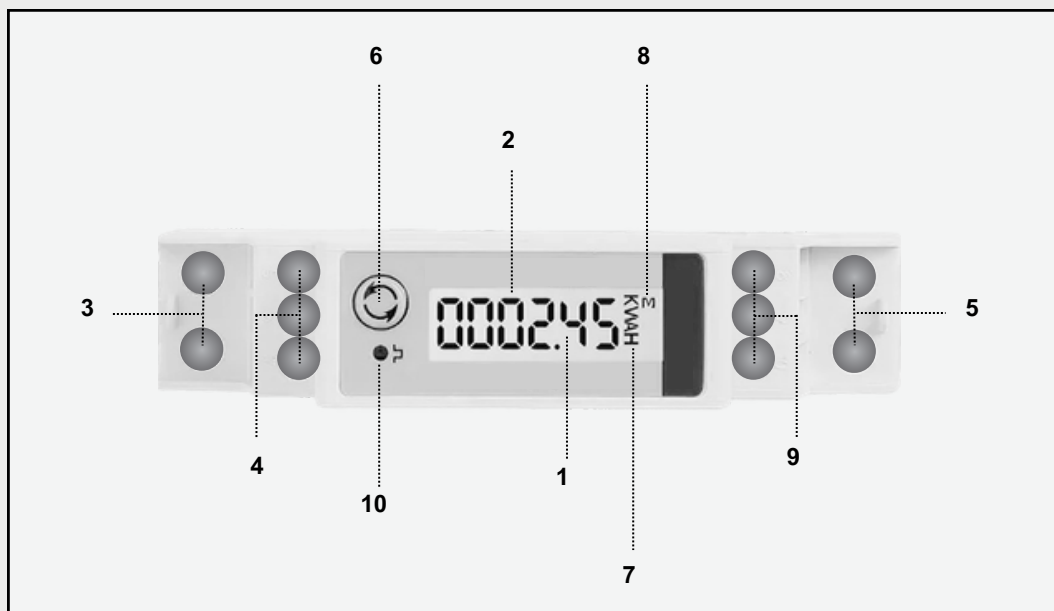
PRELIMINARY OPERATIONS

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



- | | |
|----|------------------|
| 1 | LCD |
| 2 | Values |
| 3 | Line |
| 4 | Pulse Output |
| 5 | Neutral |
| 6 | Scroll display |
| 7 | Measurement unit |
| 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

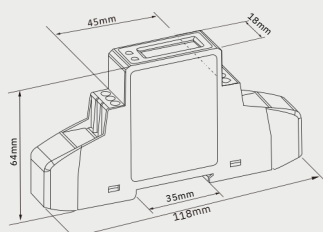
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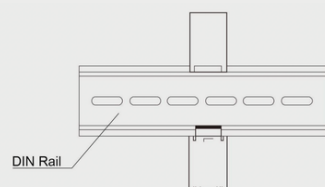
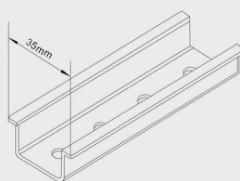
INSTALLATION

