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JUMO flowTRANS MAG H10

Electromagnetic flowmeter

for hygienic applications

Brief description

The electromagnetic JUMO flowTRANS MAG H10 flowmeter is specifically designed to meet the requirements relevant to hygienic for applications in the food and pharmaceuticals industries and it is available in numerous nominal diameters.
The sensor is made completely of stainless steel, it facilitates cleaning tasks and it meets all the requirements of 3A sanitary standards.
The variable connection concept with a standardized sensor provides for flexibility and easy installation.
Users are afforded a cost-effective and customized flowmeter with the JUMO flowTRANS MAG H10, which can be used in a wide range of applications, complete with a clear and straightforward documentation.

Type 406061/1...

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.
Refer to **Overview – models** on page 2.

Customer benefits

- Integral or remote mount design
- Variable connection concept
- Large selection of industry-specific process connections
- 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 connections
- Lining material: PFA
- 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

Integral mount design

Remote mount design

1 Sensor

2 External transmitter

Figure 1: Designs

Sensor		
Model	JUMO flowTRANS MAG H10	
Design	Integral mount design (406061/1), remote mount design (406061/2)	
Measuring accuracy for liquids	0.5 % of rate	
Permissible temperature of the medium being measured, T_{medium}	−25 to 130 °C (−13 to 266 °F)	
Minimum conductivity	> 20 µS/cm (20 µS/cm for demineralized water)	
Nominal pressure rating	PN 10 to 40, ASME CL 150, 300, JIS 10K	
Nominal diameter	DN 3 to 100 (1/10 in. to 4 in.)	
Process connection	Wafer-type design:	DN 3 to 100 (1/10 to 4 in.)
	Flange in acc. with DIN, ASME or JIS:	DN 3 to 100 (1/10 to 4 in.), PN 10 to 40
	Threaded pipe connection in acc. with DIN 11851:	DN 3 to 100 (1/10 to 4 in.), PN 10 to 40
	Weld stubs:	DN 3 to 100 (1/10 to 4 in.), PN 10 to 40
	Tri-Clamp in acc. with DIN 32676:	DN 3 to 100 (1/10 to 4 in.), PN 10 to 16
	Tri-Clamp in acc. with ASME BPE:	DN 3 to 100 (1/10 to 4 in.), PN 10
	External thread in acc. with ISO 228 / DIN 2999:	DN 3 to 25 (1/10 to 1 in.), PN 16
Process connection material	Stainless steel	
Lining material	PFA (vacuum-proof)	
Electrode material	CrNi steel 1.4571 (AISI 316Ti), 1.4539 [904L], 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(s))	

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

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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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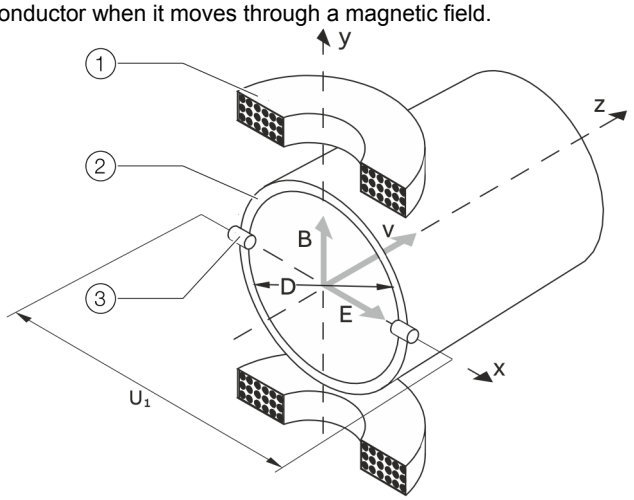
Measuring principle

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

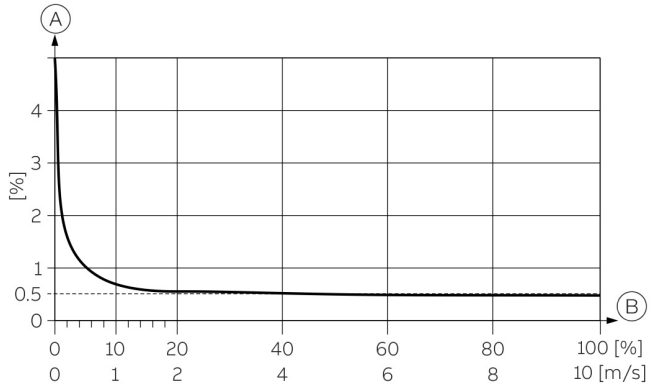
Measuring accuracy

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 6.

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

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.

Storage temperature range

-30 to 70 °C (-22 to 158 °F)

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.

Maximum Allowable Temperature Shock

Maximum allowable temperature shock difference in °C: Any
Temperature gradient °C/min: Any

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Maximum ambient temperature depending on measuring medium temperature

Process connection	Ambient temperature ($T_{amb.}$)		Temperature of medium being measured (T_{medium})	
	Minimum	Maximum	Minimum	Maximum*
Flange	-20 °C (-4 °F)	60 °C (140 °F)	-25 °C (-13 °F)	95 °C (203 °F)
	-20 °C (-4 °F)	45 °C (113 °F)	-25 °C (-13 °F)	130 °C (266 °F)
Variable process connections	-20 °C (-4 °F)	60 °C (140 °F)	-25 °C (-13 °F)	95 °C (203 °F)
	-20 °C (-4 °F)	45 °C (113 °F)	-25 °C (-13 °F)	130 °C (266 °F)

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

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 m^3/h (5.28 US gal/min)	60 m^3/h (264 US gal/min)	120 m^3/h (528 US gal/min)
65	2 ½	2.4 m^3/h (10.57 US gal/min)	120 m^3/h (528 US gal/min)	240 m^3/h (1057 US gal/min)
80	3	3.6 m^3/h (15.9 US gal/min)	180 m^3/h (793 US gal/min)	360 m^3/h (1585 US gal/min)
100	4	4.8 m^3/h (21.1 US gal/min)	240 m^3/h (1057 US gal/min)	480 m^3/h (2113 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 insertion 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 15.

Materials

Parts in contact with the medium

Part	Standard	Option
Lining	PFA	–
Signal and grounding electrode		
	CrNi steel 1.4539 (AISI 904L)	CrNi steel 1.4571 (AISI 316Ti), Hastelloy C-4 (2.4610), Hastelloy B-3 (2.4600), Titanium, tantalum, platinum-iridium
Gaskets (for weld stubs, threaded pipe connections, Tri-Clamp, external thread)		
	EPDM (Ethylene-Propylene) with FDA approval (CIP-resistant, no oils or greases)	Silicone with FDA approval (resistant to oils and greases) PTFE with FDA approval (DN 3 to 8)
Process connection		
Welded stub, Tri-Clamp, etc.	CrNi steel 1.4404 (AISI 316L)	–
OD tubing	CrNi steel 1.4435 (AISI 316L)	–

Parts not in contact with the medium

Part	Standard	Option
Flange	CrNi steel 1.4571 (AISI 316Ti)	–

Sensor housing

Part	Material
Housing	Deep-drawn housing CrNi steel 1.4301 (AISI 304), 1.4308
Meter tube	Stainless steel
Terminal box	Aluminum alloy, painted, Cobalt Blue, RAL 5013, ≥ 80 µm thick
Cable gland*	Polyamide

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

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.

Liner material	Nominal diameter	P_{medium} [mbar abs]	T_{medium}*
PFA	DN 3 to 100 ($1/10$ to 4 in.)	0	< 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.

