



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

ELECTRICITY CONSUMPTION METER
single-phase

LE-01MR

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



5

9 0 8 3 1 2 5 9 9 9 6 8



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-01MR is a static (electronic) calibrated electricity meter of single-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.

Measured values

| | |
|-----------------------------------|--------------------------|
| Active power - AE+ [kWh] | Active power - P [W] |
| Reactive energy - RE+ [kvarh] | Reactive power - Q [var] |
| Phase voltage - U [V] | Apparent power - P [VA] |
| Phase current - I [A] | Power factor - cos φ |
| Frequency - F [Hz] | |
| Meter system temperature - T [°C] | |

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 LED (1000 pulses/kWh). In addition, the device measures the mains parameters and the temperature of its own system. The values are displayed cyclically on LCD display. Parameter changes every 3 seconds. Indicated values: active power (0.1 kWh); voltage (0.1V); current intensity (0.1A). The display is active if the meter power supply is on. If the power supply is off, user can preview the energy usage [kWh] for 30 seconds by pressing the PRESS key.

- 1 -

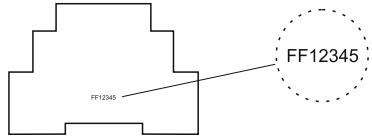
Communication with the meter working as a SLAVE is performed in accordance with Modbus RTU standard via RS-485 serial port. Converted registers values give results consistent with the indications on the meter display. Each indicator is identified by a unique address assigned by the user.

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.

Specifications

| | |
|--------------------------------------|-----------------------------------|
| reference voltage | 230V AC ±20% |
| current base | 5A |
| maximum current | 100A |
| minimum current | 0,02A |
| accuracy in accordance with IEC61036 | 1st class |
| own power consumption | <8VA; <0,4W |
| indication range | 0-99999,99kWh |
| meter constant | (1,0Wh/pulse) 1000pulses/kWh |
| read-out signalling | red LED |
| port | RS-485 |
| communication protocol | MODBUS RTU |
| working temperature | -20+55°C |
| terminal | 25mm ² screw terminals |
| tightening torque | 0,4Nm |
| dimensions | 1 module (19,5mm) |
| mounting | on TH-35 rail |
| ingress protection | IP20 |

- 2 -

MODBUS RTU protocol parameters

| Communication parameters | | | | |
|---|--|---------|------|---------------|
| Protocol | MODBUS RTU | | | |
| Operation mode | SLAVE | | | |
| Port settings (factory settings) | bits/s: 1200 / 2400 / 4800 / 9600 Data bits: 8 Parity: NONE Start bits: 1 Stop bits: 2 | | | |
| Range of network addresses (fact. set.) | 1-247 (1) | | | |
| Command codes | 3: Registers values reading (0x03 - Read holding Register) 6: Single register value setting (0x06) - Write Single Register) | | | |
| Maximum frequency of queries | 15Hz | | | |
| Registers parameters | | | | |
| address | description | command | type | attrib. |
| 0 | voltage [V] (R0x0,1) | 03 | int | read |
| 1 | current strength [A] (R1x0,1) | 03 | int | read |
| 2 | frequency [Hz] (R2x0,1) | 03 | int | read |
| 3 | active power [W] | 03 | int | read |
| 4 | reactive power [var] | 03 | int | read |
| 5 | apparent power [VA] | 03 | int | read |
| 6 | power factor cos φ (R6x0,001) | 03 | int | read |
| 7 | active power [kWh] (R7x256 ² +R8)/100 | 03 | int | read |
| 8 | | | | |
| 17 | reactive power [kvarh] (R17x256 ² +R18)/100 | 03 | int | read |
| 37 | temperature [°C] (R37x1) | 03 | int | read |
| 42 | modbus transfer rate [bit/s] 1:1200 2:2400 3:4800 4:9600 | 03/06 | int | read write |
| 43 | modbus address 1:247 | 03/06 | int | read write |

- 3 -

Registers values are stored as integers.

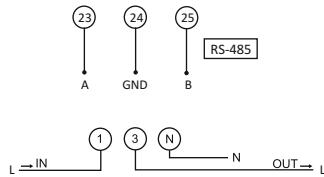
To get a reading, the three received registers values should be transform algebraically in accordance with the following formulas:
voltage: R0x0,1 [V]
current: R1x0,1 [A]
frequency: R3x0,1 [Hz]
powers: R3x1[W]; R4x1[var]; R5x1[VA]
power factor: R6x0,001
active energy [kWh]: R7x256²+R8 [kWh]
active energy [kWh]: R17x256²+R18 [kvarh]
temperature: R37x1 [°C]

The Modbus transfer rate is a corresponding number in the register, e.g. no. 4 means the rate of 9600.

Available rates and numbers assigned to them:

| bps | nr |
|------|----|
| 1200 | 1 |
| 2400 | 2 |
| 4800 | 3 |
| 9600 | 4 |

Connection scheme



Installation

1. Disconnect the power supply.
2. Mount the meter on the rail in the distribution box.
3. Connect the input phase to terminal 1.
4. Connect the neutral wire to terminal N.
5. Connect a measured circuit or a single receiver to terminal 3 (output phase) and to N.
6. Connect terminals 23, 24 and 25 to RS-485 network.

D161110

- 4 -