FP4, FP4W
Flow totalizer with data recording

- 2 analogue inputs, 2 PULS inputs
- 2 math channels
- 2 GB internal data memory, advanced data logging
- 4" touchscreen colour LCD
- USB port on the front panel
- 4 solid state relays
- 1 analogue output 4-20 mA
- Ethernet port, Modbus TCP, web server
- RS–485 port, Modbus RTU
- E-mails regarding alarm states and cyclical reports with totalizers values (up to 5 recipients)
- Dedicated PC software for commissioning and archive data visualization
- Available languages: EN, DE, ES, FR, IT, PL, PT

FP4/FP4W is a versatile, modern and precise flow totalizer with internal data logging. The device is used in the food, metallurgical and glass industries and in the supervision of production lines.

Equipped with two analogue inputs (RTD, 4-20mA, voltage or resistive output transducers) and two PULS inputs (frequency measurement, pulse counting, binary signal tracking and recording), can measure flow and other values, such as temperature and humidity. In addition FP4/FP4W has two math channels and two totalizers assigned to each of the six available channels.

Device can communicate with master system through Ethernet port (Modbus TCP protocol, web server) or through RS-485 port (Modbus RTU protocol) and can work in distributed control systems.

Device may be quickly configured by the user from front panel or using commissioning software on PC.

Device is available in panel mount version (FP4) and in wall mount version (FP4W). Both device versions have the same features.

RECORDING MEASUREMENT RESULTS

- Recording data to internal memory in the form of text files, access to recorded data through USB port on the front panel or through Ethernet port
- Checksum secured files – protection against data manipulation
- Data recording rate for process values from 2 s up to 24 h; two recording rates, toggled by alarm state
- Data recording rate for totalizers from 1 min up to 24 h
- File with events and authorized activities

EXAMPLE DATA PRESENTATION
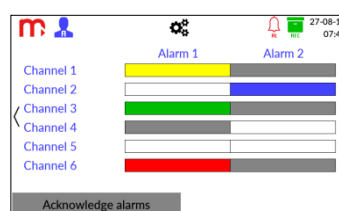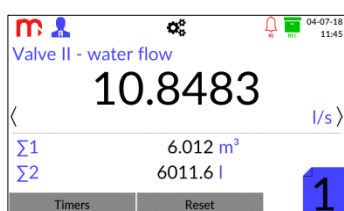
INPUTS AND CHANNELS TYPES

FP4/FP4W has 2 analogue inputs, 2 PULS type inputs, 4 solid state relays, one 4-20mA analogue output, Ethernet port and RS-485 communication port. The device enables supplying the current loop for 4-20mA transducers. Up to 10 User's characteristics can be defined.

Up to six channels of different type may be configured.

Channel type (input)	No.	Description
Analogue	2	for connection of: transducers with standard current loop output 0/4-20mA; transducers with −1 .. +1 V or −10 .. +10 V voltage output; temperature RTD type sensors (Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni1000, Cu50, Cu53, Cu100, KTY81, KTY83, KTY84); transducers with an output resistance in range 0 .. 2700 Ω
PULS	2	frequency measurement in range 0.01 Hz .. 10 kHz, counting pulses, tracking and recording of binary signal (shorting or opening); for connection of transducers with OC, contact, voltage or current (NAMUR) outputs
Math	2	calculation of the formula entered by the user (available mathematical functions: addition, subtraction, multiplication, division)

TOTALIZERS

- Two flow totalizers are available for every channel configured for flow measurement
- Totalizers can be reset be reset manually or automatically every day, week or month
- Timers T1 and T2 for counting the operation time
- Data recording rate for totalizers from 1 min up to 24 h

ALARMS AND CONTROL

- 4 solid state relays rated at 0.1 A/60 V
- 2 alarm thresholds for each input and each calculated value
- Alarm or control mode

