Paddle flow meters – P, PP, PPP flow-keepers

- For measuring of liquid and fluent materials
- Horizontal and vertical operating position
- Resistant to contamination
- Resistant to pressure shocks
- Massive all-metal design including case of indicator for industry
- Specified flow adjustment (according to the scale), which activates the limit contact
- Individual calibration
- Data about actual flow
- Short building length – straight piping, 6D prior to device 3D behind
- Extended building length for higher accuracy of measuring
- Sectional system, possibility of outlets, indication etc.
- Measuring in extreme conditions

Application

Paddle flow meters – flow-keepers are used to indication of momentary flow of liquid and fluent materials in all industrial branches. The flow meter with the switch SP5 is possible to use as a flow-keeper of pre-set flow level. The flow meter is possible to equip with the switch SP6 and evaluation devices e.g. ECLM, DMK, ERT 50000, PAX-D for continuous indication of momentary flow, or flowed volume with the possibility of analogue output (see catalogues of single equipment).
Descriptions of single types of paddle flow meters.

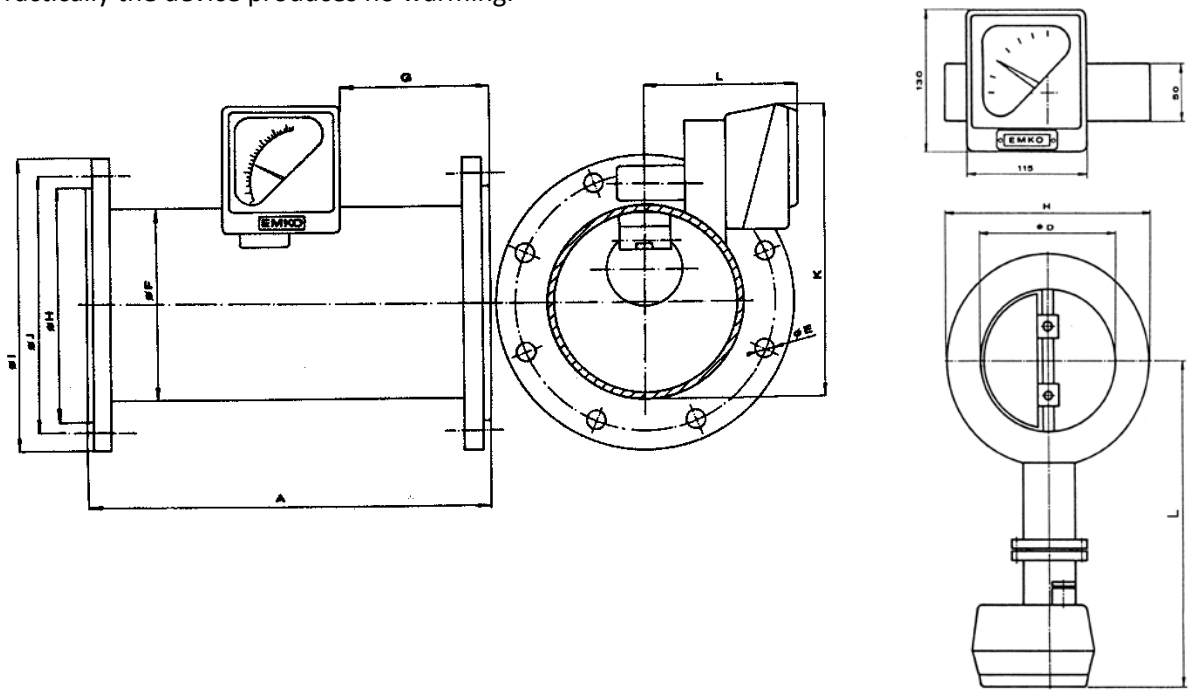
Type P – function of the flow meter consists in the measuring of the reaction board turning, that is deflected in the material flow and stopped in the position, where all forces are in balance, including gravity of the board. This type of flow meter has been designed only for the horizontal operating position and is good at small pressure loss.

Type PP – similar function to type P, but the force transmitted to the reaction board from the torsion spring is increased. This type has been designed for horizontal and vertical operating positions and has small building length.

