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ENERGY METER
three phase type

LE-03M CT

WARRANTY. The F&F products are covered by a warranty of the 24 months from the date of purchase. Effective only with proof of purchase. Contact your dealer or directly with us. More information how to make a compliant can be found on the website:
www.fif.com.pl/reklamacje

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Do not dispose of this device to a garbage bin with other unsorted waste!
In accordance with the Waste Electrical and Electronic Equipment Act any household electro-waste can be turned in free of charge and in any quantity to a collection point established for this purpose, as well as to the store in the event of purchasing new equipment (as per the old for new rule, regardless of brand). Electro-waste thrown in the garbage bin or abandoned in the bosom of nature pose a threat to the environment and human health.

Purpose

LE-03M CT is a static (electronic) rated energy which is to serve as an auxiliary meters to measure energy consumption in a three phase half direct system.
Indicator is designed to work with current transformers for primary current Ip from 5÷6000A and secondary current 5A. The maximum current measured value of the system is determined by the primary current Ip applied CT (current transformer). The user has the ability to set the index value used gear ratio, which allows you to indicate the actual value taken by the electricity system.
Serial RS-485 and implemented MODBUS RTU communication protocol allows the indicator used in networks for remote reading of data.

Functioning

Special electronics under the influence of current flow and applied voltage in each phase generates pulses in proportion to the energy consumed in this phase. Energy consumption phase is indicated by flashing the corresponding LED (L1, L2, L3).

Pulse output

Indicator has a pulse output SO+ - SO-. This allows you to connect another pulse device reading (SO) pulses generated by the meter. For proper operation of the meter is not required to connect additional devices.
Constant pulse of meter is 12000pulses/kWh for maximum input current meter, the transformer secondary current (5A). When using a dedicated CT number of pulses per 1 kWh is calculated using the formula (12000×5) / Ip, where:
Ip - primary current used transformer
Example:
for transformer 5/5a (Ip = 5): (12000×5) / 5 = 12000 pulses/kWh
for transformer 100/5A (Ip = 100): (12000×5) / 100 = 600 pulses/kWh

Parametrs of MODBUS RTU protocol

Communication parameters	
Protocol	MODBUS RTU
Working mode	SLAVE
Port settings	Number bits per second: 9600 Data bits: 8 Parity: none Start bits 1 Stop bits 1
Network adresses range	1÷245
Command codes	3: Read the value of one, and a few records (0 × 03 - Read Holding Register) 6: Setting the value of a single register (0 × 06 - Write Single Register)
The maximum frequency queries	15Hz

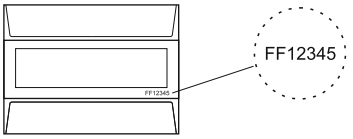
The sum of pulses of the three phases indicated by the flashing LED pulse/kWh is converted into energy collected throughout the three-phase system and its value is indicated by segment LCD display.
In the memory index values are preserved primary currents Ip transformers feasible. Choosing the appropriate value in accordance with the values of the connected transformers automatically sets the appropriate factor, according to which computes the actual value of the electricity taken. This value is projected on the LCD display format depending on the selected gear.
Values of Ip currents of transformers inscribed in memory of the indicator:
5, 20, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1250, 1500, 2000, 2500, 3000, 4000, 5000, 6000.

Meter adress and transmission

Make a change of meter address via RS-485 with Modbus RTU protocol command setting the desired value in the registery of the meter. The default meter address: 1. The default current value Ip:5
NOTE! During the change of address, hold down the rate of the 12th.

Meter number

Meter is marked individual serial number to uniquely identify it. Is indelible marking (laser engraving).



Sealing

Indicator has a sealable terminal covers input and output do to prevent bypass the meter.

Registry parameters				
adress	**description**	**order**	**type**	**atr**
0	read value registry 1st (R0)	03	int	read
1	read value registry 2nd (R1)	03	int	read
2	read value registry 3rd (R2)	03	int	read
3	read value registry 4-th (R3)	03	int	read
4	read nubers value of current Ip	03	int	read
6	set meter number	06	int	write
8	set number of current vue Ip	06	int	write

Register values are stored as integers. To get the result display should be recast algebraic registers three values obtained in accordance to the following formula:

$$(R0 \times 256^3 + R1 \times 256^2 + R2 \times 256 + R3) / X,$$

where:
R0 - the number of register 0; R1 - the number of register 1, R2 - the number of the register 2, R3 - the number of the register 3, X- factor depending on the current ip settings.
Value X in current range Ip:

5÷75	100
80÷750	10
80÷6000	1

NOTE!
The need to read all three records together. Inability to read the value of a single register.

