

## Magnetic Inductive Flow Meter



- Measuring range:  
 0...3,3 m<sup>3</sup>/h, DN10 up to  
 0...33929 m<sup>3</sup>/h, DN1000
- Accuracy:  
 ±0.3 % of reading
- p<sub>max</sub> PN 40; t<sub>max</sub> 180 °C
- Flange DN 10...1000,  
 DIN/ANSI
- Analogue, frequency,  
 connection and  
 status output
- No pressure drop  
 because of pipe restriction
- No influence of the density,  
 viscosity and temperature  
 on the measurement results
- Complete draining  
 possible



KOBOLD companies worldwide:

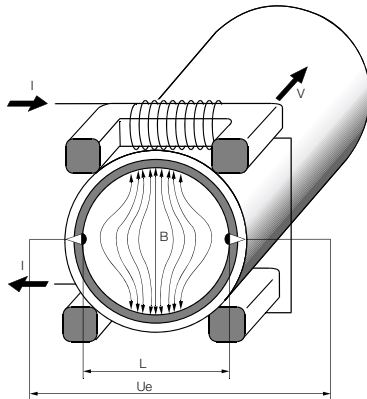
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**Model:**  
 MID

## Description

The new MID-type KOBOLD flow meters operates according to the magnetic induction measurement principle. According to Faraday's Law of magnetic induction a voltage is induced in a conductor moving through a magnetic field. The electrically conductive measuring agent acts as the moved conductor. The voltage induced in the measuring agent is proportional to the flow velocity and is therefore a value for the volumetric flow. The flowing media must have a minimum conductivity. The induced voltage is picked up by two sensing electrodes which are in contact with the measuring agent and sent to the measuring amplifier. The flow rate will be calculated based on the cross sectional area of the pipe. The measurement is not depending on the process liquid and its material properties such as density, viscosity and temperature.



## Applications

All fluids can be measured with a minimum conductivity of  $>5 \mu\text{S/cm}$  (for deionized water  $>20 \mu\text{S/cm}$ ).

### MID-1

- Drinking water
- Raw water, sea water
- Ground water for irrigation
- Sewage, sludge
- Cooling water
- Leakage monitoring
- Mining, metal processing

### MID-2

- Acids, caustic solutions in chemical and pharmaceutical industries
- Water and hot water in power plants
- Industrial effluent
- Paper industry
- Metal processing
- Abrasive agents
- Liquids with high levels of solids

## Technical data

End values in the measurement range:	0,3...12 m/s (see also the table)
Accuracy:	$\pm 0.3\%$ of the measured value $\pm 2 \text{ mm/s}$ (DN10-600) $\pm 0.5\%$ of the measured value $\pm 2 \text{ mm/s}$ (DN700-1000) (see also accuracy diagram)
Repeatability:	$\pm 0.1\%$
Solid content:	$< 3\%$ (by volume)
Conductivity:	at least $5 \mu\text{S/cm}$ (liquids except water) at least $20 \mu\text{S/cm}$ (water)
Operating temp.:	-5...+90 °C (PP-lining) -5...+80 °C (Ebonite) -40...+120 °C (PTFE/PFA lining, compact version) -40...+180 °C (PTFE/PFA lining, separate version) -40...+120 °C (ETFE- lining)
Ambient temp.:	-25...+60 °C (compact version or wall mounted electronic board) -40...+65 °C (separate version, measurement sensor)
Max. pressure:	PN 40
<b>Materials</b>	
Lining materials:	polypropylene, ebonite, PTFE, ETFE or PFA
Electrodes:	Hastelloy C4, stainless steel 1.4571, tantalum, platinum or titanium
Earthing washers:	Hastelloy C4, stainless steel 1.4571, titanium
Flange:	steel or stainless steel 1.4404
Measuring tube:	stainless steel
Sensor housing:	steel, with polyurethane lining
Electronic case:	mounting plate: painted Aluminium Cover: polyurethane (compact version) Polyamide/polycarbonate (wall housing)
Connection box:	painted Aluminium (separate version on sensor)
Display:	three-line LCD display; 8 digits + 10 digits + 6 markers
Languages :	German, English, French
Display function:	present flow, forwards and backwards counter, and totalizer (7 digits), or 25-digit bar graph indication with percentage indication and status messages



