K - Flow Meter with Float

Application

All-metal flow meters with float – type K are used for signaling and measuring of instant flow, flowed volume of liquid and fluent mediums. In respect of their massive, all-metal (stainless) construction or lining of measuring part with PP, PVDF or PVC they are highly resistant to physical and chemical agents. They are suitable for using in extreme service conditions of especially chemical, energetic, machinery, mining, food-processing industries, material distribution in sewage works, water treatment plants, etc.

Measuring principle

The flow meter is located right into the piping vertically ± 1°, where the measured material flows from bottom to top. (Before the flow meter installation it is necessary to clean the pipe and rinse it out.) The float with magnet freely moves in the measuring part of the flow meter and it is stable in specific position accordance to the flow of measured material. Momentary position of the float is transferred by means of a magnetic connector to the indicator scale. The distance between the device and ferromagnetic materials or the distance among devices has to be 20 cm at least. The devices must not be located in a strong magnetic field.

In case of dirty liquids measuring, it is possible to equip the flow meter inlet with the mechanical or magnetic filter.

This type of flow meter (up to size DN 25) is equipped with the vibration damper located by means of joint system and with the overload protection for measuring of fluent material. This construction excels in low hysteresis.

This flow meter does not require straight smooth lengths of pipes either at an inlet or at an outlet.

Precise local indication of momentary flow values directly on the flow meter scale is possible on request of the customer to complete with limit contacts SP5, which read minimal or maximal momentary flow. Or to complete with contact SP6 with electrical output 4 - 20 mA or with the evaluation device for the indication of momentary flow or/and flowed volume – i.e. totalizer.

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 ATEX II 1/2G Ex ia IIC T6-T4 Ga/Gb with the supply secured from sparking at least. Practically the device produces no warming.

Benefits

Measuring part K

- Measuring part is stainless, standard, resistant to high pressure and temperature
- Conical measuring cone, or float according to specific measuring conditions
- Magnetic transfer of float motion to the pointer is realized by high power magnetic materials with min. ageing influence
- Dumping of float motion – special ball joints construction with min. hysteresis
- Measuring part can be equipped with electrical or steam heating

Measuring part K lined with plastic

- Measurement part is resistant to extreme mechanical and chemical stress
- Suitable for measuring most acids and alkalis

Local indicator

- Direct indication of momentary flow by the pointer on the scale in fixed units
- Type for material high temperatures with the indicator offset and shielding

Limit contacts and converters

- One or two limit contacts
- Converter ECLM with linear outlet
  - 4 - 20 mA
  - 11 - 26 Vss for Ex
  - 11 - 36 Vss ambient without explosion hazard
- Evaluation device DMK with momentary flow indication
- Evaluation device ERT 50000 with indication of momentary flow and flowed volume
- Universal sectional unit PAX-D with indication of momentary flow and flowed volume

Physical engineering laboratory institute granted the Certificate FTZU 02ATEX0454X for flow meters type K with indicators P and V, design ATEX II 1/2G Ex ia IIC T6-T4 Ga/Gb for using in the ambient with explosion hazard.

K – flow meter| Emkometer s.r.o., Na Žižkově 1245, Ledeč n/S., 58401, CZ
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Technical data

Type	K
Measuring range (100% of flow) choose from table Water 20°C Air 101,3 kPa abs. , 20°C	 1 up to 250.000 l/hr 0,18 up to 1300 m^3/hr
Rate of max. and min. measured values	10 : 1
Measuring fault (in % from the rate) KP and KV KP-PP, KV-PP Additional fault of electrical outlet	 ± 1,6 ± 2,5 ± 1%
Measuring part KP, KP-PP, KV and KV-PP	Metal tube with measuring cone or shield Metal tube with measuring cone or shield lined with PP, PVDF, PVC – acc. to measured material
Float type	Conical Conical with damping Cylindrical Material – stainless steel DIN 1.4541, DIN 1.4571, titanium PP, PVDF, PVC – acc. to measured material
Scale	In flow units (on the customer's request)
Rated diameters	DN 15 up to DN 200
Shielding	IP 65, with angular connector IP 54
Flange connection acc. to CSN	DN 15 up to DN 200 DN 15 and DN 25 / PN 16 or Ermeto 12 – heating Food-processing connection acc. to DIN 11851
Max. working temperature of measured material in accordance with thermal category 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 medium without sensors max. ambient temperature ≤120°C KP and KV KP-PP, KV-PP KP-PVC, KV-PVC	 300°C (higher on request) 150°C 60°C
Max. ambient temperature with using of SP6 sensors – analogue output Max. ambient temperature with using of sensors in ambient with explosion hazard Max. ambient temperature with using of sensors SP5, SP6 – analogue output, converter outside flow meter	85°C (acc. to temperature of measured medium) 60°C 130°C
Max. working pressure	1,6 MPa – stainless 20 MPa – optional