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Overview of material load

Process connection	DN	P_{medium} max.	T_{medium}
Wafer type	DN 3 to 50 (1/10 to 2 in.)	40 bar (580 psi)	−25 to 130 °C (−13 to 266 °F)
	DN 65 to 100 (2 ½ to 4 in.)	16 bar (232 psi)	
Weld stub DIN 2463, ISO 1127, DIN 11850	DN 3 to 40 (1/10 to 1 ½ in.)	40 bar (580 psi)	−25 to 130 °C (−13 to 266 °F)
	DN 50, DN 80 (2 in., 3 in.)	16 bar (232 psi)	
	DN 65, DN 100 (2 ½ in., 4 in.)	10 bar (145 psi)	
Weld stub SMS 1145	DN 25, DN 40 to 100 (1 in.,1,5 to 4 in.)	6 bar (87 psi)	−25 to 130 °C (−13 to 266 °F)
Threaded pipe connection DIN 11851	DN 3 to 40 (1/10 to 1 ½ in.)	40 bar (580 psi)	−25 to 130 °C (−13 to 266 °F)
	DN 50, DN 80 (2 in., 3 in.)	16 bar (232 psi)	
	DN 65, DN 100 (2 ½ in., 4 in.)	10 bar (145 psi)	
Tri-Clamp DIN 32676	DN 3 to 50 (1/10 to 2 in.)	16 bar (232 psi)	−25 to 130 °C (−13 to 266 °F)
	DN 65 to 100 (2 ½ to 4 in.)	10 bar (145 psi)	
Tri-Clamp ASME BPE	DN 3 to 80 (1/10 to 3 in.)	10 bar (145 psi)	−25 to 121 °C (−13 to 250 °F)
	DN 100 (4 in.)	8.6 bar (124.7 psi)	
External thread ISO 228, DIN 2999	DN 3 to 25 (1/10 to 1 in.)	16 bar (232 psi)	−25 to 130 °C (−13 to 266 °F)
Weld stub OD tubing	DN 3 to 50 (1/10 to 2 in.)	10 bar (145 psi)	−25 to 130 °C (−13 to 266 °F)

Flange design

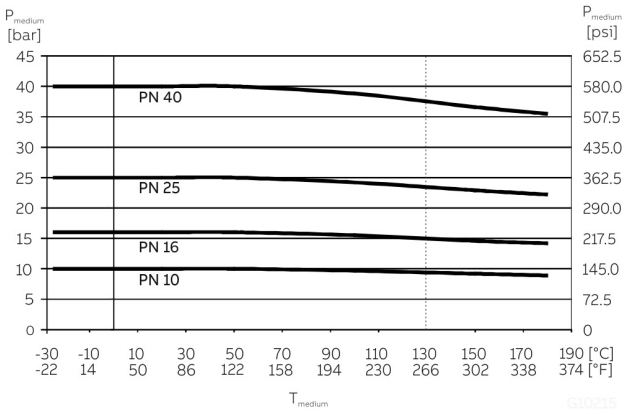

Figure 4: DIN flange, stainless steel up to DN 100 (4 in.)

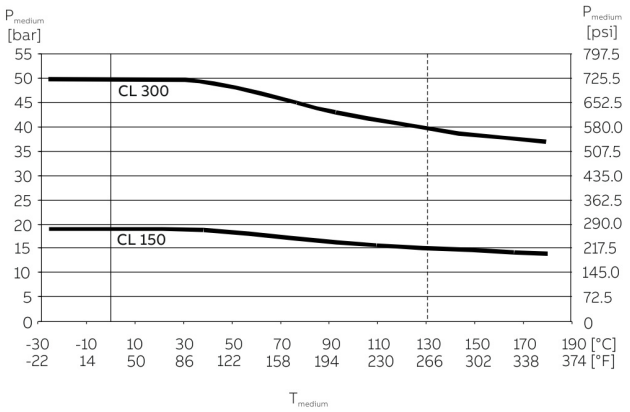

Figure 5: ASME flange, stainless steel up to DN 100 (4 in.) (CL 150 / CL 300)

JIS 10K-B2210 flange

DN	Material	PN	T_{medium}	P_{medium}
DN 25 to 100 (1 to 4 in.)	Stainless steel	10	−25 to 130 °C (−13 to 266 °F)	10 bar (145 psi)

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Wafer type design

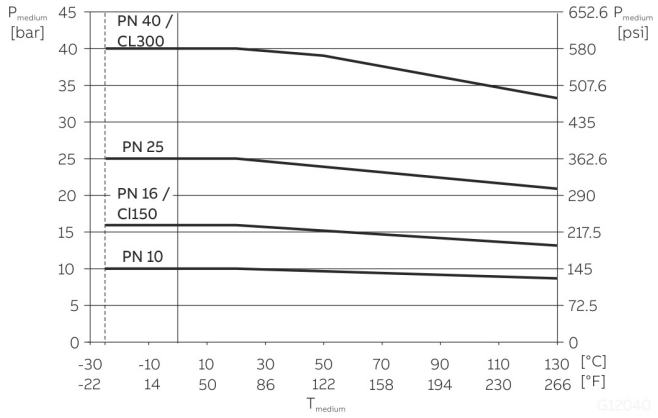

Figure 6: Wafer type design

JIS 10K-B2210 wafer type design

DN	Material	PN	T_{medium}	P_{medium}
DN 32 to 100	1.4404	10	−25 to 130 °C	10 bar
(1 ¼ to 4 in.)	1.4435		(−13 to 266 °F)	(145 psi)
	1.4301			

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.

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Gaskets

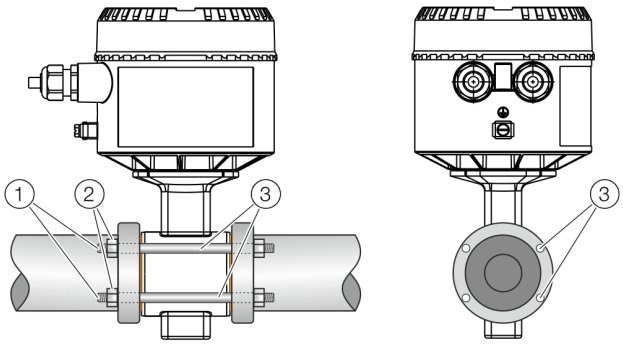
The following points must be observed when installing gaskets:

- 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.

Devices with lining made of PFA

- No additional gaskets are required for devices with lining made of PFA.

Devices with a wafer-type design



① Threaded rod
② Nut with washer
③ Centering sleeves

Figure 7: Installation set for wafer-type design (example)

For devices that feature a wafer-type design, the manufacturer offers an installation set as an accessory part that consists of threaded rods, nuts, washers and centering sleeves to facilitate installation.

Flow direction

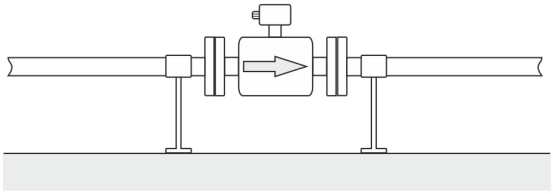
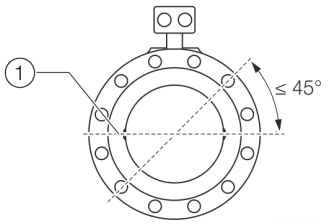


Figure 8: Flow direction

The device measures the flow rate in both flow directions. Forward flow is the factory setting, as shown in Figure 8.

Electrode axis



① Electrode axis

Figure 9: 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.

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Mounting position

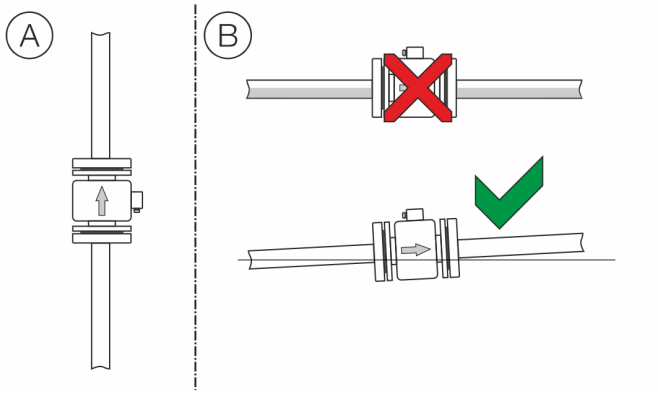

Figure 10: Mounting position

Ⓐ Vertical installation for measuring abrasive materials, preferably with flow in upward direction.
Ⓑ 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.

Note
The vertical installation position should be given preference for hygienic applications.
Ensure that the sensor is installed in a self-draining position in the case of horizontal installation.

