



Industrial Measuring Transducers

analog and digital



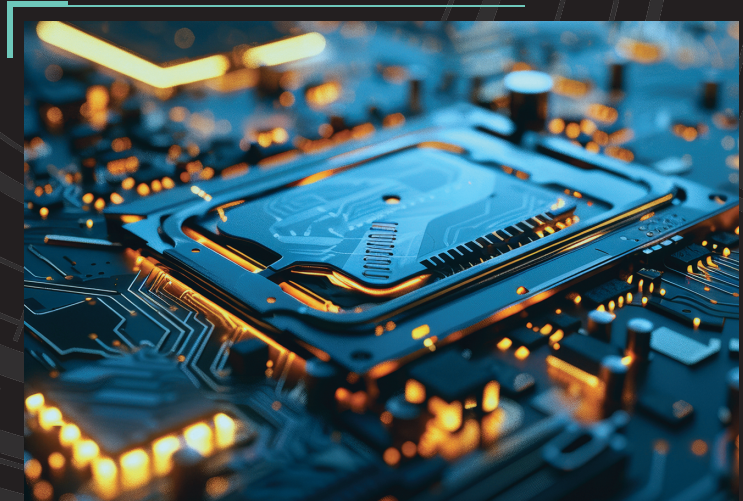
For industrial use in the development of systems for managing machines, groups of machines or processes based on PLCs and FLCs.



Measurement transducers are devices that process measurement signals according to a specific correlation.

They are widely utilized, for example, in industry in the development of systems for managing machinery and devices used in processes based on PLC (Programmable Logic Controllers) and FLC (Fuzzy Logic Controllers).

In F&F Filipowski's offer you will find measuring transducers: analog- with an output signal of $0 \div 10$ V or $4 \div 20$ mA, and digital- communicating via the MODBUS RTU protocol and the RS-485 interface.



Analog measuring transducers:

- **voltage:**

MAX-AV-1I

- **current:**

MAX-AC-1I-5A, MAX-AC-1I-15A

- **temperature:**

MAX-AT-1I, MAX-AT-2I, MAX-AT-1U,
MAX-AT-2U, MAX-AT-3I

Digital measuring transducers:

- **voltage:**

MAX-MB-1U-1, MAX-MB-3U-1

- **current:**

MAX-MB-1I-1-5A, MAX-MB-1I-1-15A,
MAX-MB-3I-1-5A, MAX-MB-3I-1-15A

- **temperature:**

MAX-MB-PT-100, MAX-MB-DS-2,
MAX-MB-DS-10, MAX-MB-DS-30

Dedicated transducers:

- **humidity and temperature:**

MAX-MB-AHT-1

- **lightning brightness level:**

MAX-MB-LS-1

- **GPS location:**

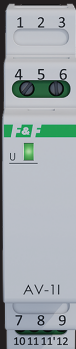
MAX-MB-GPS-1



Voltage transducers

A

with analog output:
MAX-AV-1I



MAX-AV-1I

Voltage transducer
Analog
Current (4÷20 mA)

MAX-AV-1I operation:

The MAX-AV-1I module is designed to measure voltage and convert the measured quantity to a standardized analog output current signal in the range of 4÷20 mA.

The voltage transducer measures the actual effective (TrueRMS) value of direct and alternating voltage with an amplitude not exceeding 400 V. The module's signal output is protected by an anti-interference filter, allowing for the use of cables up to 300 m long.

B

with Modbus RTU digital output:
1- phase MAX-MB-1U-1,
3- phase MAX-MB-3U-1



MAX-MB-1U-1 with Modbus RTU output

1-phase
Power supply voltage 9÷30 V DC

MAX-MB-1U-1 operation:

The MAX-MB-1U-1 transducer continuously measures alternating or direct voltage and exchanges data via the RS485 port using the Modbus RTU protocol.

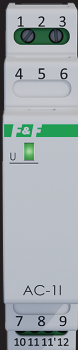


Current transducers

A

with analog output:

MAX-AC-1I-5A, MAX-AC-1I-15A



MAX-AC-1I 5A

Current (4 ÷ 20 mA)

1-phase 5 A AC

For use with a current transformer

MAX-AC-1I 5A operation:

Possible measurement of alternating or direct current intensity, is done by converting the measured quantity into an analog output current signal in the range of 4 ÷ 20 mA.

