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JUMO flowTRANS MAG S10

Electromagnetic flowmeter

Brief description

The electromagnetic JUMO flowTRANS MAG S10 flowmeter has been designed and developed for standard applications in the processing industry and mechanical engineering.
It features a high degree of flexibility and is available in a wide range of nominal diameters, lining materials and process connection.
The high-performance, reliable transmitter stands out because it can be used in various applications while offering a high level of measuring accuracy and ease of commissioning.
Users are afforded a cost-effective and customized flowmeter with the JUMO flowTRANS MAG S10, complete with a clear and straightforward documentation.

Type 406060/1... Variant 2

Model variants

Integral mount design
The transmitter and the flow sensor form a mechanical unit in devices featuring a compact (integral mount) design.
Remote mount design
The transmitter and the flow sensor are mounted physically separated from one another in devices featuring a separate (remote mount) design.
The electrical connection between the transmitter and the sensor is provided by a signal cable. With a minimum conductivity of 20 µS/cm of the medium being measured, a maximum signal cable length of 50 m (164 ft) is possible.
JUMO flowTRANS MAG S10 flow sensors are available in two different versions, variant 1 and variant 2.
Refer to **Overview – models** on page 2.

Customer benefits

- Integral or remote mount design
- Uniform transmitter electronics for all versions
- Rotatable LCD display (optional) can be operated via capacitive control buttons
- Ongoing self-monitoring of sensor, transmitter and process
- Diagnostics-related help texts for the quick and target-oriented elimination of errors (e. g. empty pipe detection)

Features

- Ease of use
- Verification option based on fingerprint technology
- Display of service interval
- Nominal pressure ratings:
  PN 10 to PN 40, ASME CL150/CL300, JIS 10K
- Various process connection and lining materials
- Temperature range of medium:
  -25 to +130 °C (-13 to +266 °F)

Approvals/Certification marks

PED Pressure Equipment Directive

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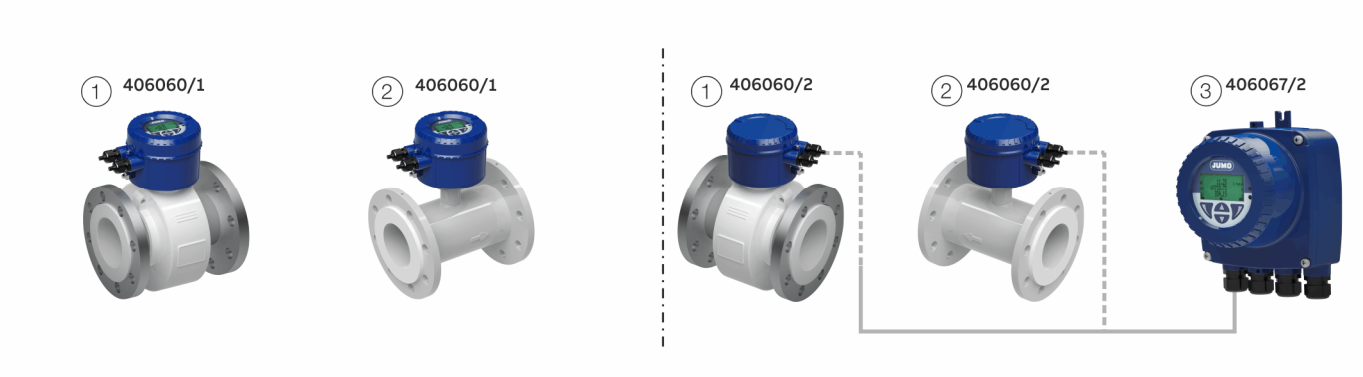
Overview – models

Sensor

Integral mount design

Remote mount design



1 Sensor housing for variant 1 (double shell housing) - DN 3 to 2000
2 Sensor housing for variant 2 - DN 25 to 600
3 External transmitter

Figure 1: Designs

Sensor	
Model	JUMO flowTRANS MAG S10
Design	Integral mount design (406060/1), remote mount design (406060/2)
Measuring accuracy for liquids	0.5 % of rate
Permissible temperature of the medium being measured (Tmedium)	−25 to 130 °C (−13 to 266 °F)
Minimum conductivity	> 20 µS/cm
Nominal pressure rating	PN 10 to 40; ASME CL 150, 300; JIS 10K
Nominal diameter	DN 3 to 2000 (1/10 to 80 in.)
Process connection	Flange* acc. to DIN, ASME, JIS
Process connection material	Steel, cast steel, stainless steel
Lining material	Hard rubber (DN 15 to 2000), soft rubber (DN 50 to 2000), PTFE (DN 10 to 600), PFA (DN 3 to 200), ETFE (DN 25 to 600)
Electrode material	Stainless steel, Hastelloy B, Hastelloy C, platinum-iridium, tantalum, titanium
IP degree of protection	Integral mount design: IP 65 / IP 67 Remote mount design: IP 65 / IP 67 / IP 68 (only for sensors)

Approvals	
Pressure Equipment Directive 2014/68/EU	Conformity assessment in accordance with category III, fluid group 1
Further approvals	Are available in the download section at www.jumo.de, or on request.

* For information regarding flange thicknesses, see **Dimensions** on page 16.

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Transmitter	
Model	JUMO flowTRANS MAG 10
Design	Remote mount design (406067/2)
IP degree of protection	IP 65 / IP 67
Signal cable length	Maximum 50 m (164 ft), remote mount design only
Power supply	100 to 240 V AC (−15% / +10 %), 24 to 48 V DC (−10% / +10 %)
Outputs	Current output: 4 to 20 mA, active Digital output 1: Passive, can be configured as pulse, frequency or switching output Digital output 2: Passive, can be configured as pulse or switching output
Local display	Graphical display, can be configured (optional)

Approvals	
Further approvals	Are available in the download section at www.jumo.de, or on request.

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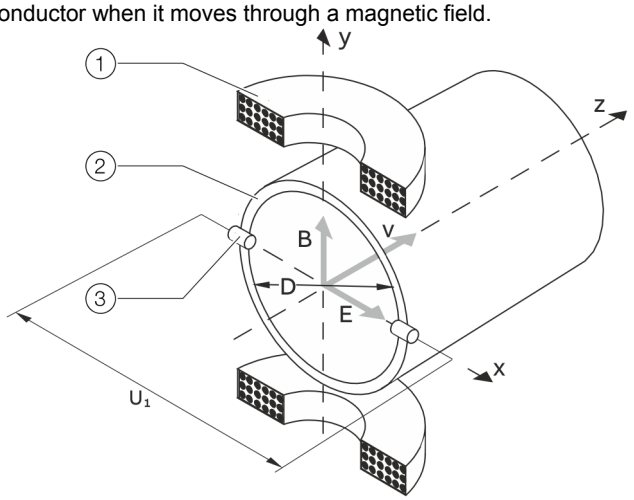
Measuring principle

Measurements performed by the electromagnetic flowmeter are based on Faraday's law of induction. A voltage is generated in a conductor when it moves through a magnetic field.



(1) Magnet coil
(2) Measuring tube in electrode plane
(3) Measuring electrode

Figure 2: Electromagnetic flowmeter diagram

$U_1 \sim B \times D \times v$ $\quad qv = \frac{D^2 \times \pi}{4} \times v$ $\quad U_1 \sim qv$

U_1	Measuring span	v	Average flow velocity
B	Magnetic induction	qv	Volume flow rate
D	Electrode spacing		

With the device-relevant application of this measuring principle, a conductive measuring medium flows through a tube in which a magnetic field is generated perpendicular to the flow direction (see Figure 2).
The voltage induced in the measuring medium is tapped by two diametrically opposed electrodes. This measurement voltage is proportional to the magnetic induction, the electrode spacing and the average medium velocity v.
Taking into account that the magnetic induction and the electrode spacing are constant values results in a proportion between the measurement voltage U_1 and the average medium velocity.
From the calculation of the volume flow rate follows that the measurement voltage is linear and proportional to the volume flow rate
The induced voltage is converted by the transmitter to standardized, analog and digital signals.

Flowmeter sensor

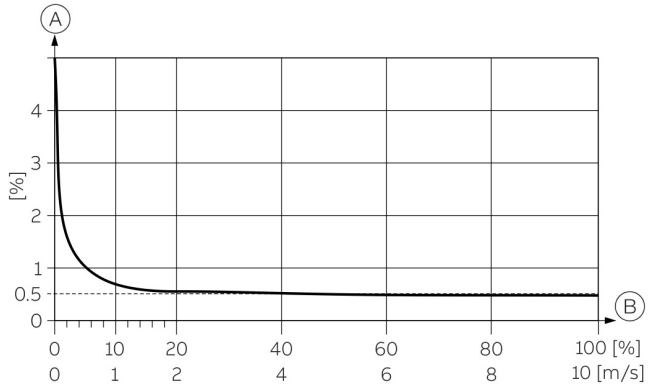
Measuring accuracy

Reference conditions

In accordance with EN 29104	
Temperature of medium being measured	20 °C (68 °F) ±2 K
Ambient temperature	20 °C (68 °F) ±2 K
Power supply	Rated voltage as per rating plate U = ±1 %; frequency f = ±1 %
Installation conditions	• Upstream: > 10 x DN straight section • Downstream: > 5 x DN straight section
Warm-up phase	30 minutes

Measurement value deviation and reproducibility

Measuring accuracy



(A) Accuracy ± of measured value in%
(B) Flow velocity, v in m/s, Q / QmaxDN in %

Figure 3: Measuring accuracy

Pulse output
±0.5 % of measured value, ±0.02 % $Q_{max}DN^*$

* $Q_{max}DN$: Refer to **Measuring range table** on page 7.

Current output
Same as pulse output plus ± 0.1 % of measured value ± 0.01 mA.

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Reproducibility, response time

Reproducibility	≤ 0.11 % of measured value, t_{meas} = 100 s, v = 0.5 to 10 m/s
Response time*	As step function, 0 to 99 % 5 τ ≥ 200 ms at 25 Hz excitation frequency 5 τ ≥ 400 ms at 12.5 Hz excitation frequency 5 τ ≥ 500 ms at 6.25 Hz excitation frequency

* For current output with damping of 0.02 seconds.

Permitted pipe vibration

In accordance with EN 60068-2-6
Valid for sensors in remote mount and integral mount design.

- Maximum deflection: 0.15 mm (0.006 in) in the frequency range of 10 to 58 Hz
- Maximum acceleration: 2 g in the frequency range of 58 to 150 Hz

IP degree of protection

- IP 65 / IP 67 in accordance with EN 60529
- IP 68 in accordance with EN 60529 (for remote mount design only)
- NEMA 4X

Signal cables

Only for remote mount design.
The maximum signal cable length between the flow sensor and the transmitter is 50 m (164 ft).
A 5 m (16.4 ft) long signal cable is included in the standard scope of supply.
Should a signal cable longer than 5 m (16.4 ft) be required, this can be ordered separately (part number: 00645914).

Temperature data

Storage temperature range

-30 to 70 °C (-22 to 158 °F)

The temperature range offered by the device is dependent on a number of different factors.
These factors include the measuring medium temperature T_{medium}, the ambient temperature T_{amb}, operating pressure P_{medium}, liner material and the approval for explosion protection.

Maximum permissible cleaning temperature

CIP media	Liner	Cleaning temperature
Steam	PTFE, PFA	150 °C (302 °F)
Cleaning fluid	PTFE, PFA	140 °C (284 °F)

- The maximum cleaning temperature specified applies to a maximum ambient temperature of 25 °C (77 °F).
  If the ambient temperature up-scales > 25 °C (> 77 °F), then the temperature difference to the current temperature must be subtracted from the max. cleaning temperature.
- The specified cleaning temperature may have an effect for a maximum of 60 minutes.

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Maximum ambient temperature depending on measuring medium temperature

Integral mount design

Liner material	Flange material	Ambient temperature ($T_{amb.}$)		Temperature of medium being measured (T_{medium})	
		Minimum	Maximum	Minimum	Maximum
Hard rubber	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	85 °C (185 °F)*
Hard rubber	Stainless steel	-15 °C (5 °F)	60 °C (140 °F)	-15 °C (5 °F)	85 °C (185 °F)*
Soft rubber	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	60 °C (140 °F)
Soft rubber	Stainless steel	-15 °C (5 °F)	60 °C (140 °F)	-15 °C (5 °F)	60 °C (140 °F)
PTFE	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	85 °C (185 °F)
		-10 °C (14 °F)	30 °C (86 °F)	-10 °C (14 °F)	130 °C (266 °F)
PTFE	Stainless steel	-20 °C (-4 °F)	60 °C (140 °F)	-25 °C (-13 °F)	85 °C (185 °F)
		-20 °C (-4 °F)	30 °C (86 °F)	-25 °C (-13 °F)	130 °C (266 °F)
PFA	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	85 °C (185 °F)
		-10 °C (14 °F)	30 °C (86 °F)	-10 °C (14 °F)	130 °C (266 °F)
PFA	Stainless steel	-20 °C (-4 °F)	60 °C (140 °F)	-25 °C (-13 °F)	85 °C (185 °F)
		-20 °C (-4 °F)	30 °C (86 °F)	-25 °C (-13 °F)	130 °C (266 °F)
ETFE	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	85 °C (185 °F)
		-10 °C (14 °F)	30 °C (86 °F)	-10 °C (14 °F)	130 °C (266 °F)
ETFE	Stainless steel	-20 °C (-4 °F)	60 °C (140 °F)	-25 °C (-13 °F)	85 °C (185 °F)
		-20 °C (-4 °F)	30 °C (86 °F)	-25 °C (-13 °F)	130 °C (266 °F)

* For variant 2 sensors lined with hard rubber, a reduced maximum temperature of 80 °C (176 °F) applies to the medium being measured.

Remote mount design

Liner material	Flange material	Ambient temperature ($T_{amb.}$)		Temperature of medium being measured (T_{medium})	
		Minimum	Maximum	Minimum	Maximum
Hard rubber	Steel	-10 °C (14 °F)	60 °C (140 °F)	-10 °C (14 °F)	90 °C (194 °F)*
Hard rubber	Stainless steel	-15 °C (5 °F)	60 °C (140 °F)	-15 °C (5 °F)	90 °C (194 °F)*
Soft rubber	Steel	-10 °C (14°F)	60 °C (140 °F)	-10 °C (14 °F)	60 °C (140 °F)
Soft rubber	Stainless steel	-15 °C (5 °F)	60 °C (140 °F)	-15 °C (5 °F)	60 °C (140 °F)
PTFE	Steel	-10 °C (14°F)	60 °C (140 °F)	-10 °C (14 °F)	130 °C (266 °F)
PTFE	Stainless steel	-25 °C (-13 °F)	60 °C (140 °F)	-25 °C (-13 °F)	130 °C (266 °F)
PFA	Steel	-10 °C (14°F)	60 °C (140 °F)	-10 °C (14 °F)	130 °C (266 °F)
PFA	Stainless steel	-25 °C (-13 °F)	60 °C (140 °F)	-25 °C (-13 °F)	130 °C (266 °F)
ETFE	Steel	-10 °C (14°F)	60 °C (140 °F)	-10 °C (14 °F)	130 °C (266 °F)
ETFE	Stainless steel	-25 °C (-13 °F)	60 °C (140 °F)	-25 °C (-13 °F)	130 °C (266 °F)

* For variant 2 sensors lined with hard rubber, a reduced maximum temperature of 80 °C (176 °F) applies to the medium being measured.