Type PPP – it is the flow meter with the spring and in an extended building length, which can increase the measuring accuracy. This type has been designed for horizontal and vertical operating positions.

In all types of flow meters, the turning of a reaction board is transmitted by means of the magnetic connector from the hermetical space to the pointer of the separated indicator.

In the ambient with explosion hazard, there is possible to use flow meters with all-metal measuring parts. The device may be connected only in a circuit followed with the sparking safeguarding device, which is certified for the design II(2) G [EEx ia] II C T6 with the supply secured from sparking at least. Practically the device produces no warming.



Technical data

Type	**P, PP, PPP**
Measuring range (100% of flow) choose from the table Water 20°C Air 101,3 kPa abs.; 20°C	 2 up to 1000 m^3/hr 20 up to 4500 m^3/hr
Rate of max. and min. measured values	7:1 (10:1 by request)
Measuring fault (in % from the rate) **Additional fault of electrical outlet**	±2,5% ±1%
Measuring part Reaction board Spring Body annulus	 Stainless steel ČSN 17 246, DIN 1.4541, titanium Stainless steel Stainless steel ČSN 17 246, DIN 1.4541, titanium, from DN 65 standard carbon steel with surface finish
Scale	In flow units (by the customer's request)
Rated diameters	DN25 up to DN400 (higher by request)
Shielding	IP65, with angular connector IP54
Flange connection acc. to CSN, DIN	DN25 up to DN400, PN16 standard
Max. working temperature of measured material in accordance with thermal category, type in explosive medium Thermal category T6 Thermal category T5 Thermal category T4 Thermal category T3	 85°C 100°C 125°C 150°C
Max. working temperature of measured material without using sensors, max. ambient temperature ≤120°C P, PP, PPP	 350°C higher on request
Max. ambient temperature with using of SP6 sensors + connector with an analogue output in the flow meter case Max. ambient temperature with using of sensors in medium with explosion hazard zone 1 Max. ambient temperature without explosion hazard with using of sensors SP5, SP6 – analogue output, converter outside flow meter	85°C 60°C 130°C
Max. working pressure	1,6 MPa – stainless 20 MPa by request