B

with Modbus RTU digital output:

1-phase, MAX-MB-1I-1-5A, MAX-MB-1I-1-15A,
3-phase, MAX-MB-3I-1-5A, MAX-MB-3I-1-15A



MAX-MB-1I-1 5A with Modbus RTU output

1-phase 5 A AC

For use with a current transformer

MAX-MB-1I-1-5A operation:

The MAX-MB-1I-1 converter is designed for measuring alternating or direct current intensity and exchanging data via the RS-485 port in accordance with the Modbus RTU protocol.

The MAX-MB-1I-1 current transducer is adapted to work with a current transformer with a secondary current of 5 A.

The converters measures the TrueRMS value, which ensures high measurement accuracy also for distorted waveforms.



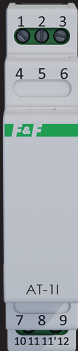


Temperature transducers

A

with analog output:

MAX-AT-1I, MAX-AT-2I, MAX-AT-3I, MAX-AT-1U, MAX-AT-2U, MAX-MB-TC-1



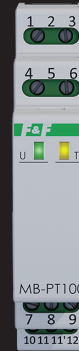
MAX-AT-1I

The MAX-AT-1I transducer is designed to measure temperature using an external temperature sensor and converting the measured value to a unified analog current output signal in the range 4÷20 mA.

B

with digital output:

MAX-MB-DS-30, MAX-MB-DS-10, MAX-MB-DS-2, MAX-MB-PT-100



MAX-MB-PT-100 with Modbus RTU output

The MAX-MB-PT-100 temperature converter is designed to measure temperature using an external PT-100 temperature sensor and exchange data via the RS-485 port in accordance with the Modbus RTU protocol.

MAX-AT-1I, MAX-AT-2I, MAX-AT-3I, MAX-PT-100 operation:

F&F temperature transducers are designed to measure temperature using an external sensor (or sensors) and convert the measured quantity into a unified 0-10 V or 4-20 mA analog signal. The offer also includes sensors with a digital RS-485-compatible output with Modbus RTU protocol. The F&F transducers, depending on the design, are adapted to work with many types of measurement sensors from -200 to over 1000 degrees (PT-100, resistance sensor KTY-81-210, digital sensor DS1820, thermocouple) and allow temperature measurements.

	Number of channels	Measurement range	Range adjustment	Sensor	Output			Housing
					0-10 V	4 -20 mA	Modbus RTU	
AT-1I	1	-50 ... +100		KTY81-210		●		DIN
AT-1U	1	-50 ... +100		KTY81-210	●			DIN
AT-2I	1	-50 ... +100		KTY81-210		●		Box
AT-2U	1	-50 ... +100		KTY81-210	●			Box
AT-1I-PT	1	-200 ... +600	●	PT100		●		DIN
AT-1U-PT	1	-200 ... +600	●	PT100	●			DIN
AT-1I-KT	1	-50 ... +150	●	KTY81-210		●		DIN
AT-1U-KT	1	-50 ... +150	●	KTY81-210	●			DIN
AT-1I-DS	1	-50 ... +120	●	DS1820		●		DIN
AT-1U-DS	1	-50 ... +120	●	DS1820	●			DIN
MB-PT-100	1	-100 ... +400		PT100			●	DIN
MB-DS-2	2	-50 ... +120		DS1820			●	DIN
MB-DS-10	10	-50 ... +120		DS1820			●	DIN
MB-DS-30	30	-50 ... +120		DS1820			●	DIN
MB-TC-1	1	-200 ... +1350		Thermocouple K, J, T, N, S, E, B, R			●	DIN



Dedicated transducers

A

humidity and temperature transducer:
MAX-MB-AHT-1



MAX-MB-AHT-1 with Modbus RTU output

The MAX-MB-AHT-1 converter is used for continuous temperature measurement in the range of $-40\div 70$ °C and humidity in the range of $0\div 500$ V RH.

MAX-MB-AHT-1 features:

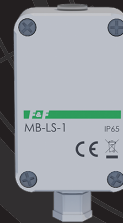
- humidity measurement
- temperature measurement
- reading the current
- temperature sensor work status

MAX-MB-AHT-1 operation:

The MAX-MB-AHT-1 humidity and temperature transducer continuously measures humidity and temperature using a built-in sensor. Reading of recorded values, setting of all measurement parameters, communication and data exchange are carried out via the RS-485 port using the Modbus RTU communication protocol.

B

lightning brightness level transducer:
MAX-MB-LS-1



MAX-MB-LS-1

The MAX-MB-LS-1 continuously measures the brightness level (light intensity) in the range of $1\div 2000$ lux and exchanges data using the RS-485 port in accordance with the Modbus RTU protocol.