Minimum spacing of the devices

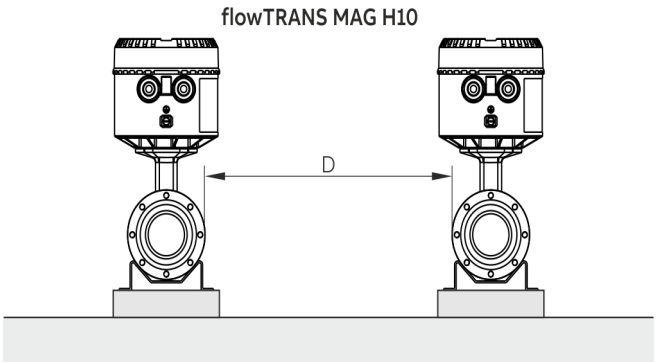

Figure 11: Distance (D): ≥ 1.0 m (≥ 3.3 ft)

- To rule out that the devices interfere with one another, ensure that the minimum distance between the devices shown in Figure 11 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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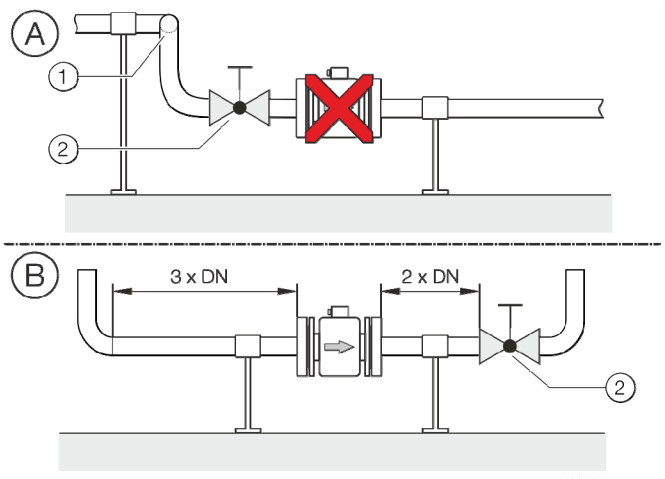
Inlet and outlet sections



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

Figure 12: 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.

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

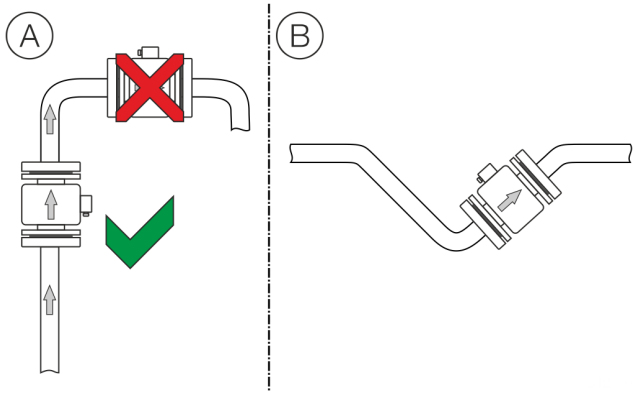


Figure 13: Free inflow and outflow

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

Mounting with heavily contaminated measuring media

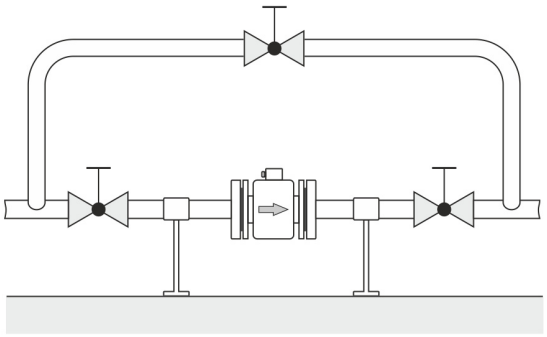


Figure 14: Bypass line

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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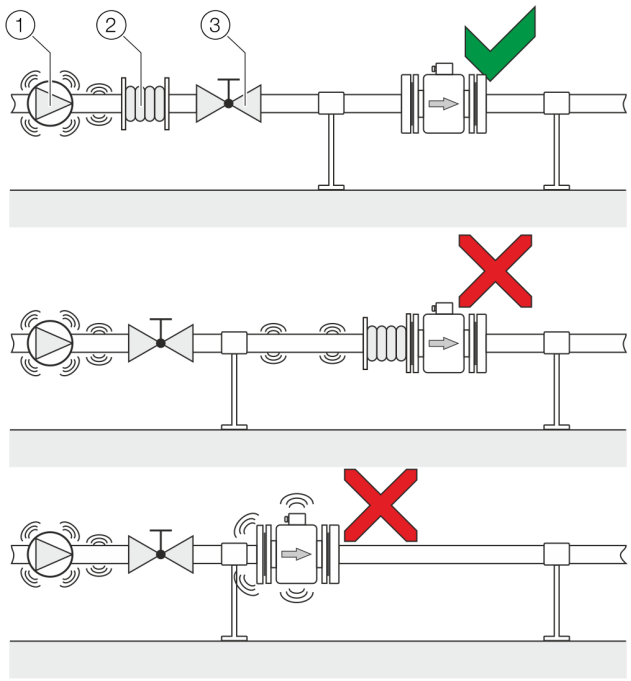
Mounting with pipe vibration

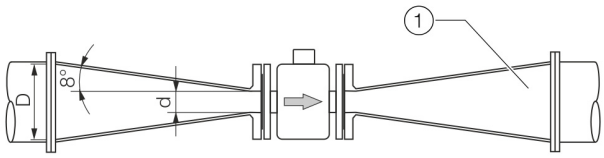


1 Pump
2 Damping device
3 Turn-off device

Figure 15: 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 16: 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 17).
3. Read the pressure loss on the Y-axis in Figure 17.

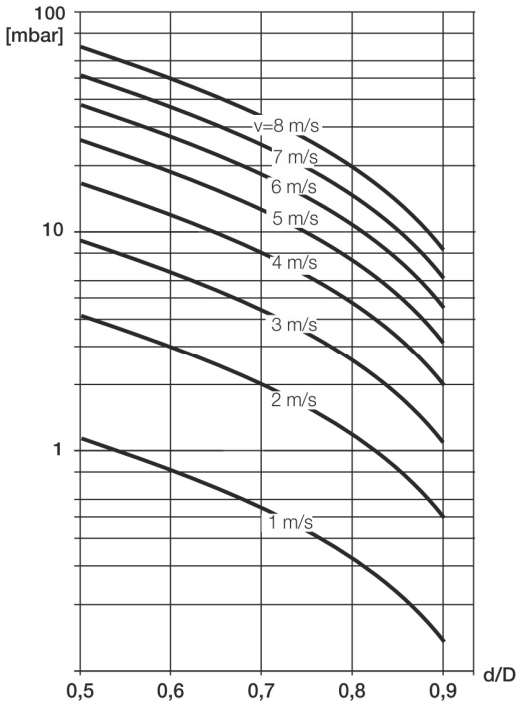


Figure 17: Flow rate nomogram for flange transition piece at α/2 = 8°

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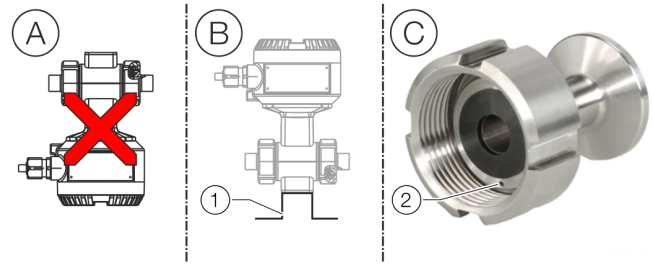
Installation in 3A compliant installations



① Angel bracket ② Leakage hole

Figure 18: 3A compliant installation

Please observe the following points:

Ⓐ Do not install the device vertically with the terminal box or transmitter housing pointing downward.

Ⓑ The ‘angel bracket’ option is not 3A compliant.

Ⓒ Please make sure that the leakage hole of the process connection is located at the lowest point of the installed device.

- A vertical mounting position is preferred. For a horizontal mounting position, make sure that the sensor is installed to be self-draining.
- Make sure that the cover of terminal box and / or transmitter housing is properly sealed. There can be no gaps between the housing and the cover.

Only devices with the following process connections fulfill 3A compliance.