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Measuring range table

The full-scale value can be set between 0.02 x Q_{max}DN and 2 x Q_{max}DN.

Nominal diameter		Lower range value	Q_{max}DN	Upper range value
DN	**in.**	**0.02 x Q_{max}DN (≈ 0.2 m/s)**	**0 to ≈ 10 m/s**	**2 x Q_{max}DN (≈ 20 m/s)**
3	1/10	0.08 l/min (0.02 US gal/min)	4 l/min (1.06 US gal/min)	8 l/min (2.11 US gal/min)
4	5/32	0.16 l/min (0.04 US gal/min)	8 l/min (2.11 US gal/min)	16 l/min (4.23 US gal/min)
6	¼	0.4 l/min (0.11 US gal/min)	20 l/min (5.28 US gal/min)	40 l/min (10.57 US gal/min)
8	5/16	0.6 l/min (0.16 US gal/min)	30 l/min (7.93 US gal/min)	60 l/min (15.85 US gal/min)
10	⅜	0.9 l/min (0.24 US gal/min)	45 l/min (11.9 US gal/min)	90 l/min (23.78 US gal/min)
15	½	2 l/min (0.53 US gal/min)	100 l/min (26.4 US gal/min)	200 l/min (52.8 US gal/min)
20	¾	3 l/min (0.79 US gal/min)	150 l/min (39.6 US gal/min)	300 l/min (79.3 US gal/min)
25	1	4 l/min (1.06 US gal/min)	200 l/min (52.8 US gal/min)	400 l/min (106 US gal/min)
32	1 ¼	8 l/min (2.11 US gal/min)	400 l/min (106 US gal/min)	800 l/min (211 US gal/min)
40	1 ½	12 l/min (3.17 US gal/min)	600 l/min (159 US gal/min)	1200 l/min (317 US gal/min)
50	2	1.2 m³/h (5.28 US gal/min)	60 m³/h (264 US gal/min)	120 m³/h (528 US gal/min)
65	2 ½	2.4 m³/h (10.57 US gal/min)	120 m³/h (528 US gal/min)	240 m³/h (1057 US gal/min)
80	3	3.6 m³/h (15.9 US gal/min)	180 m³/h (793 US gal/min)	360 m³/h (1585 US gal/min)
100	4	4.8 m³/h (21.1 US gal/min)	240 m³/h (1057 US gal/min)	480 m³/h (2113 US gal/min)
125	5	8.4 m³/h (37 US gal/min)	420 m³/h (1849 US gal/min)	840 m³/h (3698 US gal/min)
150	6	12 m³/h (52.8 US gal/min)	600 m³/h (2642 US gal/min)	1200 m³/h (5283 US gal/min)
200	8	21.6 m³/h (95.1 US gal/min)	1080 m³/h (4755 US gal/min)	2160 m³/h (9510 US gal/min)
250	10	36 m³/h (159 US gal/min)	1800 m³/h (7925 US gal/min)	3600 m³/h (15850 US gal/min)
300	12	48 m³/h (211 US gal/min)	2400 m³/h (10567 US gal/min)	4800 m³/h (21134 US gal/min)
350	14	66 m³/h (291 US gal/min)	3300 m³/h (14529 US gal/min)	6600 m³/h (29059 US gal/min)
400	16	90 m³/h (396 US gal/min)	4500 m³/h (19813 US gal/min)	9000 m³/h (39626 US gal/min)
450	18	120 m³/h (528 US gal/min)	6000 m³/h (26417 US gal/min)	12000 m³/h (52834 US gal/min)
500	20	132 m³/h (581 US gal/min)	6600 m³/h (29059 US gal/min)	13200 m³/h (58117 US gal/min)
600	24	192 m³/h (845 US gal/min)	9600 m³/h (42268 US gal/min)	19200 m³/h (84535 US gal/min)
700	28	264 m³/h (1162 US gal/min)	13200 m³/h (58118 US gal/min)	26400 m³/h (116236 US gal/min)
760	30	312 m³/h (1374 US gal/min)	15600 m³/h (68685 US gal/min)	31200 m³/h (137369 US gal/min)
800	32	360 m³/h (1585 US gal/min)	18000 m³/h (79252 US gal/min)	36000 m³/h (158503 US gal/min)
900	36	480 m³/h (2113 US gal/min)	24000 m³/h (105669 US gal/min)	48000 m³/h (211337 US gal/min)
1000	40	540 m³/h (2378 US gal/min)	27000 m³/h (118877 US gal/min)	54000 m³/h (237754 US gal/min)
1050	42	616 m³/h (2712 US gal/min)	30800 m³/h (135608 US gal/min)	61600 m³/h (271217 US gal/min)
1100	44	660 m³/h (3038 US gal/min)	33000 m³/h (151899 US gal/min)	66000 m³/h (290589 US gal/min)
1200	48	840 m³/h (3698 US gal/min)	42000 m³/h (184920 US gal/min)	84000 m³/h (369841 US gal/min)
1400	54	1080 m³/h (4755 US gal/min)	54000 m³/h (237755 US gal/min)	108000 m³/h (475510 US gal/min)
1500	60	1260 m³/h (5548 US gal/min)	63000 m³/h (277381 US gal/min)	126000 m³/h (554761 US gal/min)
1600	66	1440 m³/h (6340 US gal/min)	72000 m³/h (317006 US gal/min)	144000 m³/h (634013 US gal/min)
1800	72	1800 m³/h (7925 US gal/min)	90000 m³/h (396258 US gal/min)	180000 m³/h (792516 US gal/min)
2000	80	2280 m³/h (10039 US gal/min)	114000 m³/h (501927 US gal/min)	228000 m³/h (1003853 US gal/min)

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Process connections

For an overview of available process connection versions, see **Overview – models** on page 2.

Insertion length

The flange devices comply with the installation lengths specified in ISO 13359, or according to DVGW (process sheet W420, design WP, ISO 4064 short).
For further details, refer to chapter **Dimensions** on page 16.

Materials

Parts in contact with the medium		
Part	**Standard**	**Option**
Liner material	PTFE, PFA, ETFE, hard rubber, soft rubber	–
Measurement and grounding electrode with liner material:		
• Hard rubber • Soft rubber	CrNi steel 1.4571 (AISI 316Ti)	Hastelloy B-3 (2.4600), Hastelloy C-4 (2.4610), titanium, tantalum, platinum-iridium, CrNi steel 1.4539 (AISI 904L)
• PTFE, PFA, ETFE	CrNi steel 1.4539 (AISI 904L)	CrNi steel 1.4571 (AISI 316Ti), Hastelloy B-3 (2.4600), Hastelloy C-4 (2.4610), titanium, tantalum, platinum-iridium
Grounding plate	Stainless steel	On request
Protective pane	Stainless steel	On request

Parts that do not come into contact with medium (process connection)		
DN	**Standard**	**Option**
Sensor, variant 1		
DN 3 to 15 (1/10 to ½ in.)	Stainless steel*	–
DN 20 to 400 (¾ to 16 in.)	Steel (galvanized)**	Stainless steel[1]
DN 450 to 2000 (18 to 80 in.)	Steel (painted)**	–
Sensor, variant 2		
DN 25 to 600 (1 to 24 in.)	Steel (painted)** Cast steel (painted)***	–

The process connections are made of one of the materials listed below:

* 1.4301 (AISI 304), 1.4307, 1.4404 (AISI 316L) 1.4435 (AISI 316L), 1.4541 (AISI 321) 1.4571 (AISI 316Ti)

* 1.0038, 1.0460, 1.0570, 1.0432, ASTM A105, Q255A, 20#, 16Mn

* EN-JS1025 (5.3103)

Sensor housing	
Part / DN	**Material**
Sensor, variant 1	
Housing	
DN 3 to 400 (1/10 to 16 in.)	Cast aluminum (painted) Paint coat, ≥ 80 µm thick, RAL 9002
DN 450 to 2000 (18 to 80 in.)	Welded steel structure (painted) Paint coat, ≥ 80 µm thick, RAL 9002
Meter tube	Stainless steel*
Terminal box	Cast aluminum, Cobalt Blue, RAL 5013
Cable gland**	Polyamide
Sensor, variant 2	
Housing / Meter tube	
DN 25 to 600 (1 to 24 in.)	Steel (painted), cast steel (painted)*** Paint coat, ≥ 80 µm thick, RAL 9002
Terminal box	Cast aluminum, Cobalt Blue, RAL 5013
Cable gland**	Polyamide

The meter tube is made of one of the materials listed below:

* 1.4301, 1.4307, 1.4404, 1.4435, 1.4541, 1.4571
ASTM materials:
Grade TP304, TP304L, TP316L, TP321, TP316Ti, TP317L, 0Cr18Ni9, 00Cr18Ni10, 0CR17Ni14Mo2, 0Cr27Ni12Mo3, 0Cr18Ni10Ti

** For a cable gland with M20 x 1.5 or NPT thread, select the appropriate part number.

*** EN-JS1025 (5.3103)

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Material load for process connections

The limits of the permissible measuring medium temperature (T_{medium}) and permissible pressure (P_{medium}) are calculated on the basis of the liner and flange material used in the device (see device name plate).

Minimum permissible operating pressure

The minimum permissible operating pressure (P_{medium}) dependent on the temperature of the medium being measured (T_{medium}) and the liner material is indicated in the table below.

Sensor, variant 1

Liner material	Nominal diameter	P_{medium} [mbar abs]	T_{medium}*
Hard rubber	DN 15 to 2000 (½ to 80 in.)	0	< 85 °C (185 °F)
Soft rubber	DN 50 to 2000 (2 to 80 in.)	0	< 60 °C (140 °F)
PTFE	DN 10 to 600 (⅜ to 24 in.)	270	< 20 °C (68 °F)
		400	< 100 °C (212 °F)
		500	< 130 °C (266 °F)
PFA	DN 3 to 200 (1/10 to 8 in.)	0	< 130 °C (266 °F)
ETFE	DN 25 to 600 (1 to 24 in.)	100	< 130 °C (266 °F)

Sensor, variant 2

Liner material	Nominal diameter	P_{medium} [mbar abs]	T_{medium}*
Hard rubber	DN 40 to 600 (1 ½ to 24 in.)	600	< 80 °C (176 °F)
PTFE	DN 25 to 600 (1 to 24 in.)	270	< 20 °C (68 °F)
		400	< 100 °C (212 °F)
		500	< 130 °C (266 °F)

* For CIP/SIP cleaning, higher temperatures are permitted for limited periods; refer to table **Maximum permissible cleaning temperature** on page 5.

Approvals for liners available on request; please contact the manufacturer.

Material load

Sensor, variant 1

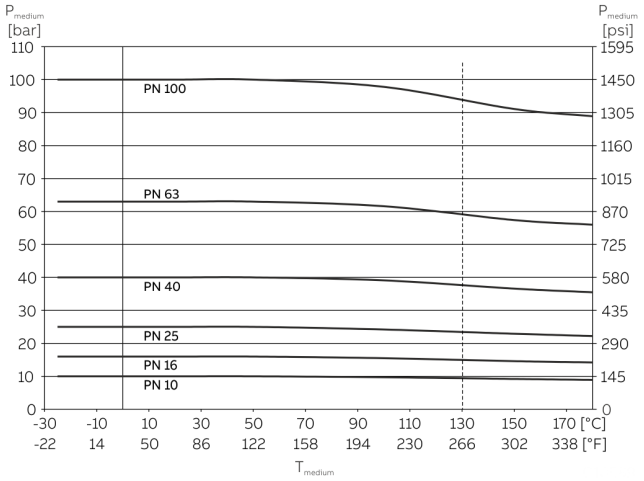

Figure 4: DIN flange, stainless steel up to DN 600 (24 in.)

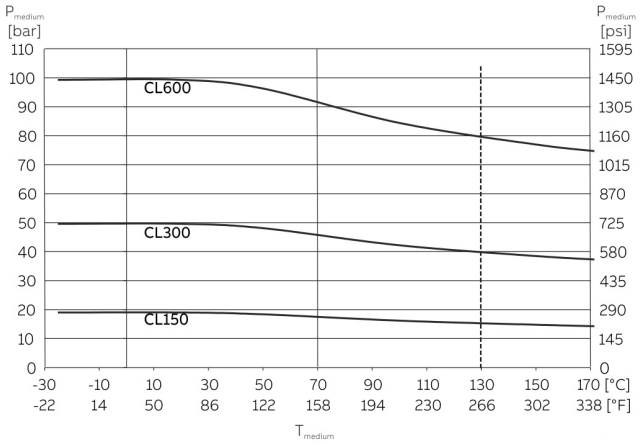

Figure 5: ASME flange, stainless steel up to DN 400 (16 in.) (CL150/300) and up to DN 1000 (40 in.) (CL150)

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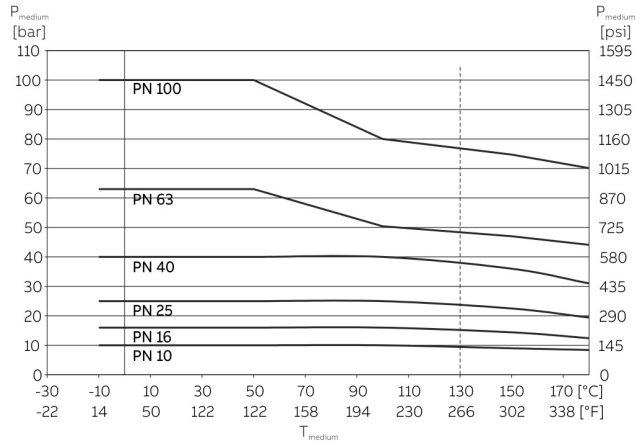


Figure 6: DIN flange, steel up to DN 600 (24 in.)

