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MB-DS-30

Temperature measurement transducer, 1-Wire 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

Measurement transducer MB-DS-30 is designed for temperature measurement using temperature sensors (DS1820, DS18B20, DS18S20) connected in 1-Wire bus and for data exchange with external devices of Master type via RS-485 port in accordance with Modbus RTU standard.

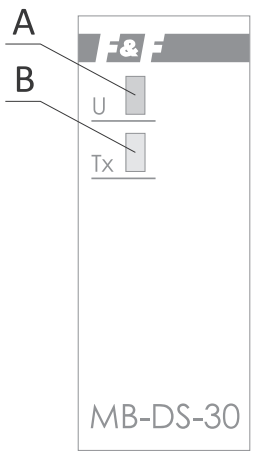
Features

» support for Dallas sensors: DS1820, DS18B20, DS18S20;
» 1-Wire bus;
» up to 10 measuring points;
» readout of the current temperature;
» RS-485/Modbus RTU communication.

Functioning

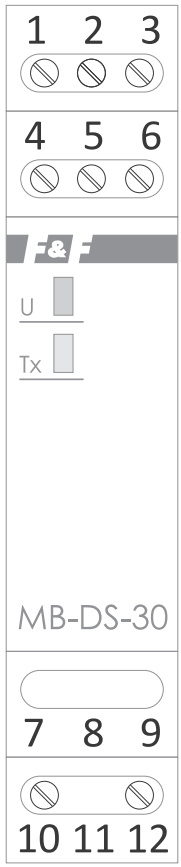
The module continuously measures temperatures using external sensors. Readout of registered temperature values, setting of all measurement, communication and data exchange parameters are carried out through the RS-485 port using the Modbus RTU communication protocol. The switching on of the supply voltage is indicated by the green U LED.
The correct data exchange between the module and the other device is indicated by the yellow Tx LED.
The module works with the following 3-wire digital sensors: DS1820, DS18B20, DS18S20.
Dedicated temperature probe made by F&F: RT-4 probe.
The probe is sold separately.

Device description



A – power supply
B – Modbus RTU data exchange

Terminals description



RS-485

1 – serial port (B)
2 – serial port (GND), common with terminal no.10
3 – serial port (A)

1-Wire

4 – input (–)
5 – input (D)
6 – input (+5V)

transducer's power supply

10 – power supply (–)
12 – power supply (+)

Mounting

The use of anti-interference and surge filters (such as OP-230) is recommended.

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.

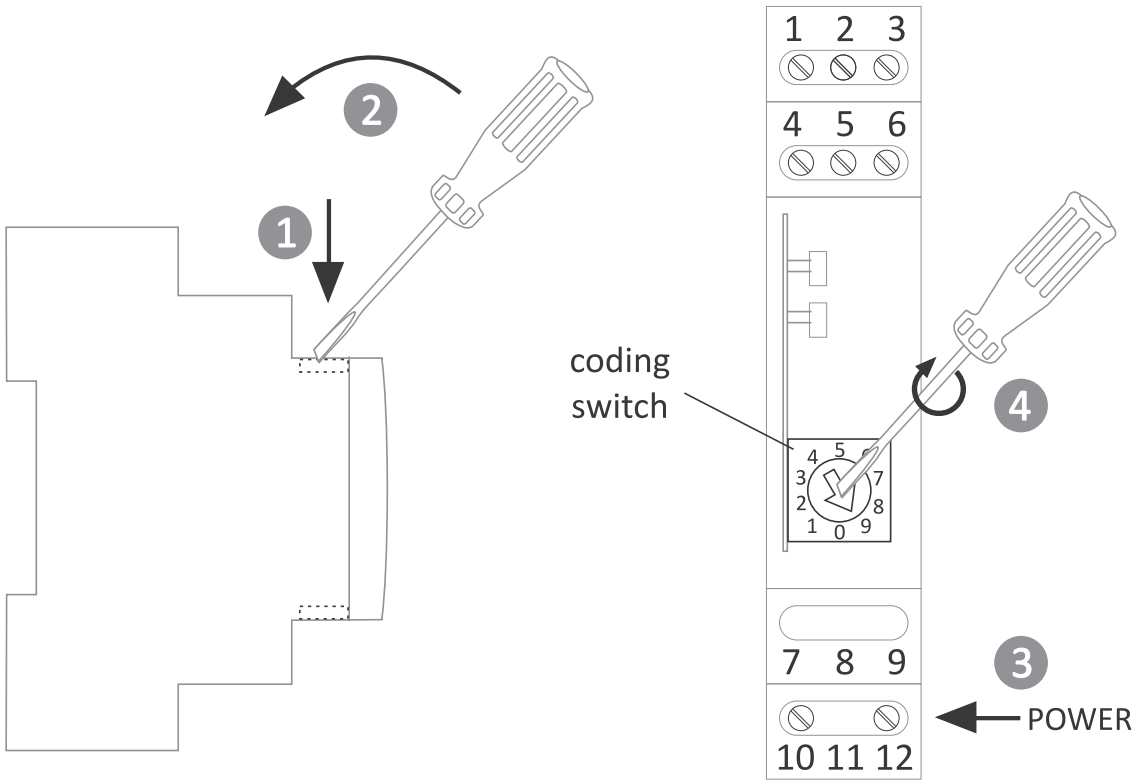
Do not route signal cables in parallel in close proximity to high and medium voltage lines.