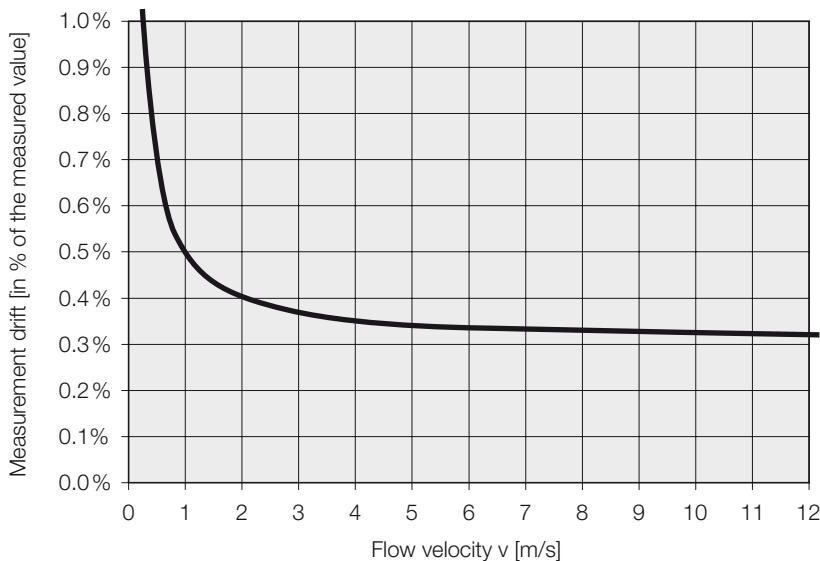
**Technical data (continued)**

Other functions:	cable duct monitoring, readout attenuation, electrode cleaning (optional)	Status output:	F/B monitoring, limit value, pipe duct, Error; active/passive
Time constant:	0.2 - 99.9 s in 0.1 second-steps adjustable	Electr. connection:	cable gland M20x1.5 or thread connection 1/2 NPT
<b>low flow cut-off</b>		Signal transmission:	5-300 m (separate version)
switch-on threshold:	1 - 19% of Q 100%, in 1%-steps	Power supply:	230 V <sub>AC</sub> , 115 V <sub>AC</sub> (48 - 63 Hz) or 24 V <sub>DC</sub>
switch-off threshold:	2 - 20% of Q 100%, in 1%-steps	Input:	5 VA (AC); 4.5 W (CC)
Current output:	0(4) - 20 mA; active/passive	Type of protection:	IP 65 or NEMA 4 / 4X IP 66/67 or NEMA 4 / 4X / 6 (separate version, sensor) IP 68 on request
Max. load:	500 Ω by active connection		
Pulse output:	Pulse/volume; Pulse/time; active/passive		

**Vacuum resistance**

Lining	Flange [mm]	Minimum pressure [mbar abs.] at an operating temperature of...								
		20°C	40°C	60°C	70°C	80°C	100°C	120°C	140°C	180°C
Polypropylene/Ebonite	DN10-150	250	250	400	400	400	-	-	-	-
Ebonite	DN200-300	250	250	400	400	400	-	-	-	-
	DN350-1000	500	500	600	600	600	-	-	-	-
PTFE	DN10-20	0	0	0	0	0	0	500	750	1000
	DN200-300	500	500	750	1000	1000	1000	1000	1000	1000
	DN350-600	800	1000	1000	1000	1000	1000	1000	1000	1000
ETFE	DN200-1000	100	100	100	100	100	100	100	-	-
PFA	DN25-150	0	0	0	0	0	0	0	0	0