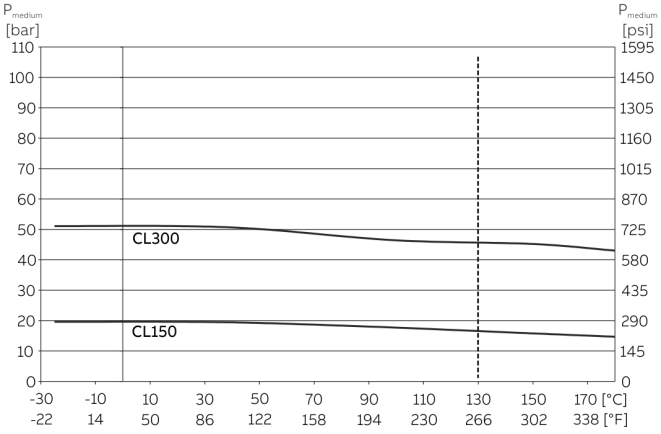
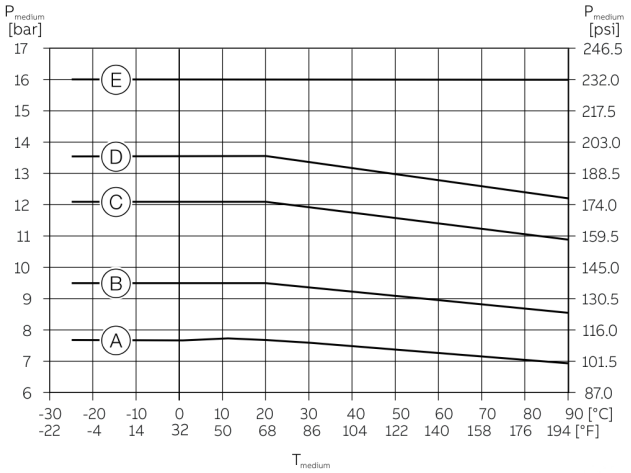


Figure 7: ASME flange, steel up to DN 400 (16 in.) (CL150/300); and up to DN 1000 (40 in.) (CL150)

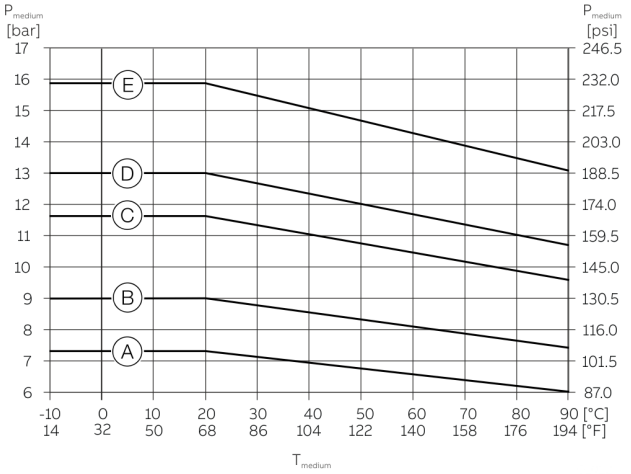
JIS 10K-B2210 flange

DN	Material	PN	T_{medium}	P_{medium}
DN 32 to 400	Stainless steel	10	−25 to 180 °C	10 bar
(1 ¼ to 16 in.)			(−13 to 356 °F)	(145 psi)
DN 32 to 400	Steel	10	-10 to 180 °C	10 bar
(1 ¼ to 16 in.)			(14 to 356 °F)	(145 psi)



(A) DN 1000, PN 10
(B) DN 700, DN800, DN900, PN 10
(C) DN 1000, PN 16
(D) DN 900, DN 800, PN 16
(E) DN 700, PN 16

Figure 8: DIN flange, stainless steel, DN 700 to 1000 (28 to 40 in.)



(A) DN 1000, PN 10
(B) DN 700, DN800, DN900, PN 10
(C) DN 1000, PN 16
(D) DN 900, DN 800, PN 16
(E) DN 700, PN 16

Figure 9: DIN flange, steel, DN 700 to 1000 (28 to 40 in.)

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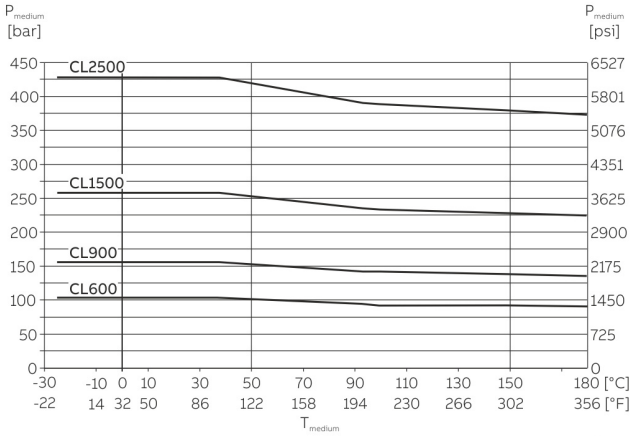

Figure 10: ASME flange, steel, DN 25 to 400 (1 to 24 in.)

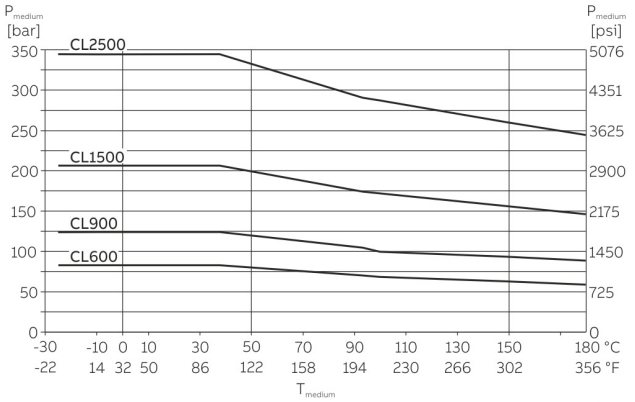

Figure 11: ASME flange, stainless steel, DN 25 to 400 (1 to 24 in.)

Sensor, variant 2

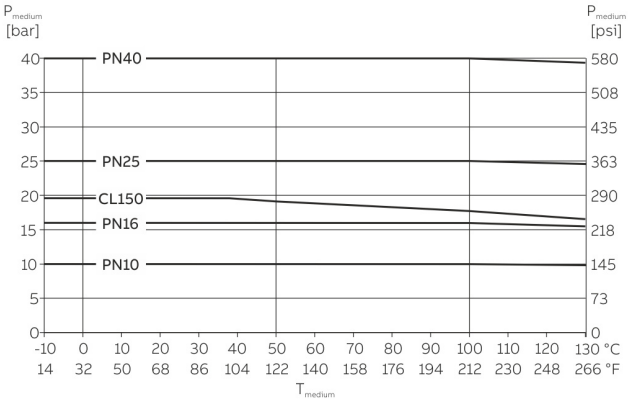

Figure 12: Cast steel housing, DN 25 to 600 (1 to 2 in.)

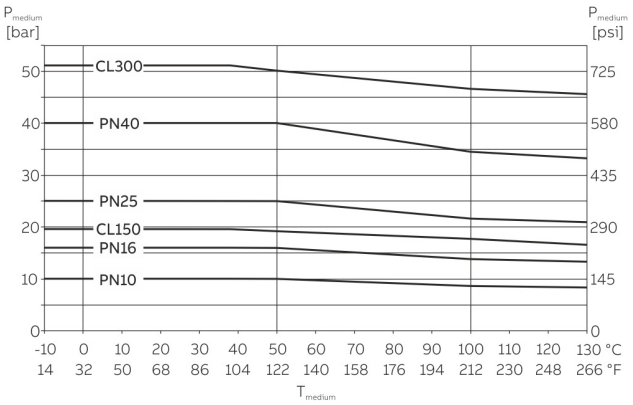

Figure 13: Welded steel housing, DN 25 to 600 (1 to 24 in.)

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Installation conditions

General

Compliance with the following points is required for installation:

- Ensure that the flow direction corresponds to the marking, if there is one.
- Ensure that the maximum torque specification is maintained for all flange screws. See chapter **"Torque information" in the operating instruction**..
- Secure flange screws and nuts against pipe vibrations.
- Install devices without mechanical tension (torsion, bend).
- Install flange and wafer-type devices with coplanar counter flanges and use only appropriate gaskets.
- Use only gaskets made from a material that is compatible with the medium being measured and its temperature.
- Ensure that gaskets do no extend into the flow area since possible turbulence could influence the device accuracy.
- Ensure that no impermissible forces or moments act on the device owing to the piping.
- Ensure that the temperature limits for the device are being adhered to during operation.
- Avoid vacuum shocks in the piping. Vacuum shocks can destroy the liner and the device.
- Do not remove the plugs for the cable glands until you are ready to install the electrical cables.
- Make sure that the gaskets for the housing cover are seated properly. Carefully close the cover. Tighten the cover screws.
- Install the remote-mount transmitter at a location that is free of vibrations to a large extent.
- Do not expose the transmitter or the sensor to direct sunlight; provide protection from the sun as needed.
- Ensure that sufficient cooling is provided whenever installing the transmitter in a control cabinet.
- Ensure that the remote-mount transmitter and the associated sensor are correctly assigned (paired). Devices that form a pair have the same numeric suffix; e.g., the X001 sensor is paired with the Y001 transmitter or the X002 sensor is paired with the Y002 transmitter; this is indicated on the rating plate.

Brackets

NOTE

Potential damage to device!
Improperly placed support structures can result in a deformed housing and damage to the inner solenoids.
Place the support structures at the edge of the transmitter housing (see arrows in **Figure 14**).

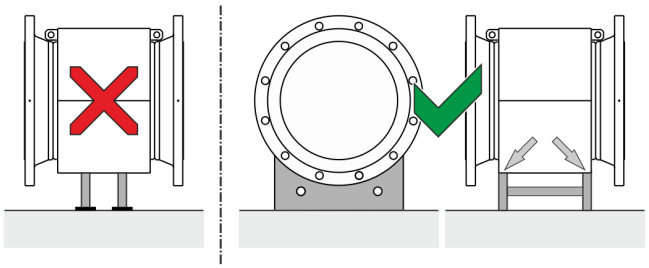

Figure 14: Support for nominal diameters larger than DN 400

Devices with nominal diameters larger than DN 400 must be mounted on a sufficiently strong foundation with support.

Gaskets

The following points must be observed when installing gaskets:

- To achieve the best results, make sure that the gaskets and meter tube fit concentrically.
- To make sure that the flow profile is not distorted, the gaskets may not intrude in the piping cross-section.
- The use of graphite with the flange or process connection gaskets is prohibited. This is because, in some instances, an electrically conductive coating may form on the inside of the meter tube.

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Device with hard rubber or soft rubber lining

- Additional gaskets are always required for devices with lining made of hard rubber or soft rubber.
- The use of rubber gaskets or sealing materials that are similar to rubber is recommended by the manufacturer.
- When selecting the seals ensure that the torques detailed in **"Torque information" in the operating instruction** are not exceeded.

Devices with lining made of PTFE, PFA or ETFE

- No additional gaskets are required for devices with lining made of PTFE, PFA or ETFE.

Flow direction

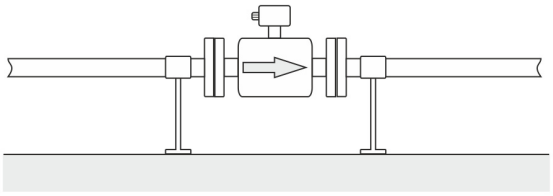
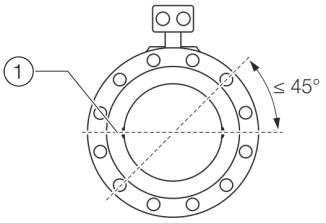


Figure 15: Flow direction

The device measures the flow rate in both flow directions. Forward flow is the factory setting, as shown in Figure 15.

Electrode axis



(1) Electrode axis

Figure 16: Orientation of the electrode axis

The flowmeter sensor should be mounted in the piping in such a manner that the electrode axis is oriented as horizontally as possible.
A maximum deviation of 45° from the horizontal position is permissible.

Mounting position

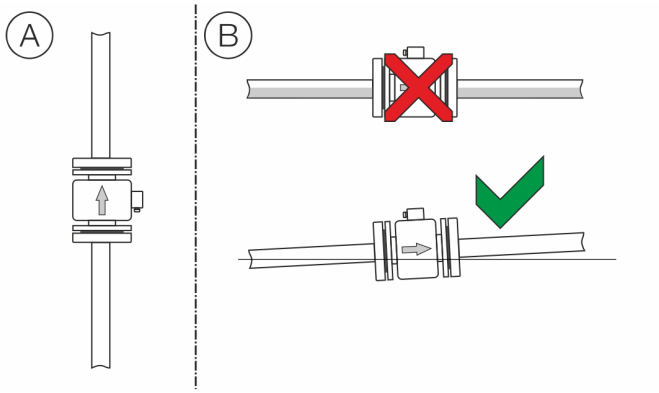


Figure 17: Mounting position

(A) Vertical installation for measuring abrasive materials, preferably with flow in upward direction.
(B) For a horizontal installation, the meter tube must always be completely filled with the measuring medium.
Provide for a slight incline of the connection for degassing.

Minimum spacing of the devices

Figure 18: Distance (D): ≥ 1.0 m (3.3 ft) for variant 1; ≥ 0.7 m (2.3 ft) for variant 2

- To rule out that the devices interfere with one another, ensure that the minimum distance between the devices shown in Figure 18 is maintained.
- Do not operate the sensor in the vicinity of strong electromagnetic fields, e.g., motors, pumps, transformers, etc. Keep a minimum distance of approx. 1 m (3.28 ft).
- When installing on or at steel parts (e. g. steel joists) maintain a minimum distance of 100 mm (3.94 in.). (These values were determined based on IEC 801-2 and/or IEC TC77B).

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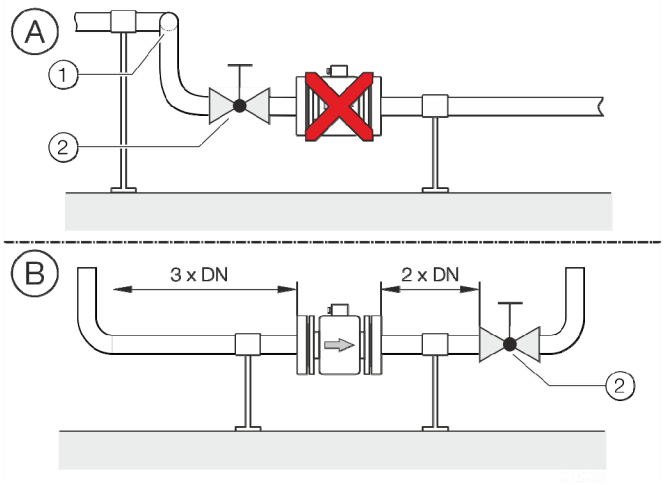
Inlet and outlet sections



① 90° out-of-plane double bend ② Shut-off device

Figure 19: Upstream and downstream sections, shut-off devices

The metering principle is independent of the flow profile as long as stationary eddies do not extend into the metering section, such as may occur downstream of 90° out-of-plane double bends, in the event of tangential inflow, or where half-open gate valves are located upstream of the sensor. Such cases require measures to be put in place to normalize the flow profile.