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

Measuring ranges

DN	Type	Measuring range l/h	Measuring range m^3/h	Max. pressure loss mbar
		Water 20°C	Air 20°C, 101,3 kPa	
15	K1	1 - 40	0,18 - 1,2	17
15	K12	6 - 60	0,22 - 1,8	17
15	K13	10 - 100	0,30 - 3,0	22
15	K14	16 - 160	0,45 - 4,5	19
15	K15	25 - 250	0,70 - 7,5	20
15	K16	40 - 400	1,10 - 11	21
15	K17	54 - 540	1,30 - 13	22
15	K18	65 - 650	1,60 - 16	26
15	K19	100 – 1 000	1,90 - 19	35
25	K21	68 - 680	1,70 - 17	10
25	K22	100 – 1 000	2,00 - 20	10
25	K23	160 – 1 600	3,00 - 30	10
25	K24	190 – 1 900	3,40 - 34	11
25	K25	280 – 2 800	4,00 - 40	11
50	K51	400 – 4 000	5,00 - 50	8
50	K52	490 – 4 900	7,00 - 70	12
50	K53	580 – 5 800	9,00 - 90	16
50	K54	800 – 8 000	11,00 - 110	16
50	K55	1 100 – 11 000	13,00 - 130	17
50	K56	1 400 – 14 000	15,00 - 150	26
50	K57	1 900 – 19 000	22,00 - 220	32
50	K58	2 500 – 25 000	26,00 - 260	36
80	K81	2 600 – 26 000	28,00 - 280	16
80	K82	3 000 – 30 000	30,00 - 300	18
80	K83	3 500 – 35 000	35,00 - 350	20
80	K84	3 900 – 39 000	50,00 - 500	21
100	K100	4 000 – 30 000	80,00 - 800	23
100	K101	6 300 – 63 000	120,00 - 1 200	31
125	K121	5 000 – 50 000	130,00 - 1 300	20
125	K122	5 500 – 75 000		22
125	K123	6 000 – 83 000		23
125	K124	15 000 – 150 000		27
150	K151	5 000 – 50 000		17
150	K152	5 500 – 55 000		19
150	K153	7 500 – 75 000		21
150	K154	10 000 – 190 000		23
150	K155	12 500 – 125 000		24
200	K201	14 000 – 140 000		20
200	K202	19 000 – 190 000		29
200	K203	25 000 – 250 000		39

Above mentioned data are valid for materials mentioned in the table. For other liquids, gasses or mixtures the measuring ranges should be calculated and set up in accordance with temperature, pressure, density and viscosity of measured medium.

