

Technical Information

Proline Promass 40E

Coriolis flowmeter



The flowmeter for minimized cost of ownership combined with a compact field transmitter

Application

- Measuring principle operates independently of physical fluid properties such as viscosity or density
- Highly accurate measurement of liquids and gases for a wide range of standard applications

Device properties

- Compact dual-tube system
- Medium temperature up to +140 °C (+284 °F)
- Process pressure: up to 100 bar (1450 psi)
- 2-line backlit display without local operation
- Device in compact version
- HART

Your benefits

- Cost-effective – multi-purpose device; an alternative to conventional volumetric flowmeters
- Fewer process measuring points – multivariable measurement (flow, temperature)
- Space-saving installation – no in/outlet run needs
- Cost-effective – dedicated design for low-end applications and direct integration
- Safe operation – display provides easy readable process information
- Fully industry compliant – IEC/EN/NAMUR

Table of contents

Function and system design	3	Rupture disk	16
Measuring principle	3	Limiting flow	17
Measuring system	3	Pressure loss	17
Input	4	System pressure	17
Measured variable	4	Thermal insulation	17
Measuring range	4	Heating	17
Operable flow range	5	Mechanical construction	18
Input signal	5	Design, dimensions	18
Output	5	Weight	33
Output signal	5	Materials	33
Signal on alarm	5	Process connections	33
Load	5	Surface roughness	33
Low flow cutoff	5	Operability	34
Galvanic isolation	5	Local display	34
Switching output	5	Languages	34
Power supply	6	Remote operation	34
Terminal assignment	6	Certificates and approvals	34
Supply voltage	6	CE mark	34
Power consumption	6	C-Tick symbol	34
Power supply failure	6	Ex approval	34
Electrical connection	6	Hygienic compatibility	34
Potential equalization	6	Pressure Equipment Directive	34
Cable entries	6	Other standards and guidelines	34
Performance characteristics	7	Ordering Information	35
Reference operating conditions	7	Accessories	35
Maximum measured error	7	Device-specific accessories	35
Repeatability	8	Communication-specific accessories	35
Response time	8	Service-specific accessories	36
Influence of fluid temperature	8	System components	36
Influence of fluid pressure	9	Documentation	36
Design fundamentals	9	Registered trademarks	37
Installation	10		
Mounting location	10		
Orientation	11		
Installation instructions	12		
Inlet and outlet runs	12		
Special installation instructions	12		
Environment	12		
Ambient temperature range	12		
Storage temperature	12		
Degree of protection	12		
Shock resistance	12		
Vibration resistance	12		
Electromagnetic compatibility (EMC)	13		
Process	13		
Fluid temperature range	13		
Medium density	13		
Secondary containment pressure rating	13		
Pressure-temperature ratings	13		

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

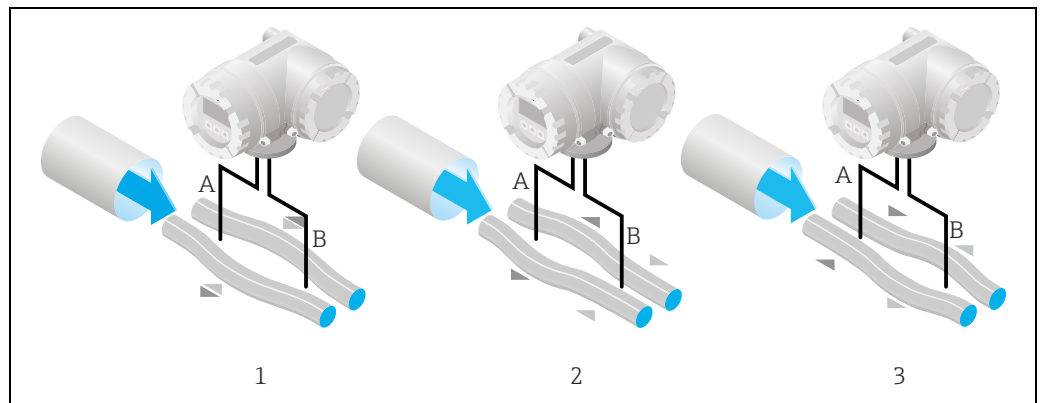
ω = rotational velocity

v = velocity of the moving mass in a 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 sensor, 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).