- Welded spuds
- Tri-clamp

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Dimensions

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

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

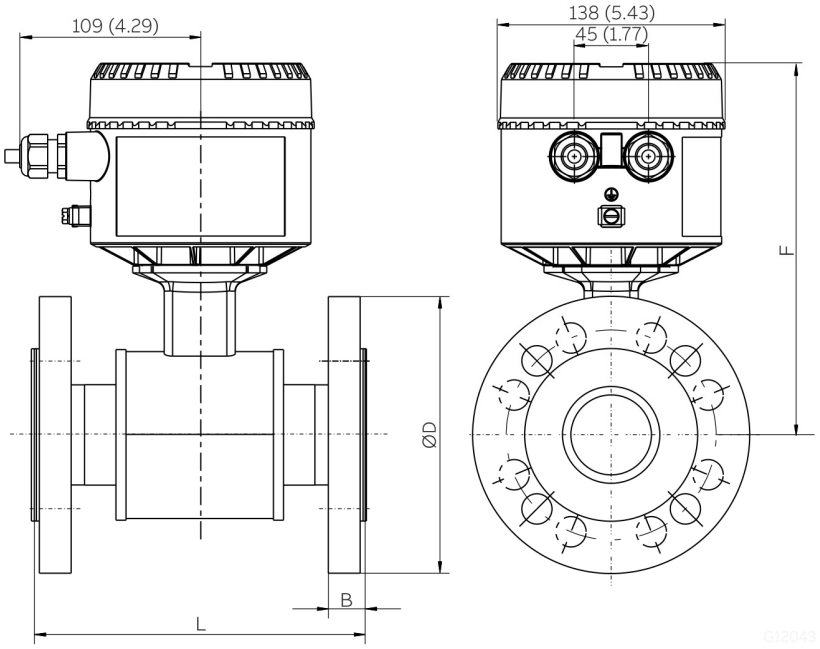

Figure 19: Flange, DN3 to 100 (1/10 to 4 in.)

Dimensions – flange devices							Approx. weight
Nominal diameter	**Process connection**	**D**	**B**	**L**	**F**	**Remote mount**	**Integral mount**
DN 3 to 10*	EN 1092-1 PN 40	90 (3.54)	19 (0.75)	200 (7.84)	190 (7.56)	5.5 (12)	6 (13.2)
(⅛ to ½ in.**)	ASME B16.5, CL 150	90 (3.54)	14.2 (0.56)				
	ASME B16.5, CL 300	95 (3.74)	17.3 (0.68)				
	JIS 10K	90 (3.54)	15 (0.59)				
DN 15	EN 1092-1 PN 40	95 (3.74)	19 (0.75)	200 (7.84)	190 (7.56)	8.5 (18.7)	9 (19.8)
(½ in.)	ASME B16.5, CL 150	90 (3.54)	14.2 (0.56)				
	ASME B16.5, CL 300	95 (3.74)	17.3 (0.68)				
	JIS 10K	95 (3.74)	15 (0.59)				
DN 20	EN 1092-1 PN 40	105 (4.13)	21 (0.83)	200 (7.84)	199 (7.83)	8.5 (18.7)	9 (19.8)
(¾ in.)	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.)

* Process connection, flange size: DN 10.

** Process connection, flange size: ½ in.

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Dimensions – flange devices							**Approx. weight**
Nominal diameter	**Process connection**	**D**	**B**	**L**	**F**	**Remote mount**	**Integral mount**
DN 25	EN 1092-1 PN 40	115 (4.53)	21 (0.83)	200 (7.84)	205 (8.07)	9.5 (20.9)	10 (22)
(1 in.)	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	EN 1092-1 PN 40	140 (5.51)	21 (0.83)	200 (7.84)	210 (8.27)	11.5 (25.4)	12 (26.5)
(1 ¼ in.)	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	EN 1092-1 PN 40	150 (5.91)	21 (0.83)	200 (7.84)	215 (8.46)	11.5 (25.4)	12 (26.5)
(1 ½ in.)	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	EN 1092-1 PN 40	165 (6.50)	23 (0.91)	200 (7.84)	225 (8.86)	11.5 (25.4)	12 (26.5)
(2 in.)	ASME B16.5, CL 150	152.4 (6.00)	22.1 (0.87)				
	ASME B16.5, CL 300	165.1 (6.50)	25.4 (1.00)				
	JIS 10K	155 (6.10)	19 (0.75)				
DN 65	EN 1092-1 PN 40	185 (7.28)	22 (0.87)	200 (7.84)	233 (9.17)	15.5 (34.2)	16 (35.3)
(2 ½ in.)	EN 1092-1 PN 40	185 (7.28)	26 (1.02)				
	ASME B16.5, CL 150	177.8 (7.00)	25.4 (1.00)				
	ASME B16.5, CL 300	190.5 (7.50)	28.4 (1.12)				
	JIS 10K	175 (6.89)	21 (0.83)				
DN 80	EN 1092-1 PN 40	200 (7.87)	28 (1.10)	200 (7.84)	242 (9.53)	18.5 (40.8)	19 (41.9)
(3 in.)	ASME B16.5, CL 150	190.5 (7.50)	26.9 (1.06)				
	ASME B16.5, CL 300	209.6 (8.25)	31.4 (1.24)				
	JIS 10K	185 (7.28)	21 (0.83)				
DN 100	EN 1092-1 PN 40	220 (8.66)	24 (0.94)	200 (7.84)	256 (10.08)	21.5 (47.4)	22 (48.5)
(4 in.)	EN 1092-1 PN 40	235 (9.25)	28 (1.10)				
	ASME B16.5, CL 150	228.6 (9.00)	27.4 (1.08)				
	ASME B16.5, CL 300	254 (10.00)	35.8 (1.41)				
	JIS 10K	210 (8.27)	21 (0.83)				

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

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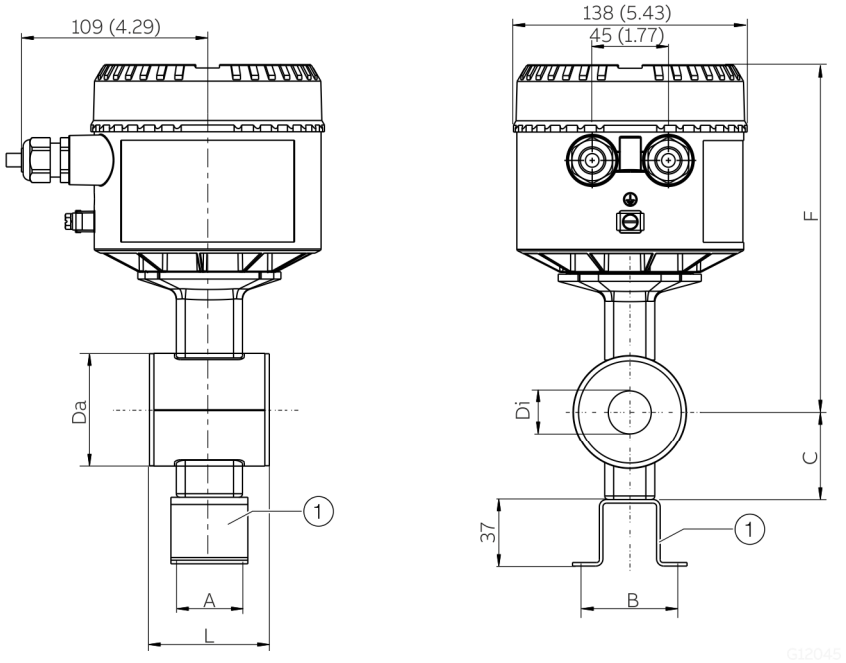
Wafer-type design, DN 3 to 40 (1/10 to 1 ½ in.)

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



(1) Mounting bracket (optional)

Figure 20: Wafer-type design, DN3 to 40 (1/10 to 1 ½ in.)