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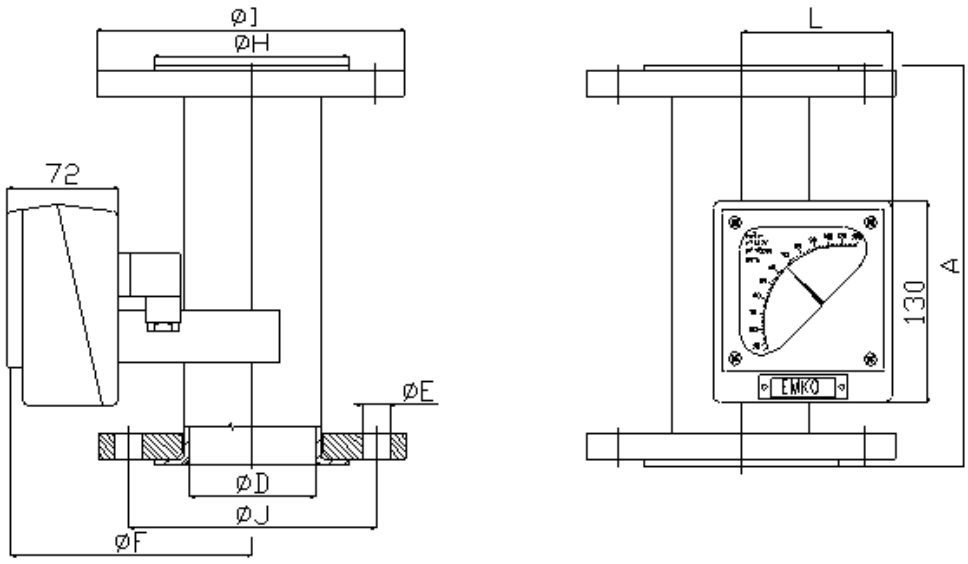
KP, KP-PP, KP-PVC with flange connection



Total connection dimensions, weights of flow meters KP, KP-PP, KP-PVC with flange connection

DN	A	D	H	J	I	E	F	L	Weight
15	250	23	45	65	90	4x∅14	112	65	2,4
25	250	33	60	85	110	4x∅14	112	65	3
50	250	60	90	125	155	4x∅18	112	77	6
80	400	80	110	160	190	8x∅18	130	90	8,5
100	450	110	148	180	210	8x∅18	150	105	15
125	500	142	188	210	245	8x∅18	180	130	27
150	550	160	212	240	280	8x∅22	210	170	35
200	600	210	268	295	335	12x∅22	250	220	45

Total connection dimensions, weights of flow meters KV, KV-PP, KV-PVC with flange connection

KV, KV-PP, KV-PVC with flange connection

					I	E	F	L	Weight
15	250	23	45	65	90	4x∅14	112	147	2,8
25	250	33	60	85	110	4x∅14	112	147	3,4
50	250	60	90	125	155	4x∅18	112	160	6,4
80	400	80	110	160	190	8x∅18	130	172	8,9
100	450	110	148	180	210	8x∅18	150	187	15,4
125	500	142	188	210	245	8x∅18	180	212	27,4
150	550	160	212	240	280	8x∅22	210	252	35,4
200	600	210	268	295	335	12x∅22	250	300	45,4

Assembly, service and maintenance

The flow meters are located in the piping vertically ±1° inlet from below. 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, filter cleaning at the inlet, if it is installed.

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If it is necessary, clean the magnetic float, which is possible to take out from the flow meter:

1. The flow meter with the crossbar guide of a float and damping in the upper part of the flow meter. Take out the retaining ring in the upper part of the device and take out the damping cylinder. Loosen (best by the special spanner) the nut and the bottom cross of the float; take out the float, clean it and also the internal space of the device.
2. The flow meter with the bar guide of a float and damping in the bottom part of the flow meter. Take out the retaining ring in the upper part of the device and take out the upper guide of the float and then the float itself. Clean the float and also the internal space of the flow meter. Some types of flow meters have the possibility to take out also the bottom-damping cylinder.

The damping is used for measuring of compressible materials.

Adjusting or reduction valve has to be located into the piping in such a way to secure fixed pressure value in the flow meter and corresponding to the value mentioned at the device scale. In like manner secure the temperature values.

This flow meter does not require straight parts of pipes either at inlet or at outlet. The device is not suitable to use in the ambient with strong magnetic fields.