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.

Volume 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 density value obtained in this way can be used in conjunction with the measured mass flow to calculate the volume flow.

The temperature of the measuring tubes is also determined in order to calculate the compensation factor due to temperature effects.

Measuring system

The measuring system consists of a transmitter and a sensor (compact version):

- Promass 40 transmitter
- Promass E sensor (DN 8 to 80; 3/8" to 3")

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)
- Volume flow (calculated from mass flow and fluid density. The density is proportional to the resonance frequency of the measuring tubes).
- Measuring tube temperature (by temperature sensors) for calculatory compensation of temperature effects.

Measuring range

Measuring ranges for liquids

DN		Range for full scale values (liquids) $\dot{m}_{\min(F)}$ to $\dot{m}_{\max(F)}$	
[mm]	[in]	[kg/h]	[lb/min]
8	$\frac{3}{8}$	0 to 2000	0 to 73.50
15	$\frac{1}{2}$	0 to 6500	0 to 238.9
25	1	0 to 18000	0 to 661.5
40	1 $\frac{1}{2}$	0 to 45000	0 to 1654
50	2	0 to 70000	0 to 2573
80	3	0 to 180000	0 to 6615

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:

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

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

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

$$\rho_{(G)} = \text{Gas density in [kg/m}^3\text{] at operating conditions}$$

DN		x
[mm]	[in]	
8	$\frac{3}{8}$	85
15	$\frac{1}{2}$	110
25	1	125
40	1 $\frac{1}{2}$	125
50	2	125
80	3	155

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


Calculation example for gas:

- Sensor type: Promass E, 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 = 125 (for Promass E DN 50)

Max. possible full scale value:

$$\dot{m}_{\max(G)} = \dot{m}_{\max(F)} \cdot \rho_{(G)} \div x \text{ [kg/m}^3\text{]} = 70000 \text{ kg/h} \cdot 60.3 \text{ kg/m}^3 \div 125 \text{ kg/m}^3 = 33800 \text{ kg/h}$$

Recommended full scale values

See information in the "Limiting flow" section →  17

Operable flow range 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, $R_i = 5 \text{ k}\Omega$, galvanically isolated.
 Configurable for: totalizer reset, positive zero return, error message reset, zero point adjustment start, batching start/stop (optional).

Output

Output signal **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.r./°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:
 Passive, open collector, 30 V DC, 250 mA, galvanically isolated.

- Frequency output: full scale frequency 2 to 1000 Hz ($f_{\text{max}} = 1250 \text{ Hz}$), on/off ratio 1:1, pulse width max. 10 s
- Pulse output: pulse value and pulse polarity selectable, pulse width configurable (0.5 to 2000 ms)

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
 Nonconductive 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**

- Open collector
- max. 30 V DC, 250 mA
- galvanically isolated
- Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values

Power supply

Terminal assignment

Order characteristic for "inputs/outputs"	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
A	-	-	Frequency output	Current output, HART
D	Status input	Status output	Frequency output	Current output, HART
S	-	-	Frequency output Ex i, passive	Current output Ex i active, HART
T	-	-	Frequency output Ex i, passive	Current output Ex i passive, HART

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

Power consumption

AC: <15 VA (including sensor)
 DC: <15 W (including sensor)

Switch-on current:

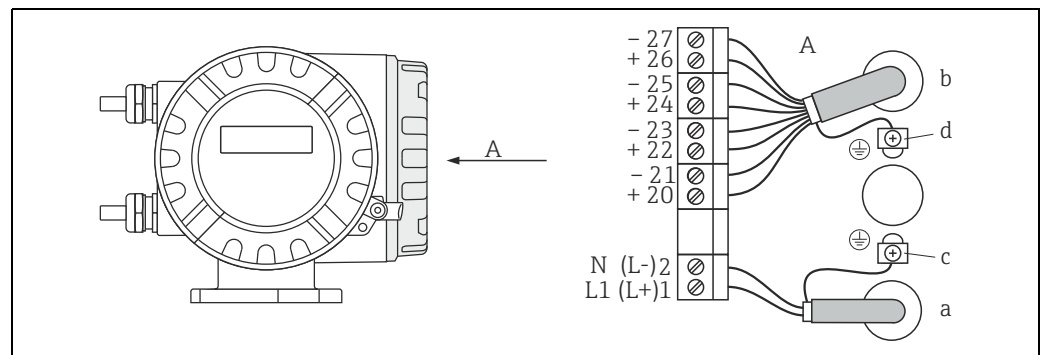
- Max. 13.5 A (< 50 ms) at 24 V DC
- Max. 3 A (< 5 ms) at 260 V AC

Power supply failure

Lasting min. 1 power cycle:

- 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.)