APPLICATION EXAMPLE
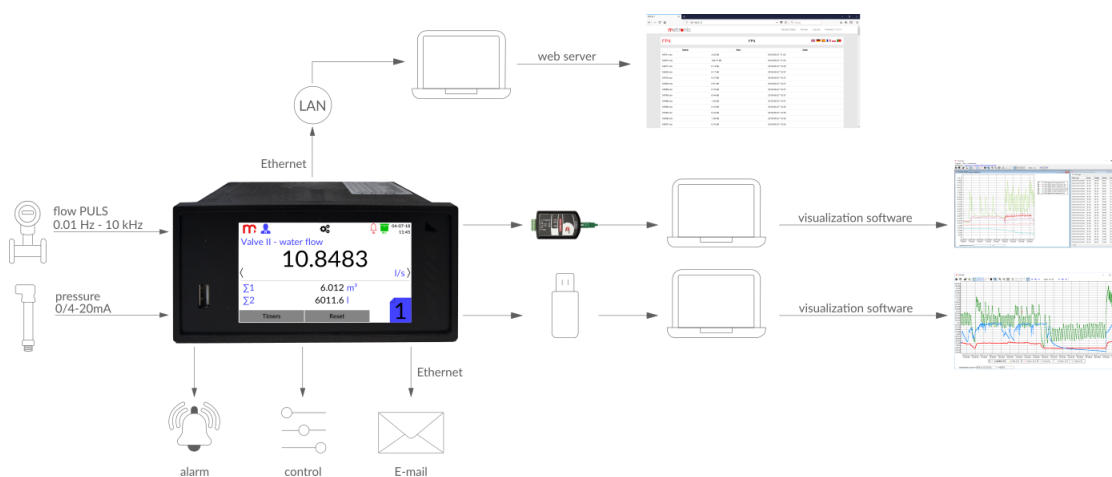
TECHNICAL SPECIFICATIONS

Front panel (FP4, FP4W)	
Type of display	LCD TFT 4" 800 px X 480 px LED backlight
Display size	86.4 mm X 52.5 mm
Keyboard	resistive touch panel
Additional indication	LED RGB

USB Port – front panel (FP4, FP4W)	
Version	USB 2.0 (with limited functionality, for connection of FLASH storage)
Connector type	USB standard 'A' type socket
Files system	FAT16, FAT32[1]

[1]Compatibility of all USB memory devices is not guaranteed.

Ethernet Port (FP4, FP4W)	
Interface	10/100Base-T Ethernet
Connector type	RJ-45
Transmission protocol	Server WWW, Modbus TCP ICMP (ping)
Number of connections opened simultaneously	Max 4

RS-485 Serial Port (FP4, FP4W)	
Signals output on terminal block	A(+), B(-)
Galvanic isolation	None
Maximum load	32 receivers/transmitters
Transmission protocol	Modbus RTU Slave
Transmission rate	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2 kbps
Parity control	Even, Odd, None
Frame	1 start bit, 8 data bits, 1 stop bit
Maximum length of line	1200 m
Internal terminating resistor	Vcc-A(+)-B(-)-G: 390 Ω - 220 Ω - 390 Ω (activated by DIP-switches)
Maximum differntial voltage A(+), B(-)	-7 .. +12 V
Minimum output signal of transmitter	1.5 V (at R_L= 54 Ω)
Minimum sensitivity of receiver	200 mV / R_{IN}= 12 kΩ
Minimum impedance of data transmission line	54 Ω
Short-circuit/thermal protection	Yes/Yes

Internal data memory (FP4, FP4W)	
Memory type	Flash
Capacity	2 GB
Estimated recording time for recording speed every 2 s for 6 measuring channels	ca. 2 years

Supply (FP4)	
Supply voltage	24 VDC (20 .. 30 VDC)
Maximum power consumption	6 W (typically 4 W)
Security	The internal delay fuse 3.15 A, the exchange only by the service company

Supply (FP4W)	
Supply voltage	100 .. 240 VAC 50/60 Hz or 24 VDC (20 .. 30 VDC)
Maximum power consumption	• for 100 .. 240 VAC 50/60 Hz power supply: 8 W (typically 6 W) • for 24 VDC (20 .. 30 VDC) power supply: 6 W (typically 4 W)