Dimensions – wafer-type design								Approx. weight
Nominal diameter	**Pressure rating**	**Do**	**Di**	**C**	**F**	**L**	**Remote mount**	**Integral mount**
DN 3 to 8 (⅛ in. to 5/16 in.)	Refer to **Overview of material load** on page 8	45 (1.77)	3 to 8 (0.12 to 0.31)	39 (1.54)	190 (7.48)	68 (2.68)	4 (8.8)	4.5 (9.9)
DN 10 (⅜ in.)			10 (0.39)				4 (8.8)	4.5 (9.9)
DN 15 (½ in.)			13 (0.51)				4 (8.8)	4.5 (9.9)
DN 20 (¾ in.)		54 (2.13)	18 (0.71)	44 (1.73)	199 (7.83)	78 (3.07)	4.5 (9.9)	5 (11.0)
DN 25 (1 in.)		63.4 (2.50)	24 (0.94)	48 (1.89)	205 (8.07)	90 (3.54)	5 (11.0)	5.5 (12.1)
DN 32 (1 ¼ in.)		73 (2.87)	30 (1.18)	53 (2.09)	210 (8.27)	98 (3.86)	5 (11.0)	5.5 (12.1)
DN 40 (1 ½ in.)		82 (3.23)	36 (1.42)	57 (2.24)	215 (8.46)	103 (4.06)	5.5 (12.1)	6 (13.2)

Installation hole spacing		
Nominal diameter	**A**	**B**
DN 3 to 20 (⅛ in. to ¾ in.)	37 (1.46)	50 (1.97)
DN 25 to 40 (1 in. to 1 ½ in.)	42 (1.65)	70 (2.76)

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

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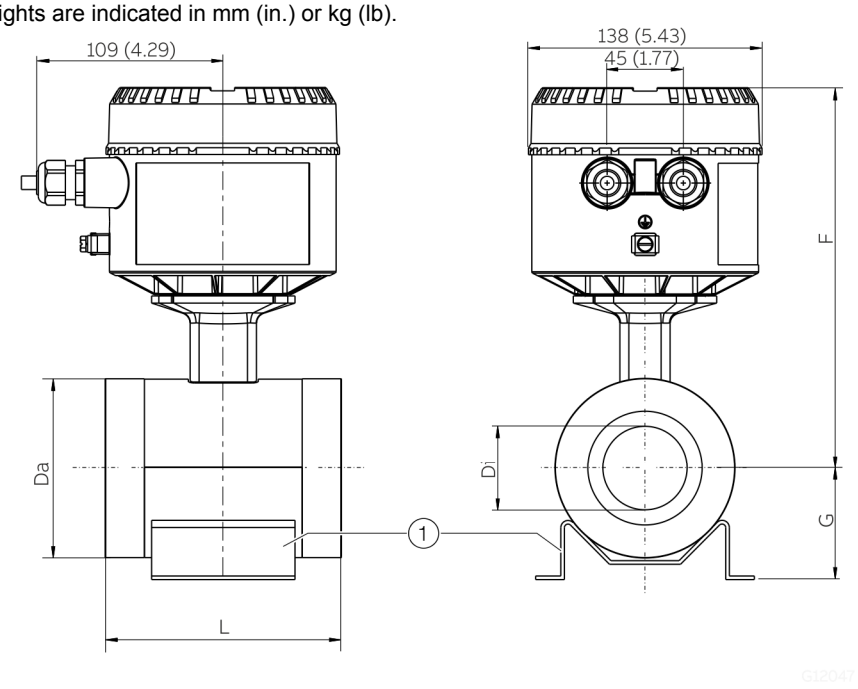
Wafer-type design, DN 50 to 100 (2 to 4 in.)

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



1 Mounting bracket (optional)

Figure 21: Wafer-type design, DN50 to 100 (2 to 4 in.)

Dimensions – wafer-type design								Approx. weight	
Nominal diameter	**Pressure rating**	**Do**	**Di**	**F**	**G**	**L**	**L***	**Remote mount**	**Integral mount**
DN 50 (2 in.)	Refer to **Overview of material load** on page 8	99.6 (3.92)	47 (1.85)	225 (8.86)	62 (2.44)	117 (4.61)	117 (4.61)	6 (13.2)	6.5 (14.3)
DN 65 (2 ½ in.)		116 (4.57)	62 (2.44)	233 (9.17)	74 (2.91)	103 (4.06)	200 (7.87)	6.5 (14.3)	7 (15.4)
DN 80 (3 in.)		133 (5.24)	74 (2.91)	242 (9.53)	86 (3.39)	103 (4.06)	200 (7.87)	7.5 (16.5)	8 (17.6)
DN 100 (4 in.)		160.4 (6.31)	96 (3.78)	256 (10.08)	105 (4.13)	133 (5.24)	250 (9.84)	9.5 (20.9)	10 (22.0)

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

* New insertion length.

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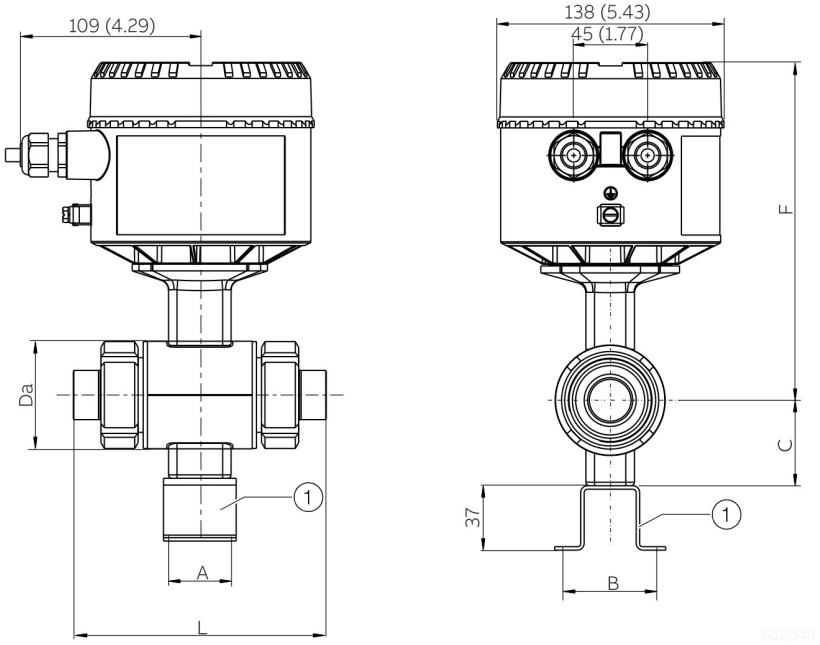
Variable process connections, DN 3 to 40 (1/10 to 1 ½ in.)

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



(1) Mounting bracket (optional)

Figure 22: Variable process connections, DN 3 to 40 (1/10 to 1 ½ in.)

Dimensions						Approx. weight*	
Nominal diameter	**Pressure rating**	**Do**	**C**	**F**	**L**	**Remote mount**	**Integral mount**
DN 3 to 8 (⅛ in. to 5/16 in.)	Refer to **Overview of material load** on page 8	45 (1.77)	39 (1.54)	190 (7.48)	Insertion length including connection adapter, see **Adapters for variable process connections, DN 3 to 100 (⅛ in. to 4 in.)** on page 21	3 (6.6)	3.5 (7.7)
DN 10 (⅜ in.)							
DN 15 (½ in.)							
DN 20 (¾ in.)		54 (2.13)	44 (1.73)	199 (7.83)		3.5 (7.7)	4 (8.8)
DN 25 (1 in.)		63.4 (2.50)	48 (1.89)	205 (8.07)		4 (8.8)	4.5 (9.9)
DN 32 (1 ¼ in.)		73 (2.87)	53 (2.09)	210 (8.27)			
DN 40 (1 ½ in.)		82 (3.23)	57 (2.24)	215 (8.46)		4.5 (9.9)	5 (11.0)

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

* Plus weight of connection adapter, see **Adapters for variable process connections, DN 3 to 100 (⅛ in. to 4 in.)** on page 21.

Installation hole spacing		
Nominal diameter	**A**	**B**
DN 3 to 20 (⅛ in. to ¾ in.)	28 (1.1)	50 (1.97)
DN 25 to 40 (1 in. to 1 ½ in.)	46 (1.81)	70 (2.76)

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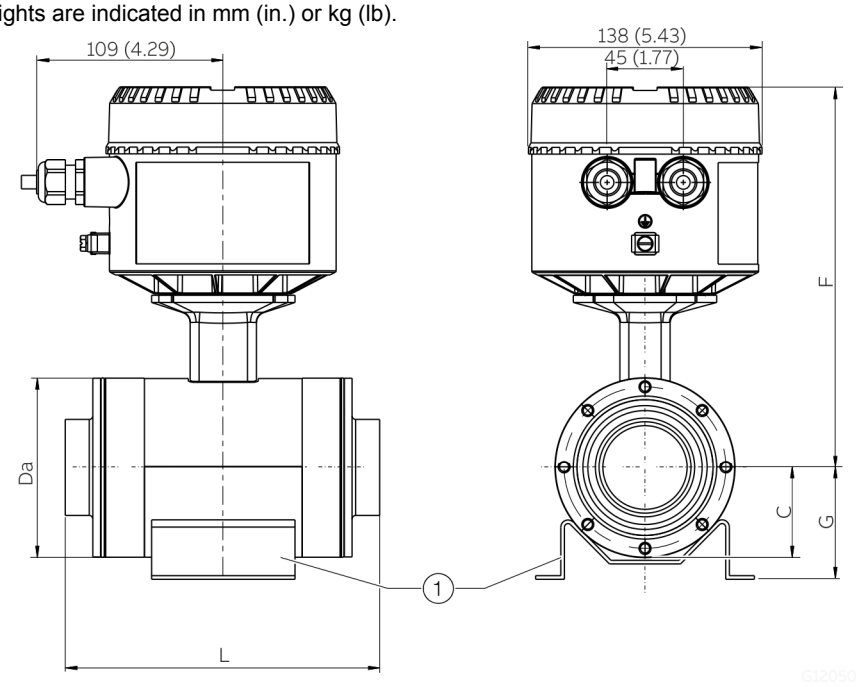
Variable process connections, DN 50 to 100 (2 to 4 in.)

