

Technical Information

Proline Promass 80F, 80M, 83F, 83M

Coriolis Mass Flow Measuring System

The universal and multivariable flowmeter for liquids and gases



www.nicsanat.com

021-87700210

Application

The Coriolis measuring principle operates independently of the physical fluid properties, such as viscosity and density.

- Extremely accurate measurement of liquids and gases such as oils, lubricants, fuels, liquefied gases, solvents, foodstuffs and compressed gases
- Fluid temperatures up to +350 °C
- Process pressures up to 350 bar
- Mass flow measurement up to 2200 t/h

Approvals for hazardous area:

- ATEX, FM, CSA, TIIS, IECEx, NEPSI

Approvals in the food industry/hygiene sector:

- 3A, FDA, EHEDG

Connection to all common process control systems:

- HART, PROFIBUS DP/PA, FOUNDATION Fieldbus, MODBUS

Relevant safety aspects:

- Secondary containment (up to 100 bar), Pressure Equipment Directive, AD 2000, SIL-2
- Purge connections or rupture disk (optional)

Your benefits

The Promass measuring devices make it possible to simultaneously record several process variables (mass/density/temperature) for various process conditions during measuring operation.

The **Proline transmitter concept** comprises:

- Modular device and operating concept resulting in a higher degree of efficiency
- Software options for batching and concentration measurement for extended range of application
- Diagnostic ability and data back-up for increased process quality

The **Promass sensors**, tried and tested in over 100000 applications, offer:

- Best performance due to PremiumCal
- Multivariable flow measurement in compact design
- Insensitivity to vibrations thanks to balanced two-tube measuring system
- Immune from external piping forces due to robust design
- Easy installation without taking inlet and outlet runs into consideration

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Function and system design

Measuring principle

The measuring principle is based on the controlled generation of Coriolis forces. These forces are always present when both translational and rotational movements are superimposed.

$$F_C = 2 \cdot \Delta m (v \cdot \omega)$$

F_C = Coriolis force

Δm = moving mass

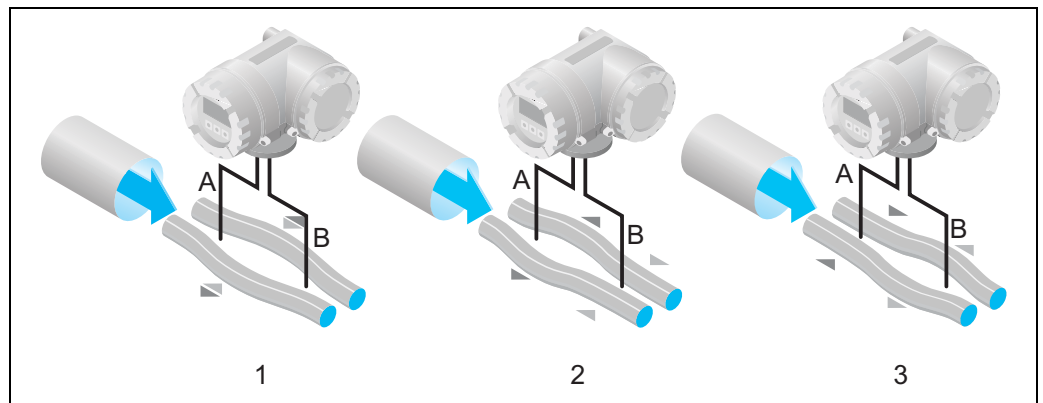
ω = rotational velocity

v = radial velocity in rotating or oscillating system

The amplitude of the Coriolis force depends on the moving mass Δm , its velocity v in the system, and thus on the mass flow. Instead of a constant angular velocity ω , the Promass sensor uses oscillation.

In the Promass F and M sensors, two parallel measuring tubes containing flowing fluid oscillate in antiphase, acting like a tuning fork. The Coriolis forces produced at the measuring tubes cause a phase shift in the tube oscillations (see illustration):

- At zero flow, in other words when the fluid is at a standstill, the two tubes oscillate in phase (1).
- Mass flow causes deceleration of the oscillation at the inlet of the tubes (2) and acceleration at the outlet (3).



a0003385

The phase difference (A-B) increases with increasing mass flow. Electrodynamical sensors register the tube oscillations at the inlet and outlet.

System balance is ensured by the antiphase oscillation of the two measuring tubes. The measuring principle operates independently of temperature, pressure, viscosity, conductivity and flow profile.

Density measurement

The measuring tubes are continuously excited at their resonance frequency. A change in the mass and thus the density of the oscillating system (comprising measuring tubes and fluid) results in a corresponding, automatic adjustment in the oscillation frequency. Resonance frequency is thus a function of fluid density. The microprocessor utilizes this relationship to obtain a density signal.

Temperature measurement

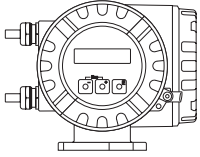
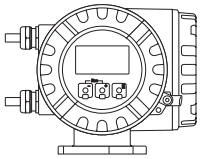
The temperature of the measuring tubes is determined in order to calculate the compensation factor due to temperature effects. This signal corresponds to the process temperature and is also available as an output.

Measuring system

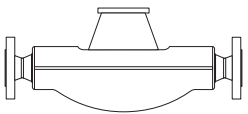
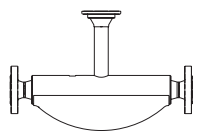
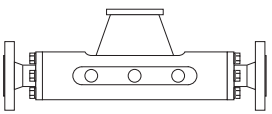
The measuring system consists of a transmitter and a sensor. Two versions are available:

- Compact version: transmitter and sensor form a mechanical unit
- Remote version: transmitter and sensor are mounted physically separate from one another

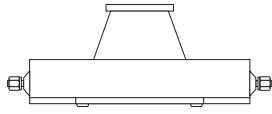
Transmitter

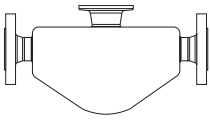
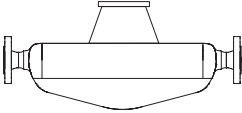
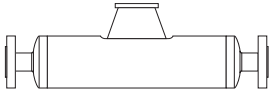
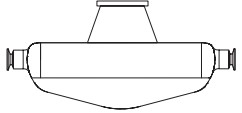
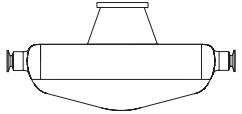
Promass 80  a0003671	■ Two-line liquid-crystal display ■ Operation with push buttons
Promass 83  a0003672	■ Four-line liquid-crystal display ■ Operation with "Touch control" ■ Application-specific Quick Setup ■ Mass flow, volume flow, density and temperature measurement as well as calculated variables (e.g. fluid concentrations)

Sensor

F  a0003673	■ Universal sensor for fluid temperatures up to 200 °C ■ Nominal diameters DN 8 to 250 ■ Material: Stainless Steel EN 1.4539/ASTM 904L, EN 1.4404/ASTM 316L, Alloy C-22 DIN 2.4602	Documentation No. TI 053D/06/en
F (High-temperature)  a0003675	■ Universal high-temperature sensor for fluid temperatures up to 350 °C ■ Nominal diameters DN 25, 50, 80 ■ Material: Alloy C-22, DIN 2.4602, EN 1.4404/ASTM 316L	
M  a0003676	■ Robust sensor for extreme process pressures, high requirements for the secondary containment and fluid temperatures up to 150 °C ■ Nominal diameters DN 8 to 80 ■ Material: Titanium, Ti Grade 2, Ti Grade 9	

Other sensors can be found in the separate documentation

A  a0003679	■ Single-tube system for highly accurate measurement of very small flows ■ Nominal diameters DN 1 to 4 ■ Material: Stainless Steel EN 1.4539/ASTM 904L, EN 1.4404/ASTM 316L (process connection), Alloy C-22 DIN 2.4602	Documentation No. TI 054D/06/en
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E  a0002271	■ General purpose sensor, ideal replacement for volumetric flowmeters. ■ Nominal diameters DN 8 to 50 ■ Material: Stainless Steel EN 1.4539/ASTM 904L, EN 1.4404/ASTM 316L	Documentation No. TI 061D/06/en
H  a0003677	■ Single bent tube. Low pressure loss and chemically resistant material ■ Nominal diameters DN 8 to 50 ■ Material: Zirconium 702/R 60702	Documentation No. TI 074D/06/en
I  a0003678	■ Straight single-tube instrument. Minimal shear stress on fluid, hygienic design, low pressure loss ■ Nominal diameters DN 8 to 80 ■ Material: Titanium, Ti Grade 2, Ti Grade 9	Documentation No. TI 075D/06/en
P  a0006828	■ Single bent tube, minimal shear stress on fluid. Hygienic design with documents for Life Science Industries applications, low pressure loss, for fluid temperatures up to 200 °C ■ Nominal diameters DN 8 to 50 ■ Material: Stainless Steel EN 1.4435/ASTM 316L	Documentation No. TI 078D/06/en
S  a0006828	■ Single bent tube. Hygienic design, low pressure loss, for fluid temperatures up to 150 °C ■ Nominal diameters DN 8 to 50 ■ Material: Stainless Steel EN 1.4539/ASTM 904L, EN 1.4435/ASTM 316L	Documentation No. TI 076D/06/en

Input

Measured variable

- Mass flow (proportional to the phase difference between two sensors mounted on the measuring tube to register a phase shift in the oscillation)
- Fluid density (proportional to resonance frequency of the measuring tube)
- Fluid temperature (measured with temperature sensors)

Measuring range

Measuring ranges for liquids

DN	Range for full scale values (liquids) $\dot{m}_{\min(F)}$ to $\dot{m}_{\max(F)}$
8	0 to 2000 kg/h
15	0 to 6500 kg/h
25	0 to 18000 kg/h
40	0 to 45000 kg/h
50	0 to 70000 kg/h
80	0 to 180000 kg/h
100 (only Promass F)	0 to 350000 kg/h
150 (only Promass F)	0 to 800000 kg/h
250 (only Promass F)	0 to 2200000 kg/h

Measuring ranges for gases

The full scale values depend on the density of the gas. Use the formula below to calculate the full scale values:

$$\dot{m}_{\max(G)} = \dot{m}_{\max(F)} \cdot \rho_{(G)} \div x \text{ [kg/m}^3\text{]}$$

$$\dot{m}_{\max(G)} = \text{max. full scale value for gas [kg/h]}$$

$$\dot{m}_{\max(F)} = \text{max. full scale value for liquid [kg/h]}$$

DN	x
8	60
15	80
25	90
40	90
50	90
80	110
100 (only Promass F)	130
150 (only Promass F)	200
250 (only Promass F)	200

Here, $\dot{m}_{\max(G)}$ can never be greater than $\dot{m}_{\max(F)}$

Calculation example for gas:

- Sensor type: Promass F, DN 50
- Gas: air with a density of 60.3 kg/m³ (at 20 °C and 50 bar)
- Measuring range (liquid): 70000 kg/h
- x = 90 (for Promass F, DN 50)

Max. possible full scale value:

$$\dot{m}_{\max(G)} = \dot{m}_{\max(F)} \cdot \rho_{(G)} \div x \text{ [kg/m}^3\text{]} = 70000 \text{ kg/h} \cdot 60.3 \text{ kg/m}^3 \div 90 \text{ kg/m}^3 = 46900 \text{ kg/h}$$

Recommended measuring ranges:

See information in the "Limiting flow" Section → Page 22 ff.

Operable flow range	Greater than 1000 :1. Flow rates above the preset full scale value do not overload the amplifier, i.e. the totalizer values are registered correctly.
Input signal	Status input (auxiliary input) $U = 3$ to 30 V DC, $R_i = 5$ kΩ, galvanically isolated. Configurable for: totalizer reset, positive zero return, error message reset, zero point adjustment start, batching start/stop (optional), totalizer reset for batching (optional). Status input (auxiliary input) with PROFIBUS DP $U = 3$ to 30 V DC, $R_i = 3$ kΩ, galvanically isolated. Switch level: $\pm 3 \dots \pm 30$ V DC, independent of polarity. Configurable for: positive zero return, error message reset, zero point adjustment start, batching start/stop (optional), totalizer reset for batching (optional). Status input (auxiliary input) with MODBUS RS485 $U = 3$ to 30 V DC, $R_i = 3$ kΩ, galvanically isolated. Switch level: $\pm 3 \dots \pm 30$ V DC, independent of polarity. Configurable for: totalizer reset, positive zero return, error message reset, zero point adjustment start. Current input (only Promass 83) Active/passive selectable, galvanically isolated, resolution: 2 μA ■ Active: 4 to 20 mA, $R_L < 700 \Omega$, $U_{out} = 24$ V DC, short-circuit proof ■ Passive: 0/4 to 20 mA, $R_i = 150 \Omega$, $U_{max} = 30$ V DC

Output

Output signal	Promass 80 <i>Current output:</i> Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.f.s./°C, resolution: 0.5 μA ■ Active: 0/4 to 20 mA, $R_L < 700 \Omega$ (for HART: $R_L \geq 250 \Omega$) ■ Passive: 4 to 20 mA; supply voltage U_S 18 to 30 V DC; $R_i \geq 150 \Omega$ <i>Pulse/frequency output:</i> Passive, open collector, 30 V DC, 250 mA, galvanically isolated. ■ Frequency output: full scale frequency 2 to 1000 Hz ($f_{max} = 1250$ Hz), on/off ratio 1:1, pulse width max. 2 s ■ Pulse output: pulse value and pulse polarity selectable, pulse width configurable (0.5 to 2000 ms) <i>PROFIBUS PA interface:</i> ■ PROFIBUS PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP), galvanically isolated ■ Profile Version 3.0 ■ Current consumption: 11 mA ■ Permitted supply voltage: 9 to 32 V ■ Bus connection with integrated reverse polarity protection ■ Error current FDE (Fault Disconnection Electronic) = 0 mA ■ Data transmission rate: 31.25 kBit/s ■ Signal encoding: Manchester II ■ Function blocks: 4 $\times$ Analog Input, 1 $\times$ Totalizer ■ Output data: Mass flow, Volume flow, Density, Temperature, Totalizer ■ Input data: Positive zero return (ON/OFF), Zero point adjustment, Measuring mode, Totalizer control ■ Bus address can be configured via miniature switches or via the local display (optional)
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Promass 83*Current output:*

Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.f.s./°C, resolution: 0.5 µA

- Active: 0/4 to 20 mA, $R_L < 700 \Omega$ (for HART: $R_L \geq 250 \Omega$)
- Passive: 4 to 20 mA; supply voltage U_S 18 to 30 V DC; $R_i \geq 150 \Omega$

Pulse/frequency output:

active/passive selectable, galvanically isolated

- Active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100 \Omega$
- Passive: open collector, 30 V DC, 250 mA
- Frequency output: full scale frequency 2 to 10000 Hz ($f_{\max} = 12500$ Hz), on/off ratio 1:1, pulse width max. 2 s
- Pulse output: pulse value and pulse polarity selectable, pulse width configurable (0.05 to 2000 ms)

PROFIBUS DP interface:

- PROFIBUS DP in accordance with EN 50170 Volume 2
- Profile Version 3.0
- Data transmission rate: 9.6 kBaud to 12 MBaud
- Automatic data transmission rate recognition
- Signal encoding: NRZ Code
- Function blocks: 6 × Analog Input, 3 × Totalizer
- Output data: Mass flow, Volume flow, Corrected volume flow, Density, Reference density, Temperature, Totalizers 1 to 3
- Input data: Positive zero return (ON/OFF), Zero point adjustment, Measuring mode, Totalizer control
- Bus address can be configured via miniature switches or via the local display (optional)
- Available output combination → Page 11

PROFIBUS PA interface:

- PROFIBUS PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP), galvanically isolated
- Data transmission rate: 31.25 kBit/s
- Current consumption: 11 mA
- Permitted supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Signal encoding: Manchester II
- Function blocks: 6 × Analog Input, 3 × Totalizer
- Output data: Mass flow, Volume flow, Corrected volume flow, Density, Reference density, Temperature, Totalizers 1 to 3
- Input data: Positive zero return (ON/OFF), Zero point adjustment, Measuring mode, Totalizer control
- Bus address can be configured via miniature switches or via the local display (optional)
- Available output combination → Page 11

MODBUS interface:

- MODBUS device type: slave
- Address range: 1 to 247
- Supported function codes: 03, 04, 06, 08, 16, 23
- Broadcast: supported with the function codes 06, 16, 23
- Physical interface: RS485 in accordance with EIA/TIA-485 standard
- Supported baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
- Transmission mode: RTU or ASCII
- Response times:
 - Direct data access = typically 25 to 50 ms
 - Auto-scan buffer (data range) = typically 3 to 5 ms
- Possible output combinations → Page 11

FOUNDATION Fieldbus interface:

- FOUNDATION Fieldbus H1, IEC 61158-2, galvanically isolated
- Data transmission rate: 31.25 kBit/s
- Current consumption: 12 mA
- Permitted supply voltage: 9 to 32 V
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Bus connection with integrated reverse polarity protection
- Signal encoding: Manchester II
- ITK Version 4.01
- Function blocks: 7 × Analog Input, 1 × Digital Output, 1 × PID
- Output data: Mass flow, Volume flow, Corrected volume flow, Density, Reference density, Temperature, Totalizers 1 to 3
- Input data: Positive zero return (ON/OFF), Zero point adjustment, Measuring mode, Reset totalizer
- Link Master (LM) function is supported

Signal on alarm*Current output:*

Failsafe mode selectable (e.g. in accordance with NAMUR Recommendation NE 43)

Pulse/frequency output:

Failsafe mode selectable

Status output (Promass 80)

Nonconductive in the event of a fault or if the power supply fails

Relay output (Promass 83)

Dead in the event of a fault or if the power supply fails

Load

see "Output signal"

Low flow cutoff

Switch points for low flow are selectable.

Galvanic isolation

All circuits for inputs, outputs, and power supply are galvanically isolated from each other.

Switching output**Status output (Promass 80)**

Open collector, max. 30 V DC / 250 mA, galvanically isolated.

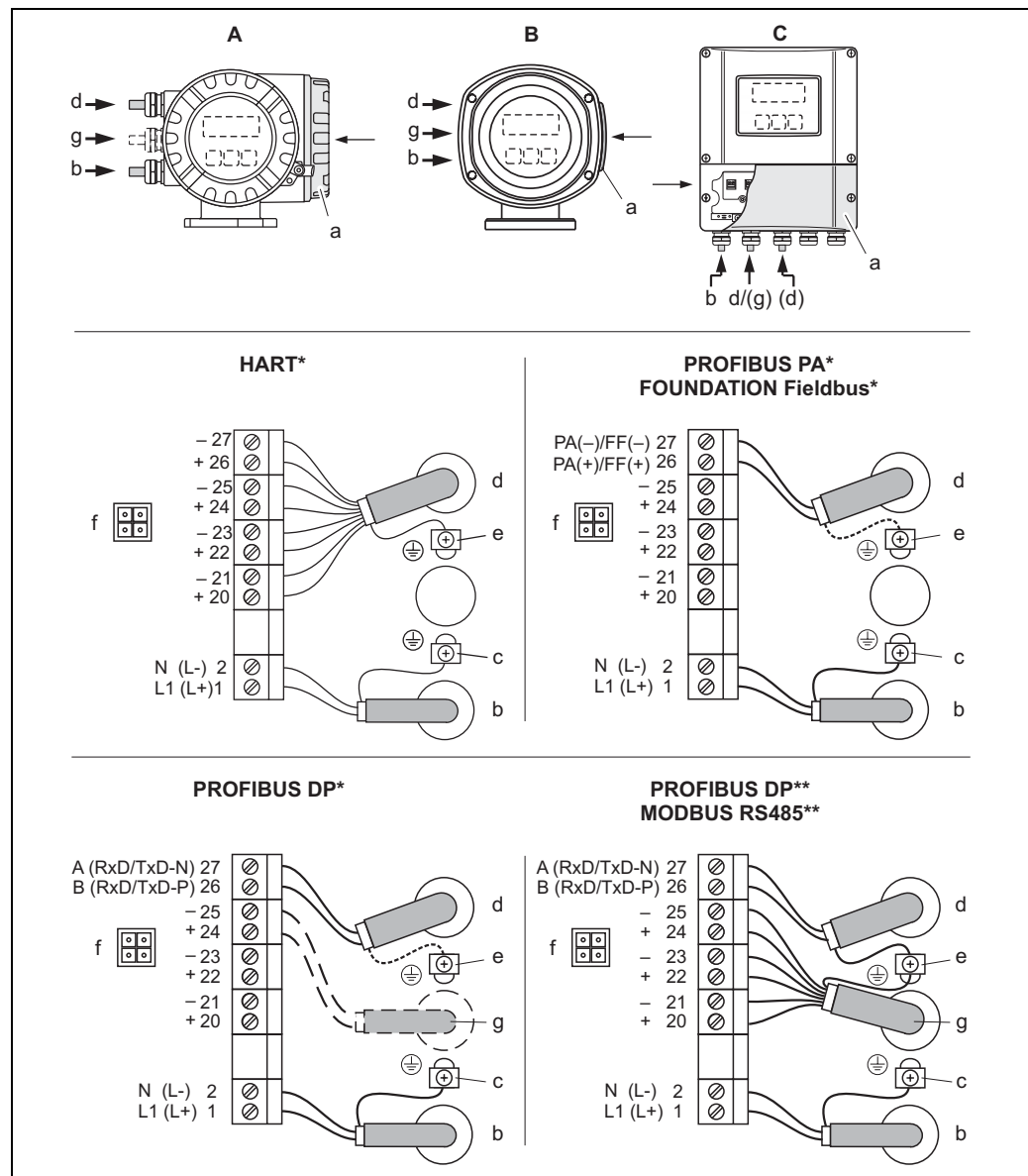
Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values.

Relay output (Promass 83)

Normally closed (NC or break) or normally open (NO or make) contacts available (factory setting: relay 1 = NO, relay 2 = NC), max. 30 V / 0.5 A AC; 60 V / 0.1 A DC, galvanically isolated.