**Accuracy diagram**

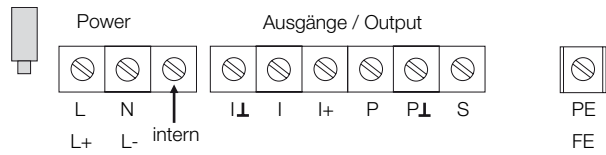




**End values in the measurement range**

DN	Q <sub>100%</sub> in m <sup>3</sup> /h		
	0,3 m/s	3 m/s	12 m/s
10	0.085	0.848	3.393
15	0.191	1.909	7.634
20	0.339	3.393	13.57
25	0.530	5.301	21.21
32	0.869	8.686	34.74
40	1.357	13.57	54.29
50	2.121	21.21	84.82
65	3.584	35.84	143.4
80	5.429	54.29	217.2
100	8.482	84.82	339.3
125	13.25	132.5	530.2
150	19.09	190.9	763.4
200	33.93	339.3	1357
250	53.01	530.1	2121
300	76.34	763.4	3054
350	103.9	1039	4156
400	135.7	1357	5429
450	171.8	1718	6871
500	212.1	2121	8482
600	305.4	3054	12215
700	415.6	4156	16625
800	542.9	5429	21715
900	687.1	6871	27482
1000	848.2	8482	33929

**Electrical connection**



**Pressure rating**

Nominal pressure acc. to the connection type	Nominal diameter																								
	10 / DN 10	15 / DN 15	20 / DN 20	25 / DN 25	32 / DN 32	40 / DN 40	50 / DN 50	65 / DN 65	80 / DN 80	1H / DN 100	1Z / DN 125	1F / DN 150	2H / DN 200	2F / DN 250	3H / DN 300	3F / DN 350	4H / DN 400	4F / DN 450	5H / DN 500	6H / DN 600	7H / DN 700	8H / DN 800	9H / DN 900	11 / DN 1000	
EN 1092-1 - PN 40	S	S	S	S	S	S	S	O	S	O	O	O	O	O	O	O	O	O	O	O	÷	÷	÷	÷	
EN 1092-1 - PN 25	÷	÷	÷	÷	÷	÷	÷	O	÷	O	O	O	O	O	O	O	O	O	O	O	O	÷	÷	÷	÷
EN 1092-1 - PN 16	÷	÷	÷	÷	÷	÷	÷	S	÷	S	S	S	O	O	O	O	O	O	O	O	O	÷	÷	÷	÷
EN 1092-1 - PN 10	÷	÷	÷	÷	÷	÷	÷	÷	÷	÷	÷	÷	S	S	S	S	S	S	S	S	S	S	S	S	
ANSI B16.5 - 150 lbs RF	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	÷	÷	÷	÷
ANSI B16.5 - 300 lbs RF	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	÷	÷	÷	÷