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



1 Mounting bracket (optional)

Figure 23: Variable process connections, DN50 to 100 (2 to 4 in.)

Dimensions							Approx. weight*	
Nominal diameter	**Pressure rating**	**Do**	**F**	**C**	**G**	**L**	**Remote mount**	**Integral mount**
DN 50 (2 in.)	Refer to **Overview of material load** on page 8	99.6 (3.92)	225 (8.86)	50 (1.97)	62 (2.44)	Insertion length including connection adapter, see **Adapters for variable process connections, DN 3 to 100 (⅛ in. to 4 in.)** on page 21	6 (13.2)	6.5 (14.3)
DN 65 (2 ½ in.)		116 (4.57)	233 (9.17)	58 (2.28)	74 (2.91)		6.5 (14.3)	7 (15.4)
DN 80 (3 in.)		133 (5.24)	242 (9.53)	66.5 (2.62)	86 (3.39)		8 (17.6)	8.5 (18.7)
DN 100 (4 in.)		160.4 (6.31)	256 (10.08)	80.2 (3.16)	105 (4.13)		10.5 (23.1)	11 (24.3)

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

* Plus weight of connection adapter, see **Adapters for variable process connections, DN 3 to 100 (⅛ in. to 4 in.)** on page 21.

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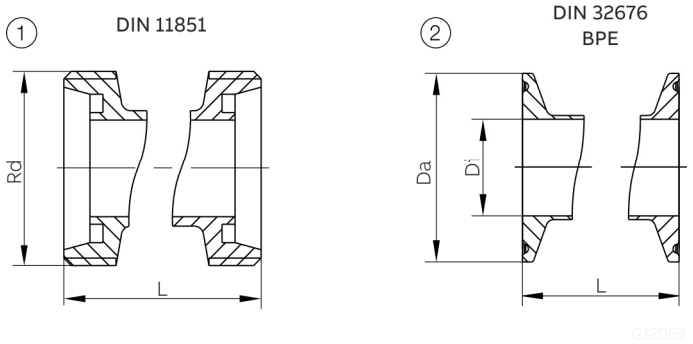
Adapters for variable process connections, DN 3 to 100 (⅛ in. to 4 in.)

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



(1) Threaded pipe connection in acc. with DIN 11851

(2) Tri-Clamp

Figure 24: Adapters for variable process connections

Threaded pipe connection in acc. with DIN 11851

Nominal diameter	Pressure rating	L (old*)	L (new**)	Thread	Ø Di	Weight
DN 3 to 10 (⅛ to ⅜ in.)	Refer to **Overview of material load** on page 8	169 (6.65)	–	28 x 1/8 in.	10 (0.39)	0.5 (1.1)
DN 15 (½ in.)				34 x 1/8 in.	16 (0.63)	
DN 20 (¾ in.)		180 (7.09)	–	44 x 1/6 in.	20 (0.79)	0.9 (2.0)
DN 25 (1 in.)		207 (8.15)	–	52 x 1/6 in.	26 (1.02)	
DN 32 (1 ¼ in.)		230 (9.06)	–	58 x 1/6 in.	32 (1.26)	1.4 (3.1)
DN 40 (1 ½ in.)		237 (9.33)	–	65 x 1/6 in.	38 (1.50)	
DN 50 (2 in.)		243 (9.57)	–	78 x 1/6 in.	50 (1.97)	
DN 65 (2 ½ in.)		245 (9.65)	330.5 (13.01)	96 x 1/6 in.	66 (2.60)	2.2 (4.9)
DN 80 (3 in.)		259 (10.20)	344.5 (13.56)	110 x 1/4 in.	81 (3.19)	3.2 (7.1)
DN 100 (4 in.)		307 (12.09)	412.5 (16.24)	130 x 1/4 in.	100 (3.94)	4.4 (9.7)

* Old insertion length, for replacement purposes only. Please take note of the ordering information.

** New insertion length.

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Tri-clamp

Nominal diameter	Pressure rating	In accordance with DIN 32676					In accordance with ASME BPE				
		L	Ø Do	Ø Di	Series	Weight	Process variable	L	Ø Do	Ø Di	Weight
DN 3 to 10 (⅛ to ⅜ in.)	Refer to **Overview of material load** on page 8	163 (6.42)	34 (1.34)	10 (0.39)	3	0.5 (1.1)	½ in.	143 (5.63)	25 (0.98)	9.4 (0.37)	0.5 (1.1)
DN 15 (½ in.)				16 (0.63)			¾ in.			15.7 (0.62)	
DN 20 (¾ in.)		168 (6.61)		20 (0.79)	3	0.7 (1.5)	1 in.		50.4 (1.98)	22.1 (0.87)	0.7 (1.5)
DN 25 (1 in.)		192 (7.56)	50.5 (1.99)	26 (1.02)	3	0.8 (1.8)	1 ½ in.	277 (34.8)		22.1 (0.87)	1.2 (2.7)
DN 32 (1 ¼ in.)		209 (8.23)		32 (1.26)	3	1.5 (3.3)	–	–	–	–	–
DN 40 (1 ½ in.)		214 (8.43)		38 (1.50)	3	1.4 (3.1)	1 ½ in.	277 (34.8)	50.4 (1.98)	34.8 (1.37)	1.8 (4.0)
DN 50 (2 in.)		216 (8.50)	64 (2.52)	50 (1.97)	3	1.2 (2.7)	2 in.		63.9 (2.52)	47.5 (1.87)	
DN 65 (2 ½ in.)		221 (8.70)*	91 (3.58)	66 (2.60)	1	1.6 (3.5)	2 ½ in.		77.4 (3.05)	60.2 (2.37)	2.0 (4.4)
		306.5 (12.07)**									
DN 80 (3 in.)		225 (8.86)*	106 (4.17)	81 (3.19)	1	2.4 (5.3)	3 in.	337 (13.27)	90.9 (3.58)	72.9 (2.87)	3.6 (8.0)
		310.5 (12.22)**									
DN 100 (4 in.)		255 (8.86)*	119 (4.69)	100 (3.94)	1	3.1 (6.8)	4 in.		118.8 (4.68)	97.4 (3.83)	4.1 (9.1)
		360.5 (14.19)**									

* Old insertion length, for replacement purposes only. Please take note of the ordering information.

** New insertion length.

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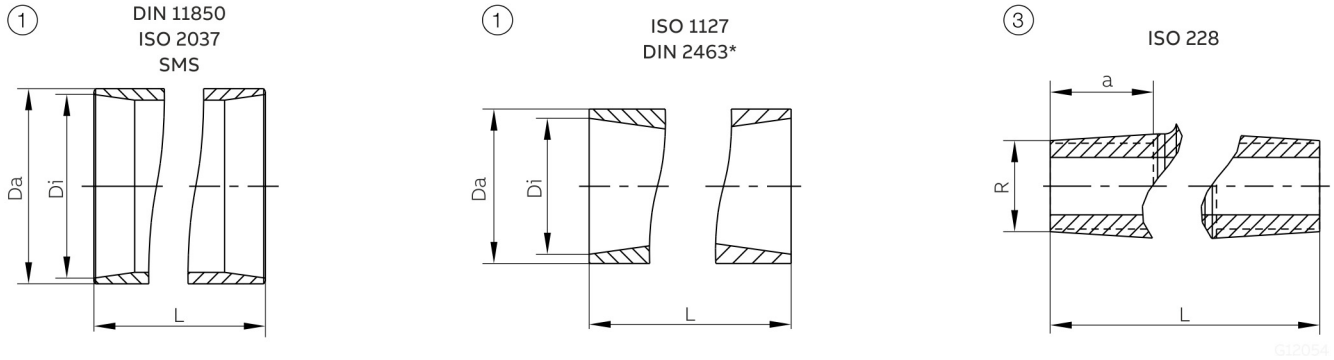