Ⓐ Do not install connections, elbows, valves, etc. directly upstream of the sensor.

Ⓑ Upstream section / Downstream section: Length of the straight pipe at the inlet and the outlet of the sensor.
Experience has shown that, in most installations, a straight upstream section length of three times the nominal diameter of the flow sensor and a straight downstream section length of two times the nominal diameter of the flow sensor are sufficient.
For test stands, the reference conditions of straight upstream section lengths ten times the nominal diameter of the sensor and straight downstream section lengths five times the nominal diameter of the sensor should be provided in accordance with EN 29104 / ISO 9104.
Valves or other shut-off devices should be installed in the downstream section.
Butterfly valves must be installed so that the valve plate does not extend into the flow sensor.

Free inlet or outlet

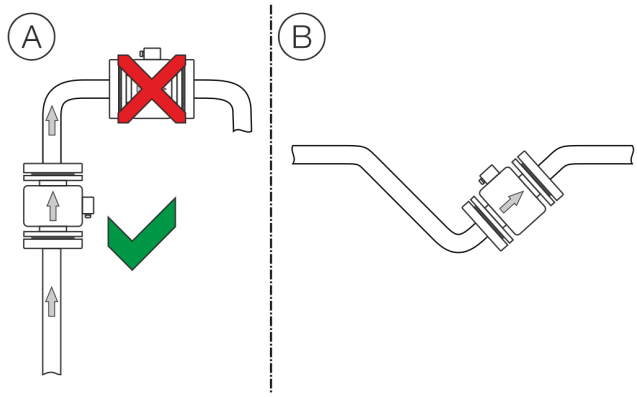


Figure 20: Free inflow and outflow

Ⓐ For a free outflow, do not install flowmeter at the highest point of the piping or on its outflow side, since the measuring tube may run empty, creating air bubbles.

Ⓑ For free inflow/outflow, provide an invert to make sure that the piping is always full

Mounting with heavily contaminated measuring media

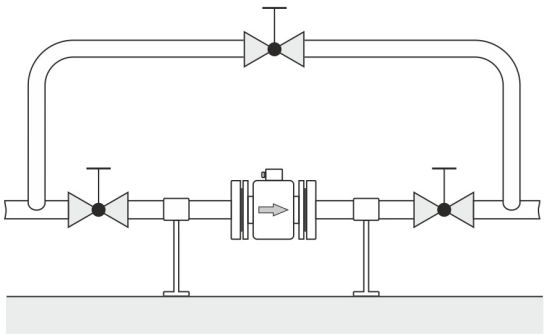


Figure 21: Bypass line

For strongly contaminated measuring media, a bypass line in accordance with the figure is recommended so that operation of the system can continue to run without interruption during mechanical cleaning.

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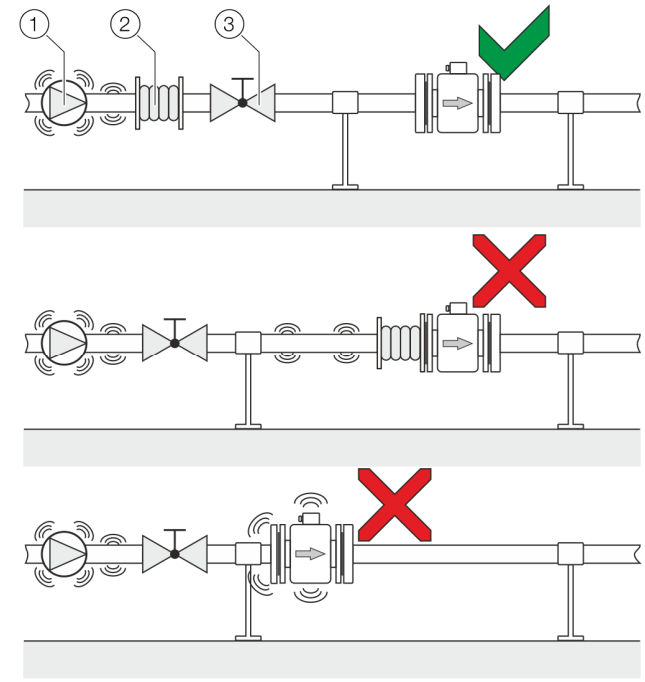
Mounting with pipe vibration

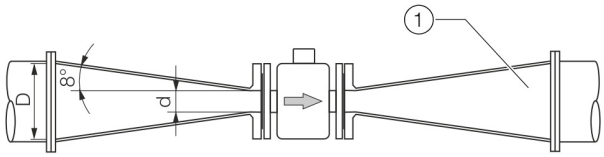


① Pump
② Damping device
③ Turn-off device

Figure 22: Vibration damping

If pipe vibration occurs, it needs to be damped using damping devices.
The damping devices must be installed outside the support section and outside of the piping section between the turn-off devices.
Avoid connecting damping devices directly to the flowmeter sensor.

Installation in piping with larger nominal diameter



① Reducer

Figure 23: Using reducers

Determine the resulting pressure loss when using reducers:

1. Determine diameter ratios d/D.
2. .Determine the flow velocity based on the flow rate nomogram (Figure 24).
3. Read the pressure loss on the Y-axis in Figure 24.

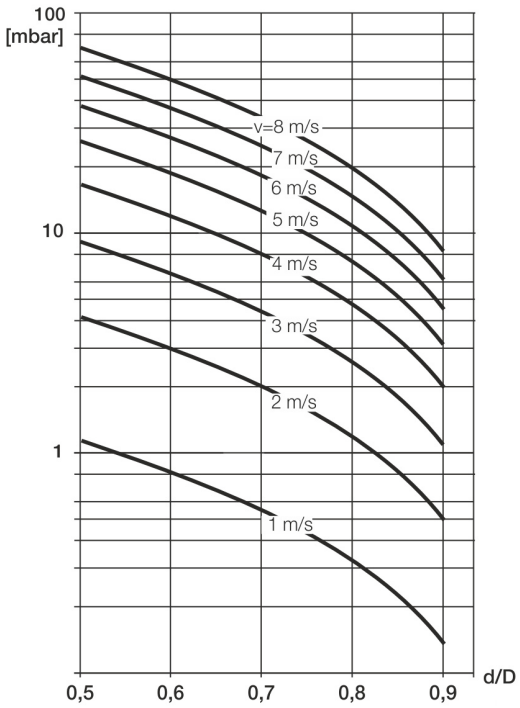


Figure 24: Flow rate nomogram for flange transition piece at α/2 = 8°

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Dimensions

Flange, DN 3 to 100 (1/10 to 4 in.), variant 1 sensor with aluminum housing (double shell housing)

All dimensions and weights are indicated in mm (in.) or kg (lb).

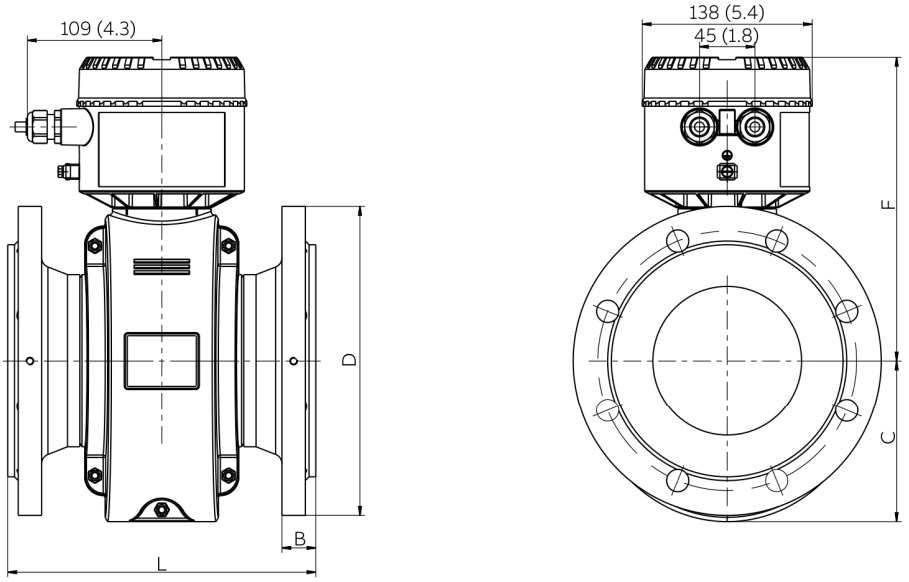

Figure 25: Flange, DN 3 to 100 (1/10 to 4 in.)

Dimensions – Flange device, variant 1 sensor with aluminum housing (double shell housing)							Approx. weight	
Nominal diameter	**Process connection**	**D**	**B**	**L[2] [3]**	**C**	**F**	**Remote mount**	**Integral mount**
DN 3 to 8[4]	EN 1092-1[6], PN 10 to 40[1]	90 (3.54)	19 (0.75)	200 (7.84)	82 (3.23)	191 (7.52)	5.5 (12.1)	6.5 (14.3)
(⅛ to 5/16 in.[5])	ASME B16.5, CL 150	90 (3.54)	14.2 (0.56)					
DN 10	ASME B16.5, CL 300	95 (3.74)	17.3 (0.68)					
(⅜ in.[5])	JIS 10K	90 (3.54)	15 (0.59)					
DN 15 (½ in.)	EN 1092-1[6], PN 10 to 40[1]	95 (3.74)	19 (0.75)	200 (7.84)	82 (3.23)	191 (7.52)	5.5 (12.1)	6.5 (14.3)
	ASME B16.5, CL 150	90 (3.54)	14.2 (0.56)					
	ASME B16.5, CL 300	95.2 (3.75)	17.3 (0.68)					
	JIS 10K	95 (3.74)	15 (0.59)					
DN 20 (¾ in.)	EN 1092-1[6], PN 10 to 40[1]	105 (4.13)	21 (0.83)	200 (7.84)	82 (3.23)	191 (7.52)	7 (15.4)	7.5 (16.5)
	ASME B16.5, CL 150	98.6 (3.88)	15.7 (0.62)					
	ASME B16.5, CL 300	117.3 (4.62)	18.7 (0.74)					
	JIS 10K	100 (3.94)	17 (0.67)					

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

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Dimensions – Flange device, variant 1 sensor with aluminum housing (double shell housing)							**Approx. weight**	
Nominal diameter	**Process connection**	**D**	**B**	**L**[2] [3]	**C**	**F**	**Remote mount**	**Integral mount**
DN 25 (1 in.)	EN 1092-1[6], PN 10 to 40[1]	115 (4.53)	21 (0.83)	200 (7.84)	82 (3.23)	191 (7.52)	8 (17.5)	8.5 (18.5)
	ASME B16.5, CL 150	108 (4.25)	17.2 (0.68)					
	ASME B16.5, CL 300	124 (4.88)	20.5 (0.81)					
	JIS 10K	125 (4.92)	17 (0.67)					
DN 32 (1 ¼ in.)	EN 1092-1[6], PN 10 to 40[1]	140 (5.51)	21 (0.83)	200 (7.84)	92 (3.62)	198 (7.80)	9 (20.0)	9.5 (21.0)
	ASME B16.5, CL 150	117.3 (4.62)	18.7 (0.74)					
	ASME B16.5, CL 300	133.4 (5.25)	22.1 (0.87)					
	JIS 10K	135 (5.31)	19 (0.75)					
DN 40 (1 ½ in.)	EN 1092-1[6], PN 10 to 40[1]	150 (5.91)	21 (0.83)	200 (7.84)	92 (3.62)	198 (7.80)	10 (22)	10.5 (22.0)
	ASME B16.5, CL 150	127 (5.00)	20.5 (0.81)					
	ASME B16.5, CL 300	155.4 (6.12)	23.6 (0.93)					
	JIS 10K	140 (5.51)	19 (0.75)					
DN 50 (2 in.)	EN 1092-1[6], PN 10 to 40[1]	165 (6.50)	23 (0.91)	200 (7.87)	97.5 (3.84)	204 (8.0)	11 (24)	12 (26.5)
	ASME B16.5, CL 150	152.4 (6.00)	22.1 (0.87)					
	ASME B16.5, CL 300	165.1 (6.50)	25.4 (1.0)					
	JIS 10K	155 (6.10)	19 (0.75)					
	AS2129 tables D, E	150 (5.91)	–				9 (19.8)	9.5 (21.0)
DN 65 (2 ½ in.)	EN 1092-1[6], PN 16[1]	185 (7.28)	22 (0.87)	200 (7.87)	108.5 (4.25)	215 (8.46)	12 (26.5)	12.5 (27.6)
	EN 1092-1[6], PN 40[1]	185 (7.28)	26 (1.02)				14 (30.9)	14.5 (32.0)
	ASME B16.5, CL 150	177.8 (7.00)	25.4 (1.0)				12 (26.5)	12.5 (27.6)
	ASME B16.5, CL 300	190.5 (7.50)	28.4 (1.12)				14 (30.9)	14.5 (32.0)
	JIS 10K	175 (6.89)	21 (0.83)				14 (30.9)	14.5 (32.0)
	AS2129 tables D, E	165 (6.50)	–				–	–
DN 80 (3 in.)	EN 1092-1[6], N 10 to 40[1]	200 (7.87)	28 (1.10)	200 (7.87)	108.5 (4.27)	215 (8.46)	16 (35.3)	16.5 (36.4)
	ASME B16.5, CL 150	190.5 (7.50)	26.9 (1.06)				16 (35.3)	16.5 (36.4)
	ASME B16.5, CL 300	210 (8.27)	31.4 (1.24)				18 (39.7)	18.5 (40.8)
	JIS 10K	185 (7.28)	21 (0.83)				18 (39.7)	18.5 (40.8)
	AS2129 tables D, E	185 (7.28)	–				–	–

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

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Dimensions – Flange device, variant 1 sensor with aluminum housing (double shell housing)							Approx. weight	
Nominal diameter	**Process connection**	**D**	**B**	**L[2] [3]**	**C**	**F**	**Remote mount**	**Integral mount**
DN 100 (4 in.)	EN 1092-1[6] PN 16[1]	220 (8.66)	24 (0.94)	250 (9.84)	122.5 (4.82)	237 (9.33)	18 (39.7)	18.5 (40.8)
	EN 1092-1[6] PN 25 to 40[1]	235 (9.25)	28 (1.10)				22 (48.5)	22.5 (49.6)
	ASME B16.5 CL 150	228.6 (9.00)	27.4 (1.08)				20 (44.1)	20.5 (45.2)
	ASME B16.5 CL 300	254 (10.0)	35.8 (1.41)				29 (63.9)	29.5 (65.0)
	JIS 10K	210 (8.72)	21 (0.83)				18 (39.7)	18.5 (40.8)
	AS2129 tables D, E	215 (8.46)	–				–	–

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

1 Other pressure ratings on request.

2 If a grounding plate is installed (attached to one side of the flange), this increases dimension L as follows: DN 3 to 100 by 3 mm (0.118 in.), for DN 125 by 5 mm (0.197 in.).