Electrical connection



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

- a 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
- b Signal cable: see Terminal assignment → 6
- c Ground terminal for protective conductor
- d Ground terminal for signal cable shield

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.

Cable entries

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

- Cable entry M20 × 1.5 (8 to 12 mm / 0.31" to 0.47")
- Thread for cable entries, ½" NPT, G ½"

Performance characteristics

Reference operating conditions

- Error limits following ISO 11631
- Water with 15 to 45 °C (59 to 113 °F); 2 to 6 bar (29 to 87 psi)
- Data according to calibration protocol
- Accuracy based on accredited calibration rigs that are traced to ISO 17025

To obtain measured errors, use the Applicator sizing tool *Applicator*: →  36.

Maximum measured error

Design fundamentals →  9

o.r. = of reading; $1 \text{ g/cm}^3 = 1 \text{ kg/l}$; T = fluid temperature

Base accuracy

Mass flow and volume flow (liquids)

±0.50% o.r.

Mass flow (gases)

±1.00% o.r.

Temperature

$\pm 0.5 \text{ °C} \pm 0.005 \cdot T \text{ °C}$ ($\pm 1 \text{ °F} \pm 0.003 \cdot (T - 32) \text{ °F}$)

Zero point stability

DN		Zero point stability	
[mm]	[in]	[kg/h]	[lb/min]
8	$\frac{3}{8}$	0.20	0.0074
15	$\frac{1}{2}$	0.65	0.0239
25	1	1.80	0.0662
40	$1\frac{1}{2}$	4.50	0.1654
50	2	7.00	0.2573
80	3	18.00	0.6615

Flow values

Flow values as turndown parameter depending on nominal diameter.

SI units

DN	1:1	1:10	1:20	1:50	1:100	1:500
[mm]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]
8	2000	200.0	100.0	40.00	20.00	4.000
15	6500	650.0	625.0	130.0	65.00	13.00
25	18000	1800	900.0	360.0	180.0	36.00
40	45000	4500	2250	900.0	450.0	90.00
50	70000	7000	3500	1400	700.0	140.0
80	180000	18000	9000	3600	1800	360.0

US units

DN [in]	1:1 [lb/min]	1:10 [lb/min]	1:20 [lb/min]	1:50 [lb/min]	1:100 [lb/min]	1:500 [lb/min]
3/8	73.50	7.350	3.675	1.470	0.735	0.147
1/2	238.9	23.89	11.95	4.778	2.389	0.478
1	661.5	66.15	33.08	13.23	6.615	1.323
1 1/2	1654	165.4	82.70	33.08	16.54	3.308
2	2573	257.3	128.7	51.46	25.73	5.146
3	6615	661.5	330.8	132.3	66.15	13.23

Accuracy of outputs

o.r. = of reading; o.f.s. = of full scale value

The output accuracy must be factored into the measured error if analog outputs are used, but can be ignored for fieldbus outputs (e.g. Modbus RS485, EtherNet/IP).

Current output

Accuracy: Max. $\pm 0.05\%$ o.f.s. or $\pm 5 \mu\text{A}$

Pulse/frequency output

Accuracy: Max. $\pm 50\%$ ppm o.r.

Repeatability

Design fundamentals →  9

o.r. = of reading; $1 \text{ g/cm}^3 = 1 \text{ kg/l}$; T = fluid temperature

Base repeatability

Mass flow and volume flow (liquids)

$\pm 0.25\%$ o.r.

Mass flow (gases)

$\pm 0.50\%$ o.r.

Temperature

$\pm 0.25 \text{ }^\circ\text{C} \pm 0.0025 \cdot T \text{ }^\circ\text{C}$ ($\pm 0.45 \text{ }^\circ\text{F} \pm 0.0015 \cdot (T-32) \text{ }^\circ\text{F}$)

Response time

- The response time depends on the configuration (damping).
- Response time in the event of erratic changes in the measured variable (only mass flow): after 100 ms 95 % of the full scale value.