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 and measurement options.
2. Disconnect the power supply in distribution box.
3. Install the module on the rail.
4. Connect the module power supply to terminals 10-12 as indicated.
5. Connect the 1-2-3 (port RS-485) signal output to the Master device output.
6. Connect the 1-Wire bus to the terminals according to the markings.

Communication settings reset

A coding switch is available under the module casing.
1. Turn off the power supply.
2. Remove the front panel of the module.
3. Set on switch 9.
4. Turn on the power and switch to 0 within 3 s.



1-Wire standard

The MB-DS-30 uses an electronic 1-Wire Master system that allows small and large 1-Wire networks to be built in serial, branch and star bus topologies with a length or radius of up to 500 m. For more information follow the links on the product sub-page of our website www.fif.com.pl.

Modbus RTU protocol parameters

Communication parameters	
Protocol	Modbus RTU
Operating mode	Slave
Port settings (factory settings)	Number of bits per second: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Data bits: 8 Parity: NONE, EVEN, ODD Start bits: 1 Stop bits: 1, 2
Network address range (factory settings)	1÷245 (30)
Command codes	3: Read the values of a group of registers (0×03 – Read Holding Register) 4: Reading of input registers (0×04 – Read Holding Register) 6: Set the value of a single register (0×06) – Write Single Registers) 16: Writing to multiple registers (0×10) – Write Multiple Registers)
Max. frequency of queries	5 Hz

Registers

address	description	func.	type	atrrib.
1000 ÷ 1009	Sensor temperature value 1÷10 ×0.1 (register 1000 -> sensor 1; register 1000+x -> sensor x+1)	4/04H	sign-ed	R
The register values are 16-bit signed integer. High-order bit indicates the sign of the number: 0 - positive number, 1 - negative number. The temperature value is the product of the register value and the multiplier of 0.1. Example: the value of 215 corresponds to a temperature of 21.5°C.				
3000	Write DS sensor address. Value 102. Reading: 0 – write correct; ≠0 – write error.	3/03H 16/10H	int	R/W
3001	DS sensor address: 1÷30	3/03H 16/10H	int	R/W
DS sensor address: write two registers at the same time: a) write the value 102 to register 3000, b) write the sensor number to register 3001.				
256	Read current and write new Modbus address: 1÷145 (30)	3/03H 6/06H	int	R/W
257	Read current and write the baud rate: 0:1200/1:2400/2:4800/ 3:9600/4:19200/5:38400/ 6:57600/7:115200	3/03H 6/06H	int	R/W

continued on next page

Registers cont.

address	description	function	type	atrrib.
258	Read current and write new parity value: 0:NONE/1:EVEN/2:ODD	3/03H 6/10H	int	R/W
259	Read current and write new number of stop bits: 0:NONE/1:EVEN/2:ODD	3/03H 6/10H	int	R/W