3 If protective panes are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 to 100 by 6 mm (0.236 in.) for DN 125 by 10 mm (0.394 in.).

4 Process connection, flange size: DN 10.

5 Process connection, flange size: ½ in.

6 Dimensions in accordance with EN 1092-1. For DN 65, PN 16 in acc. with EN 1092-1, please order PN 40.

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Flange, DN 125 to 400 (6 to 16 in.), variant 1 sensor with aluminum housing (double shell housing)

All dimensions and weights are indicated in mm (in.) or kg (lb).

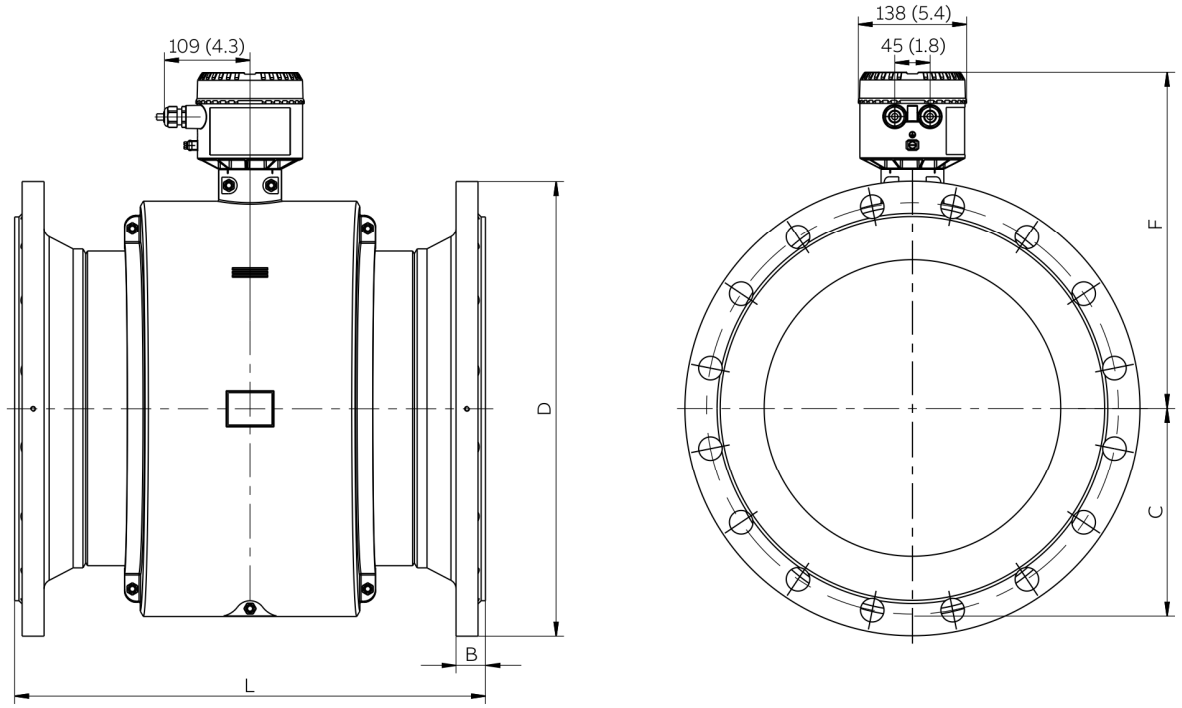

Figure 26: Flange, DN 125 to 400 (6 to 16")

Dimensions – Flange device, variant 1 sensor with aluminum housing (double shell housing)							Approx. weight	
Nominal diameter	**Process connection**	**D**	**B**	**L[2 3]**	**C**	**F**	**Remote mount**	**Integral mount**
DN 125 (5 in.)	EN 1092-1[6] PN 16[1]	250 (9.84)	25 (0.98)	250 (9.84)	130 (5.12)	247 (9.72)	21 (46.3)	21.5 (47.4)
	EN 1092-1[6] PN 25 to 40[1]	270 (10.63)	29 (1.14)				28 (61.7)	28.5 (62.8)
	ASME B16.5 CL 150	254 (10.0)	27.9 (1.10)				21 (46.3)	21.5 (47.4)
	ASME B16.5 CL 300	279.4 (11.0)	39.1 (1.54)	450 (17.72)			34 (75.0)	34.5 (76.1)
	JIS 10K	250 (9.84)	27 (1.06)	250 (9.84)			21 (46.3)	21.5 (47.4)
	AS2129 tables D, E	255 (10.04)	–				–	–
DN 150 (6 in.)	EN 1092-1 PN 16[1]	285 (11.22)	25 (0.98)	300 (11.81)	146 (5.75)	294 (11.57)	32 (70.5)	32.5 (71.7)
	EN 1092-1 PN 25 to 40[1]	300 (11.81)	31 (1.22)				38 (83.8)	38.5 (82.5)
	ASME B16.5 CL 150	279.4 (11.0)	29.4 (1.16)				32 (70.5)	32.5 (71.7)
	ASME B16.5 CL 300	317.5 (12.5)	40.5 (1.59)				46 (101.4)	46.5 (102.5)
	JIS 10K	280 (11.02)	28 (1.10)				32 (70.5)	32.5 (71.7)
	AS2129 tables D, E	280 (11.02)	–				32 (70.5)	32.5 (71.7)

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

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Dimensions – Flange device, variant 1 sensor with aluminum housing (double shell housing) **Approx. weight**

Nominal diameter	Process connection	D	B	L[2 3]	C	F	Remote mount	Integral mount
DN 200 (8 in.)	EN 1092-1[6], PN 10 to 16[1]	340 (13.39)	28 (1.10)	350 (13.78)	170.5 (6.71)	334 (13.15)	42 (92.6)	42.5 (93.7)
	EN 1092-1[6], PN 25[1]	360 (14.17)	34 (1.34)				54 (119)	54.5 (120.2)
	EN 1092-1, PN 40[1]	375 (14.76)	38 (1.50)				64 (141.1)	64.5 (142.2)
	ASME B16.5, CL 150	345 (13.58)	33.6 (1.32)				49 (108)	49.5 (109.1)
	ASME B16.5, CL 300	380 (14.96)	46.1 (1.81)				71 (156.5)	71.5 (157.6)
	JIS 10K	330 (12.99)	33 (1.30)				42 (92.6)	42.5 (93.7)
	AS2129 tables D, E	335 (13.19)	–				49 (108)	49.5 (109.1)
DN 250 (10 in.)	EN 1092-1, PN 10[1]	395 (15.55)	30 (1.18)	450 (17.72)	198 (7.80)	349 (13.74)	60 (132.3)	60.5 (133.4)
	EN 1092-1, PN 16[1]	405 (15.94)	30 (1.18)				64 (141.1)	64.5 (142.2)
	EN 1092-1, PN 25[1]	425 (16.73)	36 (1.42)				83 (183)	83.5 (184.1)
	EN 1092-1, PN 40[1]	450 (17.72)	42 (1.65)				94 (207.2)	94.5 (208.3)
	ASME B16.5, CL 150	405 (15.94)	35.2 (1.39)				69 (152.1)	69.5 (153.2)
	ASME B16.5, CL 300	445 (17.52)	52.8 (2.08)				104 (229.3)	104.5 (230.4)
	JIS 10K	400 (15.75)	37 (1.46)				64 (141.1)	64.5 (142.2)
	AS2129 tables D, E	405 (15.94)	–				69 (152.1)	69.5 (153.2)
DN 300 (12 in.)	EN 1092-1, PN 10[1]	445 (17.52)	31 (1.22)	500 (19.68)	228 (8.98)	372 (14.62)	73 (160.9)	73.5 (162)
	EN 1092-1, PN 16[1]	460 (18.11)	33 (1.30)				78 (172)	78.5 (173)
	EN 1092-1, PN 25[1]	485 (19.09)	39 (1.54)				99 (218.3)	99.5 (219.4)
	EN 1092-1, PN 40[1]	515 (20.28)	47 (1.85)	600 (23.62)			139 (306.4)	139.5 (307.5)
	ASME B16.5, CL 150	485 (19.09)	36.8 (1.45)	500 (19.68)			104 (229.3)	104.5 (230.4)
	ASME B16.5, CL 300	520 (20.47)	55.8 (2.20)				149 (328.5)	149.5 (329.6)
	JIS 10K	450 (17.72)	40 (1.57)				79 (174.2)	79.5 (175.3)
	AS2129 tables D, E	455 (17.19)	–				104 (229.3)	104.5 (230.4)
DN 350 (14 in.)	EN 1092-1, PN 10[1]	505 (19.88)	31 (1.22)	550 (21.65)	267 (10.51)	416 (16.38)	94 (207.2)	94.5 (208.3)
	EN 1092-1, PN 16[1]	520 (20.47)	35 (1.38)				109 (240.3)	109.5 (241.4)
	EN 1092-1, PN 25[1]	555 (21.85)	43 (1.69)				144 (317.5)	144.5 (318.6)
	ASME B16.5, CL 150	535 (21.06)	40.1 (1.58)				129 (284.4)	129.5 (285.5)
	ASME B16.5, CL 300	585 (23.03)	58.8 (2.31)				197 (434.3)	197.5 (435.4)
	JIS 10K	490 (19.29)	–				109 (240.3)	109.5 (241.4)
	AS2129 tables D, E	525 (20.67)	–				104 (229.3)	104.5 (230.4)
DN 400 (16 in.)	EN 1092-1 PN 10[1]	565 (22.24)	31 (1.22)	600 (23.62)	267 (10.51)	416 (16.38)	102 (224.9)	102.5 (226)
	EN 1092-1 PN 16[1]	580 (22.83)	37 (1.46)				125 (275.6)	125.5 (276.7)
	EN 1092-1 PN 25[1]	620 (24.41)	45 (1.77)				169 (372.6)	169.5 (373.7)
	ASME B16.5 CL 150	595 (23.43)	41.6 (1.64)				174 (383.6)	174.5 (384.7)
	ASME B16.5 CL 300	650 (25.59)	62.2 (2.45)				264 (582)	264.5 (583.1)
	JIS 10K	560 (22.05)	–				125 (275.6)	125.5 (276.7)
	AS2129 tables D, E	580 (22.83)	–				174 (383.6)	174.5 (384.7)

Tolerance range for L: DN 150 to 200: +0 / −3 mm (+0 / −0.018 in.), DN 250 to 400: +0 / −5 mm (+0 / −0.197 in.)

1 Other pressure ratings on request.

2 If a grounding plate is installed (attached to one side of the flange), this increases dimension L as follows: DN 3 to 100 by 3 mm (0.118 in.).

3 If protective panes are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 to 100 by 6 mm (0.236 in.).

6 Dimensions in accordance with EN 1092-1. For DN 65, PN 16 in acc. with EN 1092-1, please order PN 40.

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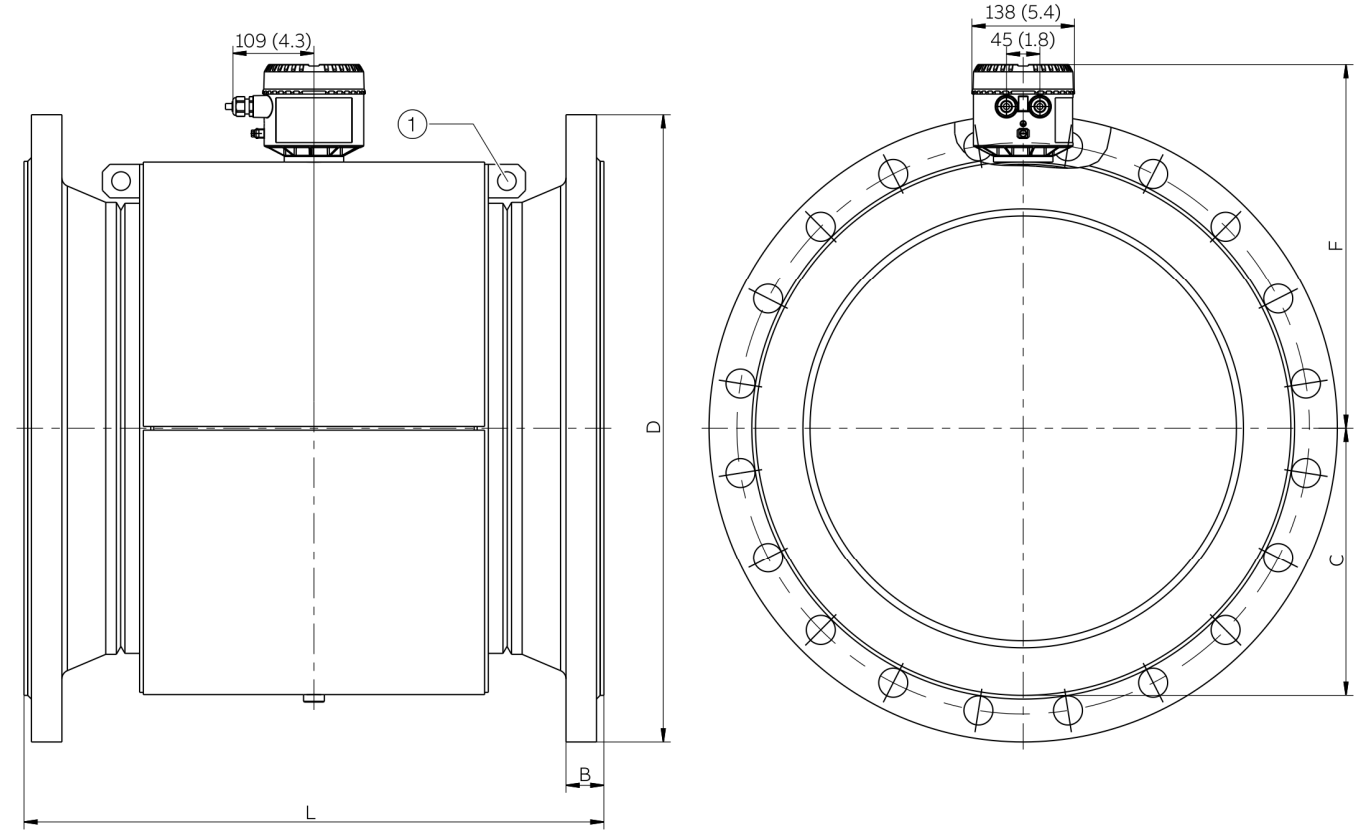
Flange, DN 450 to 2000 (18 to 80 in.), variant 1 sensor with steel housing

All dimensions and weights are indicated in mm (in.) or kg (lb).