MAX-MB-LS-1 features:

- measurement of light intensity
- sensor work status

MAX-MB-LS-1 operation:

Reading values, setting all measurement parameters, communication, and data exchange are carried out through the RS-485 port using the Modbus RTU communication protocol. The result stored in the module register is the average value of the set number of recent samples in the range $1\div 30$ (e.g. setting a value of 30 means that the result will be the average of the last 30 seconds).

C

GPS location transducer:
MAX-MB-GPS-1



MAX-MB-GPS-1

With the standard localization module of the satellite GPS system (Global Positioning System).

MAX-MB-GPS-1 features based on current data for its location:

- geographical coordinates (longitude / latitude)
- date (year / month / day)
- time (hour / minute / second)

MAX-MB-GPS-1 operation:

The MAX-MB-GPS-1 location transmitter is equipped with a location module of the GPS (Global Positioning System) satellite system and the GLONASS system. Based on one of these signals, the transmitter provides current data for its location: geographical coordinates (longitude and latitude), date and time.





I/O expansion modules

Measurement transducers that convert physical forms of energy

(such as temperature, humidity or pressure) into an electrical signal, allowing them to be read and processed by electronic devices. Thanks to the use of universal expansion modules from F&F, the functionality of systems can be increased at will and adapted to individual needs.

A

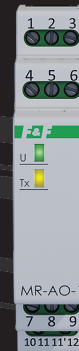
universal extension module:

MAX-MR-AI-1, MAX-MR-AO-1,
MAX-MR-DIO-1



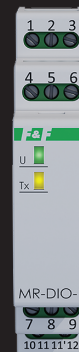
MAX-MR-AI-1 Analog input module with Modbus RTU output

- input type compliant with the standard $0 \div 10$ V or $4 \div 20$ mA
- has 4 universal analog inputs
- continuously measures the input values of current and voltage on all inputs
- LED to indicate device operation
- configuration and communication takes place via the RS-485 port, in accordance with the Modbus RTU protocol



MAX-MR-AO-1 Analog output module with Modbus RTU output

The MAX-MR-AO-1 module is an external device that extends the analog voltage outputs of programmable PLC controllers or other devices where data exchange takes place via the RS-485 port in accordance with the Modbus RTU protocol.



MAX-MR-DIO-1 I/O module with Modbus RTU output

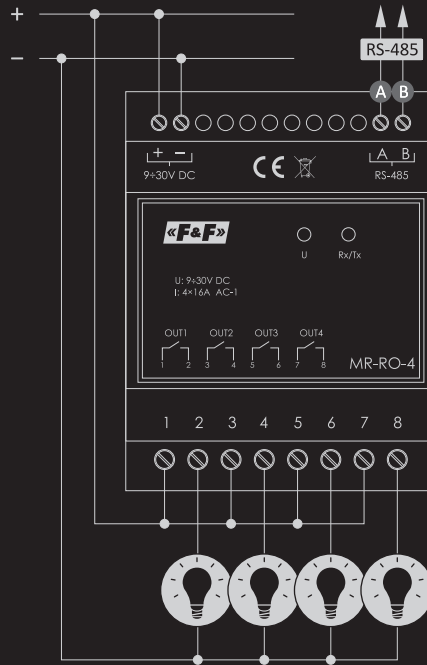
- has 6 universal contacts, each of which can function as a digital input/output
- digital inputs treated as „potential-free contact”, and outputs as „open collector”
- with the function of saving the state of outputs in non-volatile local memory
- communication and data exchange RS-485 port, in accordance with the Modbus RTU protocol

B**Modbus RTU digital modules:**

MAX-MR-RO-1, MAX-MR-RO-4

**MAX-MR-RO-1
MAX-MR-RO-4**

Version with 1 or 4 independent relays.
Relay output expansion module with Modbus RTU output.

**MAX-MR-RO-1 MAX-AT-1I, MAX-MR-RO-4 operation:**

Relay output extension modules serving as external devices for extending the relay outputs of programmable logic controllers (PLCs) or other devices in which data exchange is carried out via the RS-485 port in accordance with the Modbus RTU protocol.