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

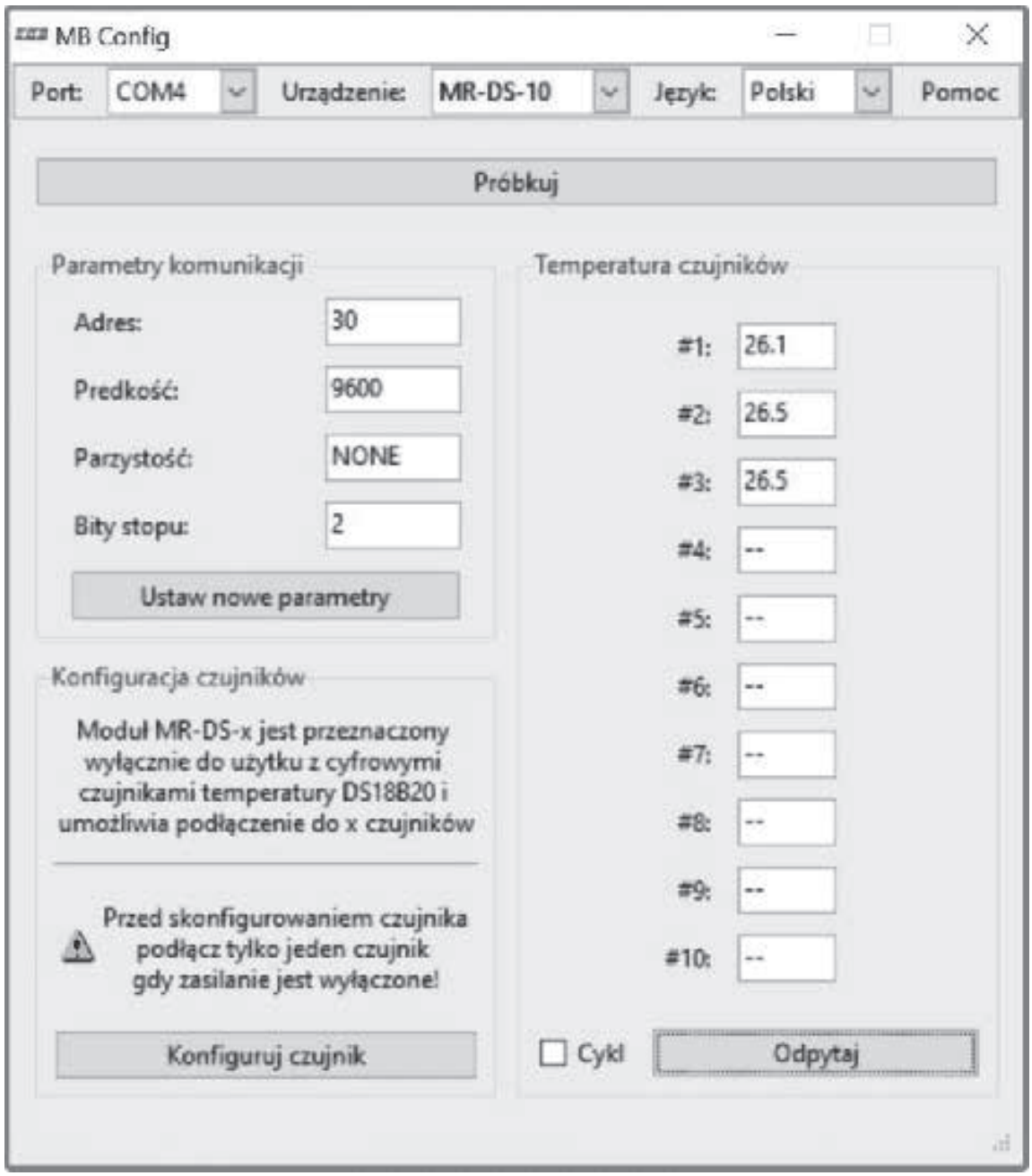
Legend:
R – read, W – write

Adressing DS sensors

1. Connect one sensor to input terminals 4-5-6.
2. Set the register values: for 3000 – code 102, and for 3001 – preset sensor address from the range of 1÷10.
3. Write the set values at the same time.
4. After at least 1 s, read register 3000. Value 0: sensor search and addressing successful; ≠0 (any value other than zero): addressing error.

MB Config service program

Service program for quick configuration of communication and module operation parameters and for addressing DS sensors. Program available on the device page or in the „Downloads” tab on the website www.fif.com.pl.



Technical data

power supply	9÷30 V DC
measurement range	-55÷125°C
maximum mesurement error	±1°C
temperature sensor type	DS1820, DS18B20, DS18S20
reading accuracy	
-10÷85°C	±0.5°C
-55÷-10°C/-85÷125°C	±2.0°C
port	RS-485
communication protocol	Modbus RTU
operating mode	Slave
power indication	green LED
communication indication	yellow LED
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 sp. j. declares that the device is in conformity with the essential requirements of The Low Voltage Directive (LVD) 2014/35/EU.

The CE 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 on the product page: www.fif.com.pl from the product subpage.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