Power supply

Electrical connection
Measuring unit



Connecting the transmitter, cable cross-section: max. 2.5 mm²

- A View A (field housing)
B View B (Stainless Steel field housing)
C View C (wall-mount housing)

*) fixed communication board

**) flexible communication board

a Connection compartment cover

b Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC

Terminal No. 1: L1 for AC, L+ for DC

Terminal No. 2: N for AC, L- for DC

c Ground terminal for protective ground

d Signal cable: see Terminal assignment → Page 11

Fieldbus cable:

Terminal No. 26: DP (B) / PA (+) / FF (+) / MODBUS RS485 (B) / (PA, FF: with reverse polarity protection)

Terminal No. 27: DP (A) / PA (-) / FF (-) / MODBUS RS485 (A) / (PA, FF: with reverse polarity protection)

e Ground terminal for signal cable shield / fieldbus cable / RS485 line

f Service adapter for connecting service interface FXA 193 (Fieldcheck, FieldCare)

g Signal cable: see Terminal assignment → Page 11

g Cable for external termination (only for PROFIBUS DP with permanent assignment communication board):

Terminal No. 24: +5 V

Terminal No. 25: DGND

**Electrical connection,
terminal assignment****Promass 80**

Order version	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
80***_*****A	-	-	Frequency output	Current output, HART
80***_*****D	Status input	Status output	Frequency output	Current output, HART
80***_*****H	-	-	-	PROFIBUS PA
80***_*****S	-	-	Frequency output Ex i, passive	Current output Ex i Active, HART
80***_*****T	-	-	Frequency output Ex i, passive	Current output Ex i Passive, HART
80***_*****8	Status input	Frequency output	Current output 2	Current output 1, HART

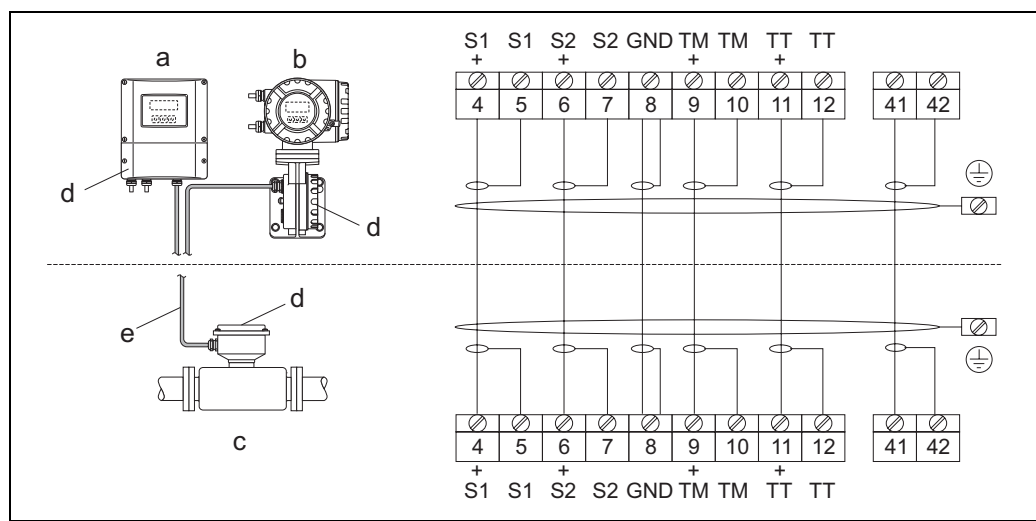
Promass 83

The inputs and outputs on the communication board can be either permanently assigned (fixed) or variable (flexible), depending on the version ordered (see table). Replacements for modules which are defective or which have to be replaced can be ordered as accessories.

Order version	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
<i>Fixed communication boards (permanent assignment)</i>				
83***_*****A	-	-	Frequency output	Current output, HART
83***_*****B	Relay output	Relay output	Frequency output	Current output, HART
83***_*****F	-	-	-	PROFIBUS PA, Ex i
83***_*****G	-	-	-	FOUNDATION Fieldbus Ex i
83***_*****H	-	-	-	PROFIBUS PA
83***_*****J	-	-	+5V (ext. termination)	PROFIBUS DP
83***_*****K	-	-	-	FOUNDATION Fieldbus
83***_*****Q	-	-	Status input	MODBUS RS485
83***_*****R	-	-	Current output 2 Ex i, active	Current output 1 Ex i active, HART
83***_*****S	-	-	Frequency output Ex i, passive	Current output Ex i Active, HART
83***_*****T	-	-	Frequency output Ex i, passive	Current output Ex i Passive, HART
83***_*****U	-	-	Current output 2 Ex i, passive	Current output 1 Ex i passive, HART
<i>Flexible communication boards</i>				
83***_*****C	Relay output 2	Relay output 1	Frequency output	Current output, HART
83***_*****D	Status input	Relay output	Frequency output	Current output, HART
83***_*****E	Status input	Relay output	Current output 2	Current output, HART
83***_*****L	Status input	Relay output 2	Relay output 1	Current output, HART
83***_*****M	Status input	Frequency output 2	Frequency output 1	Current output, HART
83***_*****N	Current output	Frequency output	Status input	MODBUS RS485
83***_*****P	Current output	Frequency output	Status input	PROFIBUS DP

Order version	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
83***_*****V	Relay output 2	Relay output 1	Status input	PROFIBUS DP
83***_*****W	Relay output	Current output 3	Current output 2	Current output 1, HART
83***_*****0	Status input	Current output 3	Current output 2	Current output 1, HART
83***_*****2	Relay output	Current output 2	Frequency output	Current output 1, HART
83***_*****3	Current input	Relay output	Current output 2	Current output 1, HART
83***_*****4	Current input	Relay output	Frequency output	Current output, HART
83***_*****5	Status input	Current input	Frequency output	Current output, HART
83***_*****6	Status input	Current input	Current output 2	Current output 1, HART
83***_*****7	Relay output 2	Relay output 1	Status input	MODBUS RS485

Electrical connection Remote version



Connecting the remote version

- a Wall-mount housing: non-hazardous area and ATEX II3G / zone 2 → see separate "Ex documentation"
- b Wall-mount housing: ATEX II2G / Zone 1 / FM/CSA → see separate "Ex documentation"
- c Remote version, flanged version
- d Cover for connection compartment or connection housing
- e Connecting cable

Terminal No.: 4/5 = gray; 6/7 = green; 8 = yellow; 9/10 = pink; 11/12 = white; 41/42 = brown

Supply voltage	85 to 260 V AC, 45 to 65 Hz
	20 to 55 V AC, 45 to 65 Hz
	16 to 62 V DC

Cable entries

Power-supply and signal cables (inputs/outputs):

- Cable entry M20 × 1.5 (8 to 12 mm)
- Thread for cable entries, 1/2" NPT, G 1/2"

Connecting cable for remote version:

- Cable entry M20 × 1.5 (8 to 12 mm)
- Thread for cable entries, 1/2" NPT, G 1/2"

Cable specification Remote version	■ $6 \times 0.38 \text{ mm}^2$ (PVC cable with common shield and individually shielded cores) ■ Conductor resistance: $\leq 50 \text{ } \Omega/\text{km}$ ■ Capacitance: core/shield: $\leq 420 \text{ pF/m}$ ■ Cable length: max. 20 m ■ Permanent operating temperature: max. $+105 \text{ } ^\circ\text{C}$ Operation in zones of severe electrical interference: The measuring device complies with the general safety requirements in accordance with EN 61010, the EMC requirements of IEC/EN 61326, and NAMUR recommendation NE 21/43.
Power consumption	AC: $<15 \text{ VA}$ (including sensor) DC: $<15 \text{ W}$ (including sensor) <i>Switch-on current:</i> ■ Max. 13.5 A ($<50 \text{ ms}$) at 24 V DC ■ Max. 3 A ($<5 \text{ ms}$) at 260 V AC
Power supply failure	Promass 80 <i>Lasting min. 1 power cycle:</i> ■ EEPROM saves measuring system data if the power supply fails ■ HistoROM/S-DAT: exchangeable data storage chip with sensor specific data (nominal diameter, serial number, calibration factor, zero point, etc.) Promass 83 <i>Lasting min. 1 power cycle:</i> ■ EEPROM and T-DAT save the measuring system data if the power supply fails. ■ HistoROM/S-DAT: exchangeable data storage chip with sensor specific data (nominal diameter, serial number, calibration factor, zero point, etc.)
Potential equalization	No special measures for potential equalization are required. For instruments for use in hazardous areas, observe the corresponding guidelines in the specific Ex documentation.

Performance characteristics

Reference operating conditions	<i>Error limits following ISO/DIS 11631:</i> ■ $20 \text{ } ^\circ\text{C}$ to $30 \text{ } ^\circ\text{C}$; 2 to 4 bar ■ Accuracy based on accredited calibration rigs according to ISO 17025 ■ Zero point calibrated under operating conditions ■ Field density calibrated (or special density calibration)
Maximum measured error	The following values refer to the pulse/frequency output. The additional measured error at the current output is typically $\pm 5 \text{ } \mu\text{A}$. o.r. = of reading Mass flow (liquid) <i>Promass 80 F, M:</i> $\pm 0.15\% \pm [(\text{zero point stability} \div \text{measured value}) \cdot 100]\% \text{ o.r.}$ Optional Promass 80F: $\pm 0.10\% \pm [(\text{zero point stability} \div \text{measured value}) \cdot 100]\% \text{ o.r.}$ <i>Promass 83 F, M:</i> $\pm 0.10\% \pm [(\text{zero point stability} \div \text{measured value}) \cdot 100]\% \text{ o.r.}$ PremiumCal (optional) Promass 83F: $\pm 0.05\% \pm [(\text{zero point stability} \div \text{measured value}) \cdot 100]\% \text{ o.r.}$

Mass flow (gas)*Promass 80/83 F:*

$$\pm 0.35\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$$

Promass 80/83 M:

$$\pm 0.50\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$$

Volume flow (liquid)*Promass 80 F:*

$$\pm 0.20\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$$

Promass 83 F:

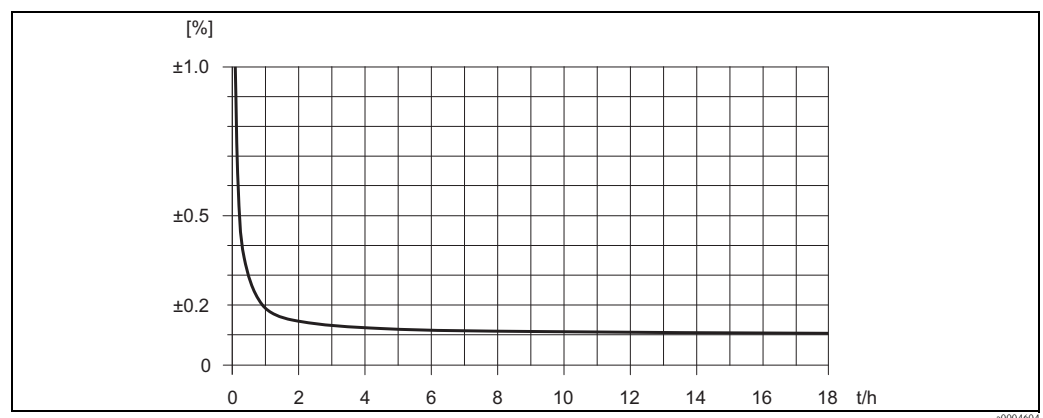
$$\pm 0.15\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$$

Promass 80/83 M:

$$\pm 0.25\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$$

Zero point stability (Promass F, M)

DN	Max. full scale value [kg/h] or [l/h]	Zero point stability		
		Promass F [kg/h] or [l/h]	Promass F (high-temperature) [kg/h] or [l/h]	Promass M [kg/h] or [l/h]
8	2000	0.030	–	0.100
15	6500	0.200	–	0.325
25	18000	0.540	1.80	0.90
40	45000	2.25	–	2.25
50	70000	3.50	7.00	3.50
80	180000	9.00	18.00	9.00
100	350000	14.00	–	–
150	800000	32.00	–	–
250	2200000	88.00	–	–

Sample calculation

Max. measured error in % of measured value (example: Promass 83 F / DN 25)

Calculation example (mass flow, liquid):

Given: Promass 83 F / DN 25, measured value flow = 8000 kg/h

Max. measured error: $\pm 0.10\% \pm [(zero\ point\ stability \div measured\ value) \cdot 100]\% \text{ o.r.}$

Max. measured error: $\pm 0.10\% \pm 0.54\text{ kg/h} \div 8000\text{ kg/h} \cdot 100\% = \pm 0.107\%$

Density (liquid)

1 g/cc = 1 kg/l

Standard calibration:

Promass F

±0.01 g/cc

Promass M

±0.02 g/cc

*Special density calibration (optional), not for high-temperature version
(calibration range = 0.8 to 1.8 g/cc, 5 °C to 80 °C):*

Promass F

±0.001 g/cc

Promass M

±0.002 g/cc

After field density calibration or under reference conditions:

Promass F

±0.0005 g/cc

Promass M

±0.0010 g/cc

Temperature

Promass F, M:

±0.5 °C ± 0.005 · T (T = medium temperature in °C)

Repeatability

Mass flow (liquid)

±0.05% ± $[\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value}) \cdot 100]\%$ o.r.

Mass flow (gas)

±0.25% ± $[\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value}) \cdot 100]\%$ o.r.

Volume flow (liquid)

Promass F:

±0.05% ± $[\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value}) \cdot 100]\%$ o.r.

Promass M:

±0.10% ± $[\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value}) \cdot 100]\%$ o.r.

o.r. = of reading

Zero point stability: see "Max. measured error" → Page 13 ff.

Calculation example (mass flow, liquid):

Given: Promass 83 F / DN 25, measured value flow = 8000 kg/h

Repeatability: ±0.05% ± $[\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value}) \cdot 100]\%$ o.r.

Repeatability: ±0.05% ± $\frac{1}{2} \cdot 0.54 \text{ kg/h} \div 8000 \text{ kg/h} \cdot 100\% = \pm 0.053\%$

Density measurement (liquid)
 $1 \text{ g/cc} = 1 \text{ kg/l}$
Promass F: $\pm 0.00025 \text{ g/cc}$ *Promass M:* $\pm 0.0005 \text{ g/cc}$ **Temperature measurement** $\pm 0.25 \text{ }^{\circ}\text{C} \pm 0.0025 \cdot T$ (T = medium temperature in $^{\circ}\text{C}$)**Influence of medium temperature**

When there is a difference between the temperature for zero point adjustment and the process temperature, the typical measured error of the Promass sensor is $\pm 0.0002\%$ of the full scale value/ $^{\circ}\text{C}$.

Influence of medium pressure

The table below shows the effect on accuracy of mass flow due to a difference between calibration pressure and process pressure.

DN	Promass F Promass F high-temperature [% o.r./bar]	Promass M [% o.r./bar]	Promass M (high pressure) [% o.r./bar]
8	No influence	0.009	0.006
15	No influence	0.008	0.005
25	No influence	0.009	0.003
40	-0.003	0.005	—
50	-0.008	No influence	—
80	-0.009	No influence	—
100	-0.012	—	—
150	-0.009	—	—
250	-0.009	—	—
o.r. = of reading			

Operating conditions: Installation

Installation instructions

Note the following points:

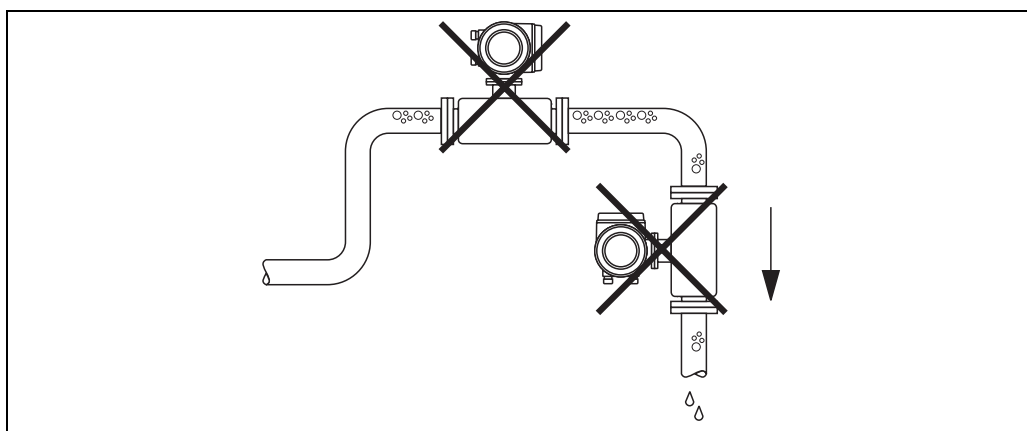
- No special measures such as supports are necessary. External forces are absorbed by the construction of the instrument, for example the secondary containment.
- The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by pipe vibrations.
- No special precautions need to be taken for fittings which create turbulence (valves, elbows, T-pieces, etc.), as long as no cavitation occurs.
- For mechanical reasons and to protect the pipe, support is recommended for heavy sensors.

Mounting location

Entrained air or gas bubbles in the measuring tube can result in an increase in measuring errors.

Avoid the following mounting locations in the pipe:

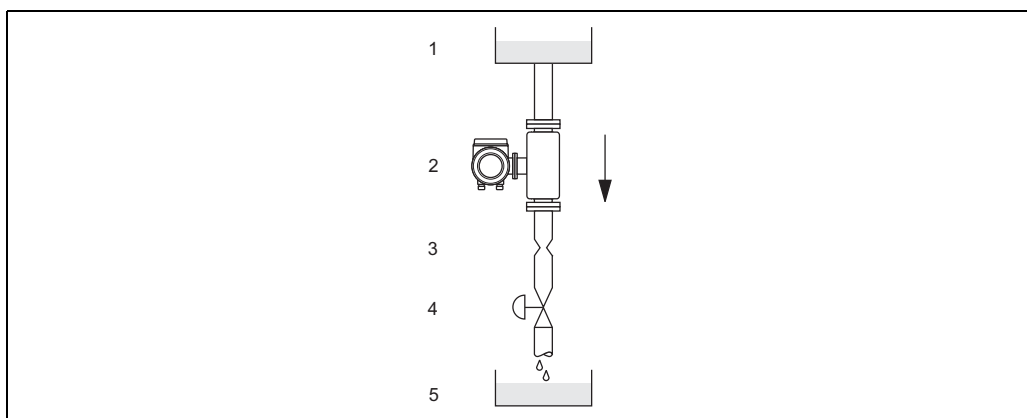
- Highest point of a pipeline. Risk of air accumulating.
- Directly upstream from a free pipe outlet in a vertical pipeline



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Mounting location

Notwithstanding the above, the installation proposal below permits installation in an open vertical pipeline. Pipe restrictions or the use of an orifice with a smaller cross-section than the nominal diameter prevent the sensor running empty while measurement is in progress.



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Installation in a down pipe (e.g. for batching applications)

1 = Supply tank, 2 = Sensor, 3 = Orifice plate, pipe restriction (see Table), 4 = Valve, 5 = Batching tank

DN	8	15	25	40	50	80	100 ¹⁾	150 ¹⁾	250 ¹⁾
Ø Orifice plate, pipe restriction [mm]	6	10	14	22	28	50	65	90	150

1) only Promass F

Orientation

Make sure that the direction of the arrow on the nameplate of the sensor matches the direction of flow (direction of fluid flow through the pipe).

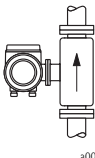
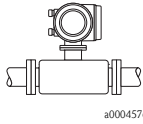
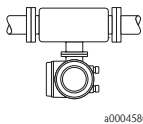
Vertical (View V)

Recommended orientation with upward direction of flow. When fluid is not flowing, entrained solids will sink down and gases will rise away from the measuring tube. The measuring tubes can be completely drained and protected against solids buildup.

Horizontal

The measuring tubes must be horizontal and beside each other. When installation is correct the transmitter housing is above or below the pipe (Views H1/H2). Always avoid having the transmitter housing in the same horizontal plane as the pipe.

Please note the special installation instructions! → Page 19

		Promass F, M Standard, compact	Promass F, M Standard, remote	Promass F High-temperature, compact	Promass F High-temperature, remote
Fig. V Vertical orientation  a0004572		✓✓	✓✓	✓✓	✓✓
Fig. H1 Horizontal orientation Transmitter head up  a0004576		✓✓	✓✓	✗ TM = >200 °C ①	✓ TM = >200 °C ①
Fig. H2 Horizontal orientation Transmitter head down  a0004580		✓✓ ②	✓✓ ②	✓✓ ②	✓✓ ②
✓✓ = Recommended orientation ✓ = Orientation recommended in certain situations ✗ = Impermissible orientation					

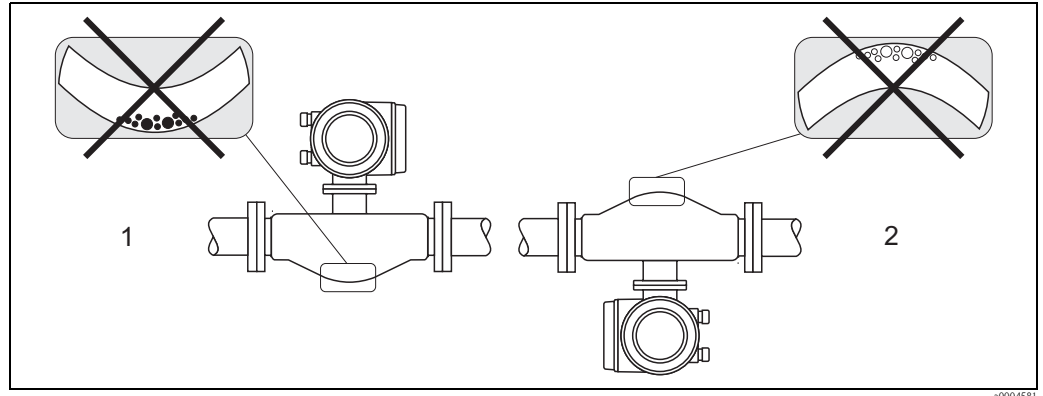
In order to ensure that the maximum permissible ambient temperature for the transmitter (−20 °C to +60 °C, optional −40 °C to +60 °C) is not exceeded, we recommend the following orientations:

① = For fluids with very high temperatures (>200 °C), we recommend the horizontal orientation with the transmitter head pointing downwards (Fig. H2) or the vertical orientation (Fig. V).

② = For fluids with low temperatures, we recommend the horizontal orientation with the transmitter head pointing upwards (Fig. H1) or the vertical orientation (Fig. V).

Special installation instructions for Promass F**Caution!**

Both measuring tubes of Promass F are slightly curved. The position of the sensor, therefore, has to be matched to the fluid properties when the sensor is installed horizontally.



Horizontal installation with Promass F

- 1 Not suitable for fluids with entrained solids. Risk of solids accumulating.
- 2 Not suitable for outgassing fluids. Risk of air accumulating.

Heating

Some fluids require suitable measures to avoid heat transfer at the sensor. Heating can be electric, e.g. with heated elements, or by means of hot water or steam pipes made of copper or heating jackets.

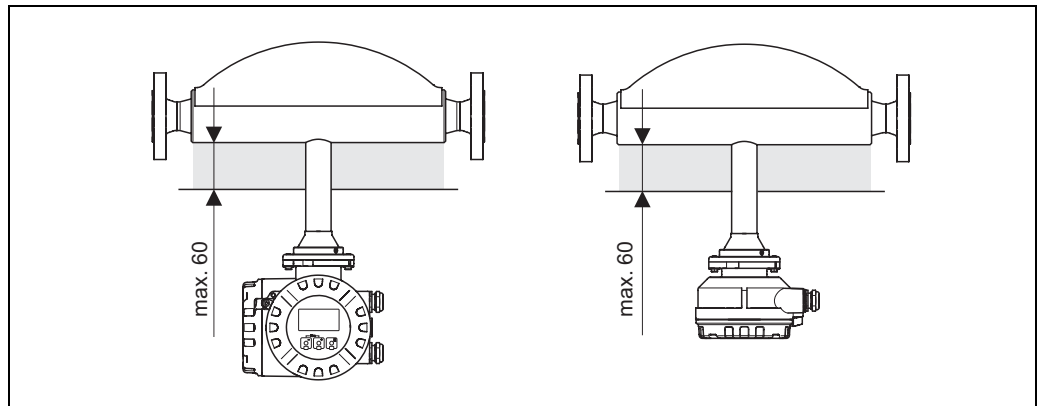
**Caution!**

- Risk of electronics overheating! Make sure that the maximum permissible ambient temperature for the transmitter is not exceeded. Consequently, make sure that the adapter between the sensor and transmitter and the connection housing of the remote version always remain free of insulating material. Note that a certain orientation might be required, depending on the fluid temperature. → Page 18
- With a fluid temperature between 200 °C to 350 °C the remote version of the high-temperature version is preferable.
- If using an electric trace heating system whose heating is regulated via phase angle control or pulse packages, influence on the measured values cannot be ruled out due to magnetic fields (i.e. for values that are greater than the values approved by the EN standard (sine 30 A/m)). In such instances, it is necessary to magnetically shield the sensor (apart from Promass M).
The secondary containment can be shielded with tin plate or electric sheets without privileged direction (e.g. V330-35A) with the following properties:
 - Relative magnetic permeability $\mu_r \geq 300$
 - Plate thickness $d \geq 0.35$ mm
- Information on permitted temperature ranges → Page 21

Special heating jackets, which can be ordered separately from Endress+Hauser as an accessory, are available for the sensors.

