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MB-PT100

Measurement
temperature transducer
with Modbus RTU output



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 transducer is designed for temperature measurement using an external PT-100 temperature sensor and data exchange via an RS-485 port in accordance with the Modbus RTU protocol.

Functions

- » Readout of the current temperature;
- » Readout of the recorded maximum and minimum temperature;
- » Setting the averaging measurement time;
- » Setting the value of standard adjustment.

Functioning

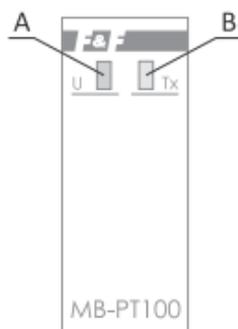
The module performs continuous temperature measurement by means of an external sensor. Reading of the recorded temperature values, setting of all measurement parameters, communication and data exchange are performed via the RS-485 port by means of the Modbus RTU communication protocol.

Switching on of the supply voltage is signalled by the lighting up of the green "U" LED. Correct data exchange between the module and the other device is signalled by illumination of the yellow "Tx" LED.

The module cooperates with a PT-100 type 3-wire temperature sensor.

Dedicated temperature probe: RT-56 probe (manufactured by F&F). Probe available separately.

Device description



- A – power supply
- B – Modbus RTU data exchange

Separation



No galvanic isolation between power supply, RS-485 line and sensor input.



Use a shielded twisted-pair cable with a conductor cross-section of not less than 0.2 mm² to create RS-485 lines. The maximum line length must not exceed 1000 m. The line ends should be terminated with LT-04 termination modules (from the F&F offer).

Terminals description



transducer's supply

- 1 – power supply (+)
- 3 – power supply (-)

RS-485

- 4 – serial port (A)
- 6 – serial port (B)

sensor power supply

- 10 – input: red
- 11 – input: white
- 12 – input: red

Mounting



Recommended use of interference and surge filters (e.g. OP-230 from the F&F offer).



It is recommended to use shielded twisted-pair cables to connect the module to another device.



When using shielded cables, ground the screens only on one side and as close to the device as possible.



Do not route signal cables in parallel in close proximity to high and medium voltage lines.



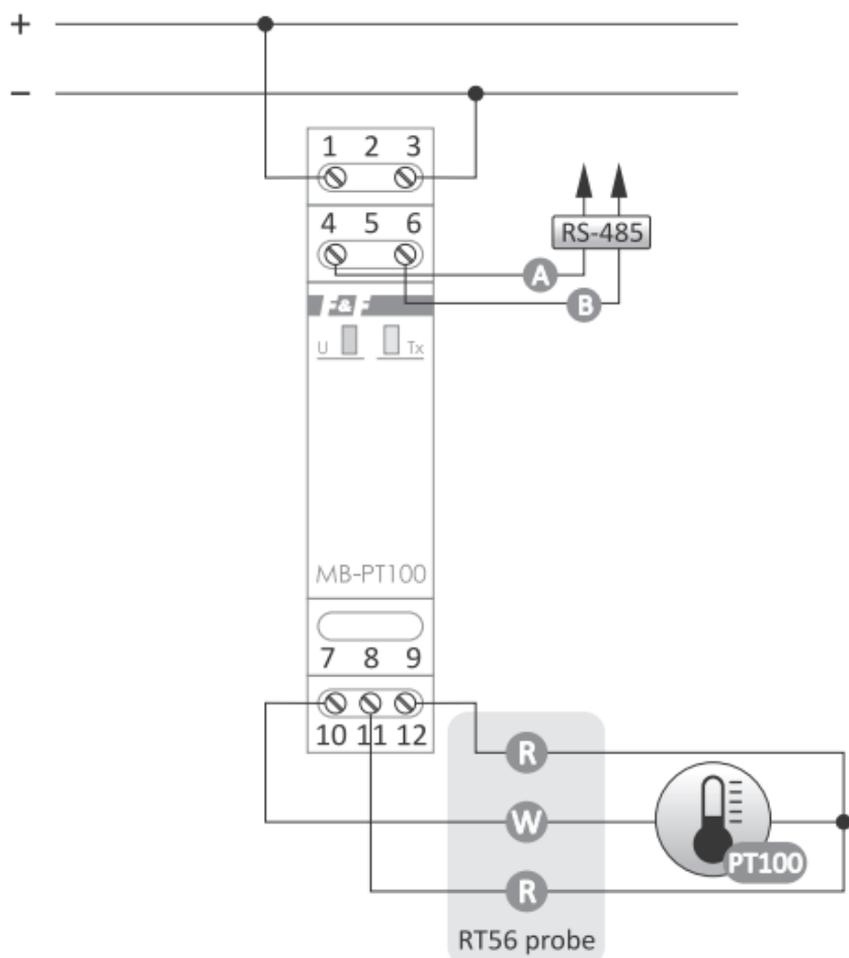
Do not install the module in the immediate vicinity of high-power electric receivers, electromagnetic measuring instruments, phase power control devices and other devices that may cause interference.