S=Standard; O=Option; ÷=on request



**Order details** (ordering example: **MID-1A 25 H 0 A A 0 0 L**)

**Water and sewage applications**

Type / type of connection*	Nominal diameter*	Lining	Electrodes material	Version	Gland	Power supply of electronics	Option	Mounting position
<b>MID-1A</b> = Flange steel, PN 40 <b>MID-1B</b> = Flange steel, PN 25 <b>MID-1C</b> = Flange steel, PN 16 <b>MID-1D</b> = Flange steel, PN 10 <b>MID-1F</b> = Flange st. steel 1.4404, PN 40 <b>MID-1G</b> = Flange st. steel 1.4404, PN 25 <b>MID-1H</b> = Flange st. steel 1.4404, PN 16 <b>MID-1K</b> = Flange st. steel 1.4404, PN 10 <b>MID-1L</b> = ANSI-Flange steel, 150 lbs <b>MID-1M</b> = ANSI-Flange steel, 300 lbs <b>MID-1R</b> = ANSI-Flange st. steel 1.4404, 150 lbs <b>MID-1S</b> = ANSI-Flansch st. steel 1.4404, 300 lbs	25 = DN 25 / 1" 32 = DN 32 40 = DN 40 / 1½" 50 = DN 50 / 2" 65 = DN 65 80 = DN 80 / 3" 1H = DN 100 / 4" 1Z = DN 125 / 5" 1F = DN 150 / 6"	H = Ebonite  P = PP-lining	0 = Hastelloy C4 (standard)  1 = stainl. steel DIN 1.4571/316Ti  6 = Titanium	A = compact vers. B = separate version with 5 m cable C = separate version with 10 m cable D = separate version with 15 m cable E = separate version with 20 m cable F = separate version with 25 m cable G = separate version with 30 m cable H = separate version with 40 m cable I = separate version with 50 m cable K = separate version with 100 m cable	A = M20x1.5 with cable gland  B = with ½ NPT adapter  C = M20x1.5 with G ½ adapter	0 = 230 V <sub>AC</sub> 4 = 115 V <sub>AC</sub> 1 = 48 V <sub>AC</sub> 2 = 24 V <sub>AC</sub> 3 = 24 V <sub>DC</sub>	0 = Standard 2 = Readout stability 3 = Pipe duct monitoring 4 = Electrode cleaning	L = from the left to the right, display on the upper part (standard)  R = from the right to the left, display on the upper part  B = from the bottom to the top, display on the right  T = from the top to the bottom, display on the right
	2H = DN 200 / 8" 2F = DN 250 / 10" 3H = DN 300 / 12" 3F = DN 350 / 14" 4H = DN 400 / 16" 4F = DN 450 5H = DN 500 / 20" 6H = DN 600 / 24" 7H = DN 700 / 28" 8H = DN 800 / 32" 9H = DN 900 / 36" 1T = DN 1000 / 40"	H = Ebonite	4 = Hastelloy B2 5 = Tantal 6 = Titanium 7 = Platinum	A = compact vers. B = separate version with 5 m cable C = separate version with 10 m cable D = separate version with 15 m cable E = separate version with 20 m cable F = separate version with 25 m cable G = separate version with 30 m cable H = separate version with 40 m cable I = separate version with 50 m cable K = separate version with 100 m cable	A = M20x1.5 with cable gland  B = with ½ NPT adapter  C = M20x1.5 with G ½ adapter	0 = 230 V <sub>AC</sub> 4 = 115 V <sub>AC</sub> 1 = 48 V <sub>AC</sub> 2 = 24 V <sub>AC</sub> 3 = 24 V <sub>DC</sub>	0 = Standard 2 = Readout stability 3 = Pipe duct monitoring 4 = Electrode cleaning	L = from the left to the right, display on the upper part (standard)  R = from the right to the left, display on the upper part  B = from the bottom to the top, display on the right  T = from the top to the bottom, display on the right