Thermal insulation

Some fluids require suitable measures to avoid heat transfer at the sensor. A wide range of materials can be used to provide the required thermal insulation.



In the case of the Promass F high-temperature version, a maximum insulation thickness of 60 mm must be observed in the area of the electronics/neck.

If the Promass F high-temperature version is installed horizontally (with transmitter head pointing upwards), an insulation thickness of min. 10 mm is recommended to reduce convection. The maximum insulation thickness of 60 mm must be observed.

Zero point adjustment

All Promass devices are calibrated to state-of-the-art technology. The zero point determined in this way is imprinted on the nameplate.

Calibration takes place under reference conditions. → Page 13 ff.

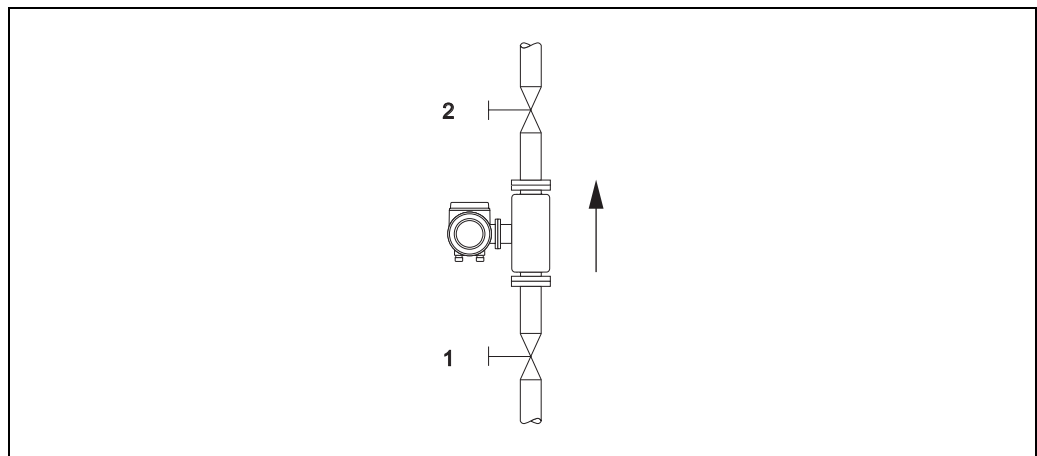
Promass therefore does **not** require zero point adjustment!

Experience shows that the zero point adjustment is advisable only in special cases:

- To achieve highest measuring accuracy also with very low flow rates
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Please note the following before carrying out the adjustment:

- The adjustment can only be performed with fluids that have no gas or solid contents.
- Zero point adjustment is performed with the measuring tubes completely filled and at zero flow ($v = 0 \text{ m/s}$). This can be achieved, for example, with shutoff valves upstream and/or downstream of the sensor or by using existing valves and gates.
 - Normal operation → valves 1 and 2 open
 - Zero point adjustment *with* pump pressure → valve 1 open / valve 2 closed
 - Zero point adjustment *without* pump pressure → valve 1 closed / valve 2 open



Zero point adjustment and shutoff valves

Inlet and outlet runs	There are no installation requirements regarding inlet and outlet runs.
Length of connecting cable	Max. 20 meters (remote version)
System pressure	It is important to ensure that cavitation does not occur, because it would influence the oscillation of the measuring tube. No special measures need to be taken for fluids which have properties similar to water under normal conditions. In the case of liquids with a low boiling point (hydrocarbons, solvents, liquefied gases) or in suction lines, it is important to ensure that pressure does not drop below the vapor pressure and that the liquid does not start to boil. It is also important to ensure that the gases that occur naturally in many liquids do not outgas. Such effects can be prevented when system pressure is sufficiently high. For this reason, the following mounting locations are preferred: ■ Downstream from pumps (no risk of partial vacuum) ■ At the lowest point in a vertical pipe

Operating conditions: Environment

Ambient temperature range	Standard: -20 °C to +60 °C (sensor, transmitter) Optional: -40 °C to +60 °C (sensor, transmitter)  Note! ■ Install the device at a shady location. Avoid direct sunlight, particularly in warm climatic regions. ■ At ambient temperatures below -20 °C the readability of the display may be impaired.
Storage temperature	-40 °C to +80 °C (preferably +20 °C)
Degree of protection	Standard: IP 67 (NEMA 4X) for transmitter and sensor
Shock resistance	In accordance with IEC 68-2-31
Vibration resistance	Acceleration up to 1 g, 10 to 150 Hz, following IEC 68-2-6
Electromagnetic compatibility (EMC)	To IEC/EN 61326 and NAMUR Recommendation NE 21

Operating conditions: Process

Medium temperature range	Sensor <i>Promass F:</i> -50 °C to +200 °C <i>Promass F (high-temperature version):</i> -50 °C to +350 °C <i>Promass M:</i> -50 °C to +150 °C
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Seals*Promass F:*

No internal seals

Promass M:

Viton -15 °C to +200 °C; EPDM -40 °C to +160 °C; silicone -60 °C to +200 °C; Kalrez -20 °C to +275 °C; FEP sheathed (not for gas applications): -60 °C to +200 °C

**Medium pressure range
(nominal pressure)****Flanges***Promass F:*

according to DIN PN 16 to 100 /according to ASME B16.5 Cl 150, Cl 300, Cl 600 / JIS 10K, 20K, 40K, 63K

Promass F (high-temperature version):

according to DIN PN 40, 64, 100 /according to ASME B16.5 Cl 150, Cl 300, Cl 600 / JIS 10K, 20K, 63K

Promass M:

according to DIN PN 40 to 100 /according to ASME B16.5 Cl 150, Cl 300, Cl 600 / JIS 10K, 20K, 40K, 63K

Promass M (high-pressure version)

Measuring tubes, connector, couplings: max. 350 bar

Pressure ranges of secondary containment

- Promass F
 - DN 8 to 50: 40 bar
 - DN 80: 25 bar
 - DN 100 to 150: 16 bar
 - DN 250: 10 bar

- Promass M
 - 100 bar

**Warning!**

In case a danger of measuring tube failure exists due to process characteristics, e.g. with corrosive process fluids, we recommend the use of sensors whose secondary containment is equipped with special pressure monitoring connections (ordering option). With the help of these connections, fluid collected in the secondary containment in the event of tube failure can be bled off. This is especially important in high pressure gas applications. These connections can also be used for gas circulation and/or gas detection. Dimensions → Page 31 ff.

**Rupture disk (optional, only
Promass F)**

Further informationen → Page 56.

Limiting flow

See information in the "Measuring range" Section → Page 6

Select nominal diameter by optimizing between required flow range and permissible pressure loss. An overview of max. possible full scale values can be found in the "Measuring range" Section.

- The minimum recommended full scale value is approx. 1/20 of the max. full scale value.
- In most applications, 20 to 50% of the maximum full scale value can be considered ideal.
- Select a lower full scale value for abrasive substances such as fluids with entrained solids (flow velocity <1 m/s).
- For gas measurement the following rules apply:
 - Flow velocity in the measuring tubes should not be more than half the sonic velocity (0.5 Mach).
 - The maximum mass flow depends on the density of the gas: formula → Page 6

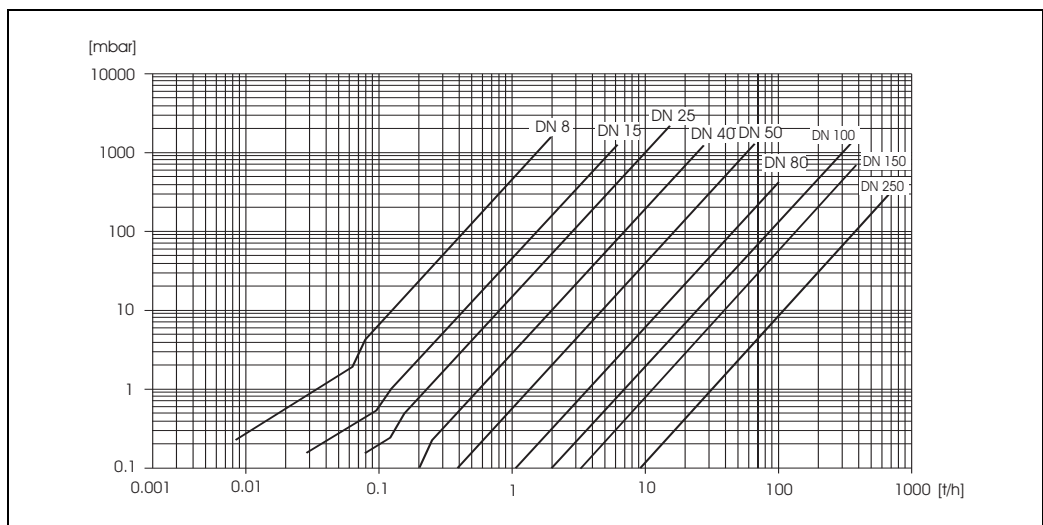
Pressure loss

Pressure loss depends on the fluid properties and on the flow rate. The following formulae can be used to approximately calculate the pressure loss:

Reynolds number	$Re = \frac{2 \cdot \dot{m}}{\pi \cdot d \cdot \nu \cdot \rho}$	a0004623
$Re \geq 2300^{1)}$	$\Delta p = K \cdot \nu^{0.25} \cdot \dot{m}^{1.85} \cdot \rho^{-0.86}$	a0004626
$Re < 2300$	$\Delta p = K1 \cdot \nu \cdot \dot{m} + \frac{K2 \cdot \nu^{0.25} \cdot \dot{m}^2}{\rho}$	a0004628
Δp = pressure loss [mbar] ν = kinematic viscosity [m ² /s] $\dot{m}$ = mass flow [kg/s] ρ = fluid density [kg/m ³] d = inside diameter of measuring tubes [m] K to $K2$ = constants (depending on nominal diameter)		
¹⁾ To compute the pressure loss for gases, always use the formula for $Re \geq 2300$.		

Pressure loss coefficient for Promass F

DN	d [m]	K	K1	K2
8	$5.35 \cdot 10^{-3}$	$5.70 \cdot 10^7$	$9.60 \cdot 10^7$	$1.90 \cdot 10^7$
15	$8.30 \cdot 10^{-3}$	$5.80 \cdot 10^6$	$1.90 \cdot 10^7$	$10.60 \cdot 10^5$
25	$12.00 \cdot 10^{-3}$	$1.90 \cdot 10^6$	$6.40 \cdot 10^6$	$4.50 \cdot 10^5$
40	$17.60 \cdot 10^{-3}$	$3.50 \cdot 10^5$	$1.30 \cdot 10^6$	$1.30 \cdot 10^5$
50	$26.00 \cdot 10^{-3}$	$7.00 \cdot 10^4$	$5.00 \cdot 10^5$	$1.40 \cdot 10^4$
80	$40.50 \cdot 10^{-3}$	$1.10 \cdot 10^4$	$7.71 \cdot 10^4$	$1.42 \cdot 10^4$
100	$51.20 \cdot 10^{-3}$	$3.54 \cdot 10^3$	$3.54 \cdot 10^4$	$5.40 \cdot 10^3$
150	$68.90 \cdot 10^{-3}$	$1.36 \cdot 10^3$	$2.04 \cdot 10^4$	$6.46 \cdot 10^2$
250	$102.26 \cdot 10^{-3}$	$3.00 \cdot 10^2$	$6.10 \cdot 10^3$	$1.33 \cdot 10^2$

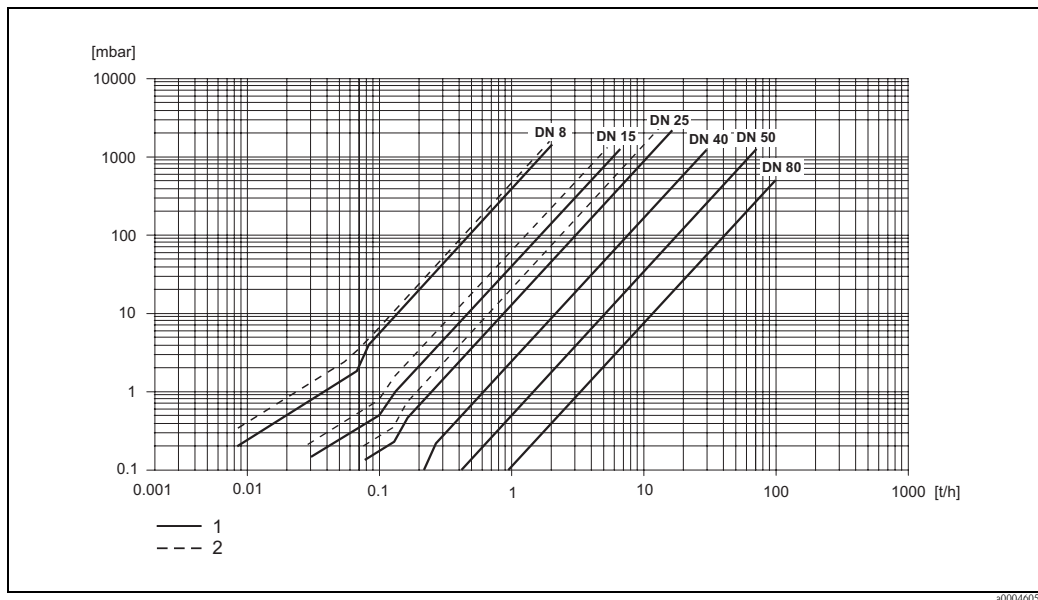


Pressure loss diagram for water

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Pressure loss coefficient for Promass M

DN	d [m]	K	K1	K2
8	$5.53 \cdot 10^{-3}$	$5.2 \cdot 10^7$	$8.6 \cdot 10^7$	$1.7 \cdot 10^7$
15	$8.55 \cdot 10^{-3}$	$5.3 \cdot 10^6$	$1.7 \cdot 10^7$	$9.7 \cdot 10^5$
25	$11.38 \cdot 10^{-3}$	$1.7 \cdot 10^6$	$5.8 \cdot 10^6$	$4.1 \cdot 10^5$
40	$17.07 \cdot 10^{-3}$	$3.2 \cdot 10^5$	$1.2 \cdot 10^6$	$1.2 \cdot 10^5$
50	$25.60 \cdot 10^{-3}$	$6.4 \cdot 10^4$	$4.5 \cdot 10^5$	$1.3 \cdot 10^4$
80	$38.46 \cdot 10^{-3}$	$1.4 \cdot 10^4$	$8.2 \cdot 10^4$	$3.7 \cdot 10^4$
High-pressure version				
8	$4.93 \cdot 10^{-3}$	$6.0 \cdot 10^7$	$1.4 \cdot 10^8$	$2.8 \cdot 10^7$
15	$7.75 \cdot 10^{-3}$	$8.0 \cdot 10^6$	$2.5 \cdot 10^7$	$1.4 \cdot 10^6$
25	$10.20 \cdot 10^{-3}$	$2.7 \cdot 10^6$	$8.9 \cdot 10^6$	$6.3 \cdot 10^5$



Pressure loss diagram for water

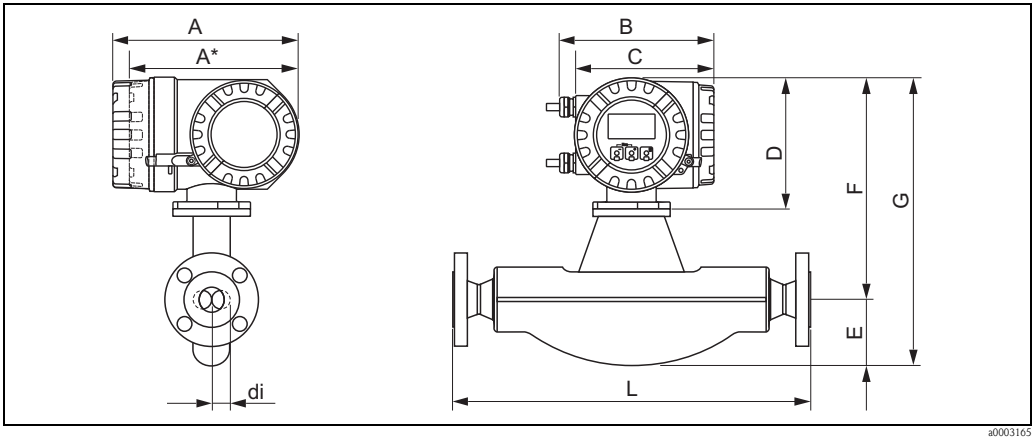
- 1 Promass M
2 Promass M (high-pressure version)

Mechanical construction

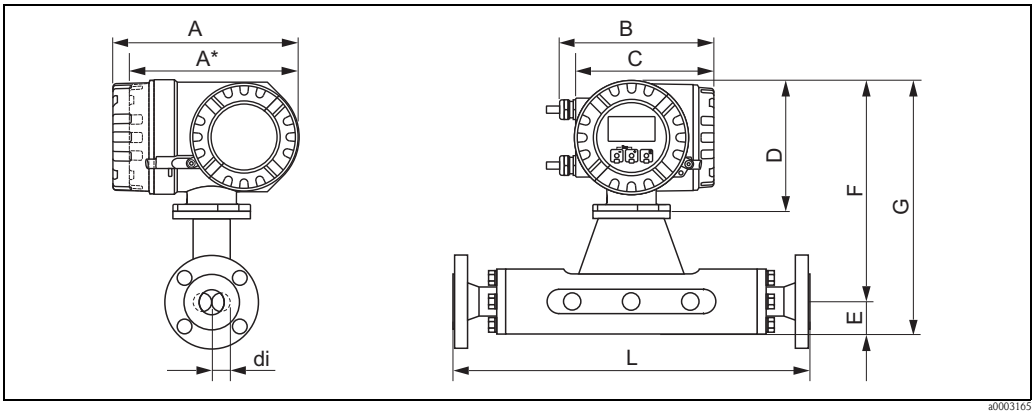
Design, dimensions

Dimensions:	
Field housing compact version, powder-coated die-cast aluminum	→ Page 26
Transmitter compact version, Stainless Steel field housing	→ Page 27
Transmitter connection housing remote version (II2G/Zone 1)	→ Page 27
Transmitter wall-mount housing (non Ex-zone and II3G/Zone 2)	→ Page 28
Connection housing remote version	→ Page 29
Connection housing remote version for heating	→ Page 29
Process connections Promass F	→ Page 31 ff.
Promass F: Flange connections EN (DIN), ASME B16.5, JIS	→ Page 31
Promass F: Tri-Clamp	→ Page 37
Promass F: DIN 11851 (threaded hygienic connection)	→ Page 38
Promass F: DIN 11864-1 Form A (threaded hygienic connection)	→ Page 39
Promass F: DIN 11864-2 Form A (flat flange with groove)	→ Page 40
Promass F: ISO 2853 (threaded hygienic connection)	→ Page 41
Promass F: SMS 1145 (threaded hygienic connection)	→ Page 42
Promass F: VCO	→ Page 43
Process connections Promass M	→ Page 44 ff.
Promass M: Flange connections EN (DIN), ASME B16.5, JIS	→ Page 44
Promass M: Tri-Clamp	→ Page 48
Promass M: DIN 11851 (threaded hygienic connection)	→ Page 49
Promass M: DIN 11864-1 Form A (threaded hygienic connection)	→ Page 49
Promass M: DIN 11864-2 Form A (flat flange with groove)	→ Page 50
Promass M: ISO 2853 (threaded hygienic connection)	→ Page 51
Promass M: SMS 1145 (threaded hygienic connection)	→ Page 51
Process connections Promass M (high pressure)	→ Page 52 ff.
Promass M (high pressure): 1/2"-NPT, 3/8"-NPT and G 3/8"	→ Page 52
Promass M (high pressure): 1/2"-SWAGELOK	→ Page 53
Promass M (high pressure): Connector with internal thread 7/8-14 UNF	→ Page 53
Promass M without process connections	→ Page 54
Purge connections / secondary containment monitoring	→ Page 55
Rupture disk	→ Page 56

Field housing compact version, powder-coated die-cast aluminum



Promass F



Promass M

A	A*	B	C	D
227	207	187	168	160

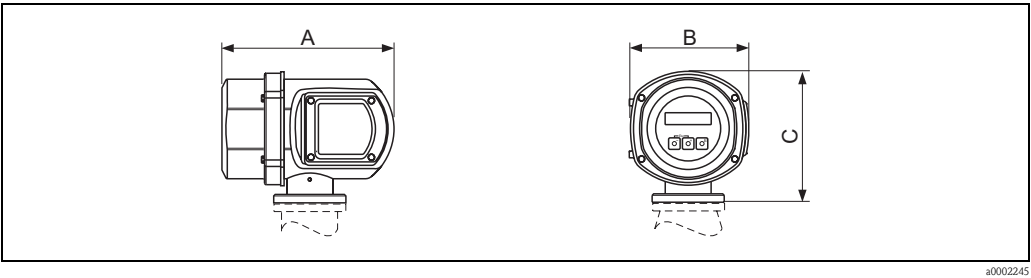
All dimensions in [mm];
* Blind version (without local display)

Promass F						Promass M					
DN	E	F	G	L	di	DN	E	F	G	L	di
8	75	266	341	1)	1)	8	35	266	301	1)	1)
15	75	266	341	1)	1)	15	37	268	305	1)	1)
25	75	266	341	1)	1)	25	40	272	312	1)	1)
40	105	271	376	1)	1)	40	49	283	332	1)	1)
50	141	283	424	1)	1)	50	58	293	351	1)	1)
80	200	305	505	1)	1)	80	76	309	385	1)	1)
100	247	324	571	1)	1)	All dimensions in [mm]; * dependent on respective process connection → For dimensions, see the following pages					
150	378	362	740	1)	1)						
250	548	390	938	1)	1)						



Note!
Dimensions for transmitters II2G/Zone 1 → Page 27.