Influence of fluid 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 $\pm 0.0003\%$ of the full scale value / $^\circ\text{C}$ ($\pm 0.0001\%$ of the full scale value / $^\circ\text{F}$).

Influence of fluid pressure

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

DN		Promass E
[mm]	[in]	[% o.r./bar]
8	3/8	no influence
15	1/2	no influence
25	1	no influence
40	1 1/2	no influence
50	2	-0.009
80	3	-0.020

Design fundamentals

o.r. = of reading

BaseAccu = base accuracy in % o.r.

BaseRepeat = base repeatability in % o.r.

MeasValue = measured value (in flow units consistent with the zero point stability value → 7)

ZeroPoint = zero point stability

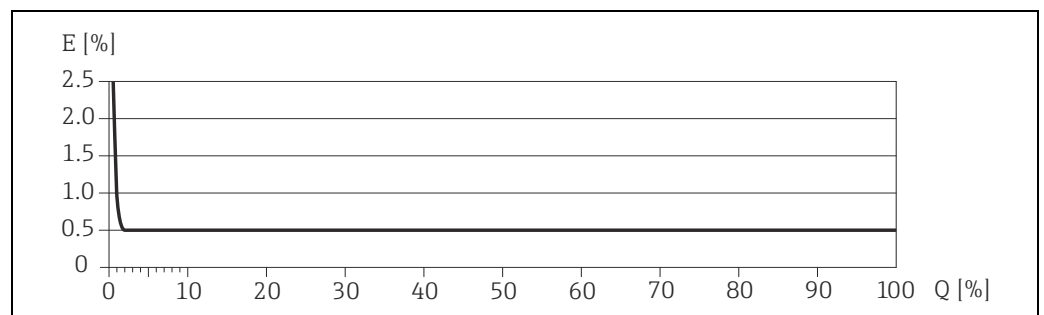
Calculation of the maximum measured error depending on flowrate

Flowrate (in flow units consistent with the zero point stability value → 7)	Maximum measured error in % o.r.
$\geq \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$ <small>A0021332</small>	$\pm \text{BaseAccu}$ <small>A0021339</small>
$< \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$ <small>A0021333</small>	$\pm \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100$ <small>A0021334</small>

Calculation of the repeatability depending on flowrate

Flowrate (in flow units consistent with the zero point stability value → 7)	Repeatability in % o.r.
$\geq \frac{1/2 \cdot \text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100$ <small>A0021335</small>	$\pm \text{BaseRepeat}$ <small>A0021340</small>
$< \frac{1/2 \cdot \text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100$ <small>A0021336</small>	$\pm 1/2 \cdot \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100$ <small>A0021337</small>

Example for maximum measured error



E = Error: Maximum measured error as % o.r.