(1) Eyebolt

Figure 27: Flange, DN 450 to 2000 (18 to 80 in.)

Dimensions – Flange device, variant 1 sensor with steel housing								Approx. weight
Nominal diameter	**Process connection**	**D**	**B**	**L****, ***	**C**	**F**	**Remote mount**	**Integral mount**
DN 450 (18 in.)	ASME B16.5, CL 150	635 (25.0)	44.6 (1.76)	686 (27.01)	310 (12.20)	437 (17.20)	259 (571)	259.5 (572)
	AS2129 tables D, E	640 (25.20)	–					
DN 500 (20 in.)	EN 1092-1, PN 10*	670 (26.38)	33 (1.30)	650 (25.59)	310 (12.20)	437 (17.20)	189 (417)	189.5 (418)
	EN 1092-1, PN 16*	715 (28.15)	39 (1.54)				239 (527)	239.5 (528)
	ASME B16.5, CL 150	698.5 (27.50)	47.9 (1.89)	762 (30.0)			299 (659)	299.5 (660)
	AS2129 tables D, E	705 (27.76)	–	650 (25.59)				
DN 600 (24 in.)	EN 1092-1, PN 10*	780 (30.71)	33 (1.30)	780 (30.71)	361 (14.21)	490 (19.29)	339 (747)	339.5 (748)
	EN 1092-1, PN 16*	840 (33.07)	41 (1.61)				317 (699)	317.5 (700)
	ASME B16.5, CL 150	812.8 (32.0)	52.8 (2.08)	914 (35.98)			424 (935)	424.5 (936)
	AS2129 tables D, E	825 (32.48)	–	780 (30.71)				

Tolerance range for L: DN 450 to 500: +0 / −3 mm (+0 / −0.018 in.), DN 600 to 2000:+0 / −10 mm (+0 / −0.394 in.)

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Dimensions – Flange device, variant 1 sensor with steel housing **Approx. weight**

Nominal diameter	Process connection	D	B	L**, ***	C	F	Remote mount	Integral mount
DN 700 (28 in.)	EN 1092-1, PN 10*	895 (35.24)	35 (1.38)	910 (35.83)	405 (15.94)	534 (21.02)	319 (703)	319.5 (704)
	EN 1092-1, PN 16*	910 (35.83)	36 (1.42)				439 (968)	439.5 (969)
	ASME B16.47, CL 150	836.7 (32.94)	49.5 (1.95)				349 (769)	349.5 (770)
DN 750 (30 in.)	ASME B16.5, CL 150	888 (34.96)	44.5 (1.75)	990 (38.96)	431 (16.97)	560 (22.05)	475 (1047)	475.5 (1048)
DN 800 (32 in.)	EN 1092-1, PN 10*	1015 (39.96)	37 (1.46)	1040 (40.94)	455 (17.91)	584 (22.99)	419 (924)	419.5 (925)
	EN 1092-1, PN 16*	1025 (40.35)	43 (1.69)				489 (1078)	489.5 (1079)
	ASME B16.47, CL 150	942 (37.09)	51 (2.01)				499 (1100)	499.5 (1101)
DN 900 (36 in.)	EN 1092-1, PN 10*	1115 (43.90)	39 (1.54)	1170 (46.06)	505 (19.88)	635 (25.0)	504 (1111)	504.5 (1112)
	EN 1092-1, PN 16*	1125 (44.29)	45 (1.77)				589 (1298)	589.5 (1299)
	ASME B16.47, CL 150	1157.1 (41.62)	57.3 (2.26)				679 (1497)	679.5 (1498)
DN 1000 (40 in.)	EN 1092-1, PN 10*	1230 (48.43)	39 (1.54)	1300 (51.18)	555 (21.85)	685 (26.97)	689 (1518)	689.5 (1519)
	EN 1092-1, PN 16*	1255 (49.41)	47 (1.85)				849 (1871)	849.5 (1872)
	ASME B16.47, CL 150	1174.8 (46.25)	60.6 (2.39)				879 (1938)	879.5 (1939)
DN 1050 (42 in.)	ASME B16.47, CL 150	1067 (42.01)	58.7 (2.31)	1365 (53.74)	607 (23.90)	737 (29.02)	931 (2052)	931.5 (2053)
DN 1100 (44 in.)	ASME B16.47, CL 150	1118 (44.02)	60.5 (2.38)	1430 (56.30)	607 (23.90)	737 (29.02)	961 (2118)	961.5 (2119)
DN 1200 (48 in.)	EN 1092-1, PN 10*	1455 (57.28)	43 (1.69)	1560 (61.42)	660 (25.98)	791 (31.14)	929 (2048)	929.5 (2049)
	EN 1092-1, PN 16*	1485 (58.46)	53 (2.09)				1119 (2467)	1119.5 (2468)
DN 1400 (56 in.)	EN 1092-1 PN 10*	1675 (65.94)	47 (1.85)	1820 (71.65)	755 (29.72)	885 (34.84)	1209 (2665)	1209.5 (2666)
	EN 1092-1 PN 16*	1685 (66.34)	57 (2.24)				1759 (3878)	1759.5 (3879)
DN 1500 (60 in.)	ASME B16.47, CL 150	1676 (65.98)	76.2 (3.00)	1950 (76.77)	807 (31.77)	937 (36.89)	1951 (4301)	1951.5 (4302)
DN 1600 (64 in.)	EN 1092-1 PN 10*	1915 (75.39)	51 (2.01)	2080 (81.89)	865 (34.06)	996 (39.21)	1629 (3591)	1629.5 (3592)
	EN 1092-1 PN 16*	1930 (75.98)	63 (2.48)				2149 (4738)	2149.5 (4739)
DN 1800 (72 in.)	EN 1092-1 PN 10*	2115 (83.27)	55 (2.17)	2340 (92.13)	980 (38.58)	1111 (43.74)	2229 (4914)	2229.5 (4915)
	EN 1092-1 PN 16*	2130 (83.86)	67 (2.64)				2899 (6391)	2899.5 (6392)
DN 2000 (80 in.)	EN 1092-1 PN 10*	2325 (91.54)	59 (2.32)	2600 (102.36)	1090 (42.91)	1221 (48.07)	1879 (4142)	1879.5 (4143)
	EN 1092-1 PN 16*	2345 (92.32)	71 (2.80)				2649 (5840)	2649.5 (5841)

Tolerance range for L: DN 600 to 2000:+0 / −10 mm (+0 / −0.394 in.)

* Other pressure ratings on request.

** If a grounding plate is installed (attached to one side of the flange), this increases dimension L as follows: DN 3 to 100 by 3 mm (0.118 in.).

*** If protective panes are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 to 100 by 6 mm (0.236 in.).

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Flange, DN 25 to 125 (1 to 5 in.), variant 2 sensor with cast steel housing

All dimensions and weights are indicated in mm (in.) or kg (lb).

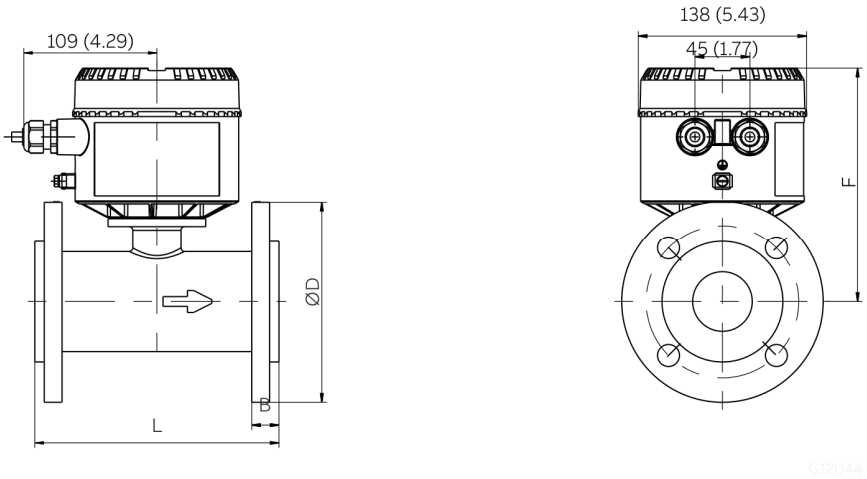

Figure 28: Flange, DN 25 to 125 (1 to 5")

Dimensions – Flange device, variant 2 sensor with cast steel housing							Approx. weight
Nominal diameter	**Process connection**	**D**	**B**	**L**[**, ***]	**F**	**Remote mount**	**Integral mount**
DN 25 (1 in.)	EN 1092-1, PN 40[*]	115 (4.53)	23.1 (0.91)	200 (7.84)	180 (7.09)	6 (13)	7 (15)
	ASME B16.5, CL 150	115 (4.53)	23.1 (0.91)				
	ASME B16.5, CL 300	125 (4.92)	22 (0.87)				
	JIS 5K	95 (3.74)	15.5 (0.61)			5 (11)	6 (13)
	JIS10K, 20K	115 (4.53)	23.1 (0.91)			6 (13)	7 (15)
	AS2129 tables D, E	115 (4.53)	23.1 (0.91)				
DN 32 (1 ¼ in.)	EN 1092-1, PN 40[*]	150 (5.91)	25 (0.98)	200 (7.84)	185 (7.28)	7 (15)	8 (17)
	ASME B16.5 CL 150	150 (5.91)	25 (0.98)				
	ASME B16.5 CL 300	135 (5.31)	23 (0.91)				
	JIS 5K, 10K, 20K	150 (5.91)	25 (0.98)				
	AS2129 tables D, E	150 (5.91)	25 (0.98)				
DN 40 (1 ½ in.)	EN 1092-1, PN 40[*]	150 (5.91)	23.5 (0.93)	200 (7.84)	190 (7.48)	8 (17)	9 (20)
	ASME B16.5 CL 150	150 (5.91)	23.5 (0.93)				
	ASME B16.5 CL 300	155 (6.10)	25 (0.98)			9 (20)	10 (22)
	JIS 5K	120 (4.72)	17.5 (0.69)			6 (13)	7 (15)
	JIS 10K	140 (5.51)	21.5 (0.85)			7 (15)	8 (17)
	JIS 20K	140 (5.51)	23.5 (0.93)				
	AS2129 table D	150 (5.91)	23.5 (0.93)			8 (17)	9 (20)
	AS2129 table E	135 (5.31)	23.5 (0.93)			6 (13)	7 (15)

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

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Dimensions – Flange device, variant 2 sensor with cast steel housing — **Approx. weight**

Nominal diameter	Process connection	D	B	L**, ***	F	Remote mount	Integral mount
DN 50 (2 in.)	EN 1092-1, PN 40*	165 (6.50)	27 (1.06)	200 (7.84)	193 (7.60)	10 (22)	11 (24)
	ASME B16.5 CL 150	165 (6.50)	27 (1.06)				
	ASME B16.5 CL 300	165 (6.50)	27 (1.06)				
	JIS 5K	130 (5.12)	20 (0.79)			7 (15)	8 (17)
	JIS 10K	165 (6.50)	27 (1.06)			8 (17)	9 (20)
	JIS 20K	155 (6.10)	24 (0.94)				
	AS2129 tables D, E	150 (5.91)	18.5 (0.73)				
DN 65 (2 ½ in.)	EN 1092-1, PN16, PN 40*	185 (7.28)	30 (1.18)	200 (7.87)	207 (8.15)	12 (26)	13 (29)
	ASME B16.5 CL 150	180 (7.09)	30 (1.18)			12 (26)	13 (29)
	ASME B16.5 CL 300	190 (7.48)	29 (1.14)			13 (29)	14 (31)
	JIS 5K, 10K, 20K	185 (7.28)	30 (1.18)			12 (26)	13 (29)
	AS2129 tables D, E	165 (6.50)	18 (0.71)			10 (22)	11 (24)
DN 80 (3 in.)	EN 1092-1, PN 40*	205 (8.07)	30 (1.18)	200 (7.87)	211 (8.31)	14 (31)	15 (33)
	ASME B16.5 CL 150	205 (8.07)	30 (1.18)			14 (31)	15 (33)
	ASME B16.5 CL 300	210 (8.27)	33 (1.30)			17 (37)	18 (40)
	JIS 5K, 10K	205 (8.07)	30 (1.18)			14 (31)	15 (33)
	JIS 20K	200 (7.87)	28.5 (1.12)			13 (29)	14 (31)
	AS2129 tables D, E	205 (8.07)	30 (1.18)			13 (29)	14 (31)
DN 100 (4 in.)	EN 1092-1, PN 16*	235 (9.25)	29 (1.14)	250 (9.84)	242 (8.53)	16 (35)	16.5 (36)
	EN 1092-1, PN 40*	235 (9.25)	28 (1.10)			18 (39)	18.5 (40)
	ASME B16.5 CL 150	235 (9.25)	29 (1.14)			16 (35)	16.5 (36)
	ASME B16.5 CL 300	255 (10.04)	38.5 (1.52)			26 (57)	26.5 (58)
	JIS 5K	200 (7.87)	24 (0.94)			13 (29)	14 (31)
	JIS 10K, 20K	235 (9.25)	29 (1.14)			16 (35)	17 (37)
	AS2129 tables D, E	235 (9.25)	29 (1.14)			16 (35)	17 (37)
DN 125 (5 in.)	EN 1092-1, PN 16*	270 (10.63)	38.5 (1.52)	250 (9.84)	254 (10.0)	21 (46)	22 (48)
	EN 1092-1, PN 40*	270 (10.63)	36 (1.42)			21 (46)	22 (48)
	ASME B16.5 CL 150	270 (10.63)	38.5 (1.52)			21 (46)	22 (48)
	ASME B16.5 CL 300	280 (11.02)	42 (1.65)			32 (70)	33 (72)
	JIS 5K, 10K, 20K	270 (10.63)	38.5 (1.52)			21 (46)	22 (48)
	AS2129 tables D, E	270 (10.63)	38 (1.50)			21 (46)	22 (48)

Tolerance range for L: +0 / −3 mm (+0 / −0.018 in.)

* Other pressure ratings on request.

** If a grounding plate is installed (attached to one side of the flange), this increases dimension L as follows: DN 3 to 100 by 3 mm (0.118 in.).