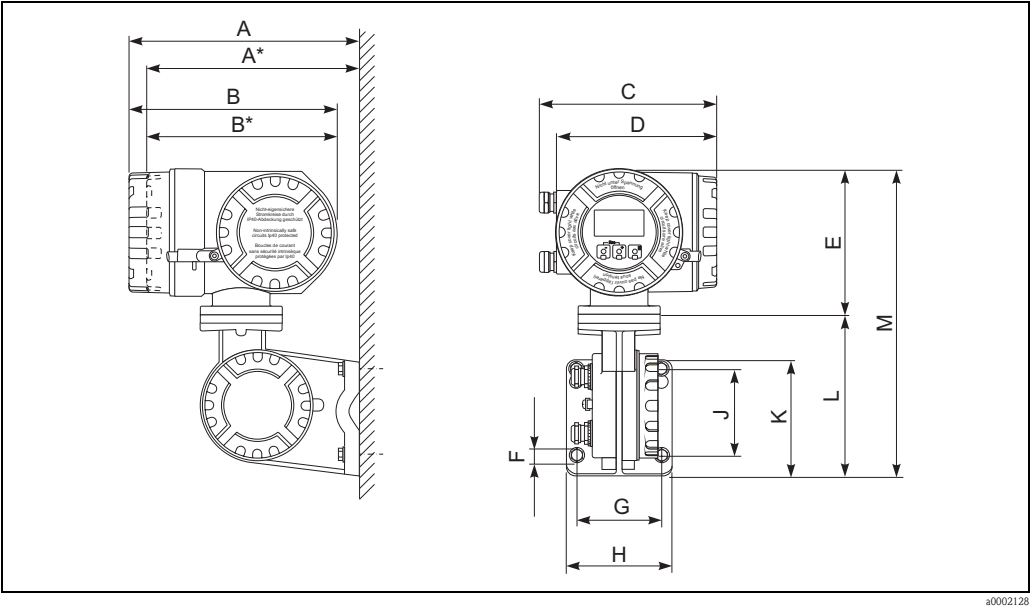
Transmitter compact version, Stainless Steel field housing



A	B	C
225	153	168

All dimensions in [mm]

Transmitter connection housing remote version (II2G/Zone 1)



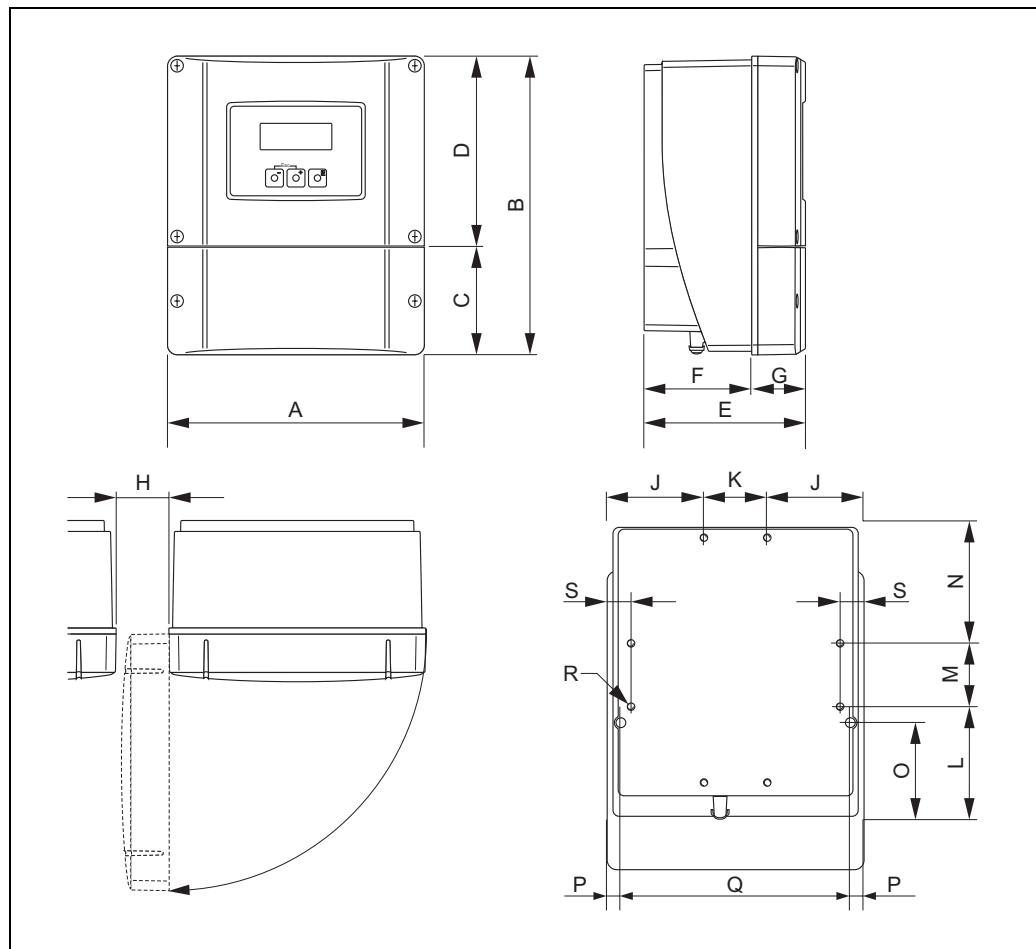
A	A*	B	B*	C	D	E
265	242	240	217	206	186	167

* Blind version (without local display)

F	G	H	J	K	L	M
Ø 8.6 (M8)	100	123	100	133	188	355

All dimensions in [mm]

Transmitter wall-mount housing (non Ex-zone and II3G/Zone 2)

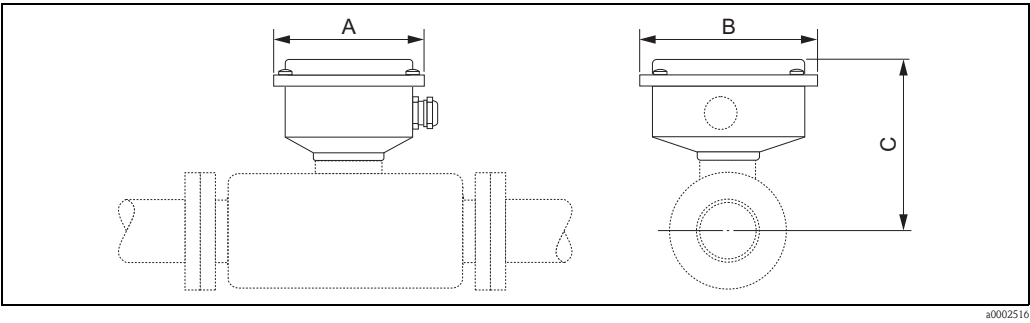


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A	B	C	D	E	F	G	H	J
215	250	90.5	159.5	135	90	45	>50	81
K	L	M	N	O	P	Q	R	S
53	95	53	102	81.5	11.5	192	8 × M5	20

All dimensions in [mm]

Connection housing remote version

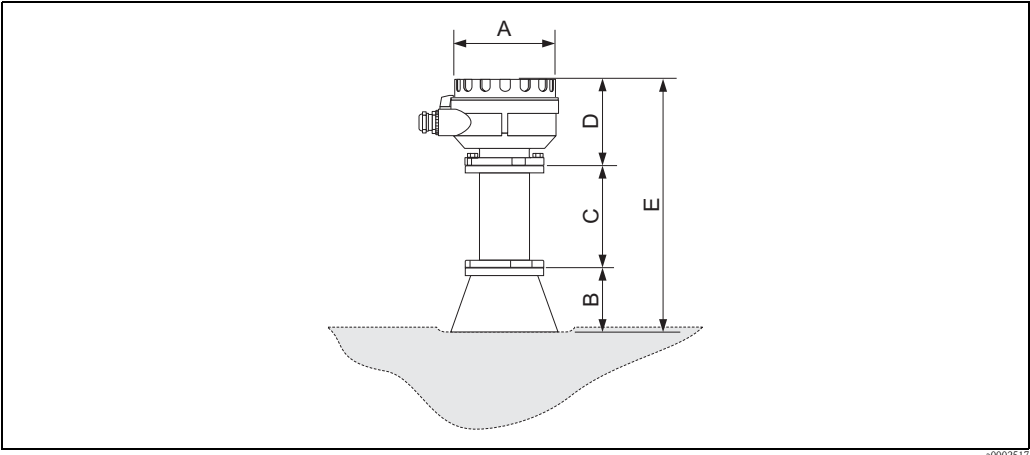


Promass F				Promass M			
DN	A	B	C	DN	A	B	C
8	118.5	137.5	113	8	118.5	137.5	113
15	118.5	137.5	113	15	118.5	137.5	115
25	118.5	137.5	113	25	118.5	137.5	119
40	118.5	137.5	118	40	118.5	137.5	130
50	118.5	137.5	130	50	118.5	137.5	140
80	118.5	137.5	152	80	118.5	137.5	156
100	118.5	137.5	171	All dimensions in [mm]			
150	118.5	137.5	209				
250	118.5	137.5	237				

Connection housing remote version for heating



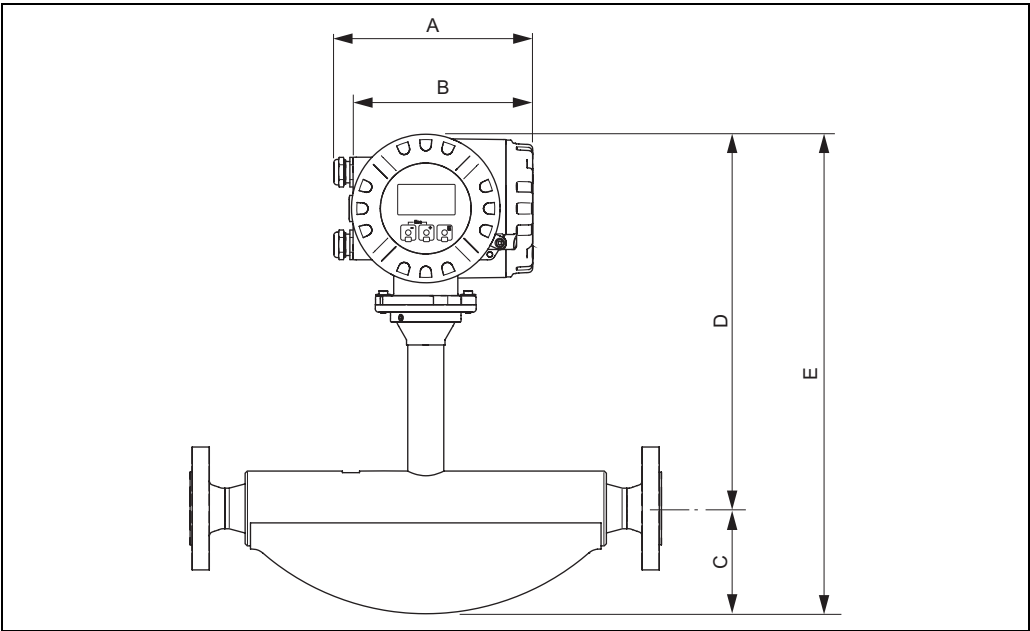
Note!
Use this version in case of insulation or application of heating jacket.



A	B	C	D	E
129	80	110	102	292

All dimensions in [mm]

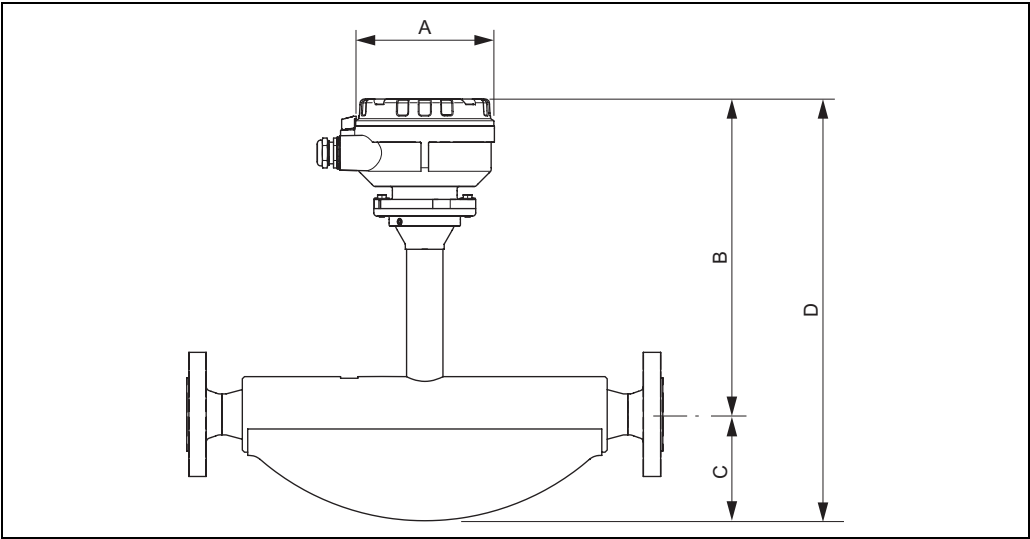
Dimensions: High-temperature version (compact)



DN	A	B	C	D	E
25	187	168	100	350	455
50	187	168	141	365	506
80	187	168	200	385	585

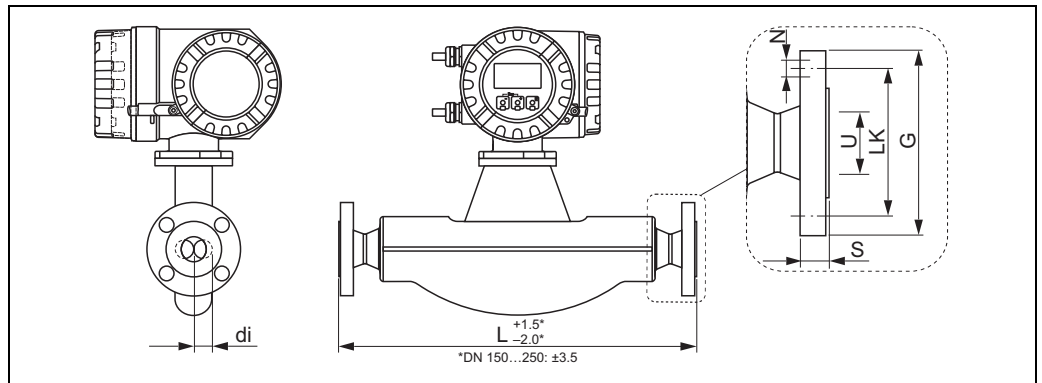
All dimensions in [mm]

Dimensions: High-temperature version (remote)



DN	A	C	D	E
25	129	105	292	397
50	129	141	307	448
80	129	200	327	527

All dimensions in [mm]

Promass F: Flange connections EN (DIN), ASME B16.5, JIS

a0002501-en

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 16: 1.4404/316L

Surface roughness (flange): EN 1092-1 Form B1 (DIN 2526 Form C), Ra 3.2 to 12.5 µm

DN	G	L	N	S	LK	U	di
100	220	1128	8 × Ø18	20	180	107.1	51.20
150	285	1330	8 × Ø22	22	240	159.3	68.90
250 ²⁾	405	1780	12 × Ø26	26	355	260.4	102.26

¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available²⁾ Not available in Alloy

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 40: 1.4404/316L, Alloy C-22

Surface roughness (flange): EN 1092-1 Form B1 (DIN 2526 Form C), Ra 3.2 to 12.5 µm

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø14	16	65	17.3	5.35
15	95	404	4 × Ø14	16	65	17.3	8.30
25	115	440	4 × Ø14	18	85	28.5	12.00
40	150	550	4 × Ø18	18	110	43.1	17.60
50	165	715	4 × Ø18	20	125	54.5	26.00
80	200	840	8 × Ø18	24	160	82.5	40.50
100	235	1128	8 × Ø22	24	190	107.1	51.20
150	300	1370	8 × Ø26	28	250	159.3	68.90
250 ²⁾	450	1850	12 × Ø33	38	385	258.8	102.26

¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available²⁾ Not available in Alloy

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501) / PN 40 (mit DN 25-Flanges): 1.4404/316L

Surface roughness (flange): EN 1092-1 Form B1 (DIN 2526 Form C), Ra 3.2 to 12.5 µm

DN	G	L	N	S	LK	U	di
8	115	440	4 × Ø14	18	85	28.5	5.35
15	115	440	4 × Ø14	18	85	28.5	8.30

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N) extension-reduction / PN 16: 1.4404/316L Only for nominal diameter DN 250 (on request)							
Surface roughness (flange): Ra 0.8 to 3.2 µm							
DN	G	L	N	S	LK	U	di
150	285	1980	8 × Ø22	22	240	159.3	102.26
200	340	1940	12 × Ø22	24	295	207.3	102.26
300	460	1940	12 × Ø26	28	410	309.7	102.26
All dimensions in [mm]							

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N) extension-reduction / PN 40: 1.4404/316L Only for nominal diameter DN 250 (on request)							
Surface roughness (flange): Ra 0.8 to 3.2 µm							
DN	G	L	N	S	LK	U	di
150	300	1980	8 × Ø26	28	250	159.3	102.26
200	375	1940	12 × Ø30	34	320	206.5	102.26
300	515	1940	16 × Ø33	42	450	307.9	102.26
All dimensions in [mm]							

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 63: 1.4404/316L, Alloy C-22							
Surface roughness (flange): EN 1092-1 Form B2 (DIN 2526 Form E), Ra 0.8 to 3.2 µm							
DN	G	L	N	S	LK	U	di
50	180	724	4 × Ø22	26	135	54.5	26.00
80	215	875	8 × Ø22	28	170	81.7	40.50
100	250	1128	8 × Ø26	30	200	106.3	51.20
150	345	1410	8 × Ø33	36	280	157.1	68.90
250 ²⁾	470	1890	12 × Ø36	46	400	255.4	102.26
¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available ²⁾ Not available in Alloy All dimensions in [mm]							

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 100: 1.4404/316L, Alloy C-22							
Surface roughness (flange): EN 1092-1 Form B2 (DIN 2526 Form E), Ra 0.8 to 3.2 µm							
DN	G	L	N	S	LK	U	di
8	105	400	4 × Ø14	20	75	17.3	5.35
15	105	420	4 × Ø14	20	75	17.3	8.30
25	140	470	4 × Ø18	24	100	28.5	12.00
40	170	590	4 × Ø22	26	125	42.5	17.60
50	195	740	4 × Ø26	28	145	53.9	26.00
80	230	885	8 × Ø26	32	180	80.9	40.50
100	265	1128	8 × Ø30	36	210	104.3	51.20
150	355	1450	12 × Ø33	44	290	154.0	68.90
¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available All dimensions in [mm]							

Flange according to ASME B16.5 / CI 150: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
8	3/8"	88.9	370	4 × Ø15.7	11.2	60.5	15.7	5.35
15	½"	88.9	404	4 × Ø15.7	11.2	60.5	15.7	8.30
25	1"	108.0	440	4 × Ø15.7	14.2	79.2	26.7	12.00
40	1½"	127.0	550	4 × Ø15.7	17.5	98.6	40.9	17.60
50	2"	152.4	715	4 × Ø19.1	19.1	120.7	52.6	26.00
80	3"	190.5	840	4 × Ø19.1	23.9	152.4	78.0	40.50
100	4"	228.6	1128	8 × Ø19.1	23.9	190.5	102.4	51.20
150	6"	279.4	1398	8 × Ø22.4	25.4	241.3	154.2	68.90
250 ¹⁾	10"	406.4	1836.8	12 × Ø25.4	30.2	362	254.5	102.26

¹⁾ Not available in Alloy

All dimensions in [mm]

Flange according to ASME B16.5 / CI 300: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
8	3/8"	95.2	370	4 × Ø15.7	14.2	66.5	15.7	5.35
15	½"	95.2	404	4 × Ø15.7	14.2	66.5	15.7	8.30
25	1"	123.9	440	4 × Ø19	17.5	88.9	26.7	12.00
40	1½"	155.4	550	4 × Ø22.3	20.6	114.3	40.9	17.60
50	2"	165.1	715	8 × Ø19	22.3	127.0	52.6	26.00
80	3"	209.5	840	8 × Ø22.3	28.4	168.1	78.0	40.50
100	4"	254.0	1128	8 × Ø22.3	31.7	200.1	102.4	51.20
150	6"	317.5	1417	12 × Ø22.3	36.5	269.7	154.2	68.90
250 ¹⁾	10"	444.5	1868.2	16 × Ø28.4	47.4	387.3	254.5	102.26

¹⁾ Not available in Alloy

All dimensions in [mm]

Flange according to ASME B16.5 / CI 600: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
8	3/8"	95.3	400	4 × Ø15.7	20.6	66.5	13.9	5.35
15	½"	95.3	420	4 × Ø15.7	20.6	66.5	13.9	8.30
25	1"	124.0	490	4 × Ø19.1	23.9	88.9	24.3	12.00
40	1½"	155.4	600	4 × Ø22.4	28.7	114.3	38.1	17.60
50	2"	165.1	742	8 × Ø19.1	31.8	127.0	49.2	26.00
80	3"	209.6	900	8 × Ø22.4	38.2	168.1	73.7	40.50
100	4"	273.1	1158	8 × Ø25.4	48.4	215.9	97.3	51.20
150	6"	355.6	1467	12 × Ø28.4	47.8	292.1	154.2	68.90
250 ¹⁾	10"	508.0	1951.2	16 × Ø35.1	69.9	431.8	254.5	102.26

¹⁾ Not available in Alloy

All dimensions in [mm]

Flange according to ASME B16.5 extension-reduction / CI 150: 1.4404/316L

Only for nominal diameter DN 250 / 10" (on request)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
150	6"	279.4	1980	8 × Ø22.4	25.4	241.3	154.2	102.26
200	8"	342.9	1940	8 × Ø22.4	28.4	298.5	202.7	102.26
300	12"	482.6	1940	12 × Ø25.4	31.8	431.8	304.80	102.26

All dimensions in [mm]

Flange according to ASME B16.5 extension-reduction / CI 300: 1.4404/316

Only for nominal diameter DN 250 / 10" (on request)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
150	6"	317.5	1980	12 × Ø22.4	36.5	269.7	154.2	102.26
200	8"	381.0	1940	12 × Ø25.4	41.1	330.2	202.7	102.26
300	12"	520.7	1940	16 × Ø31.7	50.8	450.8	304.80	102.26

All dimensions in [mm]

Flange according to ASME B16.5 extension-reduction / CI 600: 1.4404/316L

Only for nominal diameter DN 250 / 10" (on request)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
150	6"	355.6	1980	12 × Ø28.4	54.2	292.1	154.2	102.26
200	8"	419.1	1940	12 × Ø31.8	62.0	349.3	202.7	102.26

All dimensions in [mm]

Flange JIS B2220 / 10K: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
50	155	715	4 × Ø19	16	120	50	26.00
80	185	832	8 × Ø19	18	150	80	40.50
100	210	1128	8 × Ø19	18	175	100	51.20
150	280	1354	8 × Ø23	22	240	150	68.90
250 ¹⁾	400	1780	12 × Ø25	24	355	250	102.26

¹⁾ Not available in Alloy

All dimensions in [mm]

Flange JIS B2220 / 20K: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 1.6 to 3.2 µm

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø15	14	70	15	5.35
15	95	404	4 × Ø15	14	70	15	8.30
25	125	440	4 × Ø19	16	90	25	12.00
40	140	550	4 × Ø19	18	105	40	17.60
50	155	715	8 × Ø19	18	120	50	26.00
80	200	832	8 × Ø23	22	160	80	40.50
100	225	1128	8 × Ø23	24	185	100	51.20
150	305	1386	12 × Ø25	28	260	150	68.90
250 ¹⁾	430	1850	12 × Ø27	34	380	250	102.26

¹⁾ Not available in Alloy
All dimensions in [mm]

Flange JIS B2220 / 40K: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 1.6 to 3.2 µm

DN	G	L	N	S	LK	U	di
8	115	400	4 × Ø19	20	80	15	5.35
15	115	425	4 × Ø19	20	80	15	8.30
25	130	485	4 × Ø19	22	95	25	12.00
40	160	600	4 × Ø23	24	120	38	17.60
50	165	760	8 × Ø19	26	130	50	26.00
80	210	890	8 × Ø23	32	170	75	40.50
100	250	1168	8 × Ø25	36	205	100	51.20
150	355	1498	12 × Ø33	44	295	150	68.90

All dimensions in [mm]