Q = Flow rate as %

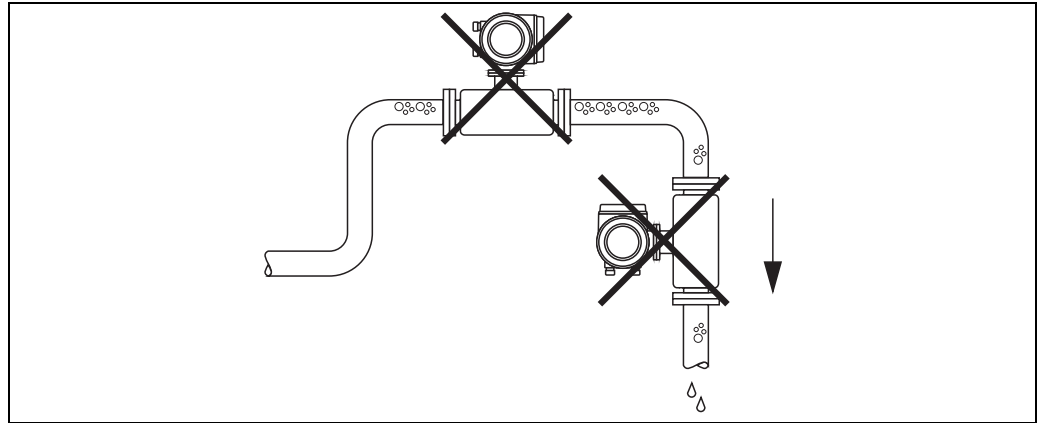
Installation

Mounting location

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

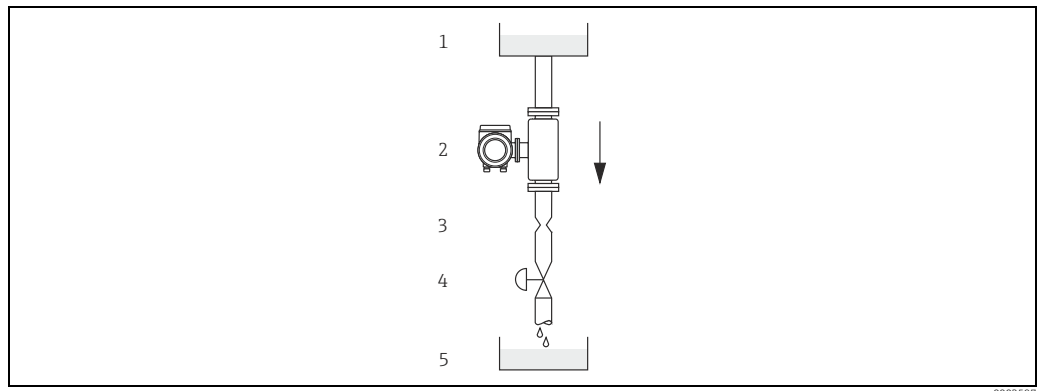
Therefore, avoid the following mounting locations in the pipe installation:

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



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.



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

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

DN		Ø Orifice plate, pipe restriction	
[mm]	[in]	[mm]	[in]
8	$\frac{3}{8}$	6	0.24
15	$\frac{1}{2}$	10	0.40
25	1	14	0.55
40	$1\frac{1}{2}$	22	0.87
50	2	28	1.10
80	3	50	2.00

Orientation

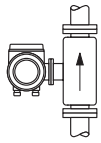
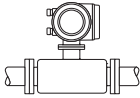
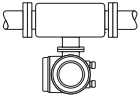
Make sure that the direction of the arrow on the nameplate of the sensor matches the direction of flow (direction of fluid flow through the pipe).

Vertical (Fig. 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. Thus the measuring tubes can be completely drained and protected against solids buildup.

Horizontal (Fig. H1 / H2)

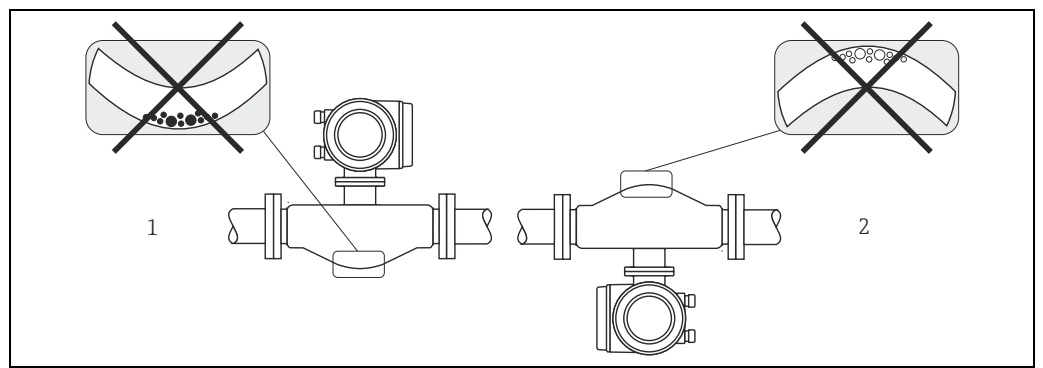
The measuring tubes must be horizontal and beside each other. When installation is correct the transmitter housing is above or below the pipe (Fig. H1/H2). Always avoid having the transmitter housing in the same horizontal plane as the pipe.

Orientation	Vertical	Horizontal, Transmitter head up	Horizontal, Transmitter head down
	 <p>Fig. V</p> <p>a0004572</p>	 <p>Fig. H1</p> <p>a0004576</p>	 <p>Fig H2</p> <p>a0004580</p>
Standard, Compact version	✓✓	✓✓	✓✓ ¹

- ✓✓ = Recommended orientation
- ✓ = Orientation recommended in certain situations
- ✗ = Impermissible orientation

¹ = To ensure that the maximum permitted ambient temperature for the transmitter is not exceeded we recommend the following orientation:
 For fluids with low temperatures, we recommend the horizontal orientation with the transmitter head pointing upwards (Fig. H1) or the vertical orientation (Fig. V).

