F&F Filipowski sp. j.
Konstantynowska 79/81, 95-200 Pabianice, POLAND
phone/fax (+48 42) 215 23 83 / (+48 42) 227 09 71
www.fif.com.pl; e-mail: biuro@fif.com.pl

LE-03MP

Electric energy meter,
3-phase

5 908312 597216

Do not dispose of this device in the trash along with other waste!
According to the Law on Waste, electro coming from households free of charge and can give any amount to up to that end point of collection, as well as to store the occasion of the purchase of new equipment (in accordance with the principle of old-for-new, regardless of brand). Electro thrown in the trash or abandoned in nature, pose a threat to the environment and human health.

Purpose

The LE-03MP is a static (electronic) calibrated electricity meter of three-phase alternating current in a direct system. It is used for reading and recording of consumed electric energy and mains parameters with remote readout via a wired RS-485 network.

Functioning

Under the influence of flowing current and applied voltage, the LE meter accurately measures the amount of consumed electricity. Energy consumption is indicated by flashing LEDs: 800 pulses/kWh for active power and 800 pulses/kvar for reactive power. In addition, the device measures the mains parameters. The values are displayed cyclically on LCD display. Parameter changes every 3 seconds. You can manually switch between successive parameters by pressing a button on the front-end of the meter.
The display is active only with meter power supply on.

The meter has an internal relay that switches L1, L2 and L3 circuits. The (ON/OFF) relay can be also operated manually.
The meter has a program overcurrent protection. If the load threshold is exceeded, the internal relay opens for 5 minutes.
After that time the relay closes and the measurement is repeated.
Prepaid power (prepayment feature) is the set increment value of available active power beyond which the internal relay is disconnected by the meter.
Automatic operation is the mode with two active functions: automatic relay disconnection if the set overcurrent threshold is exceeded and switching on the prepaid mode.
Current state of relay (ON/OFF) is indicated on the LCD display as the corresponding Modbus register value.
Readout of all measured values and parameter setting functions is done via the Modbus RTU protocol.
Communication with the meter working as a Slave is performed in accordance with Modbus RTU standard via RS-485 serial port.
Converted registers values give results consistent with the indications on the meter display.
Each indicator is identified by a unique address assigned by the user.
IrDA (infrared data transmission ) feature is inactive in the current version of the software.

Features

» Internal relay switching L1, L2, L3 phase circuits.
» Remote control of ON/OFF relay.
» Overcurrent protection – setting the load threshold.
» Prepaid power (prepayment) – active power value at which the meter disconnects the internal relay.
» Automatic mode – activation of overcurrent protection and prepaid mode.
» Status – current status of the relay [ON/OFF].

Measured values

Active energy consumed	AE+	[kWh]
Reactive energy	RE+	[kvarh]
Active power	P	[W]
Reactive power	Q	[var]
Voltage	U	[V]
Current	I	[A]
Rated frequency	F	[Hz]

Pulse output

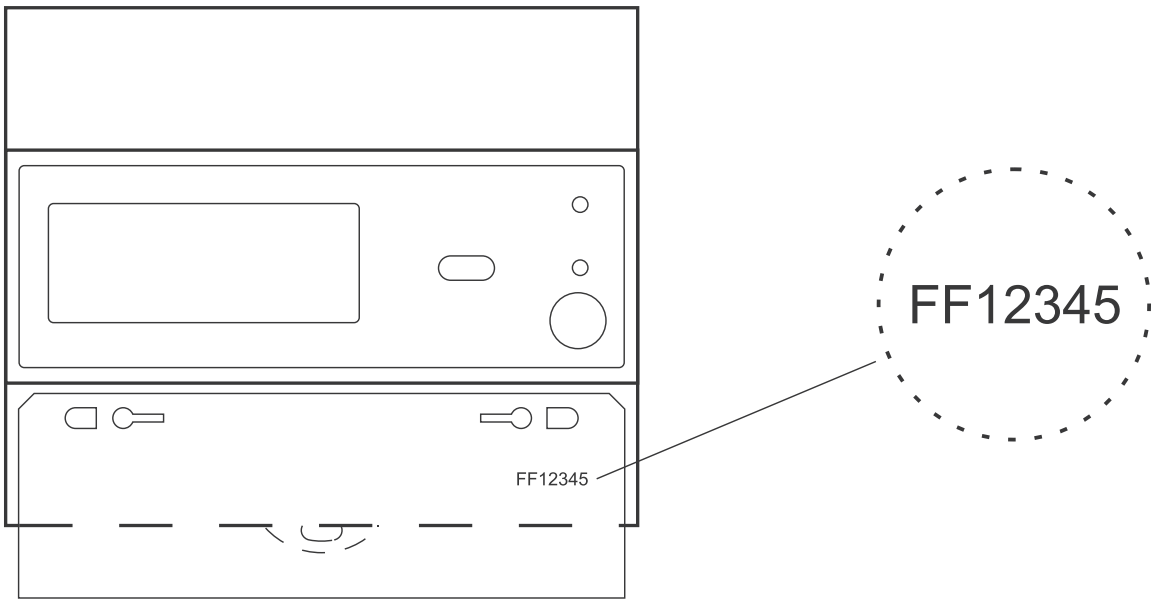
The indicator has a pulse output. This allows you to connect a pulse meter-reading pulses generated by the counter. For proper operation of the indicator is not required to connect additional devices.