Flange JIS B2220 / 63K: 1.4404/316L, Alloy C-22

Surface roughness (flange): Ra 1.6 to 3.2 µm

DN	G	L	N	S	LK	U	di
8	120	420	4 × Ø19	23	85	12	5.35
15	120	440	4 × Ø19	23	85	12	8.30
25	140	494	4 × Ø23	27	100	22	12.00
40	175	620	4 × Ø25	32	130	35	17.60
50	185	775	8 × Ø23	34	145	48	26.00
80	230	915	8 × Ø25	40	185	73	40.50
100	270	1168	8 × Ø27	44	220	98	51.20
150	365	1528	12 × Ø33	54	305	146	68.90

All dimensions in [mm]

Flange JIS B2220 extension-reduction / 10K: 1.4404/316L

Only for nominal diameter DN 250 (on request)

Surface roughness (flange): Ra 1.6 to 3.2 µm

DN	G	L	N	S	LK	U	di
150	280	1980	8 × Ø23	22	240	150	102.26
200	330	1940	12 × Ø23	22	290	200	102.26
300	445	1940	16 × Ø25	24	400	300	102.26

All dimensions in [mm]

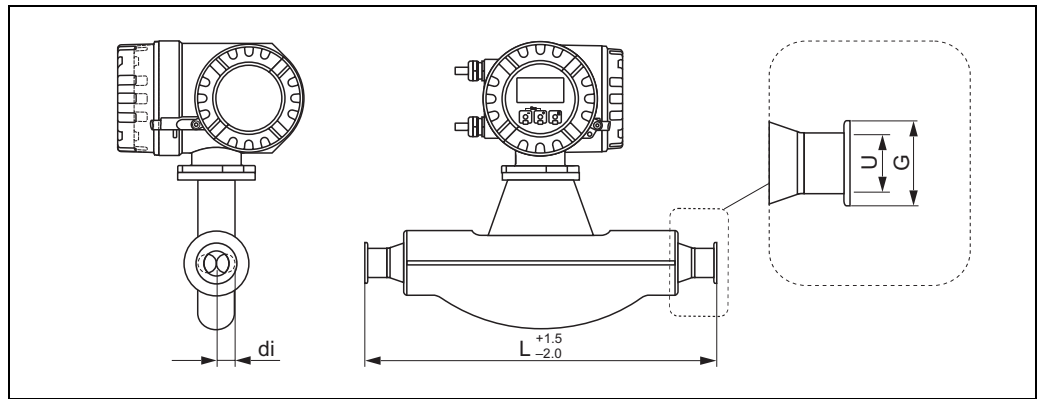
Flange JIS B2220 extension-reduction / 20K: 1.4404/316L

Only for nominal diameter DN 250 (on request)

Surface roughness (flange): Ra 1.6 to 3.2 µm

DN	G	L	N	S	LK	U	di
150	305	1980	12 × Ø25	28	260	150	102.26
200	350	1940	12 × Ø25	30	305	200	102.26
300	480	1940	16 × Ø27	36	430	300	102.26

All dimensions in [mm]

Promass F: Tri-Clamp

a0002515-en

Tri-Clamp: 1.4404/316L

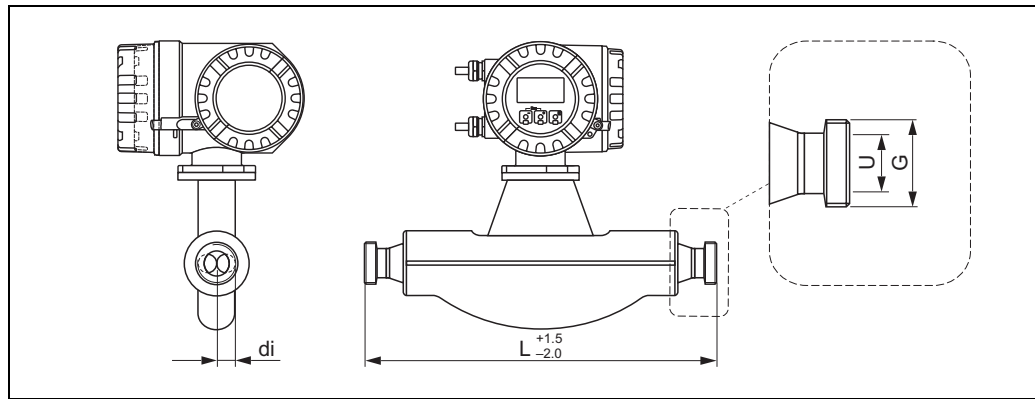
DN	Clamp	G	L	U	di
8	1"	50.4	367	22.1	5.35
15	1"	50.4	398	22.1	8.30
25	1"	50.4	434	22.1	12.00
40	1½"	50.4	560	34.8	17.60
50	2"	63.9	720	47.5	26.00
80	3"	90.9	900	72.9	40.50
100	4"	118.9	1128	97.4	51.20

3A version also available ($Ra \leq 0.8 \mu\text{m}/150$ grit. Option: $Ra \leq 0.4 \mu\text{m}/240$ grit)
 All dimensions in [mm]

½"-Tri-Clamp: 1.4404/316L

DN	Clamp	G	L	U	di
8	½"	25.0	367	9.5	5.35
15	½"	25.0	398	9.5	8.30

3A version also available ($Ra \leq 0.8 \mu\text{m}/150$ grit. Option: $Ra \leq 0.4 \mu\text{m}/240$ grit)
 All dimensions in [mm]

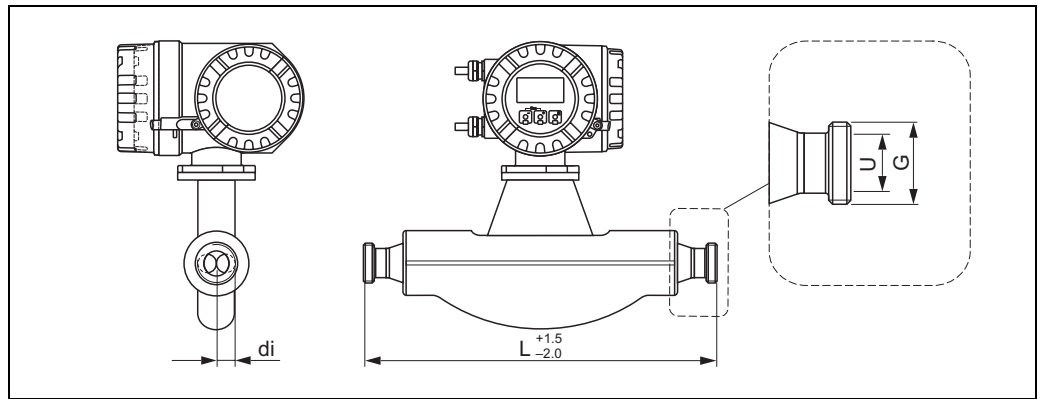
Promass F: DIN 11851 (threaded hygienic connection)

a0002530-en

Threaded hygienic connection DIN 11851: 1.4404/316L

DN	G	L	U	di
8	Rd 34 × 1/8"	367	16	5.35
15	Rd 34 × 1/8"	398	16	8.30
25	Rd 52 × 1/6"	434	26	12.00
40	Rd 65 × 1/6"	560	38	17.60
50	Rd 78 × 1/6"	720	50	26.00
80	Rd 110 × 1/4"	900	81	40.50
100	Rd 130 × 1/4"	1128	100	51.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)
All dimensions in [mm]

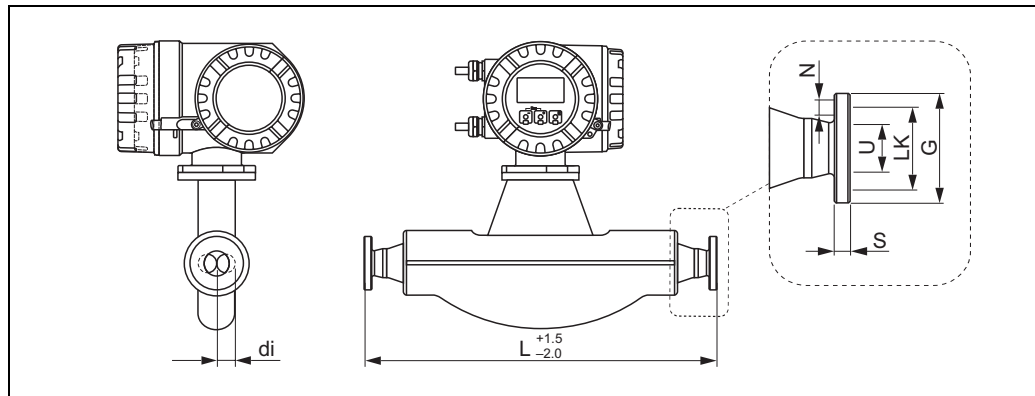
Promass F: DIN 11864-1 Form A (threaded hygienic connection)

a0002521-en

Threaded hygienic connection DIN 11864-1 Form A: 1.4404/316L

DN	G	L	U	di
8	Rd 28 × 1/8"	367	10	5.35
15	Rd 34 × 1/8"	398	16	8.30
25	Rd 52 × 1/6"	434	26	12.00
40	Rd 65 × 1/6"	560	38	17.60
50	Rd 78 × 1/6"	720	50	26.00
80	Rd 110 × 1/4"	900	81	40.50
100	Rd 130 × 1/4"	1128	100	51.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)
 All dimensions in [mm]

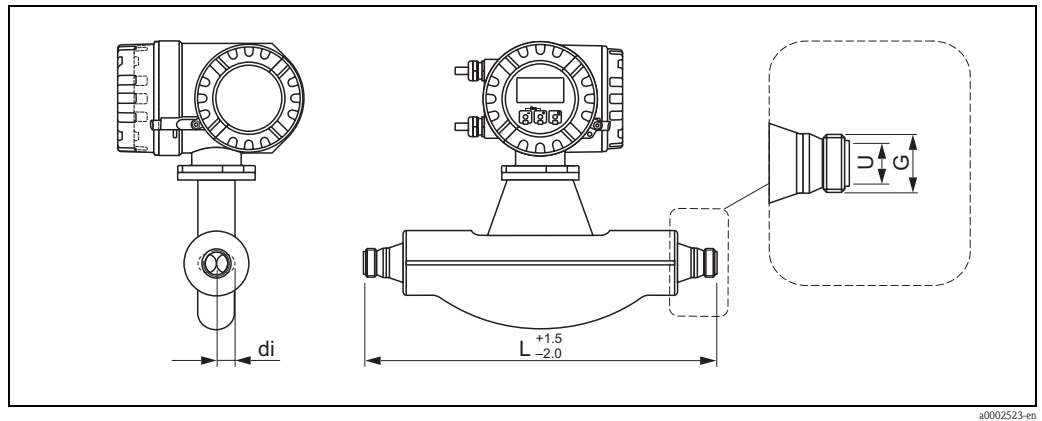
Promass F: DIN 11864-2 Form A (flat flange with groove)

a0002522-en

DIN 11864-2 Form A (flat flange with groove): 1.4404/316L

DN	G	L	N	S	LK	U	d_i
8	54	387	4 × Ø9	10	37	10	5.35
15	59	418	4 × Ø9	10	42	16	8.30
25	70	454	4 × Ø9	10	53	26	12.00
40	82	560	4 × Ø9	10	65	38	17.60
50	94	720	4 × Ø9	10	77	50	26.00
80	133	900	8 × Ø11	12	112	81	40.50
100	159	1128	8 × Ø11	14	137	100	51.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150$ grit. Option: $R_a \leq 0.4 \mu\text{m}/240$ grit)
 All dimensions in [mm]

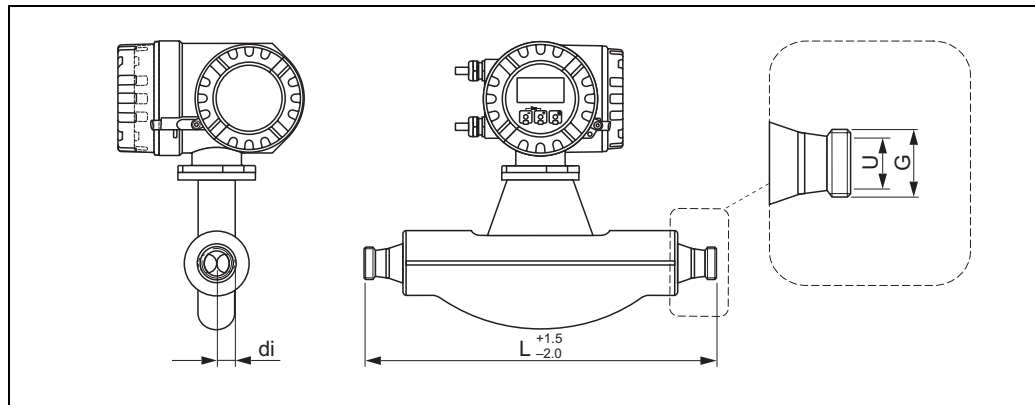
Promass F: ISO 2853 (threaded hygienic connection)**Threaded hygienic connection ISO 2853: 1.4404/316L**

DN	G ¹⁾	L	N	di
8	37.13	367	22.6	5.35
15	37.13	398	22.6	8.30
25	37.13	434	22.6	12.00
40	52.68	560	35.6	17.60
50	64.16	720	48.6	26.00
80	91.19	900	72.9	40.50
100	118.21	1128	97.6	51.20

¹⁾ Max. thread diameter to ISO 2853 Annex A

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit}$. Option: $R_a \leq 0.4 \mu\text{m}/240 \text{ grit}$)

All dimensions in [mm]

Promass F: SMS 1145 (threaded hygienic connection)

a0002524-en

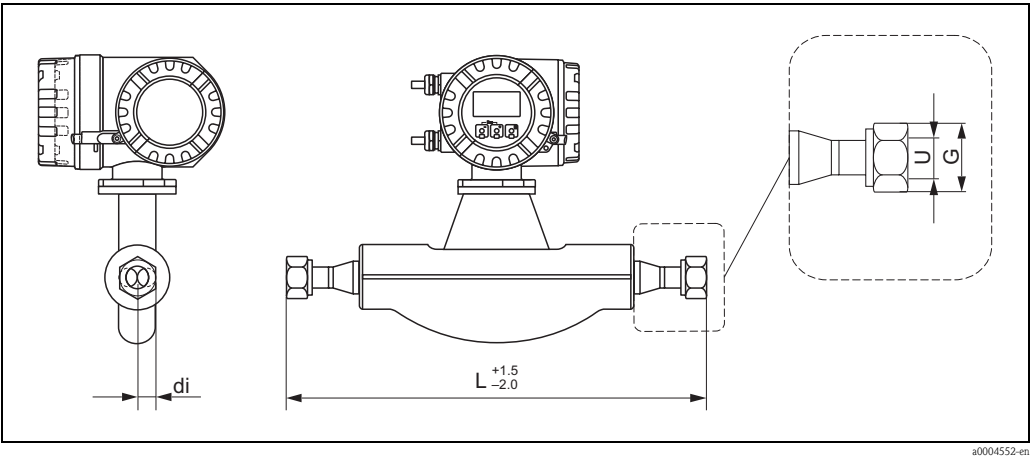
Threaded hygienic connection SMS 1145: 1.4404/316L

DN	G	L	U	di
8	Rd 40 × 1/6"	367	22.6	5.35
15	Rd 40 × 1/6"	398	22.6	8.30
25	Rd 40 × 1/6"	434	22.6	12.00
40	Rd 60 × 1/6"	560	35.6	17.60
50	Rd 70 × 1/6"	720	48.6	26.00
80	Rd 98 × 1/6"	900	72.9	40.50
100	Rd 132 × 1/6"	1128	97.6	51.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150$ grit. Option: $R_a \leq 0.4 \mu\text{m}/240$ grit)

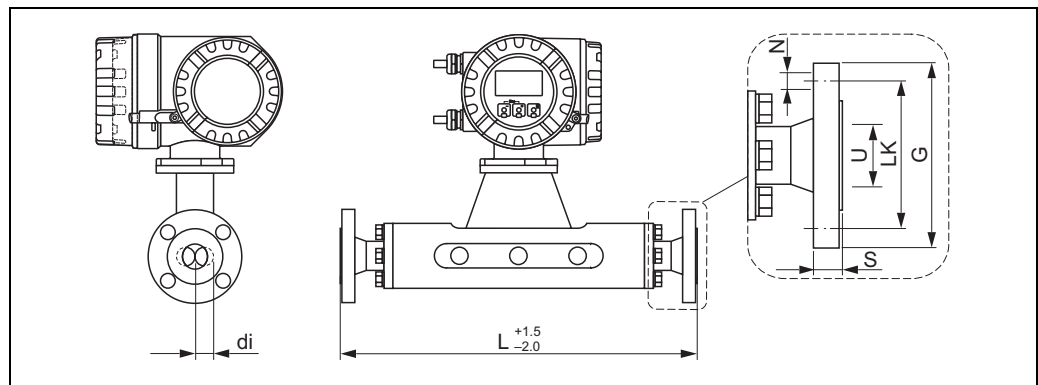
All dimensions in [mm]

Promass F: VCO



8-VCO-4 (½"): 1.4404/316L				
DN	G	L	U	d _i
8	AF 1"	390	10.2	5.35
All dimensions in [mm]				

12-VCO-4 (¾"): 1.4404/316L				
DN	G	L ¹⁾	U	d _i
15	AF 1½"	430	15.7	8.30
All dimensions in [mm]				

Promass M: Flange connections EN (DIN), ASME B16.5, JIS

a0002525-en

Flange according to EN 1092-1 (DIN 2501) / PN 16: PVDF

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø14	16	65	16.1	5.53
15	95	404	4 × Ø14	16	65	16.1	8.55
25	115	440	4 × Ø14	18	85	28.5	11.38
40	150	550	4 × Ø18	18	110	43.1	17.07
50	165	715	4 × Ø18	20	125	54.5	25.60

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 40: 1.4404/316L, Titan

Surface roughness (flange): EN 1092-1 Form B1 (DIN 2526 Form C), Ra 3.2 to 12.5 µm

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø14	16	65	17.3	5.53
15	95	404	4 × Ø14	16	65	17.3	8.55
25	115	440	4 × Ø14	18	85	28.5	11.38
40	150	550	4 × Ø18	18	110	43.1	17.07
50	165	715	4 × Ø18	20	125	54.5	25.60
80	200	840	8 × Ø18	24	160	82.5	38.46

¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501) / PN 40 (mit DN 25-Flanschen): 1.4404/316L

Surface roughness (flange): EN 1092-1 Form B1 (DIN 2526 Form C), Ra 3.2 to 12.5 µm

DN	G	L	N	S	LK	U	di
8	115	440	4 × Ø14	18	85	28.5	5.53
15	115	440	4 × Ø14	18	85	28.5	8.55

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 63: 1.4404/316L, Titan

Surface roughness (flange): EN 1092-1 Form B2 (DIN 2526 Form E), Ra 0.8 to 3.2 µm

DN	G	L	N	S	LK	U	di
50	180	724	4 × Ø22	26	135	54.5	25.60
80	215	875	8 × Ø22	28	170	81.7	38.46

¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available
All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501 / DIN 2512N ¹⁾) / PN 100: 1.4404/316L, Titan

Surface roughness (flange): EN 1092-1 Form B2 (DIN 2526 Form E), Ra 0.8 to 3.2 µm

DN	G	L	N	S	LK	U	di
8	95	400	4 × Ø14	20	65	17.3	5.53
15	95	420	4 × Ø14	20	65	17.3	8.55
25	115	470	4 × Ø14	24	85	28.5	11.38
40	150	590	4 × Ø18	26	110	43.1	17.07
50	165	740	4 × Ø18	28	125	54.5	25.60
80	230	885	8 × Ø26	32	180	80.9	38.46

¹⁾ Flange with groove according to EN 1092-1 Form D (DIN 2512N) available
All dimensions in [mm]

Flange according to ASME B16.5 / Cl 150: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
8	3/8"	88.9	4 × Ø15.7	11.2	60.5	15.7	5.53
15	1/2"	88.9	4 × Ø15.7	11.2	60.5	15.7	8.55
25	1"	108.0	4 × Ø15.7	14.2	79.2	26.7	11.38
40	1 1/2"	127.0	4 × Ø15.7	17.5	98.6	40.9	17.07
50	2"	152.4	4 × Ø19.1	19.1	120.7	52.6	25.60
80	3"	190.5	4 × Ø19.1	23.9	152.4	78.0	38.46

All dimensions in [mm]

Flange according to ASME B16.5 / Cl 150: PVDF

DN	G	L	N	S	LK	U	di
8	3/8"	88.9	4 × Ø15.7	16	60.5	15.7	5.53
15	1/2"	88.9	4 × Ø15.7	16	60.5	15.7	8.55
25	1"	108.0	4 × Ø15.7	18	79.2	26.7	11.38
40	1 1/2"	127.0	4 × Ø15.7	21	98.6	40.9	17.07
50	2"	152.4	4 × Ø19.1	28	120.7	52.6	25.60

All dimensions in [mm]

Flange according to ASME B16.5 / Cl 300: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
8	3/8"	95.2	370	4 × Ø15.7	14.2	66.5	15.7	5.53
15	1/2"	95.2	404	4 × Ø15.7	14.2	66.5	15.7	8.55
25	1"	123.9	440	4 × Ø19.0	17.5	88.9	26.7	11.38
40	1 1/2"	155.4	550	4 × Ø22.3	20.6	114.3	40.9	17.07
50	2"	165.1	715	8 × Ø19.0	22.3	127.0	52.6	25.60
80	3"	209.5	840	8 × Ø22.3	28.4	168.1	78.0	38.46

All dimensions in [mm]

Flange according to ASME B16.5 / Cl 600: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN		G	L	N	S	LK	U	di
8	3/8"	95.3	400	4 × Ø15.7	20.6	66.5	13.8	5.53
15	1/2"	95.3	420	4 × Ø15.7	20.6	66.5	13.8	8.55
25	1"	124.0	490	4 × Ø19.1	23.6	88.9	24.4	11.38
40	1 1/2"	155.4	600	4 × Ø22.4	28.7	114.3	38.1	17.07
50	2"	165.1	742	8 × Ø19.1	31.8	127.0	49.3	25.60
80	3"	209.6	900	8 × Ø22.4	38.2	168.1	73.7	38.46

All dimensions in [mm]

Flange JIS B2220 / 10K: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
50	155	715	4 × Ø19	16	120	50	25.60
80	185	832	8 × Ø19	18	150	80	38.46

All dimensions in [mm]

Flange JIS B2220 / 10K: 1.4404/316L, PVDF

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø15	16	70	15	5.53
15	95	404	4 × Ø15	16	70	15	8.55
25	125	440	4 × Ø19	18	90	25	11.38
40	140	550	4 × Ø19	21	105	40	17.07
50	155	715	4 × Ø19	22	120	50	25.60

All dimensions in [mm]

Flange JIS B2220 / 20K: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
8	95	370	4 × Ø15	16	70	15	5.53
15	95	404	4 × Ø15	16	70	15	8.55
25	125	440	4 × Ø19	18	90	25	11.38
40	140	550	4 × Ø19	21	105	40	17.07
50	155	715	4 × Ø19	22	120	50	25.60
80	200	832	8 × Ø23	22	160	80	38.46

All dimensions in [mm]