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:

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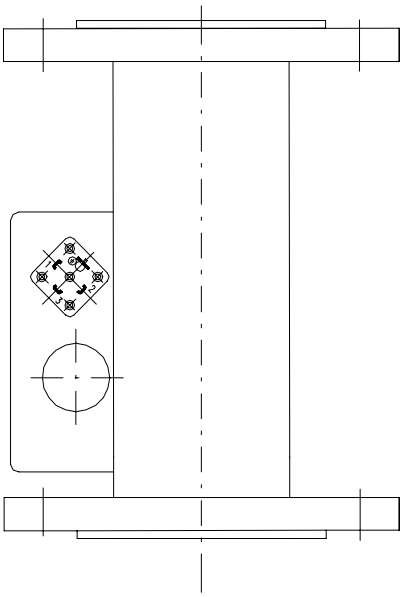
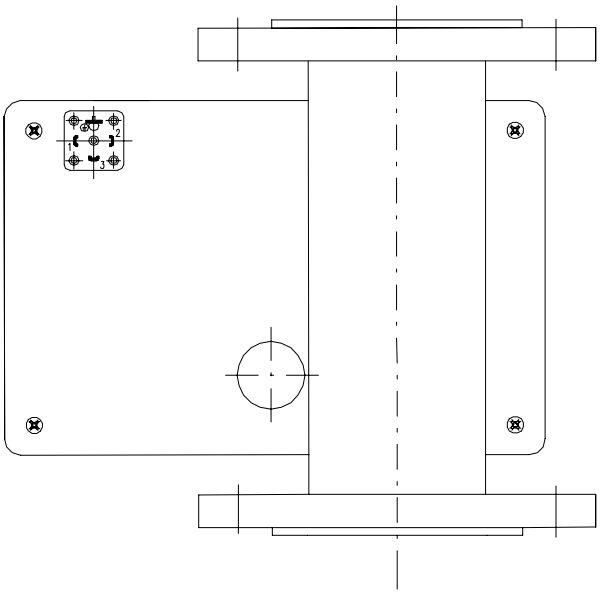
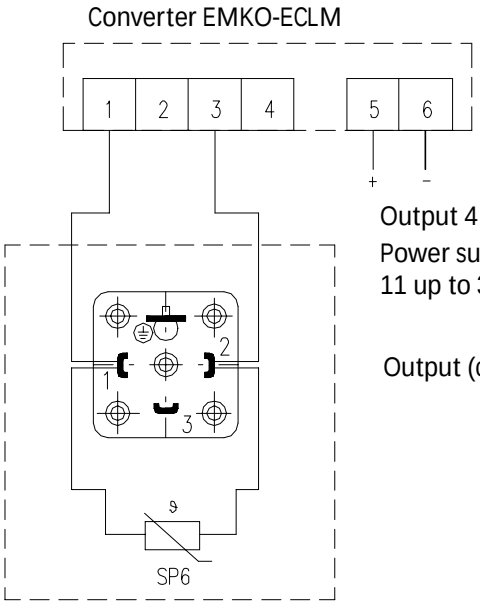
Flow meter type K - P



Flow meter type K - V



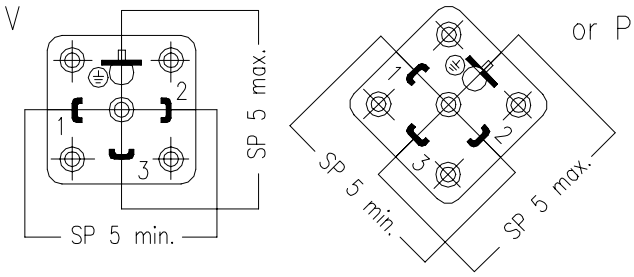
Wiring diagram of the flow meter to the converter with separated indication of momentary flow, type EMKO-ECLM with the display.



sensor

SP 5 min., contact closed at the flow fall

SP 5 max., contact closed at the flow increase

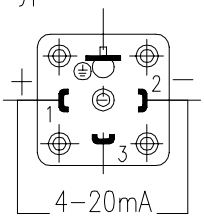


Output 4 up to 20 mA

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

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.