Meter address

Change of meter address is done via the RS-485 port using the Modbus RTU protocol command to set the desired value in the meter register. The default meter address: 1.

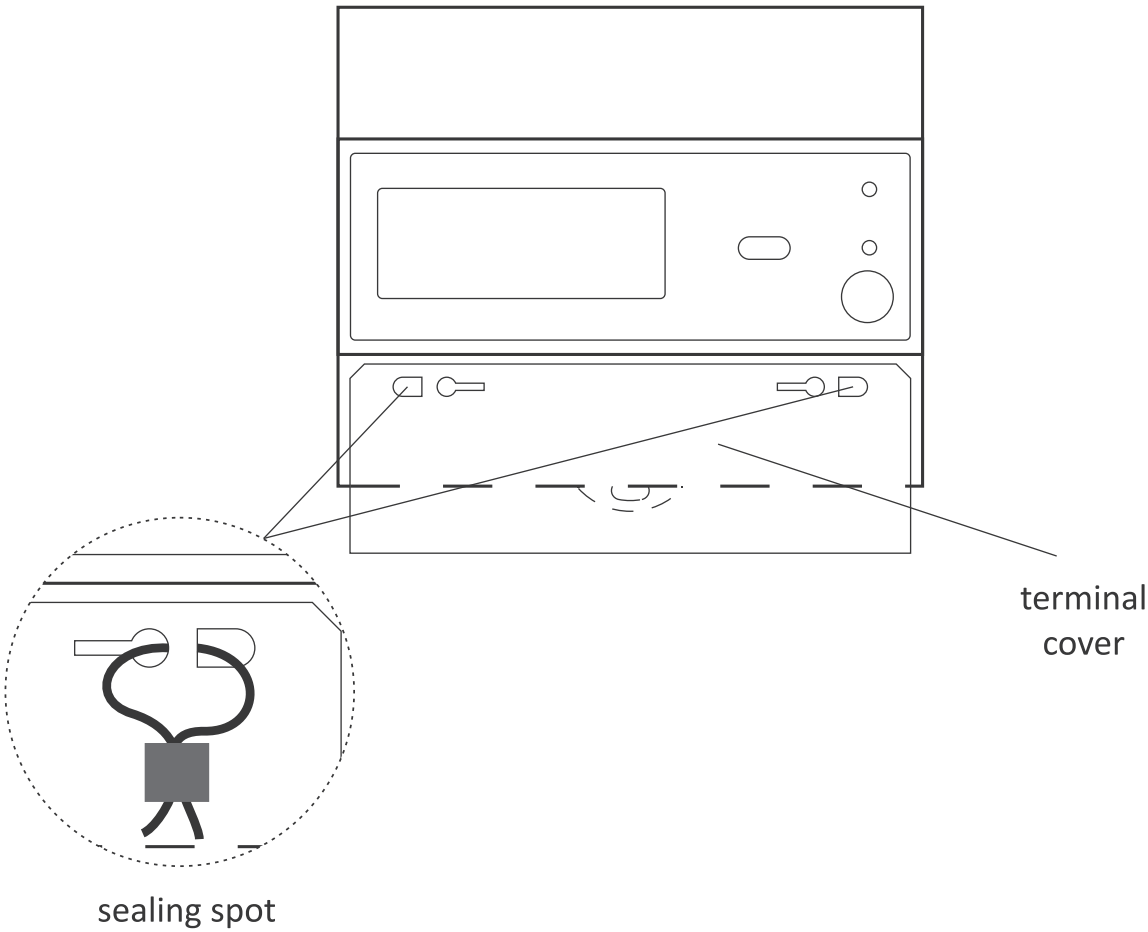
Meter number

The meter is marked with individual serial number allowing its unambiguous identification. The marking is laser engraved and cannot be removed).