Dimensions and Prescriptions

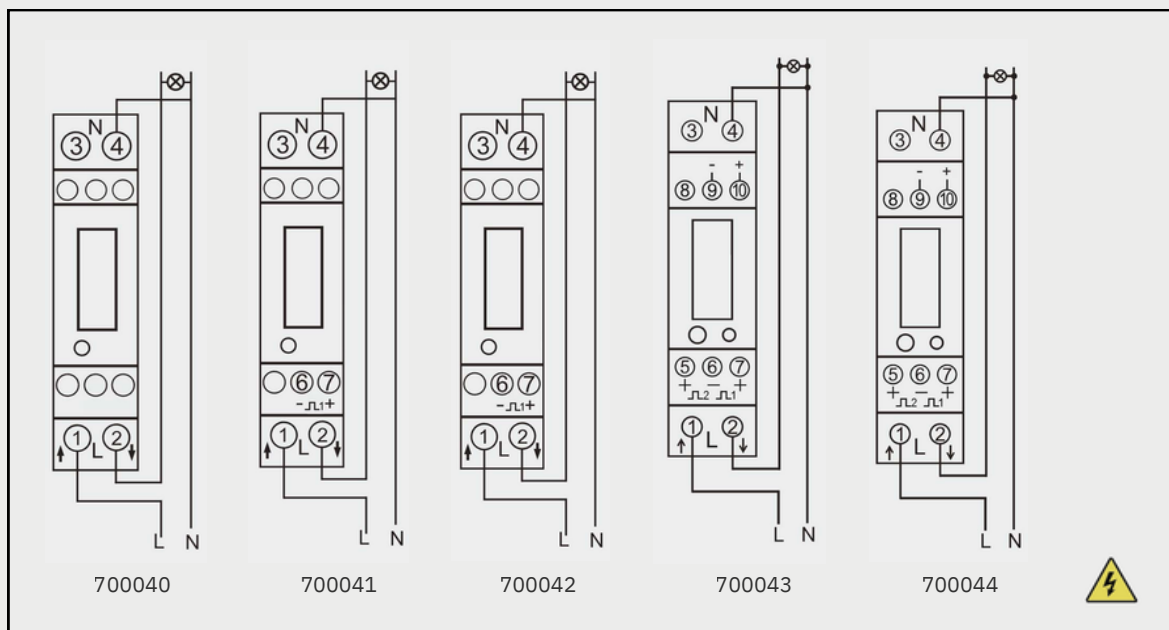
Maintain distance from systems that produce electromagnetic disturbances.



Height: 118 mm Depth: 64 mm
Width: 18 mm Weight: 0.1 Kg



Wiring diagrams



1 - 2 3 - 4	8 mm MAX 1 x 10 mm² 1 x 10 mm² 1 x 10 mm²	max 1,5 Nm 4mm PZ1
5 - 6 - 7 8 - 9 - 10	5 mm MAX 1 x 0,5 mm² 1 x 0,5 mm² 1 x 1,5 mm²	max 0,2 Nm 3mm PZ0

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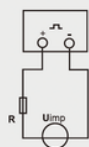
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The meter is equipped with pulse output, which is fully isolated from the inside circuit. That generates pulses in proportion to the measured energy. The pulse output is polarity dependent, passive transistor output requiring an external voltage source 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: 5~27VDC Max.
current Input: 27mA DC

Pulse output for 700041/700042:

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

Pulse Output for 700043/700044:

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 kVArh. 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/kVArh. Pulse output 2 is non-configurable. It is fixed to import kWh. The constant is 1000imp/kWh. Pulse width: 100ms.

RS485 Output for 700043/700044:

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.

01

Under this menu, long press this button for 3 seconds enter to the address setting

Adr 001

02

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

03

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

- 001 to 247

ModBus vers.

01

Under this menu, long press this button for 3 seconds enter to the set-up mode

br 384

02

The digits will flash, press this button to choose 'Baud Rate Options', then waiting for 2 seconds

br 384

03

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

- 2.4k, 4.8k, 9.6k, 19.2k, 38.4k bps

ModBus vers.

01

Under this menu, long press this button for 3 seconds enter to the set-up mode

Prty n

02

The digit will flash, press this button to choose 'Parity Options', then waiting for 2 seconds

Prty n

03

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 vers.

01

Under this menu, long press this button for 3 seconds enter to the set-up mode

Stop 1

02

The digit will flash, press this button to choose 'Stop Bits Options', then waiting for 2 seconds

Stop 1

03

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

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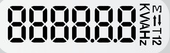
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■ Display Start-up Screens

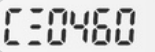
01.a	Initialization - Full Screen (Basic and Pulse vers.)
01.b	Initialization - Full Screen (ModBus vers.)
02.a	Software Version (All models)
02.b	Software Version (Basic and Pulse vers.)
02.c	Software Version (All models)
03	CRC High Bit (All models)
04	CRC Low Bit (All models)
05.a	Active Energy (Basic and Pulse vers.)
05.b	Total Active Energy (ModBus vers.)