*** If protective panes are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 to 100 by 6 mm (0.236 in.).

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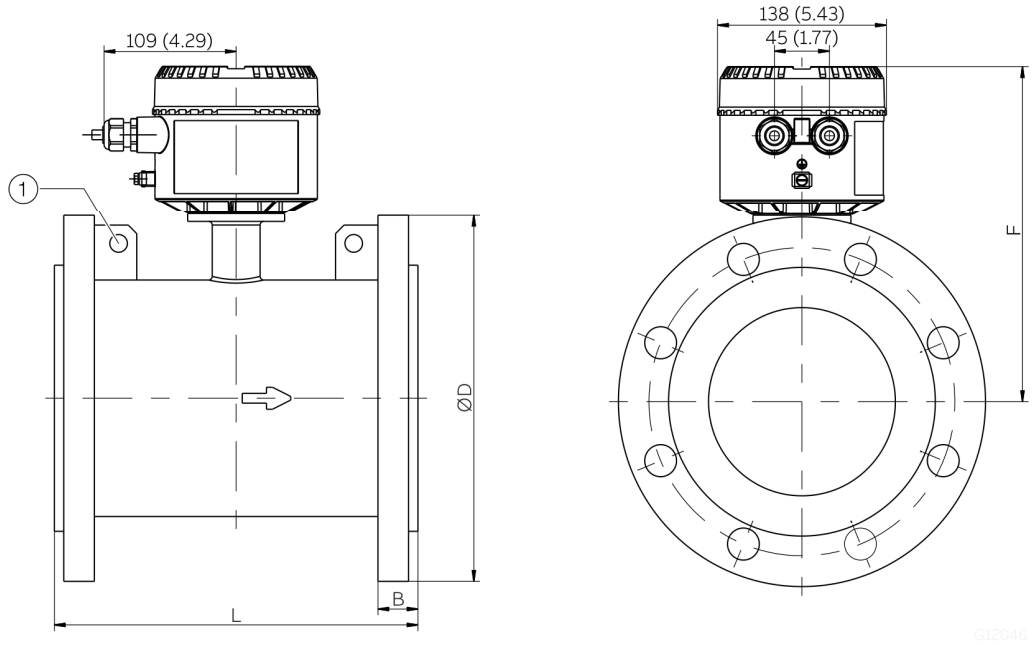
Flange, DN 150 to 600 (1 to 24 in.), variant 2 sensor with cast steel housing

All dimensions and weights are indicated in mm (in.) or kg (lb).



(1) Eyebolt

Figure 29: Flange, DN50 to 600 (1 to 24 in.)

Dimensions – Flange device, variant 2 sensor with cast steel housing							Approx. weight
Nominal diameter	**Process connection**	**D**	**B**	**L**, *****	**F**	**Remote mount**	**Integral mount**
DN 150 (6 in.)	EN 1092-1, PN 16*	300 (11.81)	31.5 (1.24)	300 (11.81)	275 (10.83)	41 (90)	42 (92)
	EN 1092-1, PN 40*	300 (11.81)	38.5 (1.52)			41 (90)	42 (92)
	ASME B16.5 CL 150	300 (11.81)	32.5 (1.28)			36 (79)	37 (82)
	ASME B16.5 CL 300	320 (12.60)	44 (1.73)			47 (104)	48 (106)
	JIS 5K, 10K	300 (11.81)	31 (1.22)			41 (90)	42 (92)
	JIS 20K	305 (12.01)	36.5 (1.44)			37 (82)	38 (84)
	AS2129 table D	300 (11.81)	31 (1.22)			41 (90)	42 (92)
	AS2129 table E	280 (11.02)	24 (0.94)			31 (68)	32 (70)
DN 200 (8 in.)	EN 1092-1, PN 10, PN 16*	375 (14.76)	35 (1.38)	350 (13.78)	301 (11.85)	66 (145)	67 (147)
	EN 1092-1 PN 25*	360 (14.17)	40 (1.57)			52 (115)	53 (117)
	EN 1092-1 PN 40*	375 (14.76)	44 (1.73)			59 (130)	60 (132)
	ASME B16.5 CL 150	375 (14.76)	35 (1.38)			66 (146)	67 (148)
	ASME B16.5 CL 300	380 (14.96)	51 (2.01)			67 (148)	68 (150)
	JIS 5K	320 (12.60)	28 (1.10)			38 (84)	39 (86)
	JIS 10K	330 (12.99)	30 (1.18)			40 (88)	41 (90)
	JIS 20K	375 (14.76)	35 (1.38)			66 (145)	67 (147)
	AS2129 tables D, E	335 (13.19)	35 (1.38)			51 (112)	52 (114)

Tolerance range for L: DN 150 to 200 +0 / −3 mm (+0 / −0.018 in.), DN 250 to 600 +0 / −5 mm (+0 / −0.197 in.)

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Dimensions – Flange device, variant 2 sensor with cast steel housing — **Approx. weight**

Nominal diameter	Process connection	D	B	L**, ***	F	Remote mount	Integral mount
DN 250 (10 in.)	EN 1092-1, PN 10*	395 (15.55)	37 (1.46)	450 (17.72)	326 (12.83)	49 (108)	50 (110)
	EN 1092-1, PN 16*	405 (15.94)	37 (1.46)			49 (108)	50 (110)
	EN 1092-1, PN 25*	425 (16.73)	40 (1.57)			60 (132)	61 (135)
	EN 1092-1, PN 40*	450 (17.72)	47 (1.85)			90 (198)	91 (200)
	ASME B16.5, CL 150	405 (15.94)	45.5 (1.79)			71 (156)	72 (158)
	ASME B16.5, CL 300	444.5 (17.50)	61 (2.40)			96 (211)	97 (213)
	JIS 5K, 10K	405 (15.94)	37 (1.46)			49 (108)	50 (110)
	JIS 20K	430 (16.93)	39 (1.45)			61 (135)	62 (137)
	AS2129 tables D, E	405 (15.94)	37 (1.46)			49 (108)	50 (110)
DN 300 (12 in.)	EN 1092-1, PN 10, PN 16*	475 (18.70)	38.5 (1.52)	500 (19.68)	351 (13.82)	71 (156)	72 (158)
	EN 1092-1, PN 25*	485 (19.09)	44 (1.73)			85 (187)	86 (189)
	EN 1092-1, PN 40*	515 (20.28)	58 (2.28)			95 (209)	96 (211)
	ASME B16.5, CL 150	485 (19.09)	50.5 (1.99)			111 (245)	112 (247)
	ASME B16.5, CL 300	521 (20.51)	69 (2.72)			141 (311)	142 (313)
	JIS 5K, 10K	475 (18.70)	38.5 (1.52)			61 (135)	62 (137)
	JIS 20K	480 (18.90)	42 (1.65)			81 (178)	82 (180)
	AS2129 tables D, E	475 (18.70)	38.5 (1.52)			61 (135)	62 (137)
DN 350 (14 in.)	EN 1092-1, PN 10*	505 (19.88)	35 (1.38)	550 (21.65)	374 (14.72)	75 (165)	76 (167)
	EN 1092-1, PN 16*	520 (20.47)	40 (1.57)			87 (192)	88 (194)
	EN 1092-1, PN 25*	555 (21.85)	47 (1.85)			122 (269)	123 (271)
	ASME B16.5, CL 150	533 (20.98)	54 (2.13)			104 (229)	105 (231)
	ASME B16.5, CL 300	584 (22.99)	80 (3.15)			197 (434)	198 (436)
	JIS 5K	480 (18.90)	29 (1.14)			60 (132)	61 (134)
	JIS 10K	490 (19.29)	31 (1.22)			64 (141)	66 (143)
	JIS 20K	540 (21.26)	45 (1.77)			101 (222)	102 (224)
	AS2129 table D	525 (20.67)	27 (1.06)			69 (152)	70 (154)
	AS2129 table E	525 (20.67)	38 (1.50)			87 (192)	88 (194)
DN 400 (16 in.)	EN 1092-1, PN 10*	565 (22.24)	37 (1.46)	600 (23.62)	398 (15.67)	94 (207)	95 (209)
	EN 1092-1, PN 16*	580 (22.83)	43 (1.69)			110 (242)	111 (244)
	EN 1092-1, PN 25*	620 (24.41)	53 (2.09)			163 (359)	164 (361)
	ASME B16.5, CL 150	597 (23.50)	57 (2.24)			131 (289)	132 (291)
	ASME B16.5, CL 300	648 (25.50)	88 (3.46)			263 (579)	264 (581)
	JIS 5K	540 (21.26)	29 (1.14)			73 (160)	74 (162)
	JIS 10K	560 (22.05)	33 (1.30)			85 (187)	86 (189)
	JIS 20K	605 (23.82)	51 (2.01)			138 (304)	139 (306)
	AS2129 table D	580 (22.83)	30 (1.20)			87 (191)	88 (193)
	AS2129 table E	580 (22.83)	39 (1.54)			103 (227)	104 (229)

Tolerance range for L: DN 150 to 200 +0 / −3 mm (+0 / −0.018 in.), DN 250 to 600 +0 / −5 mm (+0 / −0.197 in.)

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Dimensions – Flange device, variant 2 sensor with cast steel housing — **Approx. weight**

Nominal diameter	Process connection	D	B	L**, ***	F	Remote mount	Integral mount
DN 450 (18 in.)	EN 1092-1, PN 10*	615 (24.21)	41 (1.61)	600 (23.62)	423 (16.65)	112 (247)	113 (249)
	EN 1092-1, PN 16*	640 (25.20)	47 (1.85)			137 (302)	138 (304)
	EN 1092-1, PN 25*	670 (26.38)	59 (2.32)			209 (460)	210 (462)
	ASME B16.5, CL 150	635 (25.00)	66 (2.60)			145 (319)	146 (321)
	ASME B16.5, CL 300	711 (27.99)	93 (3.66)			312 (687)	313 (689)
	JIS 5K	605 (23.82)	29 (1.14)			87 (192)	88 (194)
	JIS 10K	620 (24.41)	35 (1.38)			102 (224)	104 (226)
	JIS 20K	675 (26.75)	53 (2.09)			174 (383)	175 (384)
	AS2129 table D	640 (25.20)	30 (1.18)			101 (222)	102 (224)
	AS2129 table E	640 (25.20)	40 (1.57)			124 (273)	125 (275)
DN 500 (20 in.)	EN 1092-1, PN 10*	670 (26.38)	43 (1.96)	600 (23.62)	450 (17.72)	129 (284)	130 (286)
	EN 1092-1, PN 16*	715 (28.15)	51 (2.01)			189 (416)	190 (418)
	EN 1092-1, PN 25*	730 (28.74)	63 (2.48)			248 (546)	249 (548)
	ASME B16.5, CL 150	698.5 (27.50)	69 (2.72)			172 (379)	173 (381)
	ASME B16.5, CL 300	775 (30.51)	99 (3.90)			365 (804)	366 (806)
	JIS 5K	655 (25.79)	24 (0.94)			95 (209)	96 (211)
	JIS 10K	675 (26.57)	35 (1.38)			128 (282)	129 (284)
	JIS 20K	730 (28.74)	47 (1.85)			199 (438)	200 (440)
	AS2129 table D	705 (27.76)	34 (1.34)			127 (280)	128 (282)
	AS2129 table E	705 (27.76)	43 (1.69)			166 (366)	167 (368)
DN 600 (24 in.)	EN 1092-1, PN 10*	780 (30.71)	47 (1.85)	800 (31.50)	505 (19.88)	185 (407)	186 (410)
	EN 1092-1, PN 16*	840 (33.07)	60 (2.36)			299 (659)	300 (261)
	EN 1092-1, PN 25*	845 (33.27)	73 (2.87)			396 (873)	397 (875)
	ASME B16.5, CL 150	813 (32.01)	80 (3.15)			277 (610)	278 (612)
	ASME B16.5, CL 300	914 (35.98)	118 (4.65)			617 (1360)	618 (1362)
	JIS 5K	770 (30.31)	31 (1.22)			139 (306)	140 (308)
	JIS 10K	795 (31.30)	37 (1.46)			187 (412)	188 (414)
	JIS 20K	845 (33.27)	59 (2.32)			271 (597)	272 (599)
	AS2129 table D	825 (32.48)	47 (1.85)			187 (412)	188 (414)
	AS2129 table E	825 (32.48)	53 (2.09)			264 (582)	265 (584)

Tolerance range for L: DN 250 to 600 +0 / −5 mm (+0 / −0.197 in.)

* Other pressure ratings on request.

** If a grounding plate is installed (attached to one side of the flange), this increases dimension L as follows: DN 3 to 100 by 3 mm (0.118 in.).

*** If protective panes are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 to 100 by 6 mm (0.236 in.).

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Transmitter

Features

- Current output: 4 to 20 mA.
- Current output can be set to 21 to 22.6 mA (NAMUR NE43) in the case of an alarm.
- Measuring range: Can be adjusted from 0.02 to 2 x Q_{max}DN.
- Operating mode is adjustable for measuring the flow.
- Programmable digital output. Can be configured as frequency, pulse or binary output.
- Damping: Adjustable from 0 to 100 s (1 τ).
- Low flow cut-off: From 0 to 20 % for current and pulse output.
- Empty pipe detector*.
- Simulation of current binary output (manual process control).

* Requirements for the “empty pipe detector” function:

- Conductivity of the medium being measured: ≥ 20 µS/cm
- Signal cable length: ≤ 50 m (164 ft)
- Nominal diameter: ≥ DN 10

LCD display (optional)

- High-contrast LCD display.
- Displays current and total flow quantity
- The user can select application-specific representations. Two operator pages can be configured to display several values simultaneously.
- Plain text error diagnostics tool
- Menu-driven parameter settings using four buttons.*
- Easy setup function for rapid commissioning.
- Operation via front pane via capacitive buttons.

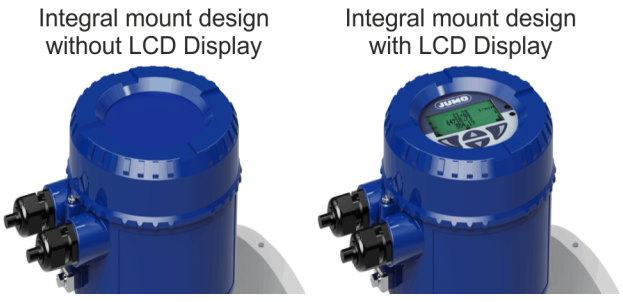

Figure 30: Optional LCD display

* For devices without an LCD display, an accessory LCD display is available (part number: 00706388) that can be connected for making parameter settings. Refer to **Accessories** on page 36

IP degree of protection

- IP 65 / IP 67 as per EN 60529

Vibration

In accordance with EN 60068-2

- Maximum deflection: 0.15 mm (0.006 in.) in frequency range from 10 to 58 Hz
- Maximum acceleration: 2 g*, in frequency range from 58 to 150 Hz

* Peak load

Temperature data

Ambient temperature

-30 to 60 °C (-22 to 140 °F)

Storage temperature

-30 to 70 °C (-22 to 158 °F)

Note

At operation below -20 °C (-4 °F), the LCD can no longer be read and the electronic unit should be operated with as few vibrations as possible.
Full functionality is assured at temperatures above -20 °C (-4 °F).