Features:

- separated switch 1P (NO/NC)
- ON/OFF control
- output status
- **time control options:**
 - on delay
 - on delay for a specified time
 - cyclic ON/OFF operation
 - cyclic OFF/ON operation
- memory status after power failure
- autostart for timer functions
- last output activation time
- output activation count
- number of performed cycles for timer functions

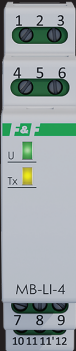


Pulse and operating time counters

A

4-channel pulse counter with Modbus RTU output:

MAX-MB-LI-4 Lo, MAX-MB-LI-4 Hi



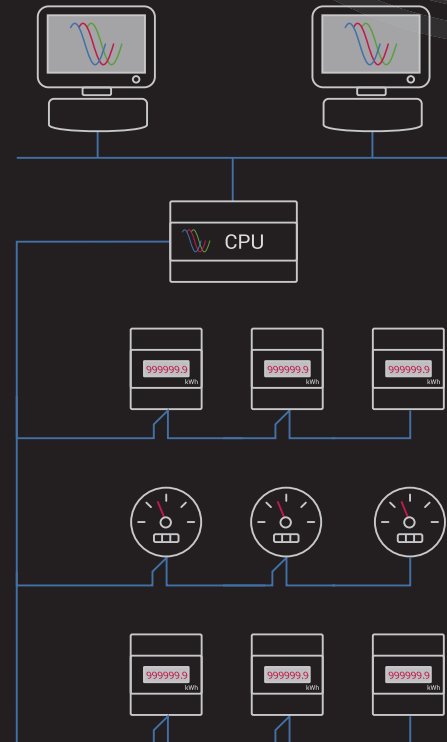
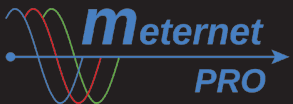
MAX-MB-LI- 4 Lo MAX-MB-LI-4 Hi

Low-voltage counting inputs (6÷30 V AC/DC) for the Lo version or high-voltage (160/265 V AC/DC) for the Hi version.

MAX-MB-LI-4 Lo/Hi operation:

The pulse counter is used to count AC/DC signals generated by external devices in order to determine the number of operating cycles performed and exchange data via the RS-485 port in accordance with the Modbus RTU protocol.

Remote system of reading and registration

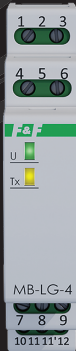


B

4-channel, unidirectional, operation time counter with Modbus RTU output:

MAX-MB-LG-4 Lo, MAX-MB-LG-4 Hi

MAX-MB-LG- 4 Lo
MAX-MB-LG- 4 Hi



Low-voltage counting inputs (6÷30 V AC/DC) for the Lo version or high-voltage (160/265 V AC/DC) for the Hi version.

MAX-MB-LG-4 Lo/Hi operation:

The MAX-MB-LG-4 working time counter counts the number of in automatic production processes. It will also be useful in counting the working hours of devices, which, due to safety requirements and operating efficiency, have a set working time limit.

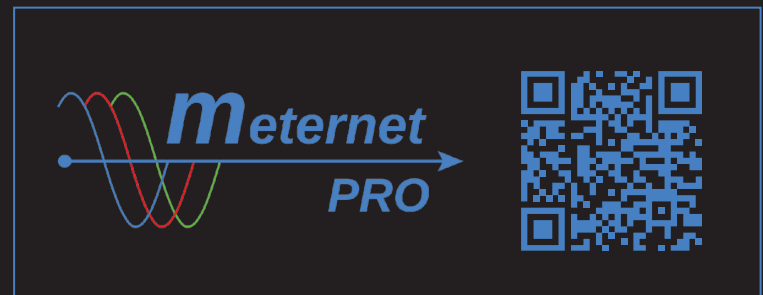
Module communication with PC:

Using the CN-USB-485 USB converter.

Features:

- 4 independent counters
- overall results in FLOAT (floating point) values for hours and INT (integer) values broken down into seconds, minutes, hours, days (4 registers per one counter)
- counter input suitable for AC/DC signals
- selection of the trigger state 1 option: by high or low voltage level
- time filter, which allows to limit the maximum length of the input signal (to eliminate interference at the input of the counter)
- memory of the counter state after the voltage drop
- digital input function

Transducers work with the remote reading and recording system – MeternetPRO



In the F&F offer, you will find analog and digital transducers:



Temperature
and humidity



Lightning
brightness level



Current



Voltage



Location



Hour and pulse
meter



F&F is a Polish family company with established traditions. Currently, we are one of the largest Polish manufacturers of high-quality electronic devices in the field of relay technology, designed for home and industrial applications and modern smart building control systems.

Our offer includes time relays, timers, phase control relays, dusk switches, energy meters, building automation systems, telemetry solutions, and measuring transducers.

We have been with you since 1992.



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PN-EN ISO 9001:2015

Certyfikat nr:
2454/07/2021/J/R



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