**Process and chemical applications**

Type / type of connection*	Nominal diameter*	Lining	Electrodes material	Version	Gland	Power supply of electronics	Option	Mounting position
<b>MID-2A</b> = Flange steel, PN 40 <b>MID-2B</b> = Flange steel, PN 25 <b>MID-2C</b> = Flange steel, PN 16 <b>MID-2D</b> = Flange steel, PN 10 <b>MID-2F</b> = Flange st. steel 1.4404, PN 40 <b>MID-2G</b> = Flange st. steel 1.4404, PN 25 <b>MID-2H</b> = Flange st. steel 1.4404, PN 16 <b>MID-2K</b> = Flange st. steel 1.4404, PN 10 <b>MID-2L</b> = ANSI-Flange steel, 150 lbs <b>MID-2M</b> = ANSI-Flange steel, 300 lbs <b>MID-2R</b> = ANSI-Flange st. steel 1.4404, 150 lbs <b>MID-2S</b> = ANSI-Flansch st. steel 1.4404, 300 lbs	10 = DN 10 / ¾" 15 = DN 15 / ½" 20 = DN 20	T = PTFE lining	0 = Hastelloy C4 (standard)  1 = stainl. steel DIN 1.4571/316Ti  4 = Hastelloy B2 5 = Tantal 6 = Titanium 7 = Platinum	A = compact vers. B = separate version with 5 m cable C = separate version with 10 m cable D = separate version with 15 m cable E = separate version with 20 m cable F = separate version with 25 m cable G = separate version with 30 m cable H = separate version with 40 m cable I = separate version with 50 m cable K = separate version with 100 m cable	A = M20x1.5 with cable gland  B = with ½ NPT adapter  C = M20x1.5 with G ½ adapter	0 = 230 V <sub>AC</sub> 4 = 115 V <sub>AC</sub> 1 = 48 V <sub>AC</sub> 2 = 24 V <sub>AC</sub> 3 = 24 V <sub>DC</sub>	0 = Standard 2 = Readout stability 3 = Pipe duct monitoring 4 = Electrode cleaning	L = from the left to the right, display on the upper part (standard)  R = from the right to the left, display on the upper part  B = from the bottom to the top, display on the right  T = from the top to the bottom, display on the right
	25 = DN 25 / 1" 32 = DN 32 40 = DN 40 / 1½" 50 = DN 50 / 2" 65 = DN 65 80 = DN 80 / 3" 1H = DN 100 / 4" 1Z = DN 125 / 5" 1F = DN 150 / 6"	A = PFA lining	4 = Hastelloy B2 5 = Tantal 6 = Titanium 7 = Platinum	A = compact vers. B = separate version with 5 m cable C = separate version with 10 m cable D = separate version with 15 m cable E = separate version with 20 m cable F = separate version with 25 m cable G = separate version with 30 m cable H = separate version with 40 m cable I = separate version with 50 m cable K = separate version with 100 m cable	A = M20x1.5 with cable gland  B = with ½ NPT adapter  C = M20x1.5 with G ½ adapter	0 = 230 V <sub>AC</sub> 4 = 115 V <sub>AC</sub> 1 = 48 V <sub>AC</sub> 2 = 24 V <sub>AC</sub> 3 = 24 V <sub>DC</sub>	0 = Standard 2 = Readout stability 3 = Pipe duct monitoring 4 = Electrode cleaning	L = from the left to the right, display on the upper part (standard)  R = from the right to the left, display on the upper part  B = from the bottom to the top, display on the right  T = from the top to the bottom, display on the right
	2H = DN 200 / 8" 2F = DN 250 / 10" 3H = DN 300 / 12" 3F = DN 350 / 14" 4H = DN 400 / 16" 4F = DN 450 5H = DN 500 / 20" 6H = DN 600 / 24" 7H = DN 700 / 28" 8H = DN 800 / 32" 9H = DN 900 / 36" 1T = DN 1000 / 40"	E = ETFE lining  T = PTFE lining  E = ETFE-lining	4 = Hastelloy B2 5 = Tantal 6 = Titanium 7 = Platinum	A = compact vers. B = separate version with 5 m cable C = separate version with 10 m cable D = separate version with 15 m cable E = separate version with 20 m cable F = separate version with 25 m cable G = separate version with 30 m cable H = separate version with 40 m cable I = separate version with 50 m cable K = separate version with 100 m cable	A = M20x1.5 with cable gland  B = with ½ NPT adapter  C = M20x1.5 with G ½ adapter	0 = 230 V <sub>AC</sub> 4 = 115 V <sub>AC</sub> 1 = 48 V <sub>AC</sub> 2 = 24 V <sub>AC</sub> 3 = 24 V <sub>DC</sub>	0 = Standard 2 = Readout stability 3 = Pipe duct monitoring 4 = Electrode cleaning	L = from the left to the right, display on the upper part (standard)  R = from the right to the left, display on the upper part  B = from the bottom to the top, display on the right  T = from the top to the bottom, display on the right

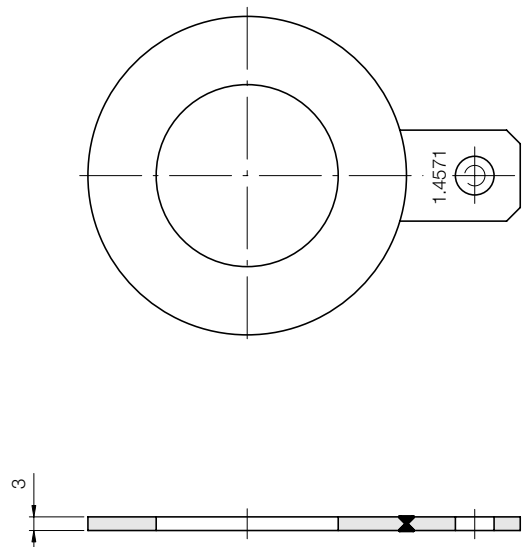
\* The combination connection type ↔ Nominal diameter is described in the table "pressure rating."