When using a bent measuring tube and horizontal installation, the position of the sensor has to be matched to the fluid properties!



Horizontal installation for sensors with a bent measuring tube

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

Installation instructions


Note the following points:

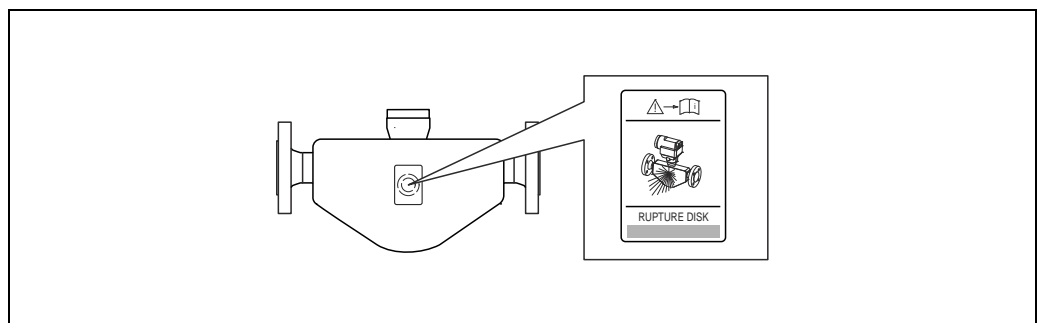
- No special measures such as supports are necessary. External forces are absorbed by the construction of the instrument, for example the secondary containment.
- The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by pipe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

Inlet and outlet runs

There are no installation requirements regarding inlet and outlet runs.

Special installation instructions**Rupture disk**


Make sure that the function and operation of the rupture disk is not impeded through the installation of the device. The position of the rupture disk is indicated on a sticker applied over it. If the rupture disk is triggered, the sticker is destroyed. The disk can therefore be visually monitored. For additional information that is relevant to the process (→  16).



A0007823

Indication label for the rupture disk

Zero point adjustment

All measuring devices are calibrated with state-of-the-art technology. Calibration takes place under reference operating conditions →  7. Consequently, the zero point adjustment is generally **not** necessary.

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

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

Environment

Ambient temperature range

Sensor, transmitter:

- Standard: -20 to $+60$ °C (-4 to $+140$ °F)
- Optional: -40 to $+60$ °C (-40 to $+140$ °F)



Note!

- Install the device at a shady location. Avoid direct sunlight, particularly in warm climatic regions.
- At ambient temperatures below -20 °C (-4 °F) the readability of the display may be impaired.

Storage temperature

-40 to $+80$ °C (-40 to $+175$ °F), preferably $+20$ °C ($+68$ °F)

Degree of protection

Standard: IP 67 (NEMA 4X) for transmitter and sensor

Shock resistance

According to IEC/EN 60068-2-31

Vibration resistance

Acceleration up to 1 g, 10 to 150 Hz, following IEC/EN 60068-2-6/IEC/EN 60068-2-6

Electromagnetic compatibility (EMC)