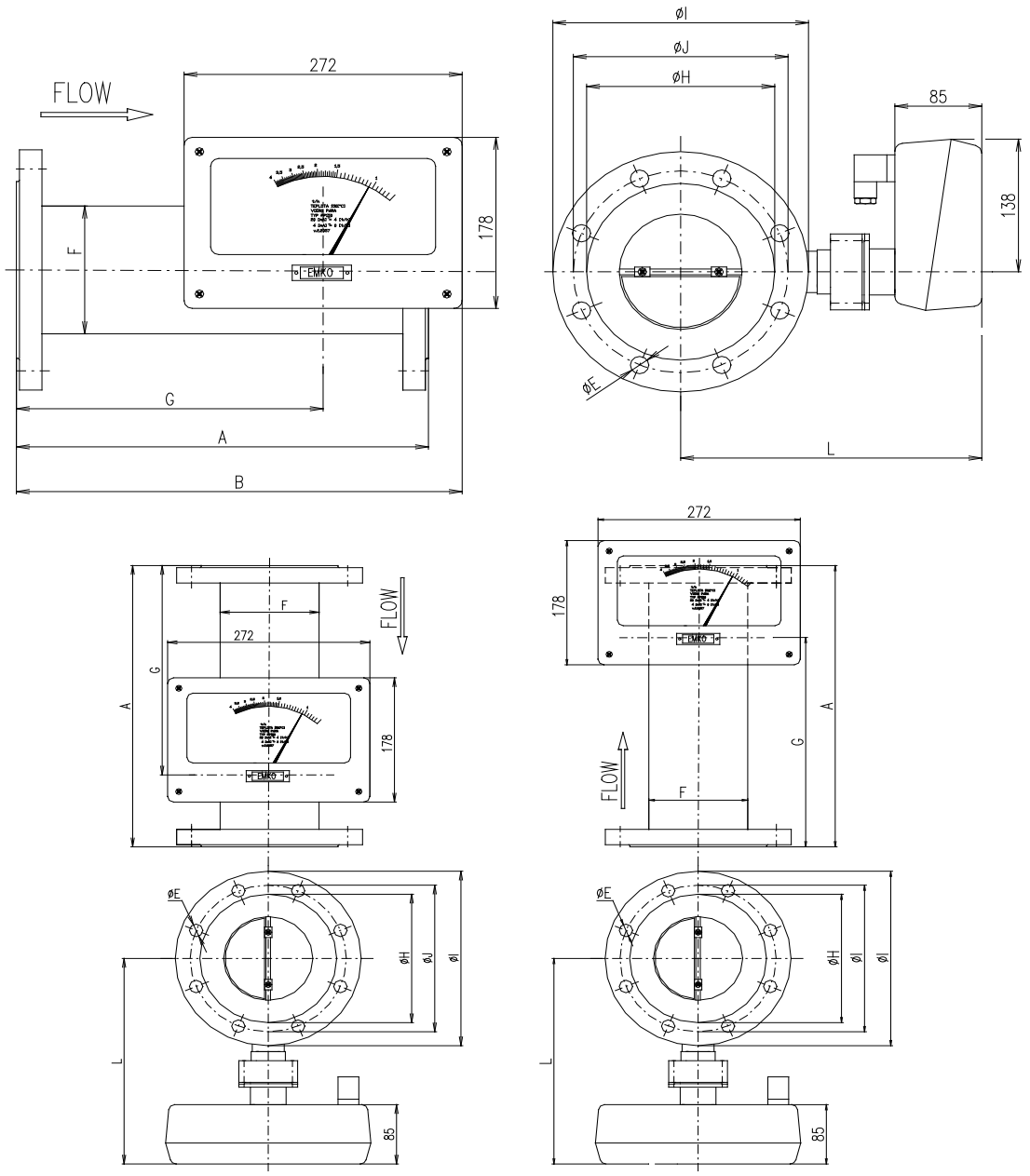
Requirements to other technical data have to be discussed with the producer.

Values of measuring ranges and dimensions - type P

	Measuring range - max. flow												
DN	Water 15°C m^3/hr	Air 20°C 101,3 kPa m^3/hr	A	H	J	I	F	G	E	L	K	Max. pressure loss – water mbar	Max. pressure loss – air mbar
80	60	500	300	136	160	195	90	115	8 x ϕ18	112	206	228	19
100	90	1 000	300	156	180	210	110	115	8 x ϕ18	129	206	210	31
125	130	1 800	400	186	210	245	140	165	8 x ϕ18	154	236	179	41
150	200	2 400	400	208	240	280	160	165	8 x ϕ23	154	255	204	35
200	300	3 000	500	268	295	335	225	215	8 x ϕ23	154	295	145	18
300	500	4 500	500	370	410	460	315	215	12xϕ23	200	410	79	8
400	1 000		500	490	525	580	450	215	16xϕ27	200	550	110	

Values of measuring ranges and dimensions - type PP

	Measuring range - max. flow						
DN	Water 15°C m^3/hr	Air 20°C 101,3 kPa m^3/hr	D	L	H	Max. pressure loss – water mbar	Max. pressure loss – air mbar
25	3	20	25	210	70	60	3
32	8	80	32	232	80	157	19
40	20	100	300	156	180	402	12
50	30	200	50	243	102	370	20
65	70	300	65	253	122	705	16
80	80	500	80	262	140	401	19
100	100	1000	100	272	160	257	31
125	150	1800	125	287	190	236	41
150	200	2400	150	300	212	203	35
200	300	3000	200	330	270	144	17
300	600	4500	300	380	380	114	8
400	1000		400	430	500	100	