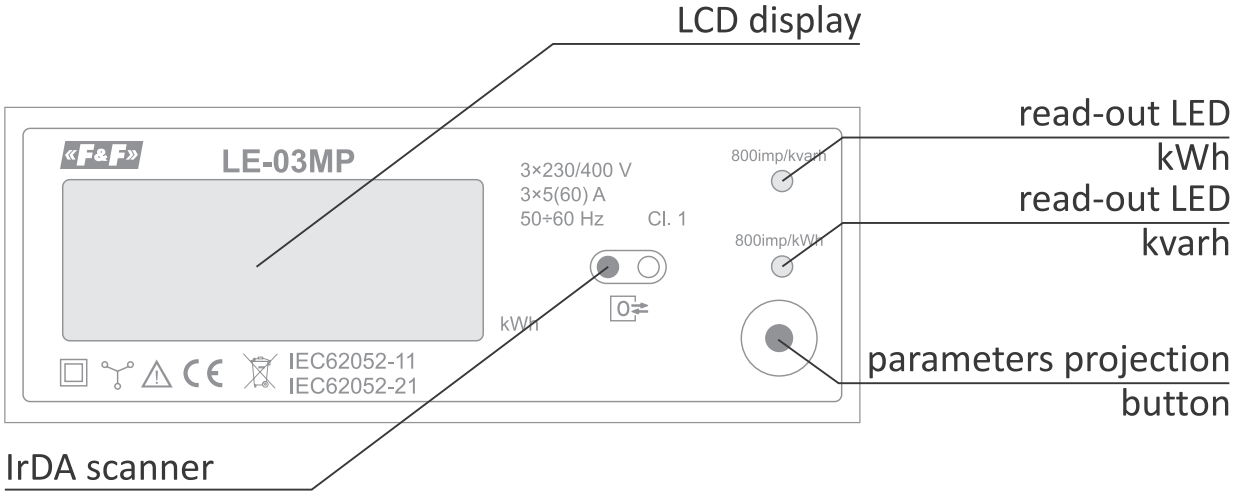


Sealing

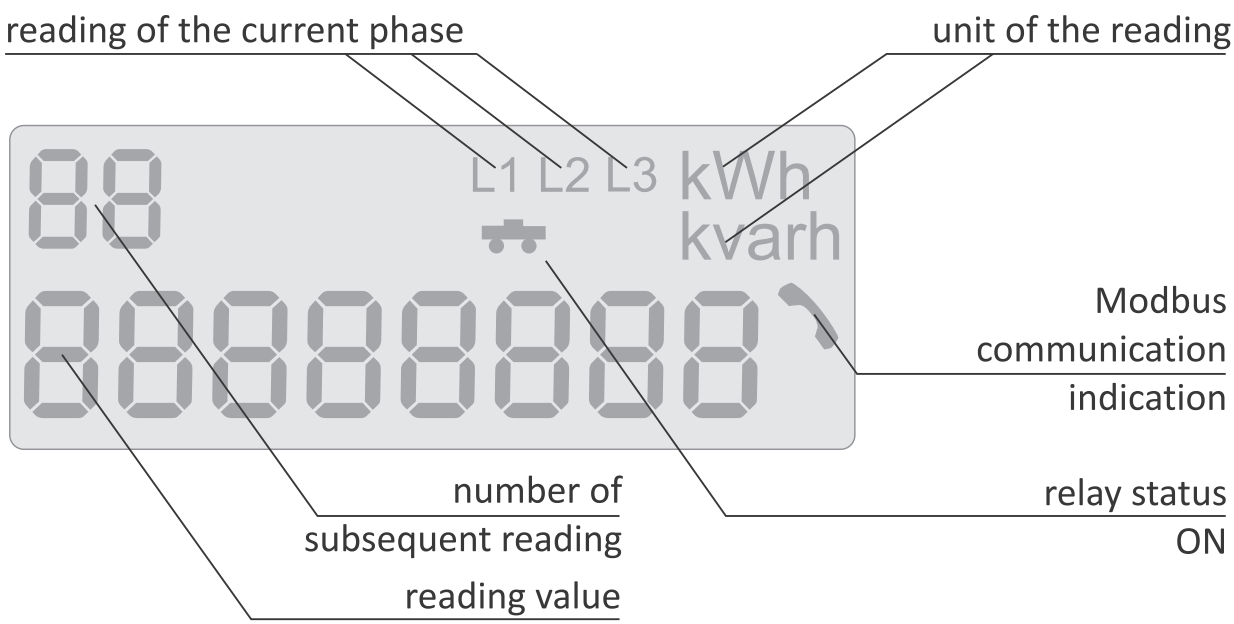
The meter has sealable input and output terminal covers to prevent any attempts to bypass the meter.