Housing design

Integral mount design	
Housing	Cast aluminum (painted), Cobalt Blue, RAL 5013
Cable gland	Polyamide

Remote mount design	
Housing	Cast aluminum, painted
Paint	Thickness: ≥ 80 µm, Cobalt Blue, RAL 5013
Cable gland	Polyamide
Weight	1.8 kg (3.97 lb)

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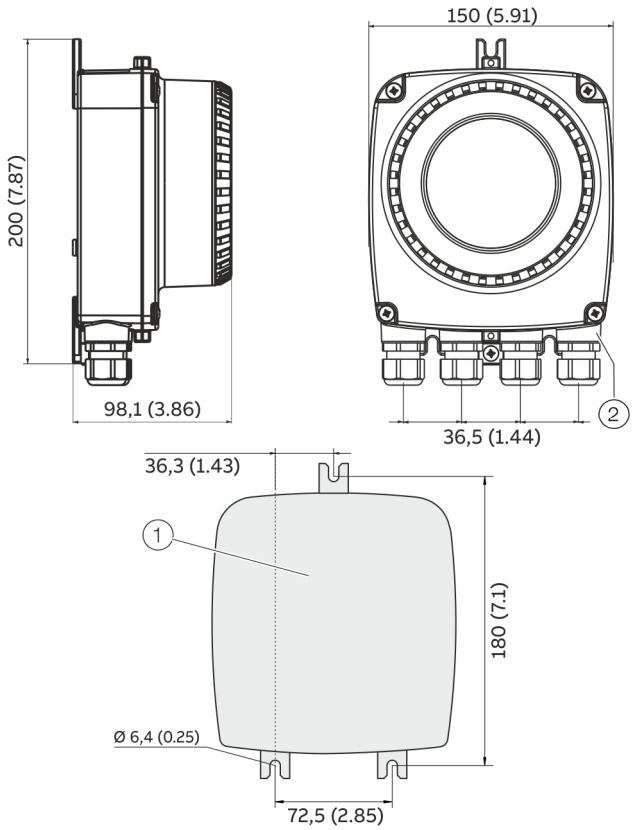
Dimensions



(1) Hole pattern for mounting holes

(2) Female thread (either ½ in NPT or M20 x 1.5), see model coding. In the case of a ½ in NPT, there is a plug instead of a cable gland.

Figure 31: Mounting dimensions single-compartment housing

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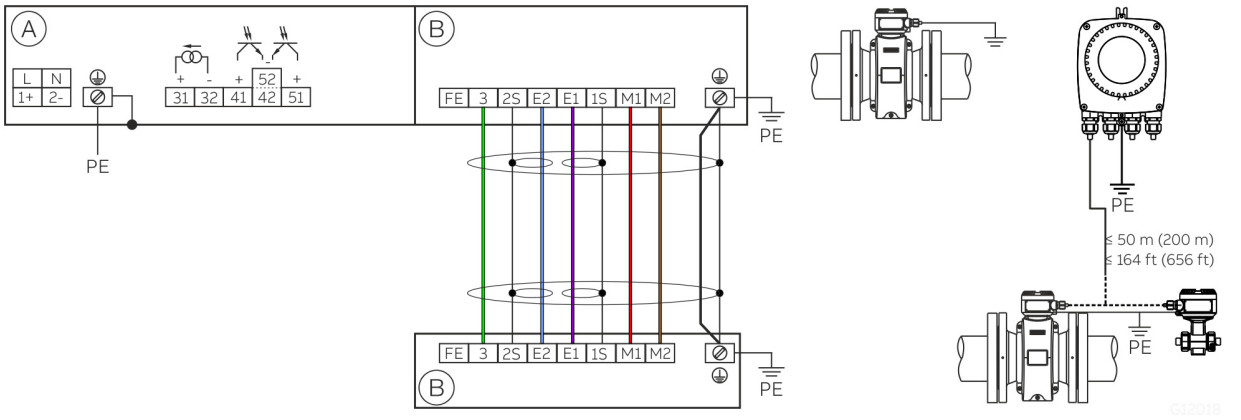
Electrical connections

Connection diagram



Ⓐ Connection points for power supply and outputs

Ⓑ Connection points for signal cable (remote mount design only)

Figure 32: Electrical connection points

Note

For detailed information on grounding the transmitter and the sensor, please refer to the operating or commissioning instruction!

Connections for the power supply

AC power supply	
Terminal	**Function / comments**
L	Phase
N	Neutral conductor
PE / ⏚	Protective earth (PE)

DC voltage supply	
Terminal	**Function / comments**
1+	+
2−	−
PE / ⏚	Protective earth (PE)

Output connections

Terminal	Function / Comment
31 / 32	Active current output The current output is designed as an active output. The power supply for the current output is integrated in the transmitter.
41 / 42	Passive digital output DO1 The output can be configured at the site as a pulse, frequency or switching output.
51 / 52	Passive digital output DO2 The output can be configured at the site as a pulse, frequency or switching output.
⏚	Functional ground

Signal cable connections

Only for remote mount design.

Terminal	Function / Comment	Color
FE	Not assigned	–
3	Measurement potential	Green
2S	Shield for E2	–
E2	Signal lead	Blue
E1	Signal lead	Violet
1S	Shield for E1	–
M1	Solenoid	Brown
M2	Solenoid	Red
SE / ⏚	Shield	–
–	Not assigned	Orange / Yellow

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Electrical data for inputs and outputs

Power supply, L / N, 1+ / 2-

Alternating voltage (AC) supply	
Terminals	L / N
Operating voltage	100 to 240 V AC (−15 % / +10 %), 47 to 64 Hz
Power consumption	< 20 VA
Switch-on current	8.8 A

Direct voltage (DC) supply	
Terminals	1+ / 2−
Operating voltage	24 to 48V DC (−10 % / +10 %)
Residual ripple	< 5 %
Power consumption	< 10 W
Switch-on current	5.6 A

Current output, 31 / 32

Can be configured for the output of mass flow and volumetric flow.

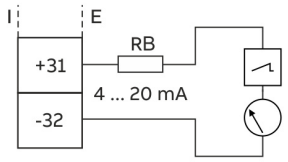
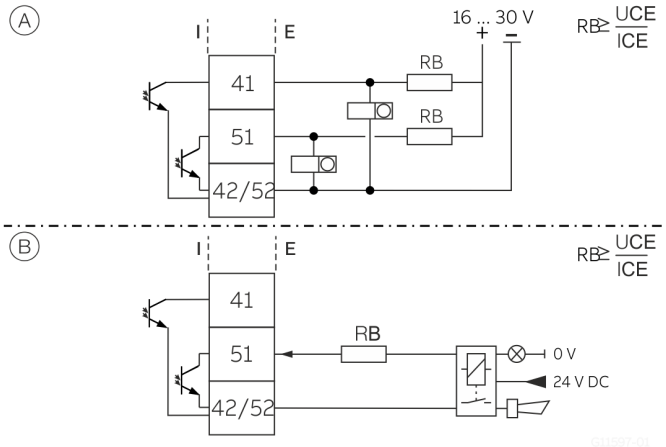


Figure 33: Connection example for active 31 / 32 current output (I = internal, E = external, R_B = load)

Current output	Active
Terminals	31 / 32
Output signal	4 to 20 mA
Load: R_B	0 Ω ≤ R_B ≤ 650 Ω

Digital output, 41 / 42, 51 / 52

Can be configured as pulse, frequency or binary output.



(A) 41 / 42, 51 / 52 passive digital output as pulse or frequency output

(B) 51 / 52 passive digital output as binary output

Figure 34: Connection example (I = internal, E = external, R_B = load)

Note

- The terminals 42 / 52 have the same potential. The digital outputs 41 / 42 and 51 / 52 are not electrically isolated from one another.
- If you are using a mechanical meter, we recommend setting a pulse width of ≥ 30 ms and a maximum frequency of fmax ≤ 3 kHz.

Pulse output / Frequency output (passive)	
Terminals	41 / 42, 51 / 52
U_{max}	30 V DC
I_{max}	25 mA
f_{max}	10.5 kHz
Pulse width	0.1 to 2000 ms

Binary output (passive)	
Terminals	41 / 42, 51 / 52
U_{max}	30 V DC
I_{max}	25 mA
Switching function	Can be configured via software as: General alarm, empty pipe alarm, min. or max. alarm, flow direction signal, among other options

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Ordering information – JUMO flowTRANS MAG S10

Further product information can be found at www.jumo.de

	(1)	**Basic type**
406060		electromagnetic flowmeter
	(2)	**Design type**
1		compact (sensor and transmitter)
2		remote (only external sensor)
	(3)	**ex zone**
00		without (general purpose)
	(4)	**housing Type / housing Material / cable glands**
01		1-chamber housing / aluminum / M20 x 1.5
02		1-chamber housing / aluminum / NPT 1/2 in.
05		remote / aluminum / M20 x 1.5
06		remote / aluminum / NPT 1/2 in.
	(5)	**nominal width**
0003		DN 3 (1/10 in.)
0004		DN 4 (5/32 in.)
0006		DN 6 (1/4 in.)
0008		DN 8 (5/16 in.)
0010		DN 10 (3/8 in.)
0015		DN 15 (1/2 in.)
0020		DN 20 (3/4 in.)
0025		DN 25 (1 in.)
0032		DN 32 (1-1/4 in.)
0040		DN 40 (1-1/2 in.)
0050		DN 50 (2 in.)
0065		DN 65 (2-1/2 in.)
0080		DN 80 (3 in.)
0100		DN 100 (4 in.)
0125		DN 125 (5 in.)
0150		DN 150 (6 in.)
0200		DN 200 (8 in.)
0250		DN 250 (10 in.)
0300		DN 300 (12 in.)
0350		DN 350 (14 in.)
0400		DN 400 (16 in.)
0450		DN 450 (18 in.)
0500		DN 500 (20 in.)
0600		DN 600 (24 in.)
0700		DN 700 (28 in.)
0750		DN 750 (30 in.)
0800		DN 800 (32 in.)
0900		DN 900 (36 in.)
1000		DN 1000 (40 in.)
1050		DN 1050 (42 in.)
1100		DN 1100 (44 in.)
1200		DN 1200 (48 in.)
1400		DN 1400 (54 in.)
1500		DN 1500 (60 in.)
1600		DN 1600 (66 in.)
1800		DN 1800 (72 in.)
2000		DN 2000 (80 in.)

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(6)	**process connection**
10	flange DIN PN 6
11	flange DIN PN 10
12	flange DIN PN 16
13	flange DIN PN 25
14	flange DIN PN 40
20	flange ASME CL 150
21	flange ASME CL 300
23	flange JIS 10K
24	flange JIS 5K
25	flange JIS 20K
(7)	**lining material**
01	PTFE
03	ETFE
06	hard rubber
08	PFA
09	soft rubber
(8)	**material process connection**
01	steel
02	stainless steel
(9)	**electrode version**
1	standard
5	pointed head
(10)	**measuring electrode material**
02	NiMo C-4 (2.4610)
03	titanium
04	tantalum
05	NiMo B-3 (2.4600)
06	platinum-iridium
07	stainless steel 1.4571
(11)	**grounding Electrode / full Pipe Detection**
0	without grounding electrode / without full pipe detection
2	with grounding electrode / without full pipe detection
(12)	**grounding accessories**
0	without
4	protection rings
(13)	**transmitter / sensor protection type**
1	IP67 (NEMA 4X)
2	IP67 (NEMA 4X) / IP68 (NEMA6P)
3	IP67 / IP68, signal cable connected, potted
(14)	**voltage supply**
0	without
5	100 ... 230 AC / 24 V DC, 50 Hz
6	100 ... 230 AC / 24 V DC, 60 Hz
(15)	**display and keypad**
0	without
2	with display, with keypad
(16)	**signal inputs / outputs**
00	without
01	20mA output active, digital output 1+2 passive
(17)	**material certificate**
0	without
2	inspection cert. 3.1 as per EN 10204

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	(18) calibration certificate
1	standard
2	3rd party witnessed calibration
	(19) approvals
1	meas. tube with PED approval
	(20) supply frequency
0	without (compact design only)
1	50 Hz
2	60 Hz
	(21) insertion length
6	standard
	(22) further options
0	without
	(23) language documentation
01	German
02	English
03	French
04	Spanish
	(24) tests and reports
0	without
4	pressure test to AD-2000
	(25) configuration
8	default setting
	(26) calibration
3	accuracy 0,5%
	(27) signal cable length
00	without signal cable
01	5 m (about 15 ft.)
02	10 m (about. 30 ft.)
03	15 m (about 49 ft.)
04	20 m (about 66 ft.)
05	25 m (about 82 ft.)
06	30 m (about 98 ft.)
07	35 m (about 115 ft.)
08	40 m (about 131 ft.)
10	50 m (about 164 ft.)
	(28) instrument label
1	adhesive label
	(29) temperatur range sensor / ambient temperature
1	standard / -20 to 60 °C (-4 to 140 °F)
	(30) number of test points
2	2 test points
3	3 test points
5	5 test points
	(31) validation function
0	validation function not activated

Order code

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19)

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(20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31)

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Ordering information – JUMO flowTRANS MAG 10 external transmitter

Further product information can be found at www.jumo.de

	(1)	**Basic type**
406067		external transmitter
	(2)	**Design type**
2		only external sensor
	(3)	**ex zone**
00		without (general purpose)
	(4)	**housing Type / housing Material / cable glands**
09		field-mount / 1-chamber housing / aluminum / M20 x1.5
10		field-mount / 1-chamber housing / aluminum / NPT 1/2in.
	(5)	**transmitter / sensor protection type**
1		IP67 (NEMA 4X)
	(6)	**voltage supply**
5		100 ... 230 AC / 24 V DC, 50 Hz
6		100 ... 230 AC / 24 V DC, 60 Hz
	(7)	**display and keypad**
0		without
2		with display, with keypad
	(8)	**signal inputs / outputs**
01		20mA output active, digital output 1+2passive
	(9)	**Food & Beverage Approvals**
0		without
	(10)	**further options**
0		without
	(11)	**language documentation**
01		German
02		English
03		French
04		Spanish
	(12)	**instrument label**
1		adhesive label
	(13)	**temperatur range sensor / ambient temperature**
1		standard / -20 to 60 °C (-4 to 140 °F)
	(14)	**mounting set transmitter**
0		without

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)		(14)
	/		-		-		-		-		-		-		-		-		-		-		-		-	

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Accessories

Description	Part number
Installation set for cable gland NPT ½ in. For sealing the cable conduit in the case of outdoor installation.	00645908
	
M20x1.5 adapter on ½ in. NPT	00706384
	
LCD adapters (HMI) – for integral and remote mount designs	00706388
	
Signal cable	00645914

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