Values of measuring ranges and dimensions – type PPP

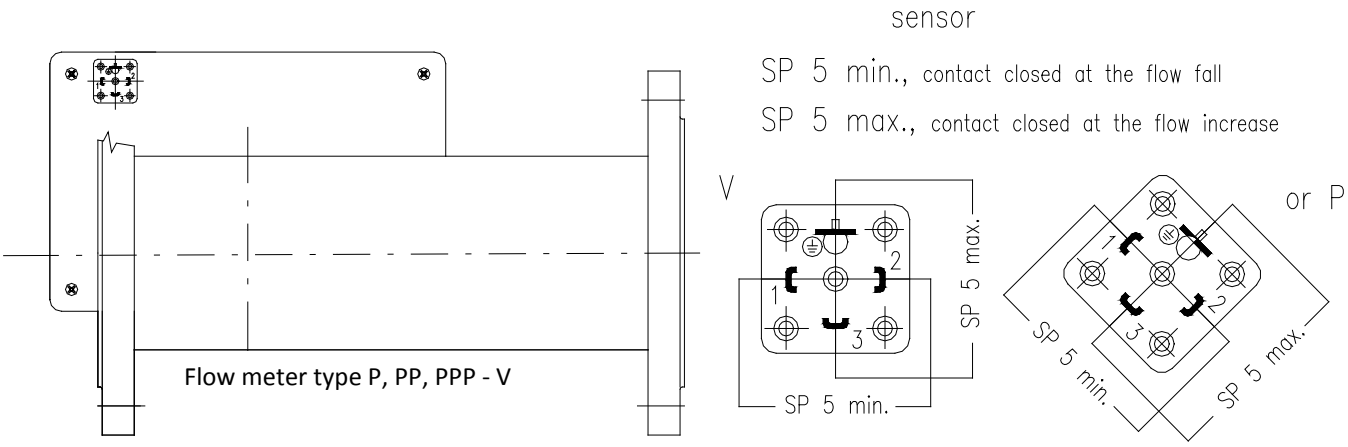
	Measuring range - max. flow														
DN	**Water 15°C m^3/hr**	**Air 20°C 101,3 kPa m^3/hr**	**A**	**H**	**J**	**I**	**F**	**G**	**G1**	**E**	**L**	**B**	**Max. pressure loss – water mbar**	**Max. pressure loss – air mbar**
80	80	500	300	136	160	195	90	220	80	8 x ϕ18	273	356	405	19
100	100	1 000	300	156	180	210	110	210	90	8 x ϕ18	283	346	259	31
125	150	1 800	400	186	210	245	140	300	100	8 x ϕ18	295	436	238	41
150	200	2 400	400	208	240	280	160	285	115	8 x ϕ23	308	421	204	35
200	300	3 000	500	268	295	335	225	360	140	8 x ϕ23	333	496	145	18
300	600	4 500	500	370	410	460	315	310	190	12 x ϕ23	383	446	114	8
400	1 000		500	490	525	580	450	260	240	16 x ϕ27	433	396	100	

Assembly, service and maintenance

The flow meter is inserted between the packing and flanges so, to be centered between flanges. This flow meter requires straight smooth piping in lengths 6D prior to the device and 3D after one. Before the flow meter installation it is necessary to clean the pipe and rinse it out. Service and maintenance present only the inspection of the tightness, paddle cleaning. During the flow meter installation it is necessary to keep the marked flow direction, data mentioned on the scale, especially material, temperature and overpressure. Install the flow meter so, the paddle rotation axis is horizontal.

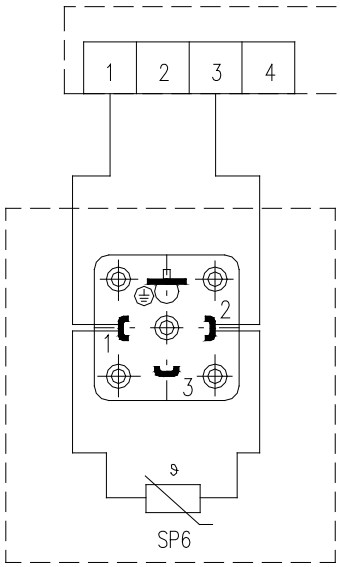
The permanent magnets secure the transmition to the indication case that's why the flow meter is not suitable into the ambient with strong magnetic field.

To connect conductors to angular connector located at the backside of the flow meter, in case of using limited contacts, current outlet or connection of external evaluation devices, follow this chart.



Wiring diagram of the flow meter to the converter with separated indication of momentary flow, type EMKO-ECLM with the display.