Front panel



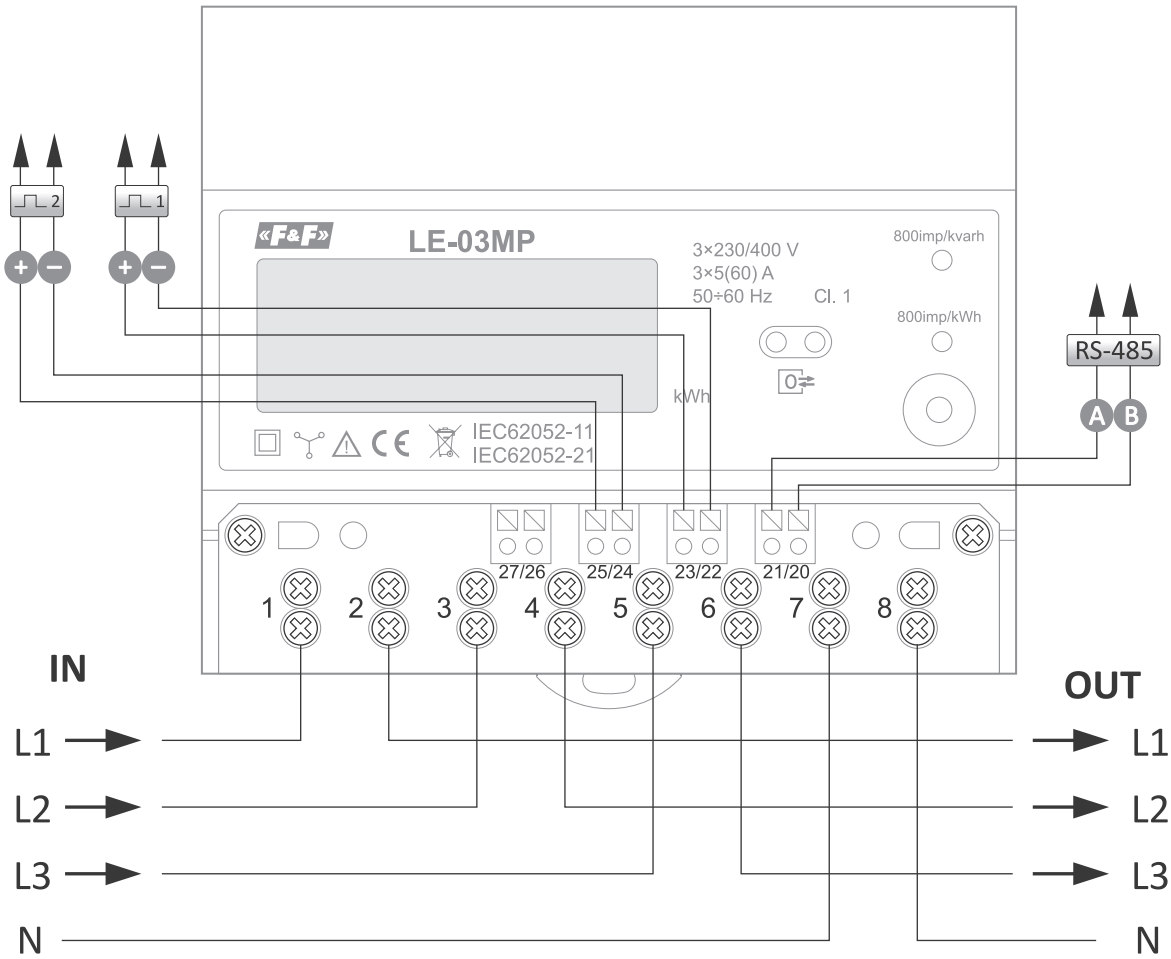
Display description



Measured values display order

1. Total active energy	000000.00 kWh
2. Total reactive energy	000000.00 kvarh
3. L1 phase voltage	000.00 V
4. L2 phase voltage	000.00 V
5. L3 phase voltage	000.00 V
6. L1 phase current	00.00 A
7. L2 phase current	00.00 A
8. L3 phase current	00.00 A
9. L1 phase active power	00.000 kW
10 .L2 phase active power	00.000 kW
11. L3 phase active power	00.000 kW
12. Total active power	00.000 kW
13. L1 phase reactive power	00.000 kvar
14. L2 phase reactive power	00.000 kvar
15. L3 phase reactive power	00.000 kvar
16. Total reactive power	00.000 kvar
17. L1 phase cosφ	0.000
18. L2 phase cosφ	0.000
19. L3 phase cosφ	0.000
20. Prepaid (remaining value)	000000.00 kWh
21. Mains voltage frequency	00.00 Hz