To set the current number Ip give a specific number for the current Ip, for example, the value of 8 for the CT 100/5 (see table number and size of the projection for the current Ip).

Current Ip	Current number value Ip	Format projection LCD
5	0	99999.99
20	1	99999.99
30	2	99999.99
40	3	99999.99
50	4	99999.99
60	5	99999.99
75	6	99999.99
80	7	999999.9
100	8	999999.9
120	9	999999.9
150	10	999999.9
200	11	999999.9
250	12	999999.9
300	13	999999.9
400	14	999999.9
500	15	999999.9
600	16	999999.9
750	17	999999.9
800	18	9999999
1000	19	9999999
1200	20	9999999
1250	21	9999999
1500	22	9999999
2000	23	9999999
2500	24	9999999
3000	25	9999999
4000	26	9999999
5000	27	9999999
6000	28	9999999

Assembly

1. Take OFF the power.
2. Energy meter put on the rail, in the switchgearbox.
3. The voltage of measured phases connect to contacts: 18(L1), 17(L2), 16(L3).
4. Cable N connect to contact 15.
5. Transform connect on phases cable and second outputs connect accordance to marks to contacts 1-2 (L1), 3-4 (L2), 5-6 (L3).

In case of opening of the secondary circuit of the transformer during its operation there is a risk that a high-voltage will emerge on a secondary winding. In order to protect the personnel operating the device, it is recommended to ground the secondary windings of the transformers.

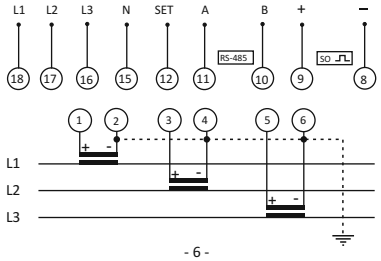
Do not tighten the clamps without put cable. This may damage the lift mechanism terminal or plastic shield, this terminal.

6. Network cables RS-485 connect to contacts 10(B)-11(A).
7. Additional pulse receiver connect to contacts 8(-) and 9(+).

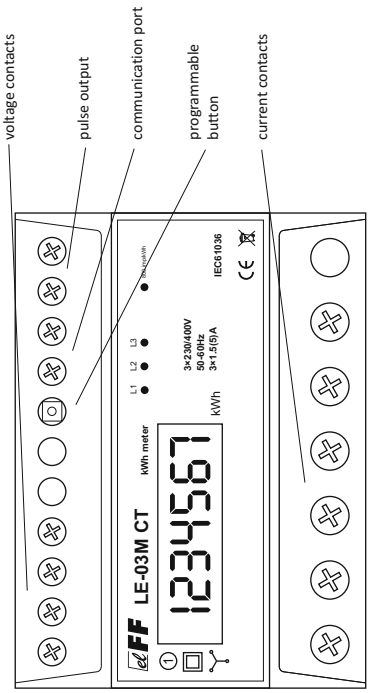
ATTENTION!! Additional pulse receiver is not required.

8. Close the terminal shell casings of meter. If requirements seal the casing.

WIRING DIAGRAM



Inputs/Outputs description



Technical data

reference voltage	3×230/400V+N
basic current	3×1.5A
maximum current	3×5A
second current	5A
minimum current	0.04A
measure precision (with IEC61036)	1st class
meter's own power consumption	<10VA; <2W
load current inputs	0.4VA
number of LCD sign	7
range of display reports	depending on transform
constant of the meter (for 5/5A)	1200pulses/kWh
current consumption signalling	3× red LED
read-out signalling	red LED
pulse output SO+ SO-	open collector
connection voltage SO+ SO-	<30V DC
connection current SO+ SO-	<27mA
constant SO+ SO-	dependent on transform
pulse time SO+ SO-	35msec
port	RS-485
communication protocol	MODBUS RTU
working temperature	-20÷55°C
connection	25mm^2 screw terminals
dimensions	7 modules (122mm)
mounting	on TH-35 rail
protection level	IP20

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