**Accessories earthing washers**

**Order information** (ordering example: MID-ZEA 10 01)

Type / type of connection MID	Nominal diameter	Earthing washers material / washers thickness
<b>MID-ZEA</b> = for DIN-flange connection  <b>MID-ZEL</b> = for ANSI-flange connection	<b>10</b> = nominal diameter DN 10	<b>01</b> = stainless steel DIN 1.4571 (316Ti) Thickness: 3 mm  <b>00</b> = Hastelloy C4 / 3 mm  <b>05</b> = Tantal / 0,5 mm  <b>06</b> = Titanium / 3 mm
	<b>15</b> = nominal diameter DN 15	
	<b>20</b> = nominal diameter DN 20	
	<b>25</b> = nominal diameter DN 25	
	<b>32</b> = nominal diameter DN 32	
	<b>40</b> = nominal diameter DN 40	
	<b>50</b> = nominal diameter DN 50	
	<b>65</b> = nominal diameter DN 65	
	<b>80</b> = nominal diameter DN 80	
	<b>1H</b> = nominal diameter DN 100	
	<b>1Z</b> = nominal diameter DN 125	
	<b>1F</b> = nominal diameter DN 150	
	<b>2H</b> = nominal diameter DN 200	
	<b>2F</b> = nominal diameter DN 250	
	<b>3H</b> = nominal diameter DN 300	
	<b>3F</b> = nominal diameter DN 350	
	<b>4H</b> = nominal diameter DN 400	
	<b>4F</b> = nominal diameter DN 450	
	<b>5H</b> = nominal diameter DN 500	
<b>6H</b> = nominal diameter DN 600		
<b>7H</b> = nominal diameter DN 700		
<b>8H</b> = nominal diameter DN 800		
<b>9H</b> = nominal diameter DN 900		
<b>1T</b> = nominal diameter DN 1000		



**Please note:** two earthing washers are required for connecting the KOBOLD-MID to non conductive pipes.

**Dimensions and weights**

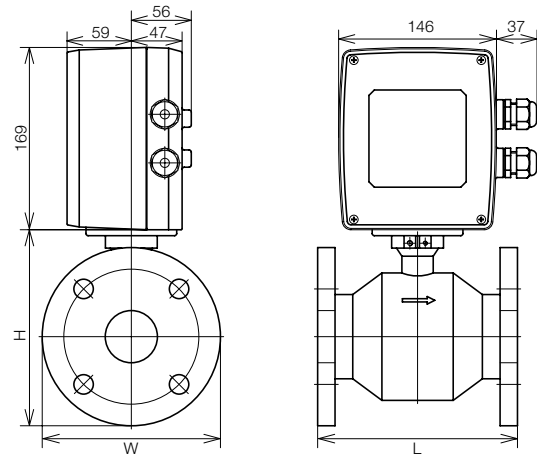
Nominal diameter		Dimensions in mm			Weight** [kg]
DN [mm]	PN [bar]	L*	H	W	
10	40	150	165	121	5.0
15	40	150	165	121	5.0
20	40	150	165	121	7.0
25	40	150	141	115	7.0
32	40	150	157	140	8.0
40	40	150	166	150	8.0
50	40	200	185	165	8.0
65	16	200	199	185	10.0
80	40	200	209	200	12.0
100	16	250	237	220	15.0
125	16	250	266	250	19.0
150	16	300	299	285	22.0
200	10	350	357	340	34.0
250	10	400	405	395	48.0
300	10	500	455	445	58.0
350	10	500	507	505	78.0
400	10	600	563	565	98.0
450	10	600	613	615	on request
500	10	600	667	670	128.0
600	10	600	777	780	164.0
700	10	700	893	895	245.0
800	10	800	1009	1015	328.0
900	10	900	1111	1115	425.0
1000	10	1000	1221	1230	507.0

\* Total fitting length for measuring sensor + 2 optional earthing washers + 2 seals.  
Dimension L + 2 x 3 mm + 2 x seal thickness.

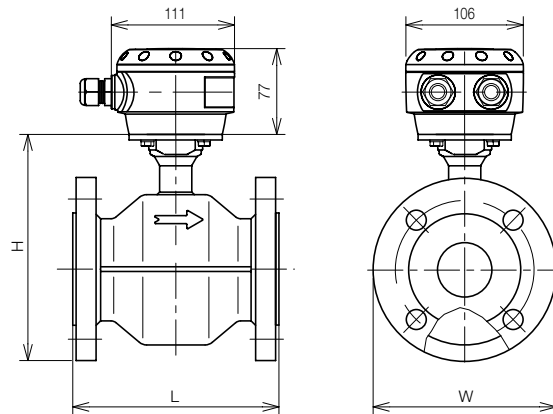
\*\* Weight of the sensor with DIN flanges.  
All flanges are acc. to EN 1092-1