Wiring diagram



1	L1IN power input
2	L1OUT power output
3	L2IN power input
4	L2OUT power output
5	L3IN power input
6	L3OUT power output
7	NIN neutral wire input
8	NOUT neutral wire output
20	RS-485 output (B)
21	RS-485 output (A)

22 pulse output 1 (–) [kWh]
23 pulse output 1 (+) [kWh]
24 pulse output 2 (–) [kvarh]
25 pulse output 2 (+) [kvarh]

Modbus RTU protocol parameters

Communication parameters	
Protocol	Modbus RTU
Operation mode	Slave
Port settings	Bits per sec: 9600 Data bits: 8 Parity: NONE Start bits: 1 Stop bits: 2
Range of network addresses (factory settings)	1÷245 (1)
Command codes	3: Register values reading (0×03 – Read Holding Register) 6: Single register value setting (0×06) – Write Single Register)
Maximum frequency of queries	15 Hz

Register parameters

address	description	type	atr
0	Meter address: range 1÷255	int	R/W
1	L1 voltage [V] (×0.01)	int	R
2	L2 voltage [V] (×0.01)	int	R
3	L3 voltage [V] (×0.01)	int	R
4	L1 current intensity [A] (×0.01)	int	R
5	L2 current intensity [A] (×0.01)	int	R
6	L3 current intensity [A] (×0.01)	int	R
7	L1 active power [kW] (×0.001)	int	R
8	L2 active power [kW] (×0.001)	int	R
9	L3 active power [kW] (×0.001)	int	R
10	L1+L2+L3 active power [kW] (×0.001)	int	R
11	Protection current [A] (×0.01)	int	R/W
12	Automatic operation mode (0:OFF/1:ON)*	int	R/W
13	Current state of relay (0:OFF/1:ON)	int	R
14	Manual relay control (0:OFF/1:ON)	int	R/W
15	Frequency [Hz] (×0.01)	int	R

** Automatic operation is the mode with two active functions: automatic relay disconnection if the set overcurrent threshold is exceeded and switching on the prepaid mode.*

Register parameters cont.

address	description	type	atr
18 19	Prepaid: value of active power top up [kWh] (×0.01)	int	R/W
20 21	Consumed active power [kWh] (×0.01) (R20×256²+R21)/100	int	R
22 23	Consumed reactive power [kvarh] (×0.01) (R22×256²+R23)/100	int	R
24	L1 reactive power [kvar] (×0.001)	int	R
25	L2 reactive power [kvar] (×0.001)	int	R
26	L3 reactive power [kvar] (×0.001)	int	R
27	L1+L2+L3 reactive power[kvar] (×0,001)	int	R
30	L1 cosϕ (R1×0.001)	int	R
31	L2 cosϕ (R1×0.001)	int	R
32	L3 cosϕ (R1×0.001)	int	R
36 37	Prepaid: remianing power [kWh] (×0,01) (R36×256²+R37)/100	int	R

Legend:
R – read, W – write.

Technical data

installation	4-wire
rated voltage	3×230/400 V
measured voltage	
L-N	100÷289 V AC
L-L	173÷500 V AC
minimum measured current	0.02 A
base current	3×5 A
maximum current	3×60 A
voltage measuring range	160÷265 V
measurement accuracy (IEC62052)	1st class
rated frequency	50 Hz
overload	30×Imax/10 ms
insulation	4 kV/1 min; 6 kV/1 µs
insulation protection class	II
housing	PC material
own power consumption	10 VA; 1.5 W
indication range	999999.99 kWh/kvarh
meter supply voltage	85÷275 V AC
constant	
kWh	800 pulses/kWh
kvarh	800 pulses/kvarh
read-out signalling	2× red LED
port	RS-485
communication protocol	Modbus RTU
transmission parameters	9600 bps
parity	NONE
stop bits	2

pulse outputs	
type	open collector
maximum voltage	27 V DC
maximum current	27 mA
pulse constant	
kWh	800 pulses/kWh
kvarh	800 pulses/kvarh
output 1 and 2	
pulse time	10 ms
working temperature	-25÷55°C
terminal	16 mm² screw terminals
dimensions	7 module (122 mm)
mounting	on TH-35 rail
ingress protection	IP20

LE Config service programm

Program for test reading of the counted energy value and for basic settings of the meter parameters.
Available at www.fif.com.pl (on the device's subpage).
For communication of the meter with the computer, the USB CN-USB-485 converter or any RS-485/USB standard is required.