Security	The internal delay fuse 3.15 A, the exchange only by the service company

Output 24 V OUT (FP4W)

Output voltage (on 24 V OUT)	unregulated 18 .. 26 VDC
Maximum load current (on 24 V OUT)	100 mA

Electrical connections (FP4)

Type	screw terminal connectors
Wire cross section	solid and flexible 0.14 .. 1.5 mm^2 flexible with bootlace ferrule 0.25 .. 1.5 mm^2 AWG 30/14

Electrical connections (FP4W)

Type	spring type terminal block
Wire cross section	• supply 230 VAC: 0.2 .. 2.5 mm^2 • others: 0.2 .. 1.5 mm^2
Cable glands	• supply: one M16 cable gland, cable diameter: 5 .. 10 mm • I/O signals: three M20 cable glands, cable diameter: 8 .. 13 mm • Ethernet: one M20 cable gland, cable diameter: 6 mm (the possibility of installing a cable with an RJ-45 connector)

Mechanical Dimensions – enclosure (FP4)

Enclosure type	panel mount, nonflammable plastic material „Noryl"
Dimensions with connectors (w X h X d)	144 mm X 72 mm X 127 mm
Dimensions of panel cut-out (w X h)	138^{+1} mm X 68$^{+0.7}$ mm
Maximum panel thickness	5 mm
Weight	0.5 kg
Protection class	IP30 on front panel side IP30 on rear panel side

Mechanical Dimensions – enclosure (FP4W)

Enclosure type	Wall mount, polycarbonate material

Dimensions (w X h X d)	• without cable glands:
	  213 mm x 185 mm x 102 mm
	• with cable glands:
	  213 mm x 215 mm x 102 mm

Weight	c.a. 0.8 kg
Protection class	IP54

Environmental conditions (FP4, FP4W)

Ambient temperature	• FP4: 0 .. +50 °C • FP4W: -20 .. +50 °C
Relative humidity	5 .. 95% (without steam condensation)
Maximum altitude	<2000 m above sea level
Storage temperature	-30 .. +70 °C
Degree of pollution	PD2
EMC	EMC Directive 2014/30/EU EN 61326-1:2013 Table 2 (immunity) EN 61326-1:2013 Class A (emission)
RoHS	RoHS Directive 2011/65/EU
Installation location	• FP4: Indoor only • FP4W: Indoor or outdoor[2]

[2]If additional protection against atmospheric precipitation is provided (roofing), the device can be installed outdoor.

ANALOGUE INPUTS (FP4, FP4W)

Number of inputs	2 (input type (0/4-20mA/RTD/U) configurable by jumpers inside the device)
Update rate	0.5 s/display every 1 s
Low-pass digital filter (damping filter)[3]	A time constant programmed in the range 2 .. 60 s
Galvanic isolation between inputs	None
Galvanic isolation from the other circuits	Functional, 250 VAC
Maximum input voltage	±30 VDC between terminals A(I+), B(I-)

[3]Device has two low-pass filters. Notch filter designed to reject 50/60 Hz interference set automatically depending on the measurement update rate. Digital low-pass filter with time constant is programmable by the user.

Configuration: 0/4-20mA input[4]

Measurement range	0 .. 22 mA
Input resistance	<100 Ω
Initial accuracy (T_a=+25 °C)	±0.1% of range (typically ±0.05% of range)
Conversion characteristic	Linear or User
Transducers powered from recorder	24 VDC (+10/-20%), 24 mA (current-limited polymer fuse)

[4]The device is delivered in the 0/4-20mA configuration.