Flange JIS B2220 / 40K: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
8	115	400	4 × Ø19	20	80	15	5.53
15	115	425	4 × Ø19	20	80	15	8.55
25	130	485	4 × Ø19	22	95	25	11.38
40	160	600	4 × Ø23	24	120	38	17.07
50	165	760	8 × Ø19	26	130	50	25.60
80	210	890	8 × Ø23	32	170	75	38.46

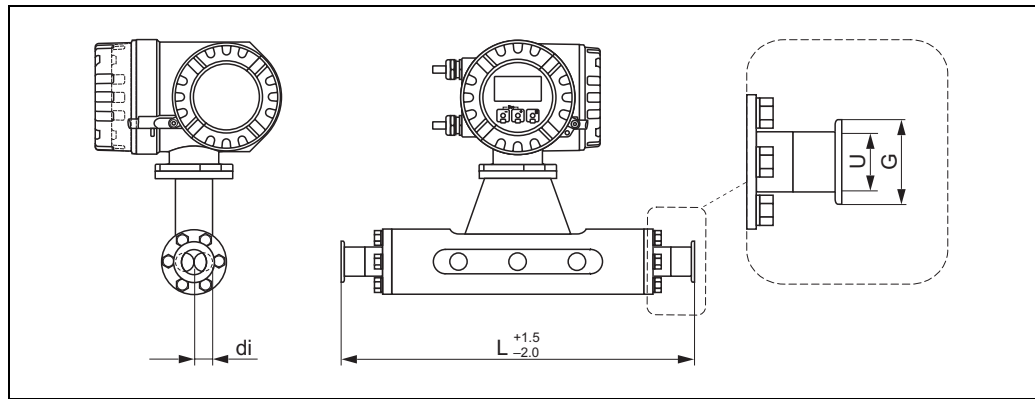
All dimensions in [mm]

Flange JIS B2220 / 63K: 1.4404/316L, Titan

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
8	120	420	4 × Ø19	23	85	12	5.53
15	120	440	4 × Ø19	23	85	12	8.55
25	140	494	4 × Ø23	27	100	22	11.38
40	175	620	4 × Ø25	32	130	35	17.07
50	185	775	8 × Ø23	34	145	48	25.60
80	230	915	8 × Ø25	40	185	73	38.46

All dimensions in [mm]

Promass M: Tri-Clamp

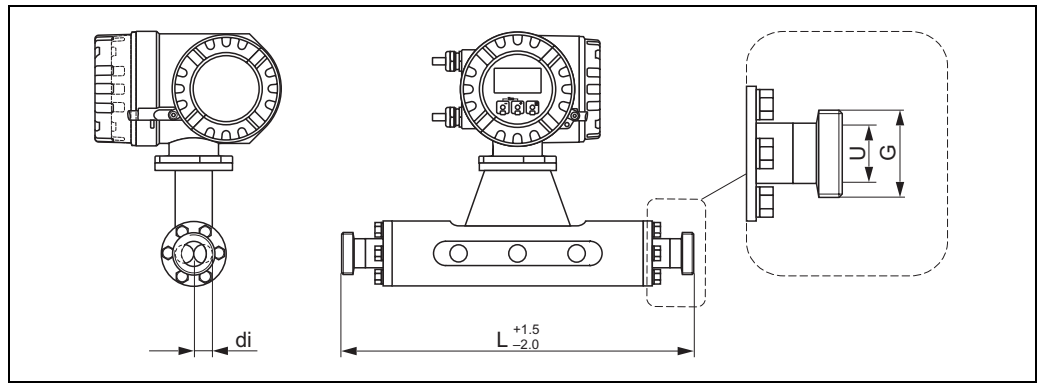
a0002520-en

Tri-Clamp: 1.4404/316L

DN	Clamp	G	L	U	di
8	1"	50.4	367	22.1	5.53
15	1"	50.4	398	22.1	8.55
25	1"	50.4	434	22.1	11.38
40	1½"	50.4	560	34.8	17.07
50	2"	63.9	720	47.5	25.60
80	3"	90.9	801	72.9	38.46
3A version also available (Ra ≤ 0.8 µm/150 grit.) All dimensions in [mm]					

½"-Tri-Clamp: 1.4404/316L

DN	Clamp	G	L	U	di
8	½"	25.0	367	9.5	5.53
15	½"	25.0	398	9.5	8.55
3A version also available (Ra ≤ 0.8 µm/150 grit.) All dimensions in [mm]					

Promass M: DIN 11851 (threaded hygienic connection)

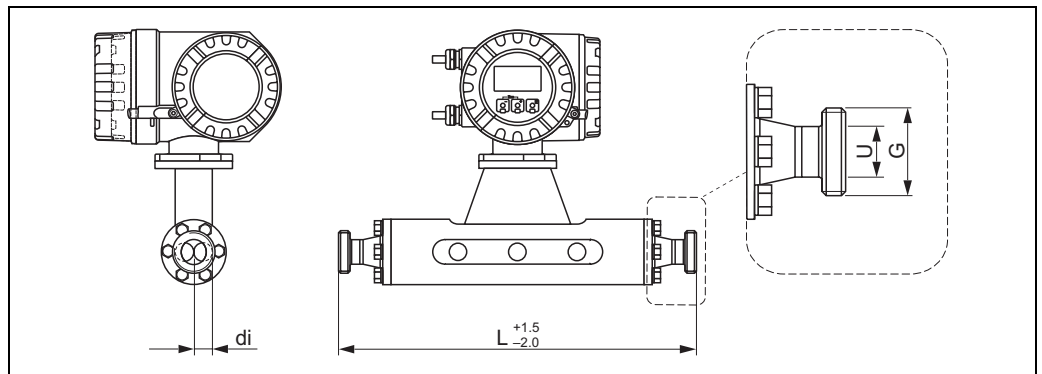
a0002527-en

Threaded hygienic connection DIN 11851: 1.4404/316L

DN	G	L	U	di
8	Rd 34 × 1/8"	367	16	5.53
15	Rd 34 × 1/8"	398	16	8.55
25	Rd 52 × 1/6"	434	26	11.38
40	Rd 65 × 1/6"	560	38	17.07
50	Rd 78 × 1/6"	720	50	25.60
80	Rd 110 × 1/4"	815	81	38.46

3A version also available ($Ra \leq 0.8 \mu\text{m}/150 \text{ grit.}$)

All dimensions in [mm]

Promass M: DIN 11864-1 Form A (threaded hygienic connection)

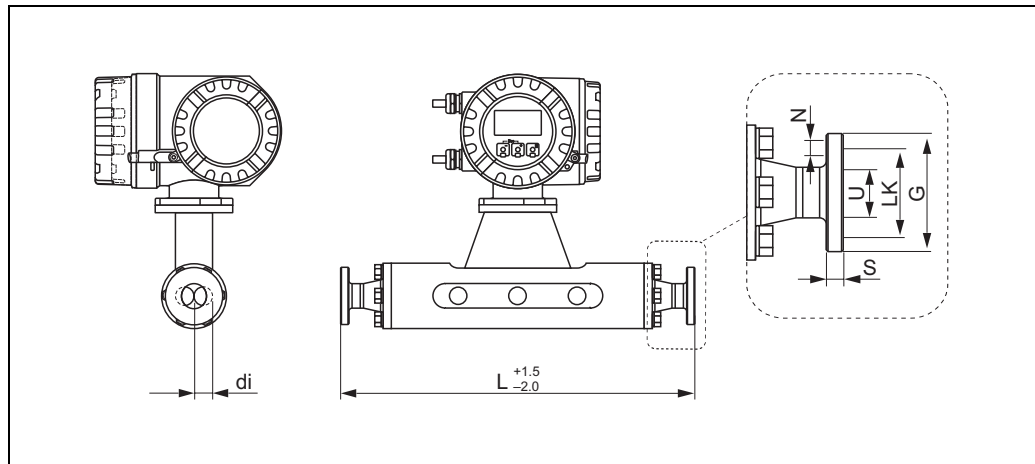
a0002528-en

Threaded hygienic connection DIN 11864-1 Form A: 1.4404/316L

DN	G	L	U	di
8	Rd 28 × 1/8"	367	10	5.53
15	Rd 34 × 1/8"	398	16	8.55
25	Rd 52 × 1/6"	434	26	11.38
40	Rd 65 × 1/6"	560	38	17.07
50	Rd 78 × 1/6"	720	50	25.60
80	Rd 110 × 1/4"	815	81	38.46

3A version also available ($Ra \leq 0.8 \mu\text{m}/150 \text{ grit.}$)

All dimensions in [mm]

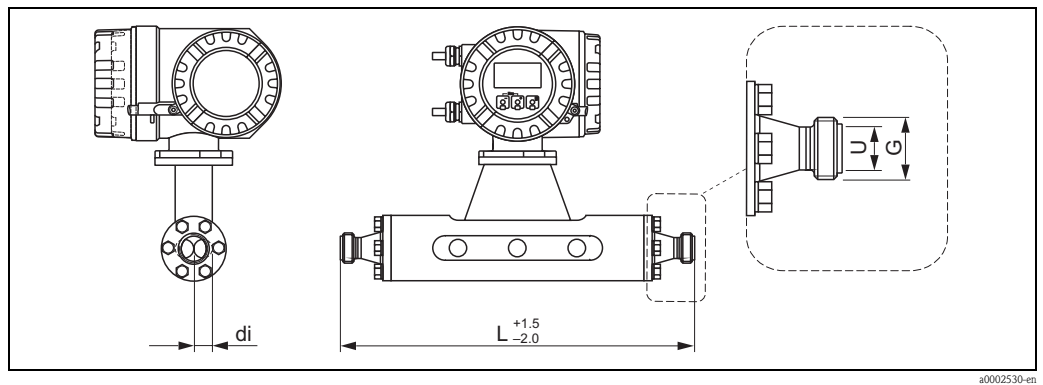
Promass M: DIN 11864-2 Form A (flat flange with groove)

a0002529-en

DIN 11864-2 Form A (flat flange with groove): 1.4404/316L

DN	G	L	N	S	LK	U	di
8	54	367	4 × Ø9	10	37	10	5.53
15	59	398	4 × Ø9	10	42	16	8.55
25	70	434	4 × Ø9	10	53	26	11.38
40	82	560	4 × Ø9	10	65	38	17.07
50	94	720	4 × Ø9	10	77	50	25.60
80	133	815	8 × Ø11	12	112	81	38.46

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)
 All dimensions in [mm]

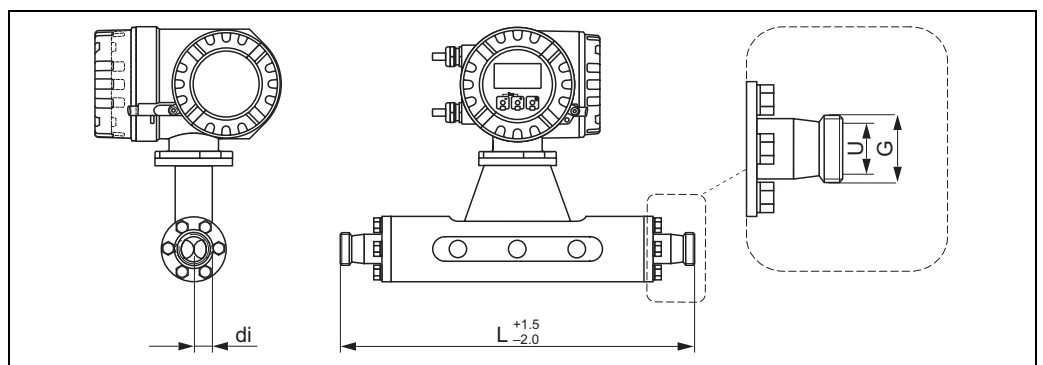
Promass M: ISO 2853 (threaded hygienic connection)

a0002530-en

Threaded hygienic connection ISO 2853: 1.4404/316L

DN	G ¹⁾	L	N	di
8	37.13	367	22.6	5.53
15	37.13	398	22.6	8.55
25	37.13	434	22.6	11.38
40	52.68	560	35.6	17.07
50	64.16	720	48.6	25.60
80	91.19	815	72.9	38.46

¹⁾ Max. thread diameter to ISO 2853 Annex A
 3A version also available (Ra ≤ 0.8 µm/150 grit)
 All dimensions in [mm]

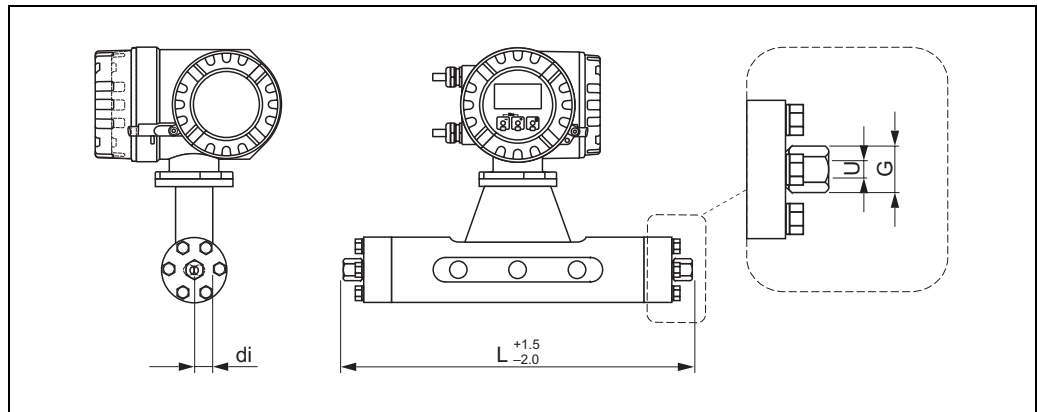
Promass M: SMS 1145 (threaded hygienic connection)

a0002531-en

Threaded hygienic connection SMS 1145: 1.4404/316L

DN	G	L	U	di
8	Rd 40 × 1/6"	367	22.5	5.53
15	Rd 40 × 1/6"	398	22.5	8.55
25	Rd 40 × 1/6"	434	22.5	11.38
40	Rd 60 × 1/6"	560	35.5	17.07
50	Rd 70 × 1/6"	720	48.5	25.60
80	Rd 98 × 1/6"	792	72.0	38.46

3A version also available (Ra ≤ 0.8 µm/150 grit.)
 All dimensions in [mm]

Promass M (high pressure): ½"-NPT, 3/8"-NPT and G 3/8"

a0002532-en

½"-NPT: 1.4404/316L

DN	G	L	U	di
8	AF 1 1/16"	370	10.2	4.93
15	AF 1 1/16"	400	10.2	7.75
25	AF 1 1/16"	444	10.2	10.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)

All dimensions in [mm]

3/8"-NPT: 1.4404/316L

DN	G	L	U	di
8	AF 1 5/16"	355.8	10.2	4.93
15	AF 1 5/16"	385.8	10.2	7.75
25	AF 1 5/16"	429.8	10.2	10.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)

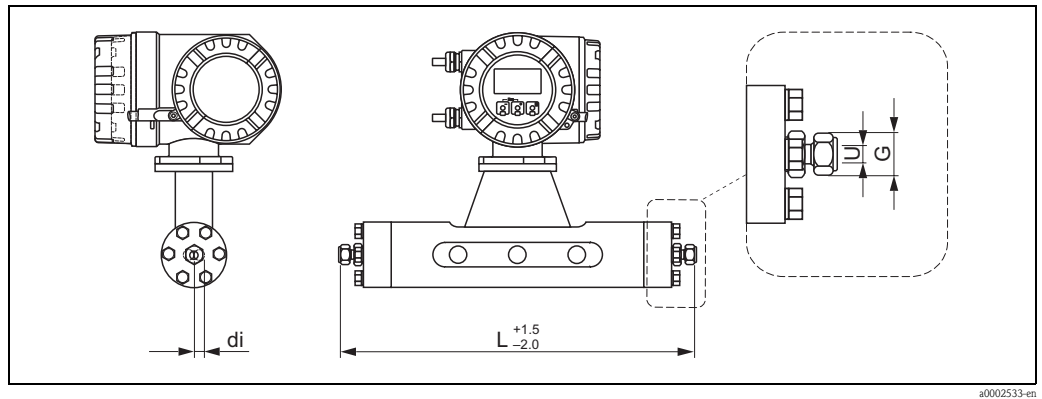
All dimensions in [mm]

G 3/8": 1.4404/316L

DN	G	L	U	di
8	AF 24	355.8	10.2	4.93
15	AF 24	385.8	10.2	7.75
25	AF 24	429.8	10.2	10.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)

All dimensions in [mm]

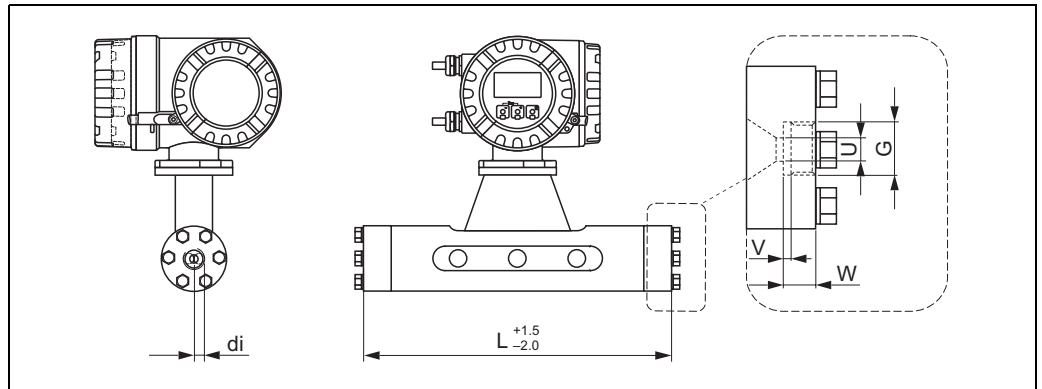
Promass M (high pressure): ½"-SWAGELOK

a0002533-en

½"-SWAGELOK: 1.4404/316L

DN	G	L	U	di
8	7/8"	366.4	10.2	4.93
15	7/8"	396.4	10.2	7.75
25	7/8"	440.4	10.2	10.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)
 All dimensions in [mm]

Promass M (high pressure): Connector with internal thread 7/8-14 UNF

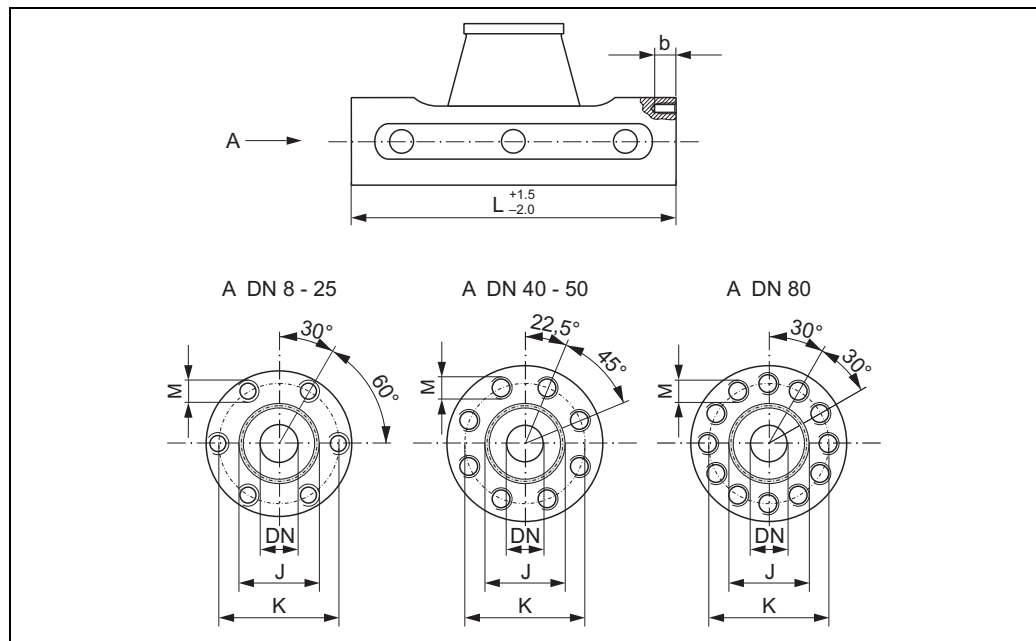
a0002534-en

Internal thread 7/8-14-UNF: 1.4404/316L

DN	G	L	U	V	W	di
8	7/8-14UNF	304	10.2	3	14	4.93
15	7/8-14UNF	334	10.2	3	14	7.75
25	7/8-14UNF	378	10.2	3	14	10.20

3A version also available ($R_a \leq 0.8 \mu\text{m}/150 \text{ grit.}$)
 All dimensions in [mm]

Promass M: Without process connections



a0002535

DN	L	J	K	M	b _{max.}	b _{min.}
8	256	27	54	6 × M 8	12	10
8 ¹⁾	256	27	54	6 × M 8	12	10
15	286	35	56	6 × M 8	12	10
15 ¹⁾	286	35	56	6 × M 8	12	10
25	310	40	62	6 × M 8	12	10
25 ¹⁾	310	40	62	6 × M 8	12	10
40	410	53	80	8 × M 10	15	13
50	544	73	94	8 × M 10	15	13
80	644	102	128	12 × M 12	18	15

¹⁾ High-pressure version; permitted screws: A4 - 80; lubricant: Molykote P37
All dimensions in [mm]

DN	Tightening torque Nm	Lubricated thread YES/NO	O-ring	
			Thickness	Inside Ø
8	30.0	NO	2.62	21.89
8 ¹⁾	19.3	YES	2.62	21.89
15	30.0	NO	2.62	29.82
15 ¹⁾	19.3	YES	2.62	29.82
25	30.0	NO	2.62	34.60
25 ¹⁾	19.3	YES	2.62	34.60
40	60.0	NO	2.62	47.30
50	60.0	YES	2.62	67.95
80	100.0	YES	3.53	94.84

¹⁾ High-pressure version; permitted screws: A4 - 80; lubricant: Molykote P37
All dimensions in [mm]

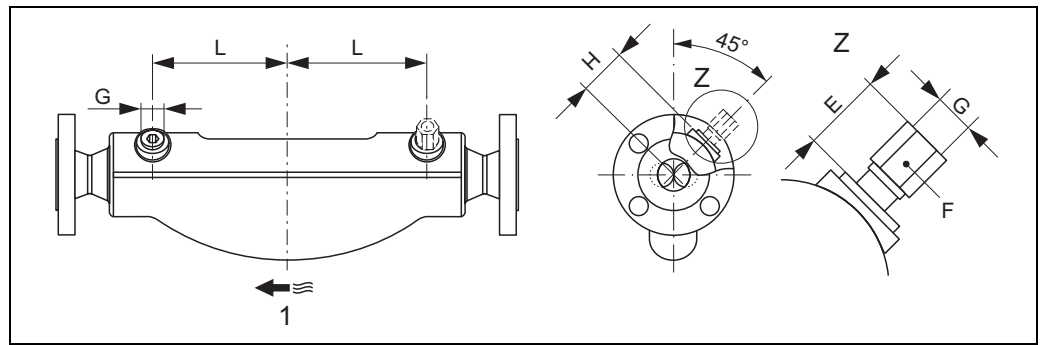


Purge connections / secondary containment monitoring

Caution!