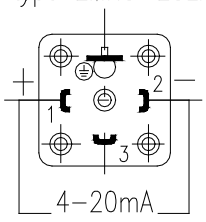
Converter **EMKOMETER-ECLM**



Output 4 up to 20 mA
Power supply from the current loop 11 up to 36 Vss

Output (current loop): U_i=36 V DC
I_i=100 mA
P_i=0,9 W
L_i=350 µH
C_i=55 nF

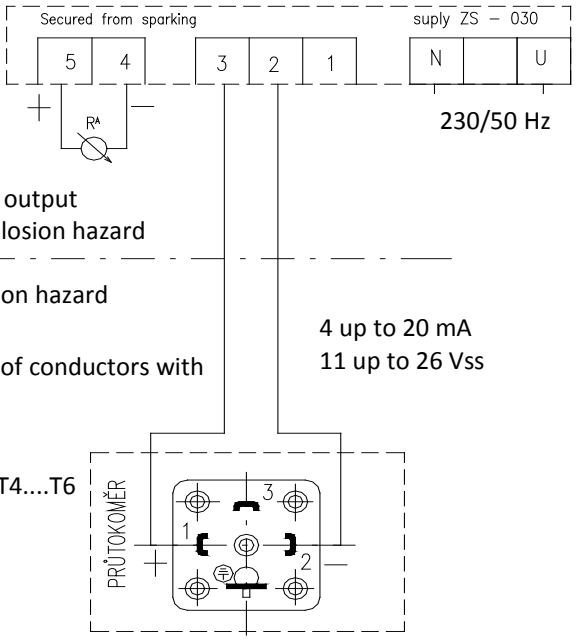
Wiring diagram
of the flow meter output 4–20mA
type EMKO–ECLM



Power supply from the current loop 11 up to 36 Vss
11–26 Vss Ex

Screw possible corrections of a circuit resistance:
Specify in your order or during the adjusting the size of the total circuit resistance Rv.clamps are instrumental to the connection of conductors with profile from 0,5 to 1,5 mm^2.

Wiring diagram of the flow meter and the converter Ex to following equipment, which max. output parameters have to be smaller or equal to corresponding converter max. input parameters of: U_i=26 V DC
I_i=100 mA
P_i=0,9 W
L_i=350 µH
C_i=55 nF



Converter Ex 5102

Screw clamps are instrumental to the connection of conductors with profile from 0,5 to 1,5 mm2.