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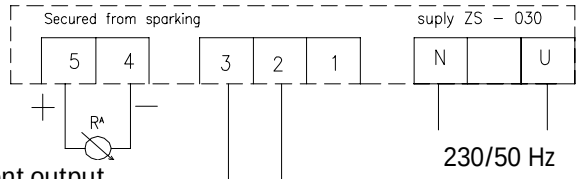
Wiring diagram of the flow meter with the converter Ex to following equipment, which max. output parameters have to be smaller or equal to corresponding converter max. input parameters of:

U_i=26 V DC
I_i=100 mA
P_i=0,9 W
L_i=350 µH
C_i=55 nF



00(4) - 20 mA Current output
Ambient without explosion hazard

Ambient with explosion hazard

Converter Ex 5102

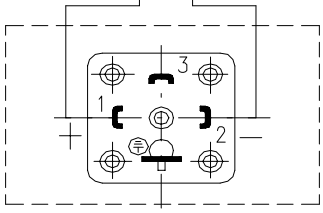
4 up to 20 mA
11 up to 26 Vss

Screw clamps are instrumental to the connection of conductors with profile from 0.5 to 1.5 mm2.

Parameters of the converter

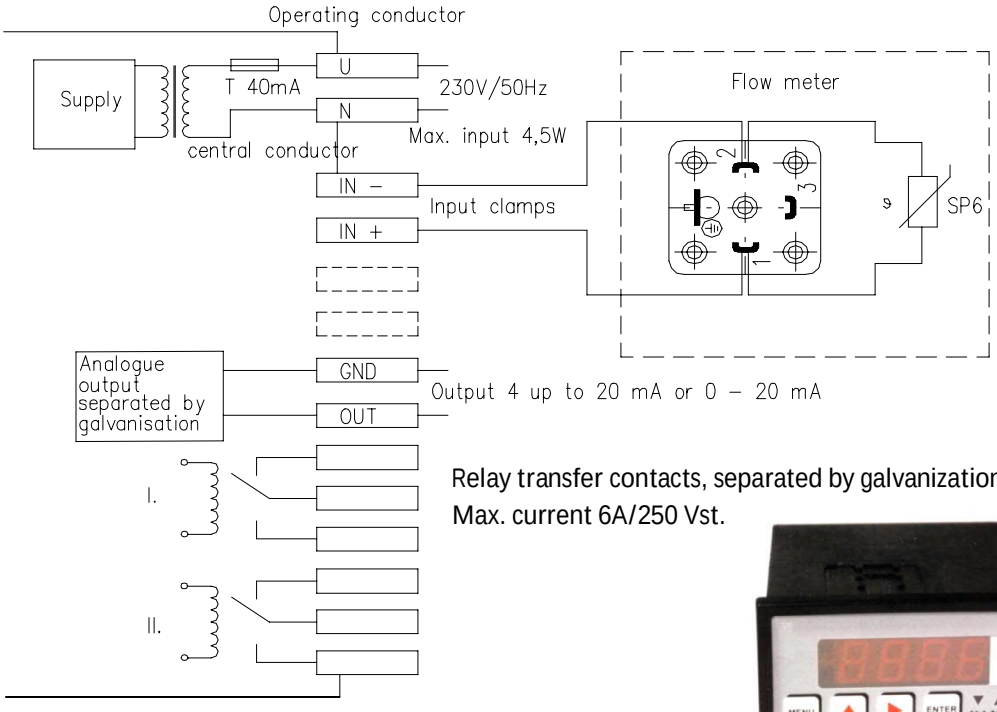
Sparking safety stage: II1G EEX ia IIC T4....T6

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



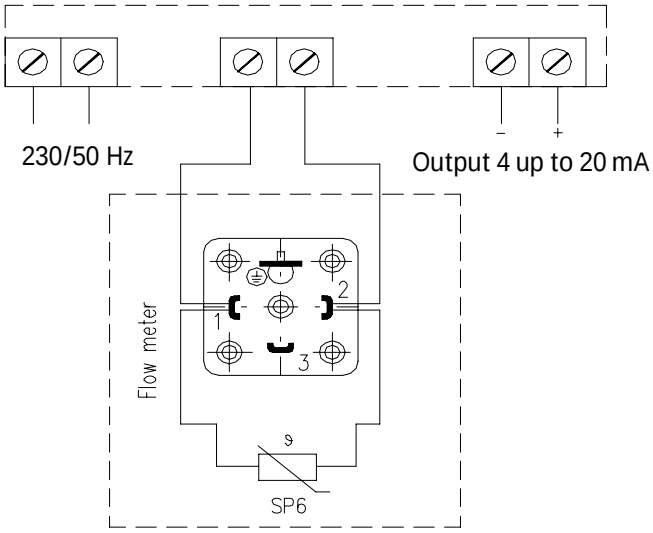
The flow meter connector for the current

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



Relay transfer contacts, separated by galvanization
Max. current 6A/250 Vst.