Warranty

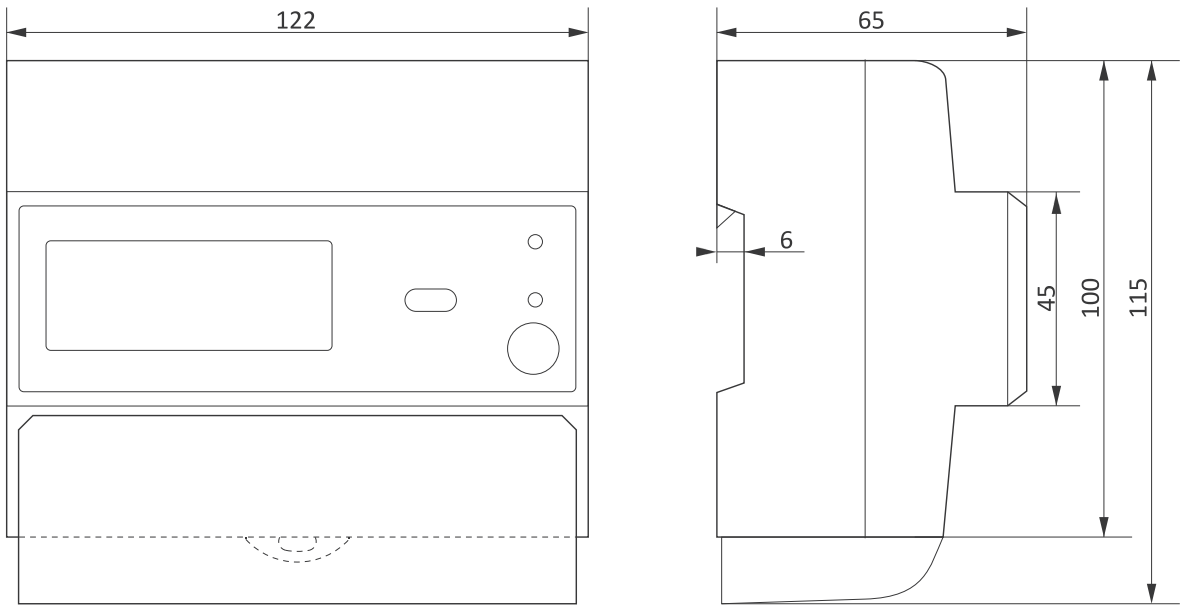
F&F products are covered by a 24-month warranty from the date of purchase. The warranty is only valid with proof of purchase. Contact your dealer or contact us directly.

CE declaration

F&F Filipowski sp. j. declares that the device is in conformity with the essential requirements of The Low Voltage Directive (LVD) 2014/35/EU and the Electromagnetic Compatibility (EMC) Directive 2014/30/UE.

The CE Declaration of Conformity, along with the references to the standards in relation to which conformity is declared, can be found www.fif.com.pl on the product subpage.

Dimensions



General work safety conditions

» Please read the instructions carefully before installation.
» The device should be installed and operated by qualified personnel who are familiar with its design, operation, and associated risks.
» Do not install a meter that is damaged or incomplete.
» The user is responsible for proper grounding of the system, proper selection, installation, and efficiency of other devices connected to the meter, including safety devices such as overcurrent, residual current and overvoltage circuit breakers.
» Before connecting the power supply, make sure that all cables are connected correctly.
» It is essential to observe the operating conditions of the meter (supply voltage, humidity, temperature).
» To avoid electric shock or damage to the meter, turn off the power supply whenever the connection is changed.
» Do not make any changes to the unit yourself. Doing so can result in damage to or improper operation of the device, which in turn can pose a threat to people operating it. In such cases, the manufacturer is not responsible for the resulting events and may refuse the provided warranty in the event of a complaint.
» Do not tighten the terminals without the wire inserted. This may damage the lift mechanism of the terminal or the plastic cover of this terminal.


«F&F»