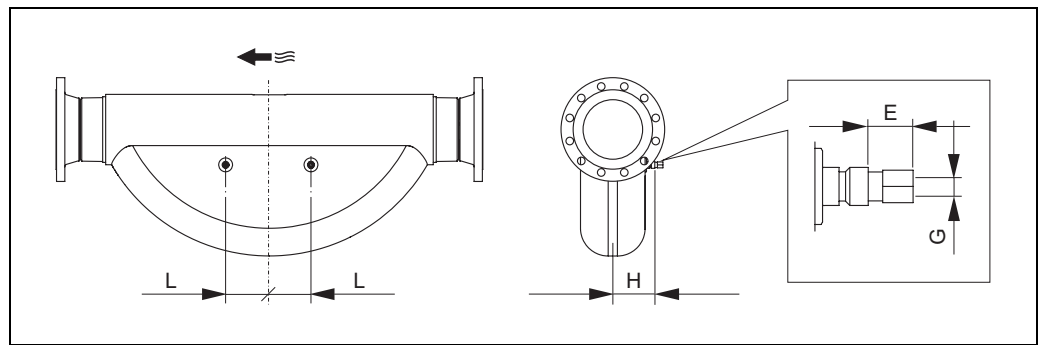
- The secondary containment is filled with dry nitrogen (N_2). Do not open the purge connections unless the containment can be filled immediately with a dry inert gas. Use only low gauge pressure to purge.
Maximum pressure: 5 bar.
- Purge connections or secondary containment monitoring can not be combined with separately available heating jacket.

Promass F: (not available for the Promass F high-temperature version)



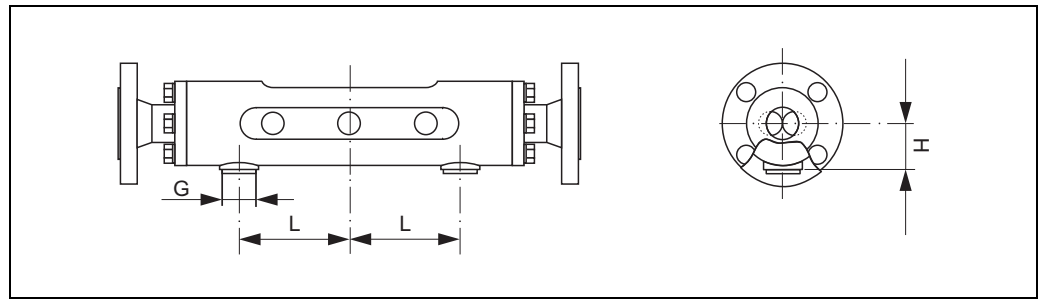
Promass F DN 8 to DN 150

1 = Flow direction



Promass F DN 250

DN	F	G	H	L
8	AF 1"	½"-NPT	62	108
15			62	110
25			62	130
40			67	155
50			79	226
80			101	280
100			120	342
150			141	440
All dimensions in [mm]				

Promass M:

DN	L	H	G
8	85	44.0	½"-NPT
15	100	46.5	
25	110	50.0	
40	155	59.0	
50	210	67.5	
80	210	81.5	
All dimensions in [mm]			

Rupture disk

Sensor housings with integrated rupture disks are optionally available.

**Warning!**

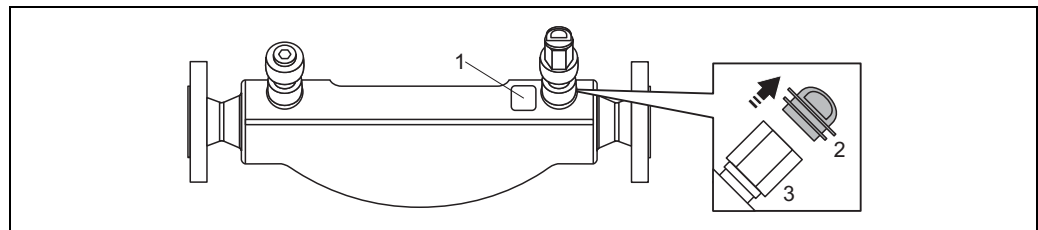
- Make sure that the function and operation of the rupture disk is not impeded through the installation. Triggering overpressure in the housing as stated on the indication label. Take adequate precautions to ensure that no damage occurs, and risk to human life is ruled out, if the rupture disk is triggered. Rupture disk: Burst pressure 10 to 15 bar.
- Please note that the housing can no longer assume a secondary containment function if a rupture disk is used.
- It is not permitted to open the connections or remove the rupture disk.

**Caution!**

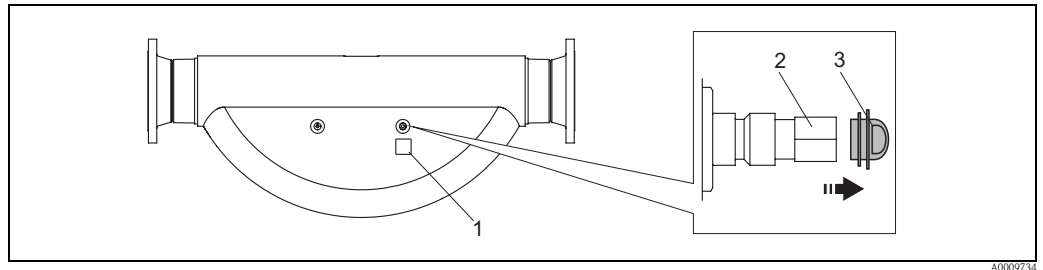
- Rupture disks can not be combined with separately available heating jacket.
- The existing connection nozzles are not designed for a rinse or pressure monitoring function.

**Note!**

- Before commissioning, please remove the transport protection of the rupture disk.
- Please note the indication labels.

*Promass F DN 8 to DN 150*

1 = Indication label for the rupture disk, 2 = Transport protection, 3 = ½" NPT internal screw thread with 1" width across flats



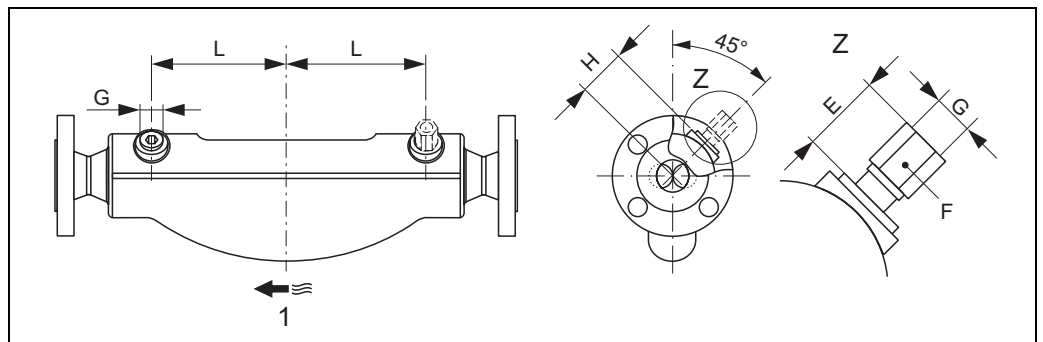
Promass F DN 250

1 = Indication label for the rupture disk, 2 = Transport protection, 3 = 1/2" NPT internal screw thread with 1" width across flats



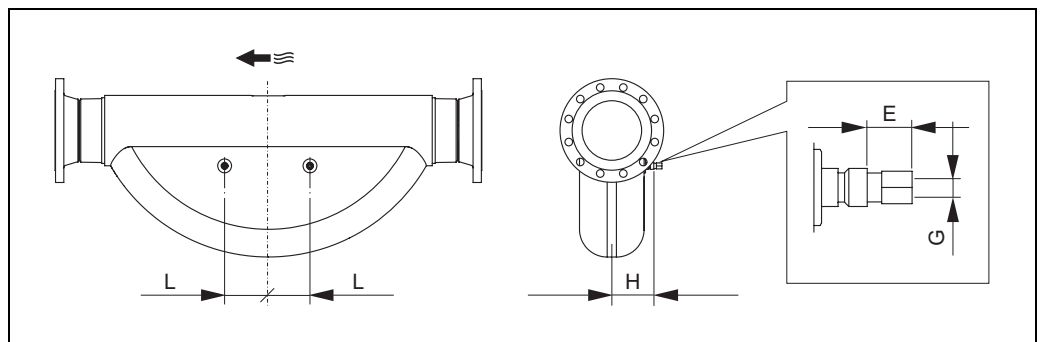
Indication label for the rupture disk

Promass F: (not available for the Promass F high-temperature version)



Promass F DN 8 to DN 150

1 = Flow direction



Promass F DN 250

DN	E	F	G	H	L
8	approx. 42	AF 1"	½"-NPT	62	108
15				62	110
25				62	130
40				67	155
50				79	226
80				101	280
100				120	342
150				141	440
All dimensions in [mm]					

Weight

- Compact version: see table below
- Remote version
 - Sensor: see table below
 - Wall-mount housing: 5 kg

Promass F / DN	8	15	25	40	50	80	100	150	250 ¹⁾
Compact version	11	12	14	19	30	55	96	154	400
High-temperature compact version	–	–	14.7	–	30.7	55.7	–	–	–
Compact version Ex d	20	21	23	28	39	64	105	163	409
Remote version	9	10	12	17	28	53	94	152	398
High-temperature remote version	–	–	13.5	–	29.5	54.5	–	–	–
¹⁾ With 10" according to ASME B16.5 Cl 300 flanges									

Promass M / DN	8	15	25	40	50	80
Compact version	11	12	15	24	41	67
Remote version	9	10	13	22	39	65

Weight information in [kg].

All values (weight) refer to devices with EN/DIN PN 40 flanges.

Material**Transmitter housing**

- Compact housing: stainless steel 1.4301/304
- Compact housing: powder coated die-cast aluminum
- Compact housing Ex d: stainless steel CF3M
- Wall-mount housing: powder coated die-cast aluminum
- Remote field housing: powder-coated die-cast aluminum

Sensor housing / containment*Promass F:*

Acid and alkali-resistant outer surface
Stainless steel 1.4301/1.4307/304L

Promass M:

Acid and alkali-resistant outer surface
DN 8 to 50: steel, chemically nickel-plated
DN 80: stainless steel

Connection housing, sensor (remote version)

- Stainless steel 1.4301/304 (standard)
- Powder coated die-cast aluminum (high-temperature version and version for heating)

Process connections*Promass F:*

- Flanges according to EN 1092-1 (DIN 2501) / according to ASME B16.5 / JIS B2220
→ Stainless Steel 1.4404/316L
- Flanges according to EN 1092-1 (DIN 2501) /according to ASME B16.5 / JIS B2220
→ Alloy C-22 2.4602/N 06022
- DIN 11864-2 Form A (flat flange with groove) → Stainless Steel 1.4404/316L
- Threaded hygienic connection DIN 11851 / threaded hygienic connection SMS 1145
→ Stainless Steel 1.4404/316L
- Threaded hygienic connection ISO 2853 / threaded hygienic connection DIN 11864-1
→ Stainless Steel 1.4404/316L
- Tri-Clamp (OD-Tubes)→ Stainless Steel 1.4404/316L
- VCO connection → Stainless Steel 1.4404/316L

Promass F (high-temperature version):

- Flanges according to EN 1092-1 (DIN 2501) /according to ASME B16.5 / JIS B2220
→ Stainless Steel 1.4404/316L
- Flanges according to EN 1092-1 (DIN 2501) /according to ASME B16.5 / JIS B2220
→ Alloy C-22 2.4602 (N 06022)

Promass M:

- Flanges according to EN 1092-1 (DIN 2501) /according to ASME B16.5 / JIS B2220
→ Stainless Steel 1.4404/316L, titanium Grade 2
- Flange according to DIN 11864-2 Form A (flat flange with groove) → Stainless Steel 1.4404/316L
- PVDF coupling to DIN /according to ASME B16.5 / JIS
- Threaded hygienic connection DIN 11851 / threaded hygienic connection SMS 1145
→ Stainless Steel 1.4404/316L
- Threaded hygienic connection ISO 2853 / threaded hygienic connection DIN 11864-1
→ Stainless Steel 1.4404/316L
- Tri-Clamp (OD-Tubes) → Stainless Steel 1.4404/316L

Promass M (high-pressure version):

- Connector → Stainless steel 1.4404/316L
- Coupling → Stainless steel 1.4401/316

Measuring tubes

Promass F:

- DN 8 to 100: stainless steel 1.4539 (904L)
- DN 150: stainless steel 1.4404/316L
- DN 250: stainless steel 1.4404/316L; manifold: CF3M
- DN 8 to 150: Alloy C-22 2.4602/N 06022

Promass F (high-temperature version):

- DN 25, 50, 80: Alloy C-22 2.4602/N 06022

Promass M:

- DN 8 to 50: Titanium grade 9
- DN 80: Titanium grade 2

Promass M (high-pressure version):

- Titanium Grade 9

Seals

Promass F:

Welded process connections without internal seals

Promass M:

Viton, EPDM, silicone, Kalrez 6375, FEP sheathing (not for gas applications)

Material load diagram

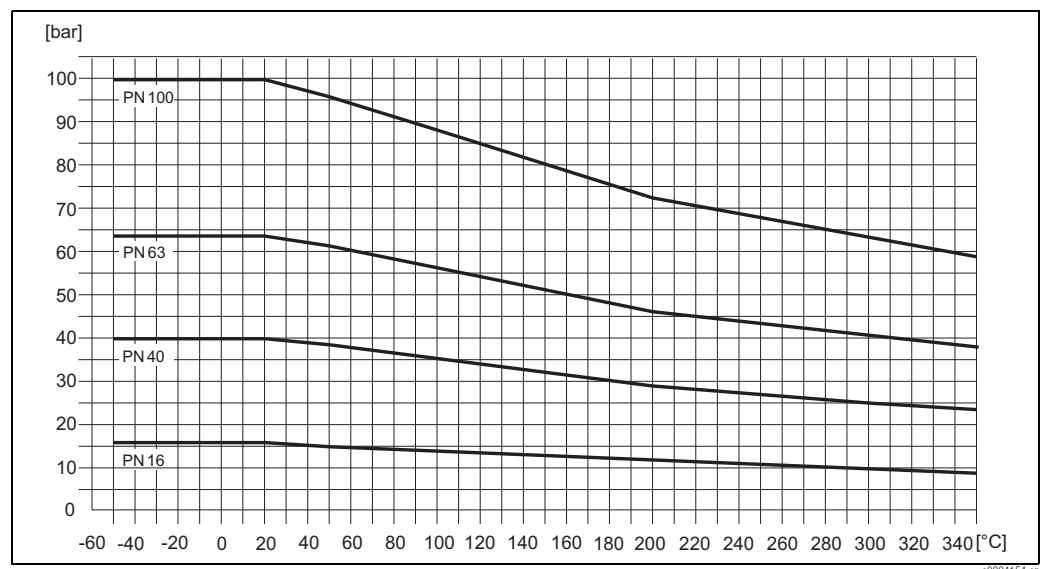


Warning!

The following material load curves refer to the entire sensor and not just the process connection.

Promass F with flange connection according to EN 1092-1 (DIN 2501)

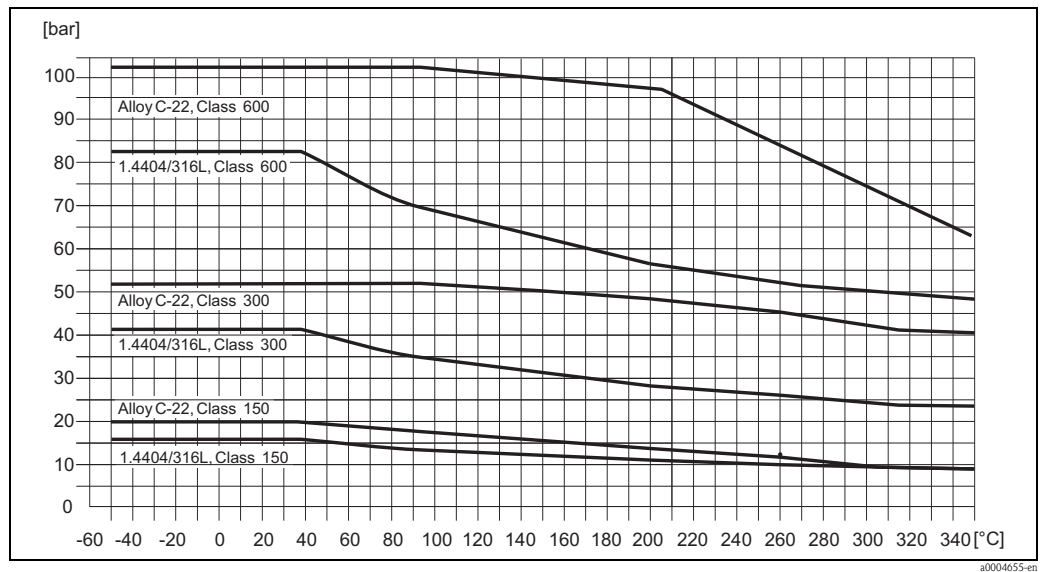
Flange material: 1.4404/316L, Alloy C-22



The values for the temperature range from 200 °C to 350 °C are exclusively valid for Promass F (HT) high-temperature version.

Promass F with flange connection according to ASME B16.5

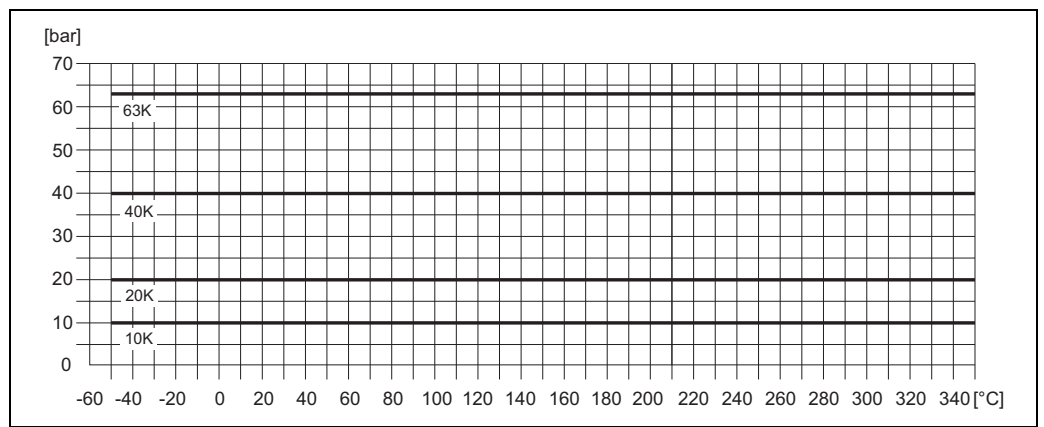
Flange material: 1.4404/316L, Alloy C-22



The values for the temperature range from 200 °C to 350 °C are exclusively valid for Promass F (HT) high-temperature version.

Promass F with flange connection to JIS B2220

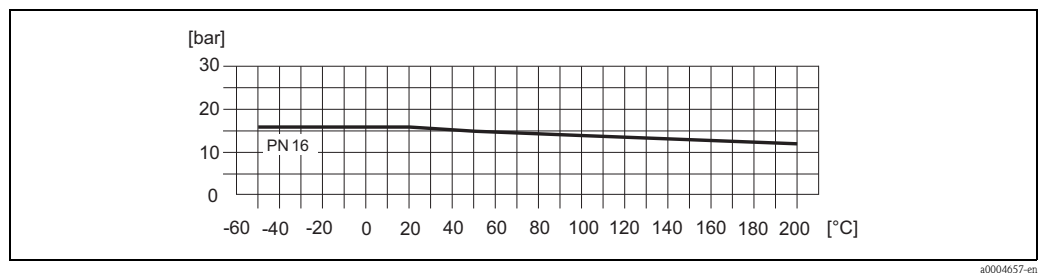
Flange material: 1.4404/316L, Alloy C-22



The values for the temperature range from 200 °C to 350 °C are exclusively valid for Promass F (HT) high-temperature version.

Promass F with threaded hygienic connection to DIN 11851 / SMS 1145

Connection material: 1.4404/316L

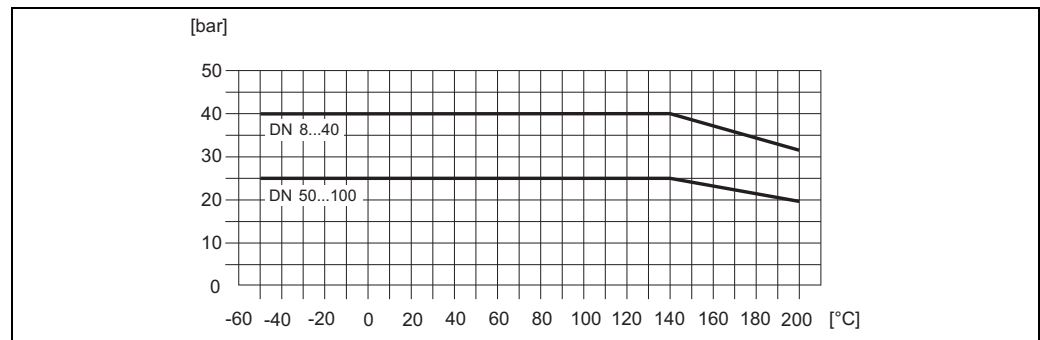


Promass F with Tri-Clamp process connection

The Clamp connections (e.g. Tri-Clamp ISO2852, DIN32676) are suited up to a maximum pressure of 16 bar. As these operating limits also depend on the clamp and the seal used, their specifications have to be observed. The clamp and the seal are not included in the scope of supply.