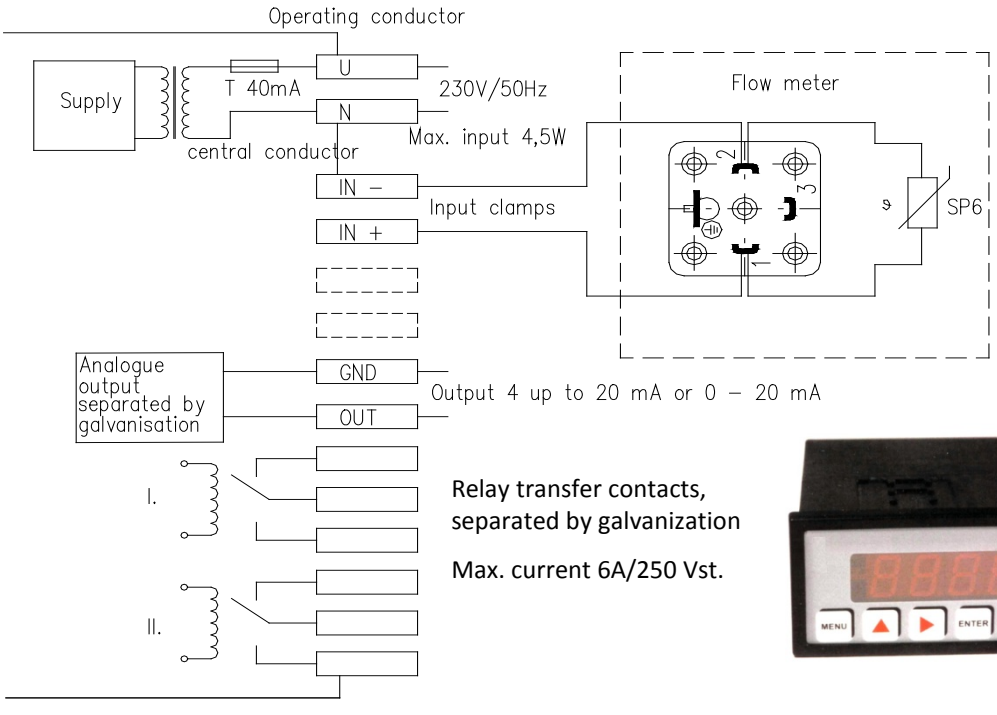
Parameters of the converter

Sparking safety stage: Ex II1G EEX ia IIC T4....T6

Output (current loop): U_i=26 V DC
I_i=100 mA
P_i=0,9 W
L_i=350 µH
C_i=55 nF

The flow meter connector for the current

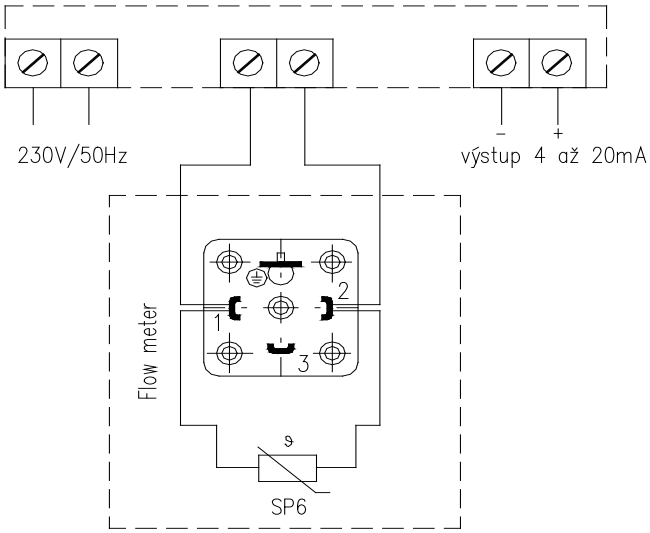
Wiring diagram of the flow meter to the converter with separated indication of momentary flow and with the signalling of two comparative values – type **DMK with contacts**, sectional unit



Relay transfer contacts, separated by galvanization

Max. current 6A/250 Vst.

