«F&F»®

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CURRENT STRENGTH TRANSDUCER
with MODBUS RTU output

MB-3I-1

5A

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:
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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

MB-3I-1 transducer is designed to measure the strength of alternating current or direct current and to transmit the data via RS-485 port using MODBUS RTU protocol.

Functioning

The module is designed to work with current transformer with 5 A secondary current.

The module continuously measures the current flowing through the measurement inputs. Readout of recorded current strength and setting of all communication parameters are carried out through RS-485 port using the MODBUS RTU communication protocol.

Power up is indicated by a green LED U light. Valid data exchange between the module and the second device is indicated by a yellow LED Tx light.

The transducer measures the effective value of TrueRMS current, which ensures high accuracy even with distorted flow.

### Communication parameters of MODBUS RTU protocol

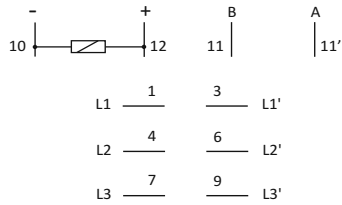| Communication parameters	
Protocol	MODBUS RTU
Operation mode	SLAVE
Port settings (factory settings)	bits/s: 1200 / 2400 / 4800 / <u>9600</u> / 19200 / 38400 / 57600 / 115200 Data bits: <u>8</u> Parity: <u>NONE</u> / EVEN / ODD Start bits: <u>1</u> Stop bits: 1 / <u>2</u>
Range of network addresses (factory settings)	1÷247 (<u>20</u>)
Range of base addresses	1÷238
Range of residual addresses (code switch)	0÷9
Command codes	3: Readout of outputs registers values (0×03 - Read Holding Register) 4: Readout of all or a couple of input values registers (0×04 - Read Input Register) 6: Single output value setting (0×06) 16: Setting values of multiple outputs (0×10 - Write Multiple Registers) 17: ID readout (0x11 - Report Slave ID)
Maximum frequency of queries (max)	15Hz

Registers

Communication registers				
address	description	funct.	type	atr.
0	Readout of a current base address	03	int	read
0	Recording of a new base address: 1÷238	06, 16	int	write

The module can receive network addresses in the range 1÷247. The network address of the module is set in a combined way: using the MODBUS protocol user sets the base address, which is a number between 1÷238 and using a multi-position switch he sets the residual address, which is a number between 0÷9. The sume of these two values designate a network address (e.g. 1+6=7; 70+3=73; 238+9=247).

1	Readout of a current transmission rate	03	int	read
1	Recording of a new transmission rate	06, 16	int	write

Transmission rate [bit/s] is given in the form of a integer divided by 100, for example transmission rate of 9600 bits/s is written as 96; 115200 bits/s is written as 1152.

2	Readout of a current parity value	03	int	read
2	Recording of a new parity value	06, 16	int	write

Parity adopts adequate value: NONE - 0; EVEN - 1; ODD - 2.

3	Readout of a current number of stop bits	03	int	read
3	Recording of a new number of stop bits	06, 16	int	write

Stop bits number adopts value 1 or 2.

Input parameters				
address	description	command	type	atr.
1000	channel 1 (L1) current value	04	int	read
1001	channel 2 (L2) current value	04	int	read
1002	channel 3 (L3) current value	04	int	read

Value of measured current is stored in the registry as an integer of 0.1 multiplication factor (e.g. the registry value 43 corresponds to the voltage of 4,3A).

In response to the "read ID" command (code 17), we get a packet of information about module: code 0xEC in the "Slave ID"; code 0xFF in the "Run Indicator Status" field; text "PU-1Mv1.2" in the "Additional Data" field.

Network address settings

The module can receive network addresses in the range 1÷247. The network address of the module is set in a combined way: using the MODBUS protocol user sets the base address, which is a number between 1÷238 and using a multi-position switch he sets the residual address, which is a number between 0÷9. The sum of these two values designate a network address (e.g. 1+6=7; 70+3=73; 238+9=247). Multi-position code switch is located under the front casing. Removed the front casing with a 3mm flat screwdriver by gently prying the tabs on the sides of the housing. With 3mm flat screwdriver move the rotary switch on the selected digit as a partial address (range 0÷9). When the setting is done, reattach the front casing, paying particular attention to correctly fit LEDs in to mounting holes.
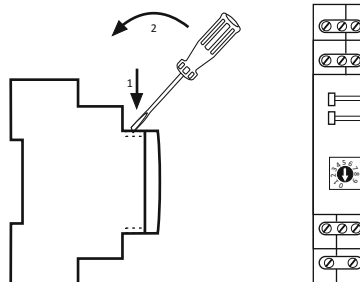
Description IN/OUT

1-3   L1 current circuit
4-6   L2 current circuit
7-9   L3 current circuit
10-12   module power supply
11-11'   RS-485 serial port

Measurement channel is galvanically separated from the converter power input and the RS-485 communication port.
RS-485 is not separated from the power supply.

Installation

General guidelines:
* Use of surge protectors and interference filters is recommended (e.g. OP-230 F&F).
* Use of shielded twisted wires is recommended for connecting the unit to another device.
* If using shielded cables, ground the shield on one side only and as close to the device as possible.
* The ends of the signal line must be completed with termination modules LT-04 (F&F).
* Do not run signal cables parallel and in direct proximity to high- and medium-voltage line.
* Do not install the unit in direct proximity to high power receivers, electromagnetic measuring devices, appliances with phase power adjustment and any other devices that can create interferences.

Installation:
1. Set the network address and the communication parameters..
2. Disconnect the power.
3. Install the unit on the rail.
4. Connect the unit power supply to terminals 10-12 as indicated.
5. Connect signal output 11-11' (RS-485 port) to the MASTER output of another device.
6. Connect the measurement circuit to the corresponding inputs of the transducer (as in a given example).
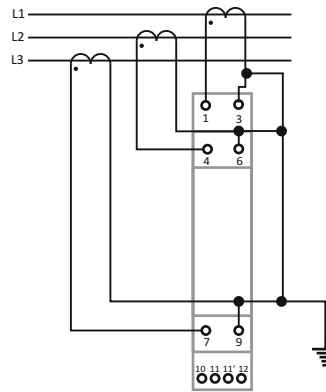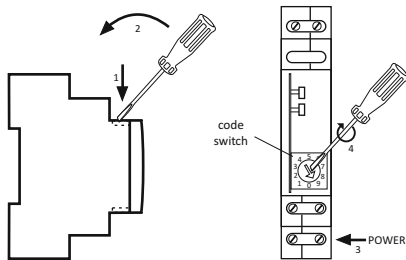

Indirect measurement
of the three-phase current network
using the current transformers.

Reset communication settings

Under cover is available code switch.
1. Take OFF the power.
2. Remove front panel.
3. Set "9" on the switch.
4. Take ON the power and within 3 sec switch to "1".

code switch

POWER

Technical data

supply voltage	9÷30V DC
maximum power consumption	50mA
TrueRMS measurement range	0÷5A AC / 285V AC
max. load current of measurement input	10A AC
measurement error	±0.5%
register readout precision	0.1A
sampling rate	10Hz
IN->OUT breakdown voltage	>2.1kV
port	RS-485
communication protocol	Modbus RTU
operating mode	SLAVE
working temperature	-20÷50°C
relative humidity	85% for +30°C
terminal	2,5mm² screw terminals
tightening torque	0.4Nm
dimensions	1 module (18 mm)
protection level	IP20