1 Weld stub

2 External thread

Figure 25: Adapters for variable process connections

Weld stubs

Nominal diameter	Pressure rating	L	In accordance with DIN 11850			In accordance with ISO 1127			In accordance with SMS		Weight
			Ø Do	Ø Di	Series	Ø Do	Ø Di	Series	Ø Do	Ø Di	
DN 3 to 10 (⅛ to ⅜ in.)	Refer to **Overview of material load** on page 8	127 (5.0)	13 (0.51)	10 (0.39)	2	13.5 (0.53)	10.3 (0.41)	1	–	–	0.4 (0.9)
DN 15 (½ in.)			19 (0.75)	16 (0.63)		21.3 (0.84)	18.1 (0.71)		–	–	0.4 (0.9)
DN 20 (¾ in.)		132 (5.2)	23 (0.91)	20 (0.79)		26.9 (1.06)	23.7 (0.93)		–	–	0.7 (1.5)
DN 25 (1 in.)		149 (5.87)	29 (1.14)	26 (1.02)		26.9 (1.06)	23.7 (0.93)		25 (0.98)	22.6 (0.89)	0.7 (1.5)
DN 32 (1 ¼ in.)		166 (6.54)	34 (1.34)	32 (1.26)	1	33.7 (1.33)	30.5 (1.20)		–	–	1.0 (2.2)
DN 40 (1 ½ in.)		171 (6.73)	41 (1.61)	38 (1.50)	2	42.2 (1.66)	39 (1.54)	1	38 (1.50)	35.6 (1.40)	1.0 (2.2)
DN 50 (2 in.)		173 (6.81)	54 (2.13)	50 (1.97)	3	51 (2.01)	47.8 (1.88)	2	51 (2.01)	48.6 (1.91)	1.0 (2.2)
DN 65 (2 ½ in.)		165 (6.50)*	70 (2.76)	66 (2.60)	2	70 (2.76)	66 (2.60)	2	63.5 (2.50)	60.3 (2.37)	1.4 (3.1)
		250.5 (9.86)**									
DN 80 (3 in.)		169 (6.65)*	85 (3.35)	81 (3.19)		76.1 (3.00)	72.9 (2.87)	1	76.1 (3.00)	72.9 (2.87)	2.0 (4.4)
		254.5 (10.02)**									
DN 100 (4 in.)		199 (7.83)*	104 (4.09)	100 (3.94)		101.6 (4.00)	97.6 (3.84)	2	104 (4.09)	100 (3.94)	2.6 (5.7)
		304.5 (11.99)**									

* Old insertion length, for replacement purposes only. Please take note of the ordering information.

** New insertion length.

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Weld stubs

Nominal diameter	Pressure rating	L	In accordance with DIN EN ISO 2037		In accordance with DIN 2463		Weight
			Ø Do	Ø Di	Ø Do	Ø Di	
DN 3 to 10 (⅛ to ⅜ in.)	Refer to **Overview of material load** on page 8	127 (5.0)	12 (0.47)	10 (0.39)	13.5 (0.53)	10.3 (0.41)	0.4 (0.9)
DN 15 (½ in.)			17.2 (0.68)	15.2 (0.60)	21.3 (0.84)	18.1 (0.71)	0.4 (0.9)
DN 20 (¾ in.)		132 (5.2)	21.3 (0.84)	19.3 (0.76)	26.9 (1.06)	23.7 (0.93)	0.7 (1.5)
DN 25 (1 in.)		149 (5.87)	25 (0.98)	22.6 (0.89)	28 (1.10)	25 (0.98)	0.7 (1.5)
DN 32 (1 ¼ in.)		166 (6.54)	33.7 (1.33)	31.3 (1.23)	35 (1.38)	32 (1.26)	1.0 (2.2)
DN 40 (1 ½ in.)		171 (6.73)	38 (1.5)	35.6 (1.40)	40 (1.57)	36.8 (1.45)	1.0 (2.2)
DN 50 (2 in.)		173 (6.81)	51 (2.01)	48.6 (1.91)	52 (2.05)	49 (1.93)	1.0 (2.2)
DN 65 (2 ½ in.)		165 (6.50)*	63.5 (2.50)	60.3 (2.37)	70 (2.76)	66 (2.60)	1.4 (3.1)
		250.5 (9.86)**					
DN 80 (3 in.)		169 (6.65)*	76.1 (3.00)	72.9 (2.87)	85 (3.35)	81 (3.19)	2.0 (4.4)
		254.5 (10.02)**					
DN 100 (4 in.)		199 (7.83)*	101.6 (4.00)	97.6 (3.84)	104 (4.09)	100 (3.94)	3.0 (6.6)
		304.5 (11.99)**					

* Old insertion length, for replacement purposes only. Please take note of the ordering information.

** New insertion length.

External thread in acc. with ISO 228 / DIN 2999

Nominal diameter	Pressure rating	L	R	a	Weight
DN 3 to 10 (⅛ to ⅜ in.)	Refer to **Overview of material load** on page 8	139 (5.47)	⅜ in.	18 (0.71)	0.4 (0.9)
DN 15 (½ in.)		139 (5.47)	½ in.	18 (0.71)	0.4 (0.9)
DN 20 (¾ in.)		164 (6.46)	¾ in.	25 (0.98)	0.8 (1.8)
DN 25 (1 in.)		179 (7.05)	1 in.	25 (0.98)	0.8 (1.8)

Weld stubs suitable for OD tubing

Nominal diameter	Pressure rating	Weld stub size	Di	Do	L	Weight
10 (⅜ in.)	Refer to **Overview of material load** on page 8	½ in.	9.40 (0.37)	12.70 (0.70)	127 (5.00)	0.4 (0.9)
15 (½ in.)		¾ in.	15.75 (0.62)	19.05 (0.75)	127 (5.00)	0.4 (0.9)
20 (1 in.)		1 in.	22.10 (0.87)	25.40 (1.00)	132 (5.20)	0.7 (1.5)
25 (1 in.)		1 in.	22.10 (0.87)	25.40 (1.00)	149 (5.87)	1.0 (2.2)
40 (1 ½ In.)		1 ½ in.	34.80 (1.37)	38.10 (1.50)	171 (6.73)	
50 (2 in.)		2 in.	47.50 (1.87)	50.80 (2.00)	173 (6.81)	

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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.

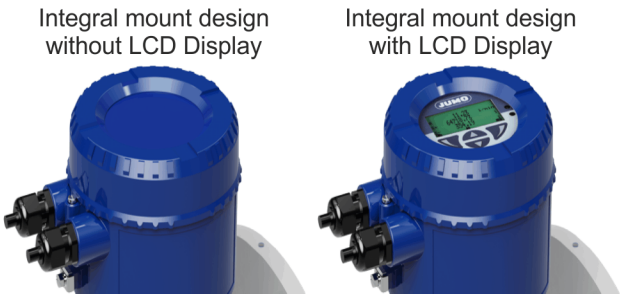

Figure 26: Optional LCD display

* 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

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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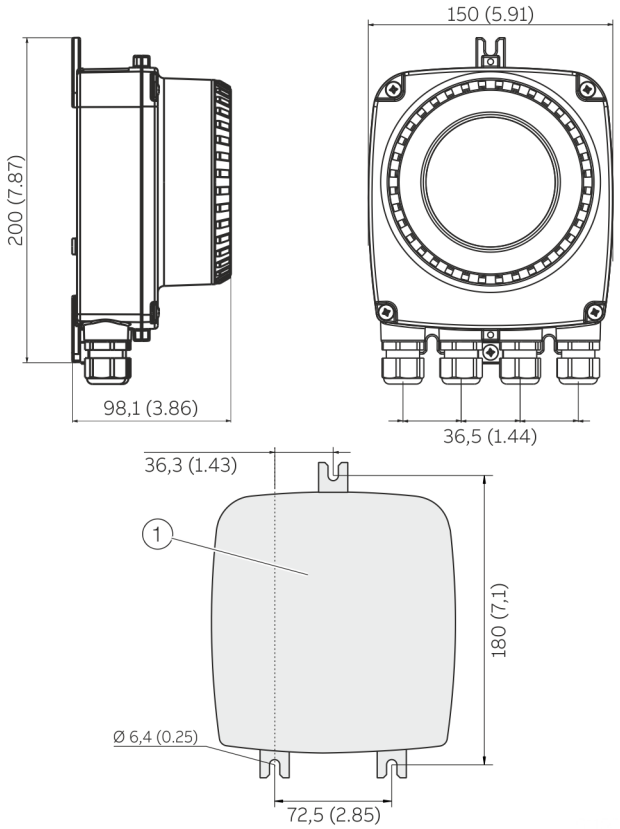
Dimensions