1. Before installing the module, set the selected Modbus communication parameters.
 2. Disconnect the power supply.
 3. Install the module on the rail.
 4. Connect the module's power supply to terminals 1-3 as marked.
 5. Connect signal output 4-6 (RS-485 port) to the master output.
 6. Connect the temperature probe as indicated: red wires to terminals 10 and 12 and the white wire to terminal 11.
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Implementation of communication connections according to RS-485 standard specification.

Wiring diagram

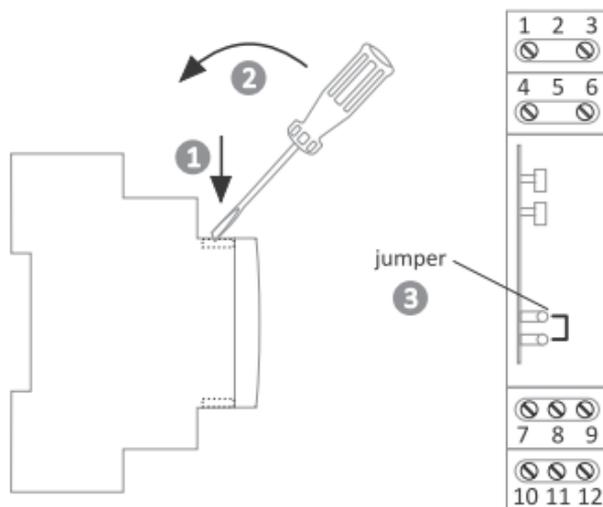


Legend:

R – red, W – white

Communication settings reset

A configuration jumper is available under the module casing. Starting the controller with the jumper closed restores the factory settings of the communication parameters. To do this, remove the casing of the module and put the jumper on both pins. After the reset is done, remove the jumper.



Technical data

power supply	9÷30 V DC
measurement range	-100÷400°C
maximum measurement error	±1°C
breakdown voltage IN -> OUT	2,1 kV
temperature sensor type	PT100
power indication	green LED
communication indication	yellow LED

port	RS-485
communication protocol	Modbus RTU
operating mode	Slave
communication parameters	
baud rate (adjustable)	1200÷115200 bits/s
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
address	1÷247
power consumption	0.3 W
working temperature	-20÷50°C
terminal	2.5 mm ² screw terminals
tightening torque	0.4 Nm
dimensions	1 module (18 mm)
mounting	on TH-35 rail
protection level	IP20

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 L.P. 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 and MID Declaration of Conformity, along with the references to the standards in relation to which conformity is declared, can be found at www.fif.com.pl from the product subpage.

Modbus RTU protocol parameters

Communication parameters

Protocole	Modbus RTU
Operating mode	Slave
Port settings (<u>factory settings</u>)	Number of bits per second: 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: <u>1/1,5/2</u>
Network address range (<u>factory settings</u>)	1÷245 (<u>1</u>)
Command codes	3: Read the values of a group of registers (0×03 – Read Holding Register) 6: Set the value of a single register (0×06) – Write Single Register 17: ID read (0×11 – Report Slave ID)
Max. frequency of queries	15 Hz

Measurement parameters (factory settings)

Averaging time of the measurement result	5 s (register value: 20)
Reference correction value	0°C (register value: 0)

Communication registers

address	description	func.	type	atr.
16	Read current and write new base address: $\underline{1}$ ÷245	03 06	int	R/W
17	Read current and write the new baud rate: 0:1200/1:2400/2:4800/3: <u>9600</u> /4:19200/5:38400/6:57600/7:115200	03 06	int	R/W
18	Read current and write new parity value: 0: <u>NONE</u> /1:EVEN/2:ODD	03 06	int	R/W
19	Read current and write new number of stop bits: 0:1 bit/1:1.5 bits/2:2 bits	03 06	int	R/W
20	Restore the factory settings: Set the value 1.	06	int	W

In response to the command "read ID" (code 17), we receive the text: "F&F MB-PT-100".

Note!

Changes in communication parameters (baud rate, number of stop bits, parity) are only taken into account only after the power is restarted.

Measurement registers

address	description	func.	type	atr.
0	Current temperature [°C] (×0.1)	03	int	R
1	Recorded minimum temperature [°C] (×0.1) Writing to value 1 cancels the recorded temperature value	03 06	int	R/W
2	Recorded maximum temperature [°C] (×0.1) Writing to value 1 cancels the recorded temperature value	03 06	int	R/W
8	Result averaging time (time period from which the average temperature is calculated). Setting range: 1÷480. Step: 1=0.25 s. Maximum value: 480	03 06	int	R/W
9	Calibration correction. Value to be stored as a whole number with +/- times 0.1°C (e.g. a value of 15 corresponds to a temperature of 1.5°C).	03 06	int	R/W