Basic/Pulse vers.	Initialization - Full Screen
01.a	 Initialization - Full screen

ModBus vers.	Initialization - Full Screen
01.b	 Initialization - Full screen

All models	Software Version
02.a	 Software version

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

All models	Software Version
02.c	 Software version

All models	CRC High Bit
03	 CRC high bit

All models	CRC Low Bit
04	 CRC low bit

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

ModBus 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 vers.)
02	Import Active Energy (ModBus vers.)
03	Export Active Energy (ModBus vers.)
04	Total Reactive Energy (ModBus vers.)
05	Voltage (ModBus vers.)
06	Current (ModBus vers.)
07	Active Power (ModBus vers.)
08	Frequency (ModBus vers.)
09	Power Factor (ModBus vers.)
10	Modbus Address
11	ModBus Baud Rate
12	Parity (ModBus vers.)

Basic/Pulse vers.	Active Energy
01.a	

ModBus vers.	Total Active Energy
01.b	

ModBus vers.	Import Active Energy
02	

ModBus vers.	Export Active Energy
03	

ModBus vers.	Total Reactive Energy
04	

ModBus vers.	Voltage
05	

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ModBus vers.	Current	
06	20.18 ^{>}	Current

ModBus vers.	Active Power	
07	000 ^W	Active power

ModBus vers.	Frequency	
08	5004 _{Hz}	Frequency

ModBus vers.	Power Factor	
09	PF 100	Power factor

ModBus vers.	Mod Bus Address	
10	Ad-001	Modbus address

ModBus vers.	Mod Bus Baud Rate	
11	br 384 ^x	Baud rate

ModBus vers.	Parity	
12	Prty n	Parity

TECHNICAL SPECIFICATIONS

Display

Type

All devices are equipped with a LCD with backlit, except for model 700040, which features a standard LCD display.

Electric characteristics

Voltage AC (Un)

230V

Voltage range

176~276V AC (Basic/Pulse vers.)
100~277V AC (Modbus vers.)

Current input

0.15-5(45)A (Max. 45A)

Voltage Circuit

<2W/10VA

Current Circuit

<1VA

Frequency

50/60Hz

AC voltage withstand

4KV for 1 minute

Impulse voltage withstand

6KV~1.2uS waveform

Overcurrent withstand

30Imax for 0.01s

Pulse output 1

1000/100/10/1imp/kWh/kVArh (conf.)

Pulse output 2

1000imp/kWh (no conf.)

Max. Reading

99999.9kWh/kVArh

Accuracy (IEC/EN61557-12)

Voltage

cl. 0.5

Current

cl. 0.5

Frequency

cl. 0.2

Power factor

cl. 1

Active power

cl. 1

Reactive power

cl. 1

Apparent power

cl. 1

Environment

Reference temperature

23°C±2°C

Installation category

CATIII

Relative Humidity

0 to 95%, non-condensing

Altitude

Up to 2000m

Location

Dry

Warm up time

3s

Mechanical characteristics

Weight

0.1 kg

Din rail dimensions

18x118x64 (WxHxD) DIN 43880

Mounting

DIN rail 35mm (wall or cabinet mounting)

Protection class:

- Terminal protection index against solid bodies and liquids

IP20 (IEC/EN 60529).

- Housing protection index against solid bodies and liquids

IP51 (IEC/EN 60529).

Material

Self-extinguishing UL94V-0

Class II

Front panel with cover plate

Level of pollution

2

Protection class against external mechanical impacts

IK02 (IEC/EN 62052-31)

Mechanical environment

M1

Electromagnetic environment

E2

Climatic characteristics

Operating room temperatures

T min. = - 40 °C; T max. = + 70 °C

Storage room temperatures

T min. = - 40 °C; T max. = + 80 °C

Diagnostic

Current output diagnostic

Open circuit

Voltage output diagnostic

Low output load

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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.

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Note

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