**Dimensions and weights**

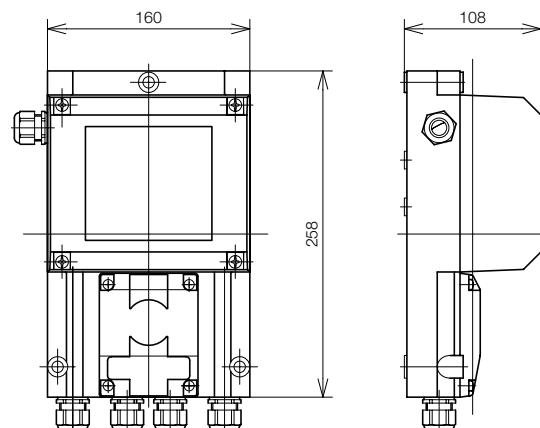
**MID compact version**



**MID separate sensor version**



**Wall mount of the electronics enclosure**





**Dimensions and weights**

Nominal diameter		Flange dimensions with 150 lbs in inches			Weight***
ANSI	[psig]*	L**	H	W	[lbs]
3/8"	284	5.12	8.23	3.50	13.2
1/2"	284	5.12	8.23	3.50	13.2
1"	284	5.91	5.39	4.25	17.6
1 1/2"	284	5.91	6.10	5.00	19.8
2"	284	7.87	7.05	6.00	17.6
3"	284	7.87	8.03	7.50	29.0
4"	284	9.84	9.49	9.00	40.0
5"	284	9.84	10.55	10.00	x
6"	284	11.81	11.69	11.00	58.0
8"	284	13.78	14.29	11.00	95.0
10"	284	15.75	16.77	13.50	140.0
12"	284	19.69	20.08	16.00	210.0
14"	284	27.56	20.71	19.00	285.0
16"	284	31.50	23.07	21.00	365.0
20"	284	31.50	27.09	23.50	492.0
24"	284	31.50	31.50	32.00	675.0
28"	145	35.43	35.98	36.50	x
32"	145	39.37	40.75	41.73	x
36"	145	43.31	44.96	46.00	x
40"	145	47.24	49.41	50.75	x
48"	145	55.12	57.87	59.50	x
72"	145	78.74	82.80	86.50	x
80"	145	86.61	95.39	99.75	x

Flange dimensions with 150 lbs in mm			Weight***
L**	H	W	[kg]
130	209	89	6.0
130	209	89	6.0
150	137	108	8.0
150	155	127	9.0
200	179	152	8.0
200	204	191	13.2
250	241	229	18.1
250	268	254	x
300	297	279	26.3
350	363	279	43.1
400	426	343	63.5
500	510	406	95.3
700	526	483	129.3
800	586	533	165.6
800	688	597	223.2
800	800	813	306.2
900	914	927	x
1000	1035	1060	x
1100	1142	1168	x
1200	1255	1289	x
1400	1470	1511	x
2000	2103	2197	x
2200	2423	2534	x

Nominal diameter		Flange dimensions with 300 lbs in inches			Weight***
ANSI	[psig]*	L**	H	W	[lbs]
3/8"	740	5.12	8.23	3.75	x
1/2"	740	5.12	8.23	3.75	x
1"	740	5.91	5.71	4.87	x
1 1/2"	740	7.87	6.65	6.13	x
2"	740	9.84	7.32	6.50	x
3"	740	9.84	8.43	8.25	x
4"	740	11.81	10.00	8.25	x
6"	740	12.60	12.44	12.50	x

Flange dimensions with 300 lbs in mm			Weight***
L**	H	W	[kg]
130	209	95	x
130	209	95	x
150	145	124	x
200	169	156	x
250	186	165	x
250	214	210	x
300	254	210	x
320	316	317	x

\* at 68°F/20°C

\*\* Total fitting length when delivered with separate earthing washers:  
Length L + 2 x (0,12" or 3 mm) + 2 x seal thickness

\*\*\* Approx. weight of the sensor, ANSI flanges included.  
Flange ANSI 3/8" - 24" according to ANSI B 16.5.  
Flange ANSI 28" and above according to ANSI B 1647 A.

x = on request