(1) Fixing hole pattern

Figure 27: Installation dimensions (remote mount design)

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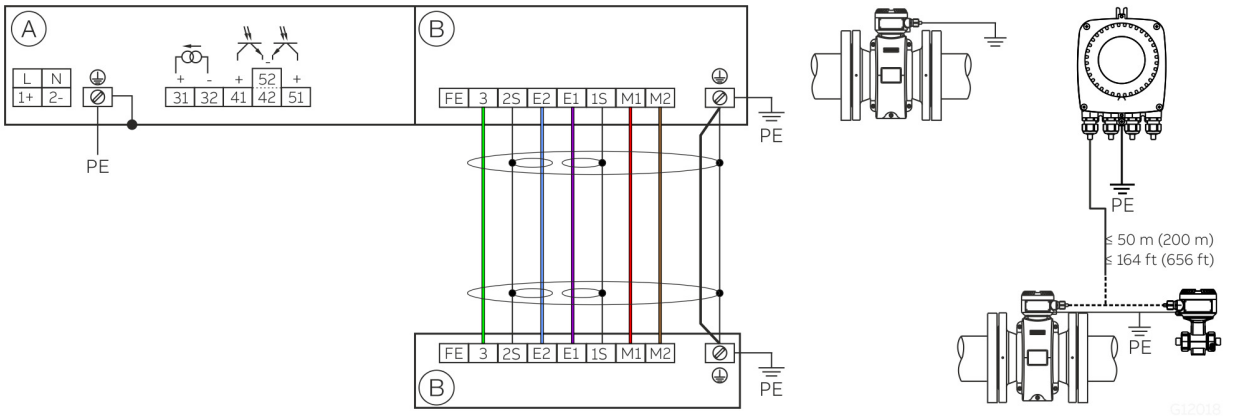
Electrical connections

Connection diagram



Ⓐ Connection points for power supply and outputs

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

Figure 28: 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.

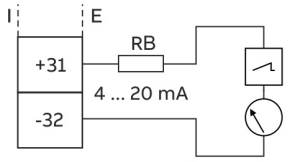
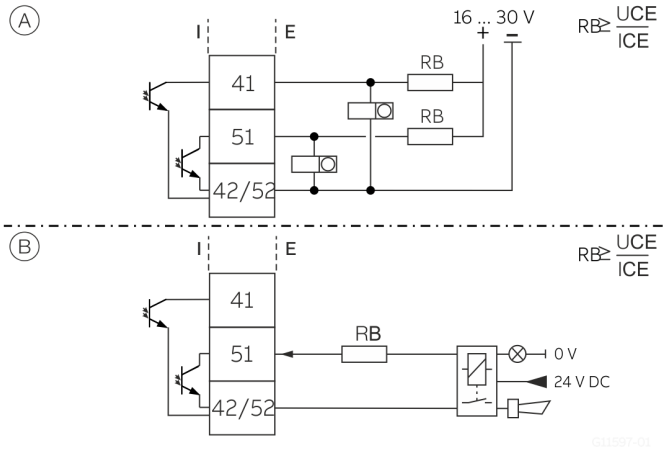


Figure 29: Connection example for active 31 / 32 current output
(I = internal, E = external, R_B = load)

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 30: 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 H10

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

	(1)	**Basic type**
406061		electromagnetic flowmeter
	(2)	**Design type**
1		compact (sensor und 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.)
	(6)	**process connection**
30		outer thread ISO 228/DIN 2999 (conical)
40		screw connection as per DIN 11851
50		weld stub as per ISO 2037
51		weld stub as per DIN 2463
52		weld stub as per DIN 11850
53		weld stub as per ISO 1127
54		weld stub as per OD Tubing
55		weld stub as per SMS
60		Tri clamp as per DIN 32676
61		Tri clamp as per ASME BPE
70		wafer
	(7)	**lining material**
08		PFA
	(8)	**material process connection**
03		stainless steel with EPDM seal
04		stainless steel,EPDM seal, fixing
05		stainless steel, silicone seal
06		stainless steel, silicone seal, fixing
09		without PA, without seal, with fixing
10		without PA, seal and fixing
	(9)	**electrode version**
1		standard
5		pointed head

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(10)	**measuring electrode material**
01	stainless steel 1.4539
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 pipedetection
2	with grounding electrode / without full pipedetection
(12)	**grounding accessories**
0	without
(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
(18)	**calibration certificate**
1	standard
2	3rd party witnessed calibration
(19)	**approvals**
1	meas. tube with PED approval
(20)	**Food & Beverage Approvals**
0	without
(21)	**supply frequency**
0	without (compact design only)
1	50 Hz
2	60 Hz
(22)	**insertion length**
4	Old insertion length for DN 1- 100
5	New insertion length for DN 65, DN 80, DN100
(23)	**further options**
0	without
(24)	**language documentation**
01	German
02	English
03	French
04	Spanish
(25)	**tests and reports**
0	Ohne
(26)	**configuration**
8	Default setting

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	(27) calibration
3	accuracy 0,5%
	(28) 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.)
	(29) instrument label
1	adhesive label
	(30) temperatur range sensor / ambient temperature
1	standard / -20 to 60 °C (-4 to 140 °F)
	(31) number of test points
2	2 test points
3	3 test points
5	5 test points
	(32) 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)	
	/		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-		-	

(20)		(21)		(22)		(23)		(24)		(25)		(26)		(27)		(28)		(29)		(30)		(31)		(32)
	-		-		-		-		-		-		-		-		-		-		-	

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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

Wafer-type accessories

The threaded rods, nuts, washers, and centering sleeves required for mounting the wafer-type design are included in the wafer-type accessories.

Nominal diameter	Pressure rating	Part number
DN 3 to DN 10 (1/10 to 3/8 in.)	PN 10 to PN 40	00706886
	ASME CL 150	00706886
	ASME CL 300	00706891
DN 15 (½ in.)	PN 10 to PN 40	00706886
	ASME CL 150	00706909
	ASME CL 300	00706911
DN 20 (¾ in.)	PN 10 to PN 40	00706912
	ASME CL 150	00706913
	ASME CL 300	00706914
DN 25 (1 in.)	PN 10 to PN 40	00706916
	ASME CL 150	00706917
	ASME CL 300	00706918
DN 32 (1-¼ in.)	PN 10 to PN 40	00706954
	ASME CL 150	00706955
	ASME CL 300	00706957
DN 40 (1-½ in.)	PN 10 to PN 40	00706959
	ASME CL 150	00706961
	ASME CL 300	00706962
DN 50 (2 in.)	PN 10 to PN 40	00706971
	ASME CL 150	00706972
	ASME CL 300	00706976
DN 65 (2-½ in.)	PN 10 to PN 16	00707035
New insertion length	PN 25 to PN 40	00707036
	ASME CL 150	00707037
	ASME CL 300	00707038
DN 80 (3 in.)	PN 10 to PN 40	00707039
New insertion length	ASME CL 150	00707040
	ASME CL 300	00707042
DN 100 (4 in.)	PN 10 to PN 16	00707044
New insertion length	PN 25 to PN 40	00707045
	ASME CL 150	00707046

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Welding adapter

The welding adapter is an auxiliary tool for sensors that feature a “weld stub” as process connection. It enables these weld stubs to be welded into the pipe in a coplanar manner.
The adapter is made of stainless steel 1.4301 (AISI 304).

Nominal diameter	Part number
DN 3 to DN 10 (1/10 to 3/8 in.)	00706391
DN 15 (1/2 in.)	00706473
DN 20 (3/4 in.)	00706474
DN 25 (1 in.)	00706476
DN 32 (1-1/4 in.)	00706493
DN 40 (1-1/2 in.)	00706506
DN 50 (2 in.)	00706507
DN 65 (2-1/2 in.), old insertion length	00706521
DN 65 (2-1/2 in.), new insertion length	00706522
DN 80 (3 in.), old insertion length	00706573
DN 80 (3 in.), new insertion length	00706574
DN 100 (4 in.), old insertion length	00706575
DN 100 (4 in.), new insertion length	00706576

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

Trademark information

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