Promass F with threaded hygienic connection to DIN 11864-1

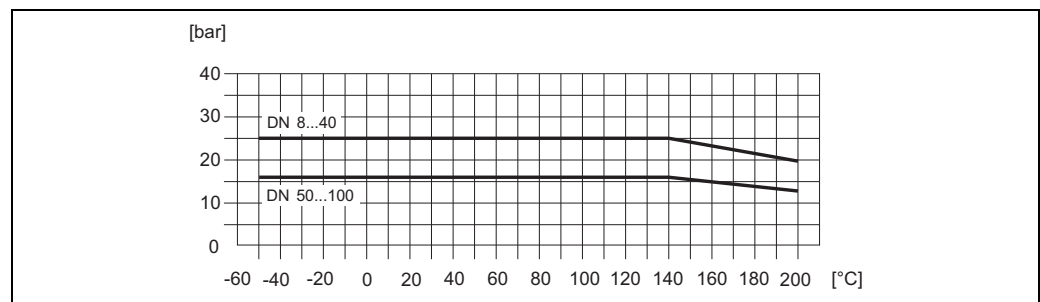
Connection material: 1.4404/316L



a0004658-en

Promass F with flange connection to DIN 11864-2 Form A (flat flange with groove)

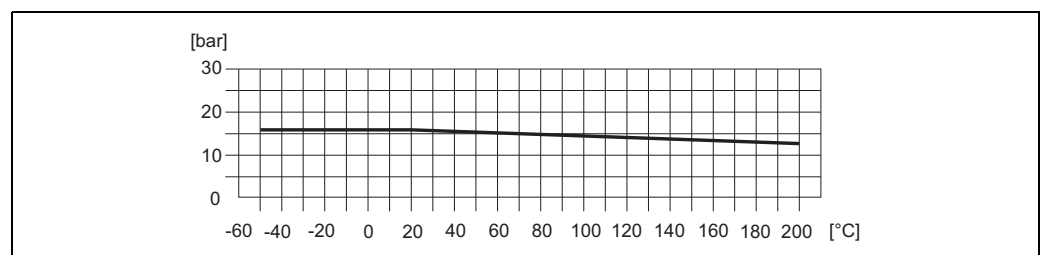
Flange material: 1.4404/316L



a0004659-en

Promass F with threaded hygienic connection to ISO 2853

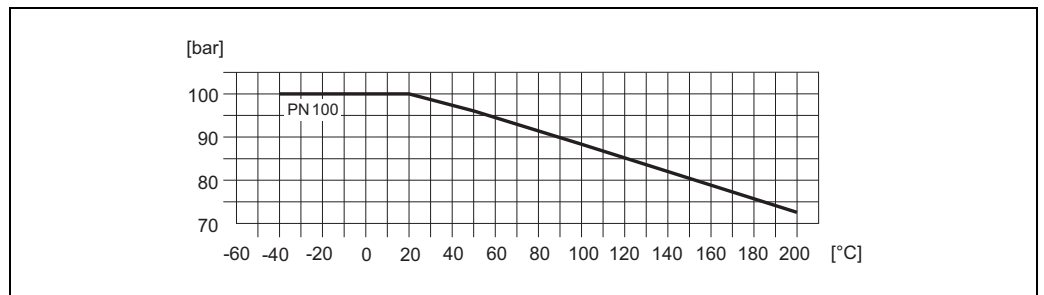
Connection material: 1.4404/316L



a0004660-en

Promass F with VCO process connection

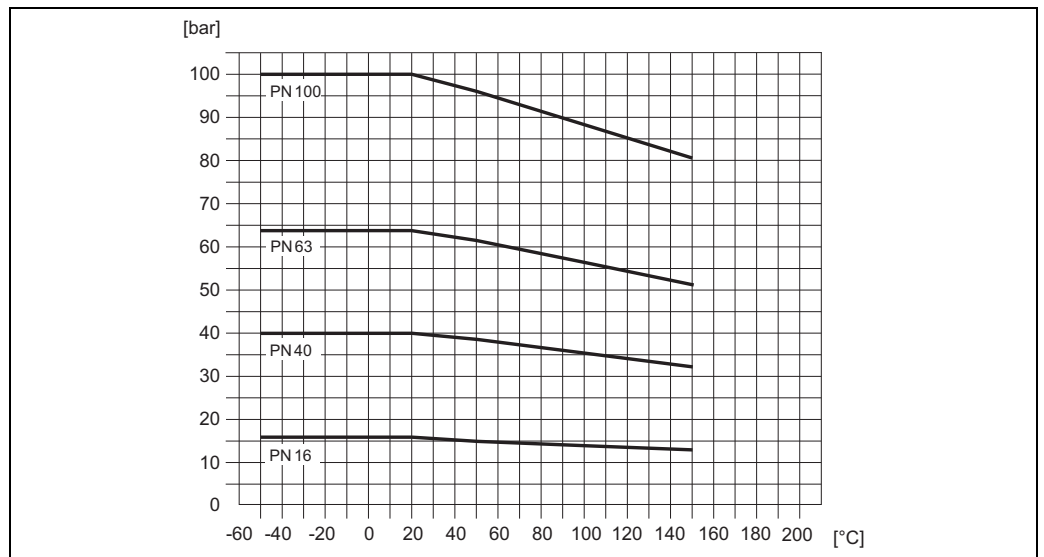
Connection material: 1.4404/316L



a0004553-en

Promass M with flange connection according to EN 1092-1 (DIN 2501)

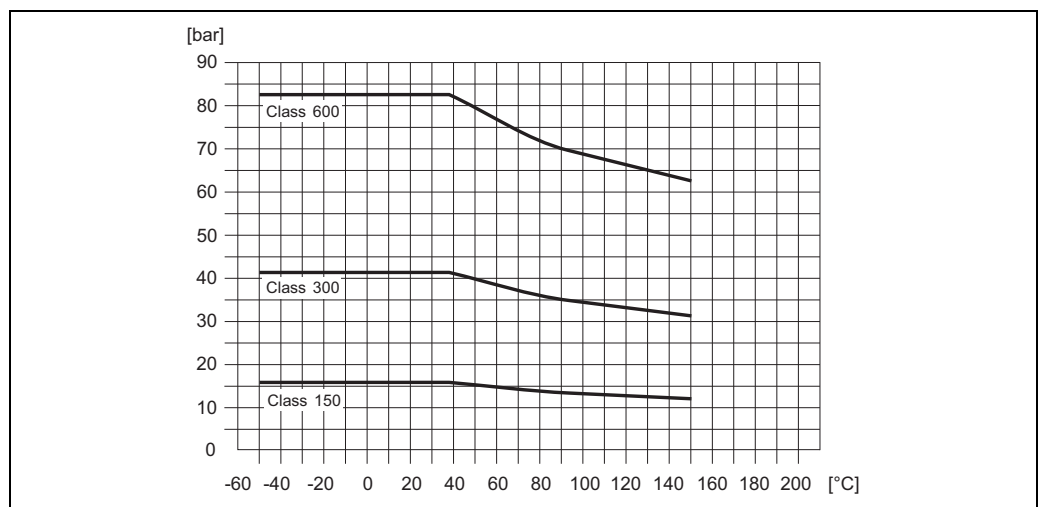
Flange material: 1.4404/316L, titanium grade 2



a0003293-en

Promass M with flange connection according to ASME B16.5

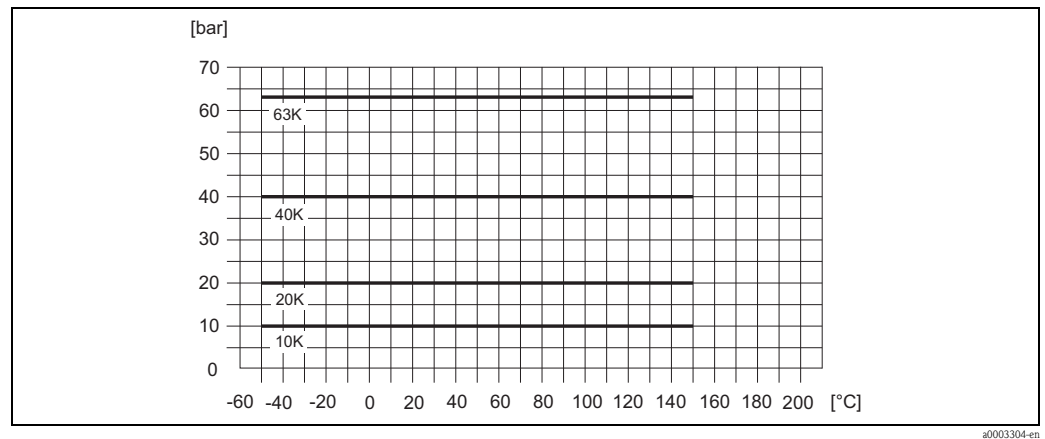
Flange material: 1.4404/316L, titanium grade 2



a0003297-en

Promass M with flange connection to JIS B2220

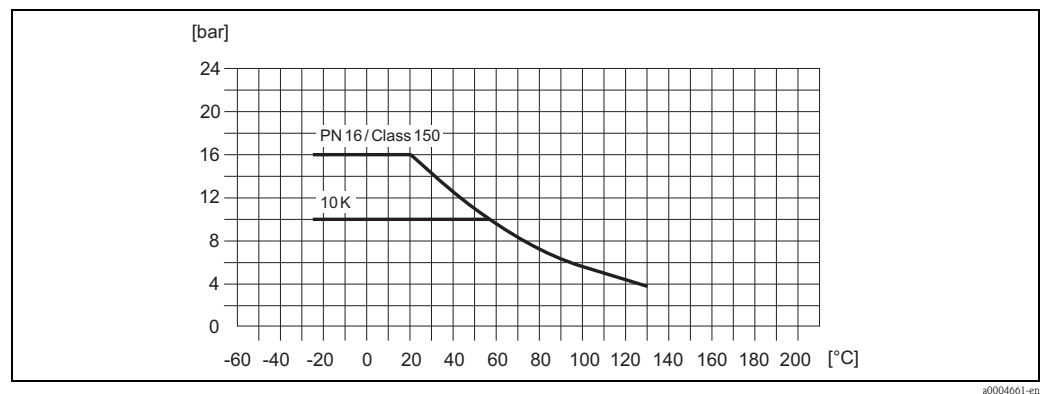
Flange material: 1.4404/316L, titanium grade 2



a0003304-en

Promass M with PVDF flange connection (to DIN 2501, according to ASME B16.5, JIS B2220)

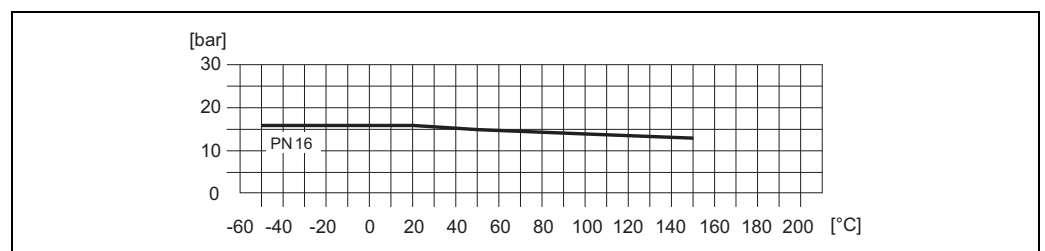
Flange material: PVDF



a0004661-en

Promass M with threaded hygienic connection to DIN 11851 / SMS 1145

Connection material: 1.4404/316L

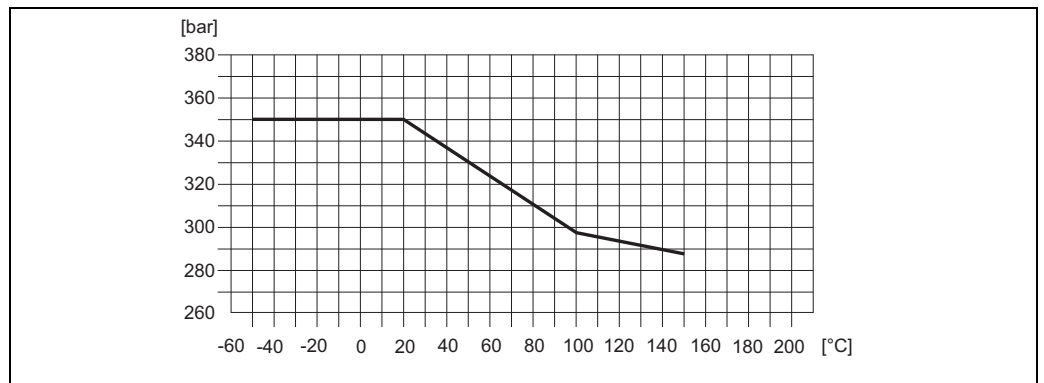


a0003305-en

Promass M with process connections for high-pressure version

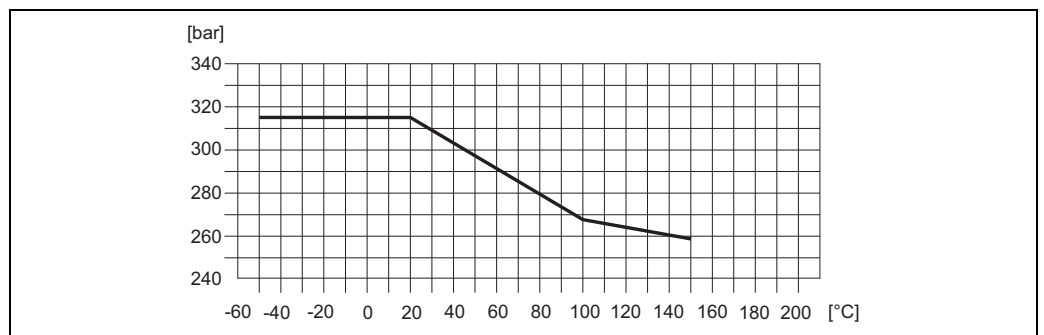
Connector material: 1.4404/316L

Material of thread connections (G 3/8", VCO with 1/2" SWAGELOK, NPT 3/8"): 1.4401/316



a0004662-en

Material of thread connections (NPT 1/2"): 1.4401/316



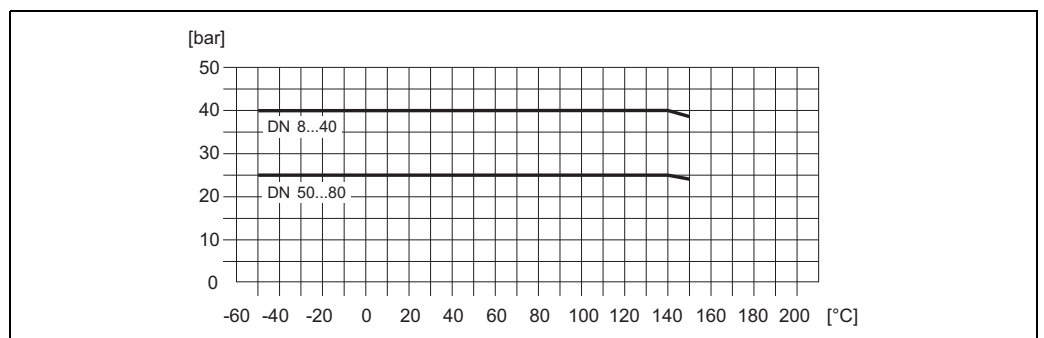
a0004663-en

Promass M with Tri-Clamp process connection

The Clamp connections (e.g. Tri-Clamp ISO2852, DIN32676) are suited up to a maximum pressure of 16 bar. As these operating limits also depend on the clamp and the seal used, their specifications have to be observed. The clamp and the seal are not included in the scope of supply.

Promass M with threaded hygienic connection to DIN 11864-1

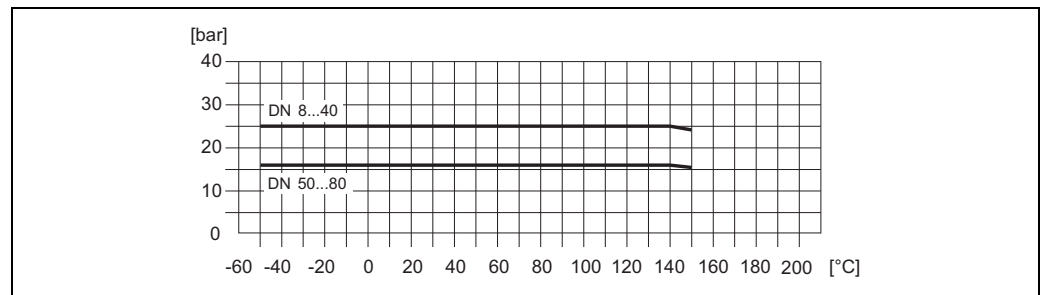
Connection material: 1.4404/316L



a0004664-en

Promass M with flange connection to DIN 11864-2 Form A (flat flange with groove)

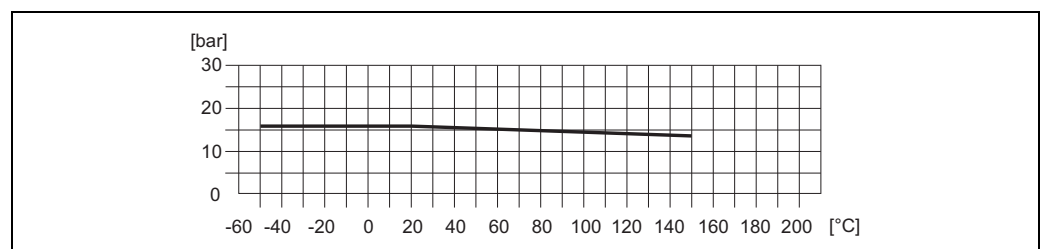
Flange material: 1.4404/316L



a0004665-en

Promass M with threaded hygienic connection to ISO 2853

Connection material: 1.4404/316L



a0003308-en

Process connections

Promass F (welded process connections):

- Flanges according to EN 1092-1 (DIN 2501), according to ASME B16.5, JIS B2220, VCO connections
- Sanitary connections: Tri-Clamp, threaded hygienic connections (DIN 11851, SMS 1145, ISO 2853, DIN 11864-1), flange to DIN 11864-2 Form A (flat flange with groove)

Promass M (threaded process connections):

- Flanges according to EN 1092-1 (DIN 2501), according to ASME B16.5, JIS B2220
- Sanitary connections: Tri-Clamp, threaded hygienic connections (DIN 11851, SMS 1145, ISO 2853, DIN 11864-1), flange to DIN 11864-2 Form A (flat flange with groove)

Promass M (high-pressure version):

- Thread connections: 3/8", 1/2" NPT, 3/8" NPT and 1/2" SWAGELOK couplings; connector with 7/8-14UNF internal thread

Human interface

Display elements

- Liquid-crystal display: backlit, two lines (Promass 80) or four lines (Promass 83) with 16 characters per line
- Selectable display of different measured values and status variables
- At ambient temperatures below -20 °C the readability of the display may be impaired.

Unified control concept for both types of transmitter

Promass 80

- Local operation with three keys (–, +, E)
- Quick Setup menus for straightforward commissioning

Promass 83

- Local operation with three optical keys ($\square/\square/\square$)
- Application-specific Quick Setup menus for straightforward commissioning

Language group



Note!

The language group is changed using the "FieldCare" operating program.

Language groups available for operation in different countries:

- Western Europe and America (WEA):
English, German, Spanish, Italian, French, Dutch and Portuguese
- Eastern Europe/Scandinavia (EES):
English, Russian, Polish, Norwegian, Finnish, Swedish and Czech
- South and Eastern Asia (SEA):
English, Japanese, Indonesian

Only Promass 83

- China (CN):
English, Chinese

Remote operation

Promass 80

Remote operation via HART, PROFIBUS PA

Promass 83

Remote operation via HART, PROFIBUS DP/PA, FOUNDATION Fieldbus

Certificates and approvals

CE mark	The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.
C-Tick symbol	The measuring system complies with the EMC requirements of the "Australian Communications and Media Authority (ACMA)"
Ex approval	Information about currently available Ex versions (ATEX, FM, CSA, IECEx, NEPSI) can be supplied by your Endress+Hauser Sales Center on request. All explosion protection data are contained in separate explosion protection documentation which you can order if required.
Sanitary compatibility	■ 3A approval ■ EHEDG-tested
FOUNDATION Fieldbus certification	The flowmeter has passed all the test procedures implemented and has been certified and registered by the Fieldbus Foundation. The flowmeter thus meets all the requirements of the specifications listed below: ■ Certified to FOUNDATION Fieldbus specification ■ The flowmeter meets all the specifications of the FOUNDATION Fieldbus-H1. ■ Interoperability Test Kit (ITK), revision status 5.0: The device can also be operated in conjunction with other-make certified devices ■ Physical Layer Conformance Test of the Fieldbus Foundation
PROFIBUS DP/PA certification	The flow device has successfully passed all the test procedures carried out and is certified and registered by the PNO (PROFIBUS User Organization). The device thus meets all the requirements of the following specifications: ■ Certified to PROFIBUS Profile Version 3.0 (device certification number: on request) ■ The device can also be operated with certified devices of other manufacturers (interoperability)
MODBUS certification	The measuring device meets all the requirements of the MODBUS/TCP conformity and integration test and has the "MODBUS/TCP Conformance Test Policy, Version 2.0". The measuring device has successfully passed all the test procedures carried out and is certified by the "MODBUS/TCP Conformance Test Laboratory" of the University of Michigan.
Other standards and guidelines	■ EN 60529 Degrees of protection by housing (IP code) ■ EN 61010 Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures. ■ IEC/EN 61326 "Emission in accordance with Class A requirements". Electromagnetic compatibility (EMC requirements). ■ NAMUR NE 21 Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment. ■ NAMUR NE 43 Standardization of the signal level for the breakdown information of digital transmitters with analog output signal. ■ NAMUR NE 53 Software of field devices and signal-processing devices with digital electronics
Pressure measuring device approval	Flowmeters with a nominal diameter smaller or equal DN 25 are covered by Art. 3(3) of the European directive 97/23/EC (Pressure Equipment Directive) and are designed according to sound engineering practice. For larger nominal diameters, optional approvals according to Cat. II/III are available if required (depends on fluid and process pressure). Optionally flowmeters in accordance to the guidelines AD 2000 are available on request.

Functional safety

SIL -2:
 accordance IEC 61508/IEC 61511-1 (FDIS)
 "4-20 mA" - output according to the following order code:

Promass 80

Promass80***_*****A
 Promass80***_*****D
 Promass80***_*****S
 Promass80***_*****T
 Promass80***_*****8

Promass 83

Promass83***_*****A	Promass83***_*****M	Promass83***_*****Ø
Promass83***_*****B	Promass83***_*****R	Promass83***_*****2
Promass83***_*****C	Promass83***_*****S	Promass83***_*****3
Promass83***_*****D	Promass83***_*****T	Promass83***_*****4
Promass83***_*****E	Promass83***_*****U	Promass83***_*****5
Promass83***_*****L	Promass83***_*****W	Promass83***_*****6

Ordering information

The Endress+Hauser service organization can provide detailed ordering information and information on the order codes on request.

Accessories

Various accessories, which can be ordered separately from Endress+Hauser, are available for the transmitter and the sensor.

Documentation

- Flow measuring technology (FA005D/06/en)
- Technical Information Promass 80E, 83E (TI061D/06/en)
- Technical Information Promass 80A, 83A (TI054D/06/en)
- Technical Information Promass 80H, 83H (TI074D/06/en)
- Technical Information Promass 80I, 83I (TI075D/06/en)
- Technical Information Promass 80P, 83P (TI078D/06/en)
- Technical Information Promass 80S, 83S (TI076D/06/en)
- Operating Instructions Promass 80 (BA057D/06/en)
- Operating Instructions Promass 80 PROFIBUS PA (BA072D/06/en)
- Operating Instructions Promass 83 (BA059D/06/en)
- Operating Instructions Promass 83 FOUNDATION Fieldbus (BA065D/06/en)
- Operating Instructions Promass 83 PROFIBUS DP/PA (BA063D/06/en)
- Operating Instructions Promass 83 MODBUS (BA107D/06/en)
- Description of Device Functions Promass 80 (BA 058D/06/en)
- Description of Device Functions Promass 80 PROFIBUS PA (BA073D/06/en)
- Description of Device Functions Promass 83 (BA 060D/06/en)
- Description of Device Functions Promass 83 FOUNDATION Fieldbus (BA066D/06/en)
- Description of Device Functions Promass 83 PROFIBUS DP/PA (BA064D/06/en)
- Description of Device Functions Promass 83 MODBUS (BA108D/06/en)
- Supplementary documentation on Ex-ratings: ATEX, FM, CSA, IECEx, NEPSI
- Functional Safety Manual for Promass 80, 83 (SD077D/06/en)

Registered trademarks

KALREZ® and VITON®

Registered trademarks of E.I. Du Pont de Nemours & Co., Wilmington, USA

TRI-CLAMP®

Registered trademark of Ladish & Co., Inc., Kenosha, USA

SWAGELOK®

Registered trademark of Swagelok & Co., Solon, USA

HART®

Registered trademark of HART Communication Foundation, Austin, USA

PROFIBUS®

Registered trademark of the PROFIBUS User Organization, Karlsruhe, Germany

FOUNDATION™ Fieldbus

Registered trademark of the Fieldbus FOUNDATION, Austin, USA

MODBUS®

Registered trademark of the MODBUS Organization

HistoROM™, S-DAT®, T-DAT™, F-CHIP®, Fieldcheck®, FieldCare®, Applicator®

Registered or registration-pending trademarks of Endress+Hauser Flowtec AG, Reinach, CH



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People for Process Automation