Flow indicator ERT50000

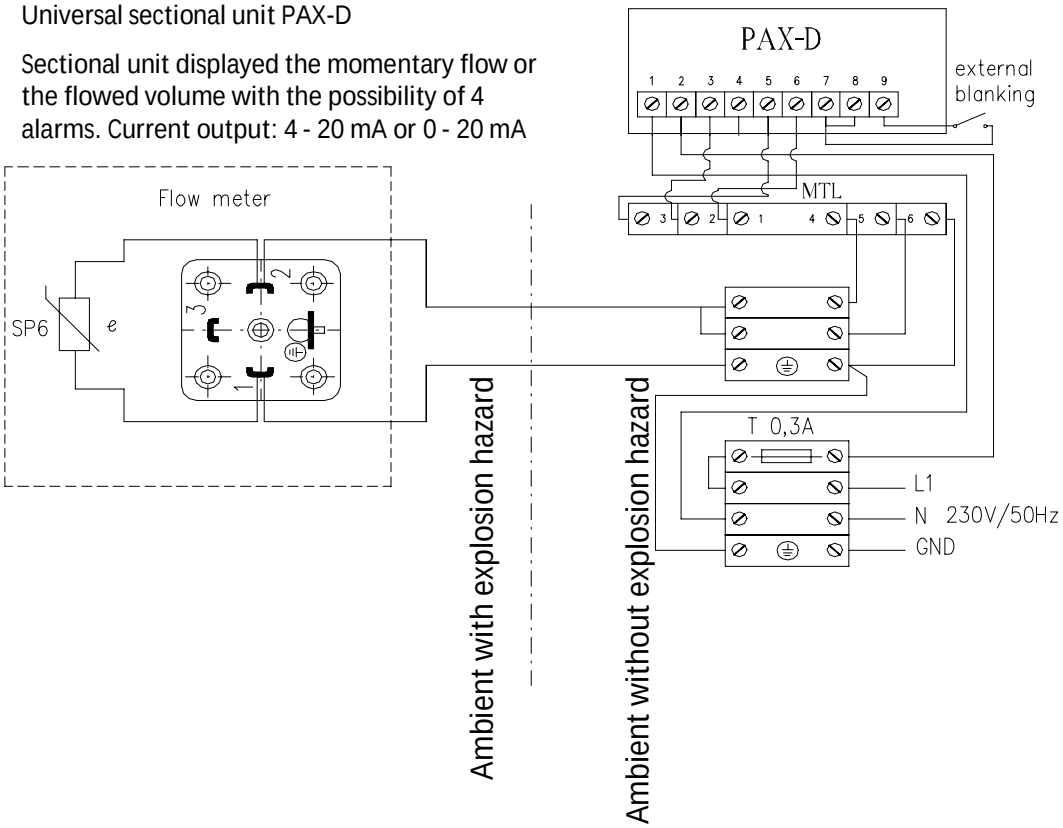


Technical data

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



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Accessories

EMKO - 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 measurement.

a) Indicator P with dimensions 130 x 115 mm - screw off 3 pcs of 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 of bolts M 4 on the front side of the case
   - Remove the front part of the case
   - Screw off 2 pcs of bolts of the sensor SP5
   - By moving the sensor SP5 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 of 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 on request)
Max. voltage	60 V
Max. closing output	10 W
Max. ambient temperature	130°C

We recommend protecting the switch SP5 by connection to the 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

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e) Universal sectional unit PAX – D	Displayed momentary flow Displayed flowed volume 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.

Order

Necessary data

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

Example

We order 1 pc of all-metal flow meter type K 21 for the measuring of the airflow 1600 – 16000 Nl/hr, temperature 20°C, and absolute pressure 201,35 kPa (overpressure 100 kPa).

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