Configuration: R/RTD input

Sensor type	• Resistive (refer the table below) • Linear resistance
Sensor connection type	2-wire
Sensor current	420 µA
Wire resistance compensation in the 2-wire connection	User programmed in the range of -99 .. +99 Ω
Resistance of wires (to the sensor)	max 50 Ω
Transducer resistance range	0 .. 2700 Ω
Initial accuracy (T_a=+25 °C)	±0.5 Ω (typically ±0.3 Ω)
Conversion characteristic for R	Linear, User or sensors
RTD sensor type, range and accuracy	Refer the table below

Configuration: U (±10 V) input

Voltage range	-10 .. +10 V
Input resistance	>10 kΩ
Conversion characteristic (for U)	Linear or User
Initial accuracy (T_a=+25 °C)	±0.5% of range

PULS TYPE INPUTS (FP4, FP4W)

Number of inputs	2
Measurement range	• 0.01 Hz .. 10 kHz, additional filter disabled • 0.01 Hz .. 1 kHz, additional filter enabled
Minimum pulse width	• 50 µs, additional filter disabled • 0.5 ms, additional filter enabled
Maximum input voltage	±30 VDC (between terminals F+ and F-)

Frequency measurement

Conversion characteristic	Linear or User
Initial accuracy (T_a=+25 °C)	0.05% * f ±0.1 Hz

Pulse counting

Conversion characteristic	Linear
Measuring range	0 .. 10 kHz
Initial accuracy (T_a=+25 °C)	0.05% * f ±0.1 Hz (without losing pulses in the counters)

Configuration: OC/contact[5]	
Open contact voltage	ca. 4.3 V
Short circuit current	ca. 4.3 mA
Switch on/off threshold	ca. 2.4 V / 2.6 V
Maximum short circuit resistance	100 Ω

[5]The device is delivered in the OC/contact configuration, with the additional filtering capacitor disconnected.

Configuration: current input NAMUR	
Input resistance	1.5 kΩ
Switch on/off threshold	ca. 1.6 mA / 1.8 mA

Configuration: current input EH	
Input resistance	200 Ω
Switch on/off threshold	ca. 11 mA / 13 mA

Configuration: voltage input	
Input resistance	>10 kΩ
Switch on/off threshold	ca. 2.4 V / 2.6 V
Maximum input voltage	±30 VDC

RELAY OUTPUTS (FP4, FP4W)

Number of outputs	4
Outputs type	Solid state relays
Maximum voltage	60 V AC/DC
Maximum load current	0.1 A

ANALOGUE OUTPUT 4-20mA (FP4, FP4W)

Output signal	4-20 mA (3.6 .. 22 mA)
Current loop supply	no (external supply required)
Maximum voltage between I+ and I-	28 VDC
Minimum supply current loop voltage	9 VDC (R_L=0 Ω)
Loop resistance (R_L)	0 .. 500 Ω
Accuracy	0.2%
Galvanic isolation to supply voltage	Functional, 250 VAC

TABLE OF RTD SENSORS

Sensor type	Range	Accuracy
Pt100, Pt200, Pt500, Pt1000 (EN 60751+A2:1995)	-200 .. +850 °C -328 .. +1562 °F	±0.5 °C (typically ±0.3 °C) ±0.9 °F (typically ±0.5 °F)
Ni100, Ni120, Ni1000 (DIN43760 /08-1985)	-60 .. +250 °C -76 .. +482 °F	±0.5 °C (typically ±0.3 °C) ±0.9 °F (typically ±0.5 °F)
Cu50, Cu53, Cu100 (GOST6651-2009)	-180 .. +200 °C -292 .. +392 °F	±0.5 °C (typically ±0.3 °C) ±0.9 °F (typically ±0.5 °F)
KTY81 (NXP Rev05-25.04.2008)	-55 .. +150 °C -67 .. +302 °F	±0.5 °C ±0.9 °F
KTY83 (NXP Rev06-4.04.2008)	-55 .. +175 °C -67 .. +347 °F	±0.5 °C ±0.9 °F
KTY84 (NXP Rev06-8.05.2008)	-40 .. +300 °C -40 .. +572 °F	±0.8 °C ±1.5 °F
Linear resistance	0 .. 2700 Ω (or sub-range)	±0.5 Ω (typically ±0.3 Ω)

ORDERING INFORMATION

Provide the appropriate name of the ordered device:
- **FP4** – device for panel mounting,
- **FP4W** – device for wall mounting.