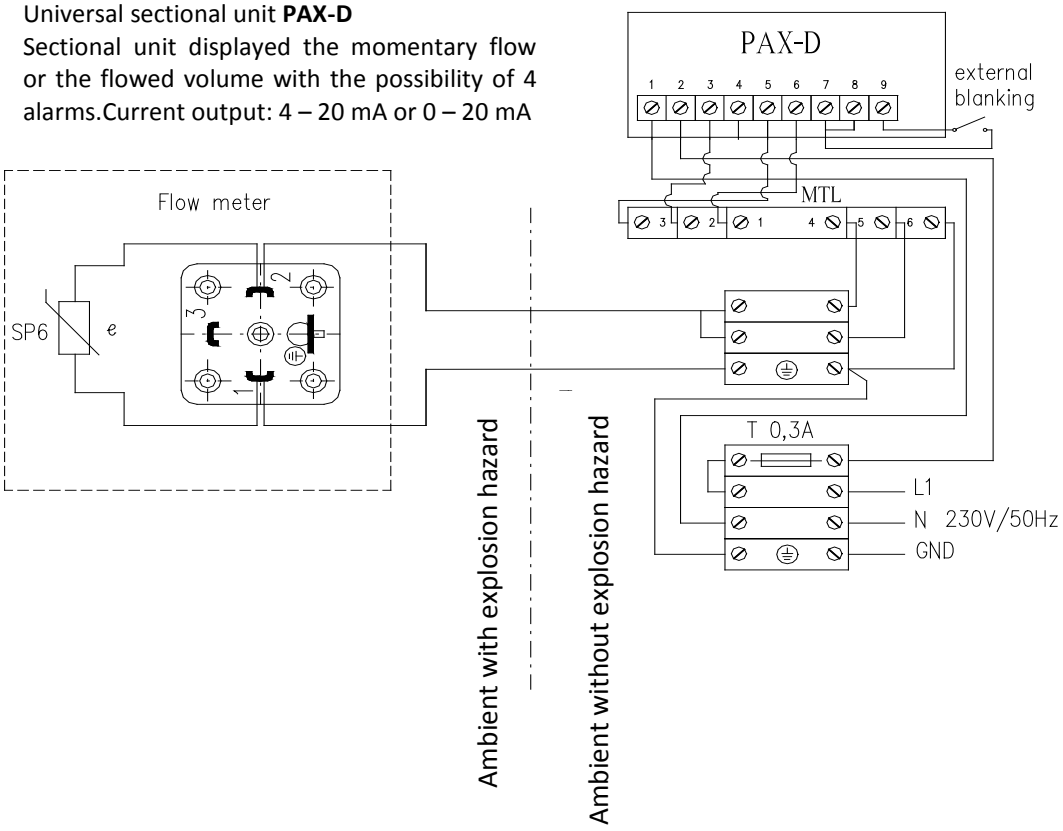
Flow indicator ERT50000



Technical data:

Power supply:	230V/50Hz
Input:	3VA
Display:	8 digits LCD height 11,7 mm
Current output:	active 4 – 20 mA or 0 – 20 mA
	R_{max}=500Ω

Universal sectional unit **PAX-D**
Sectional unit displayed the momentary flow or the flowed volume with the possibility of 4 alarms.Current output: 4 – 20 mA or 0 – 20 mA



Accessories

EMKOMETER - flow meter – flow-keeper is possible to equip with sensors of flow volume

a) Limit contacts - SP5 min contact closed at the flow fall
- SP5 max contact closed at the flow increase

Limit contacts SP5 are monostable and adjustable in 10 – 20% of max.value of momentary flow measuring. Make it as follows:

a) Indicator P with dimensions 130 x 115 mm - screw off 3 pcs bolts M 5 with an internal hexagon on the back side of the case
b) Indicator V with dimensions 178 x 272 mm - screw off 4 pcs bolts M 4 on the front side of the case
   - Remove the front part of the case
   - Screw off 2 pcs bolts of the sensor SP5
   - By the sensor SP5 moving in v arc-channel adjust the required flow value, which evokes the contact closing – opening. To adjust the sensor to higher value, it is possible to evoke the contact opening, closing and opening during the operation.
   - Retighten 2 pcs bolts of the sensor SP5 thereby fix the sensor
   - Check the free movement of the pointer by its slight turning
   - Close the case in opposite way

Max. closing current of contact	0,3 A (1 A by request)
Max. voltage	60 V
Max. closing output	10 W
Max. medium temperature	130°C

We recommend protecting the switch SP5 by connection to locking relay.

b) Continuous reading - SP6 + converter ECLM with linear output 4 – 20 mA
twin wire wiring
11 – 26 Vss for Ex
11 – 36 Vss ambient without explosive hazard

c) Evaluation device DMK- Display of momentary flow, converter with the output e.g. 4 -20 mA or 0 – 20 mA
Output – contact 250 V 6A

d) Flow indicator ERT 50000 - Display of momentary flow - 6 digits
Display of flowed volume, counter A - 8 digits
Counter B - 7 digits – daily counter
Converter 4 - 20 mA , 0 – 20 mA
Power supply 230 V

e) Universal sectional unit PAX – D - Sectional unit displayed the momentary flow or the flowed volume with the possibility of 4 alarms. Current output: 4 - 20 mA or 0 - 20 mA

Testing

The flow meters production covers following tests: material, dimensions, design, surface finish, assembly and marking correctness, tightness and pressure tests. Each device is calibrated individually.

- Individualized calibration of each device
- Tests of material
- Tests of size
- Aspect tests
- Surface finish tests
- Tests of assembling and indication correctness
- Leakage test
- Pressure test

Order

Necessary data:

- Type of the flow meter
- Flow values to be measured during the operation (max, min)
- Measured material
- Pressure
- Temperature
- If it is necessary to sense the flow value – cable length
- Delivery time
- Quantity (pcs)