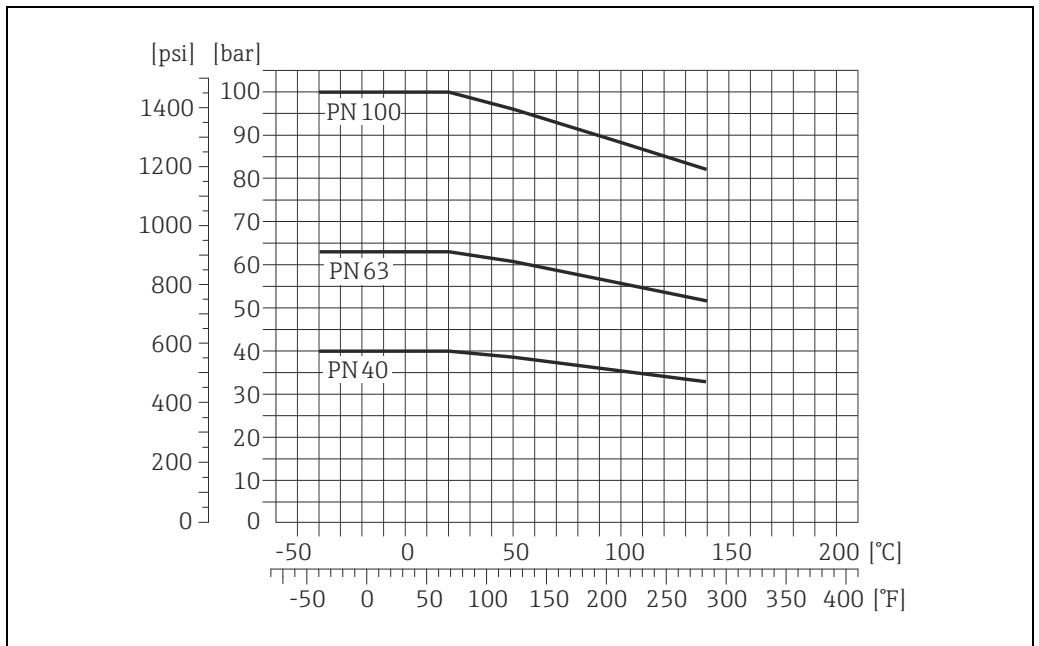
As per IEC/EN 61326 and NAMUR recommendation NE 21

Process

Fluid temperature range	Sensor -40 to +140 °C (-40 to +284 °F)
Medium density	0 to 5000 kg/m ³ (0 to 312 lb/ft ³)
Secondary containment pressure rating	The sensor housing is filled with dry nitrogen and protects the electronics and mechanics inside. The secondary containment does not have pressure vessel classification. Reference value for the pressure loading capacity of the sensor housing: 16 bar (232 psi).
Pressure-temperature ratings	The following pressure-temperature ratings refer to the entire device and not just the process connection.

Flange connection according to EN 1092-1 (DIN 2501)

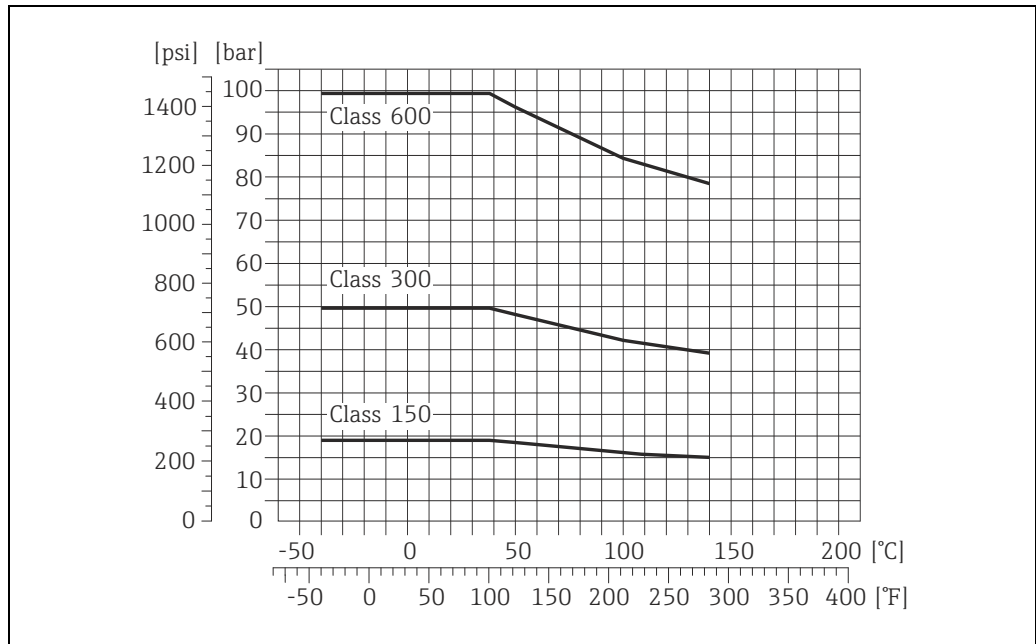
Flange material: 1.4404 (F316/F316L)



A0020972-EN

Flange connection according to ASME B16.5

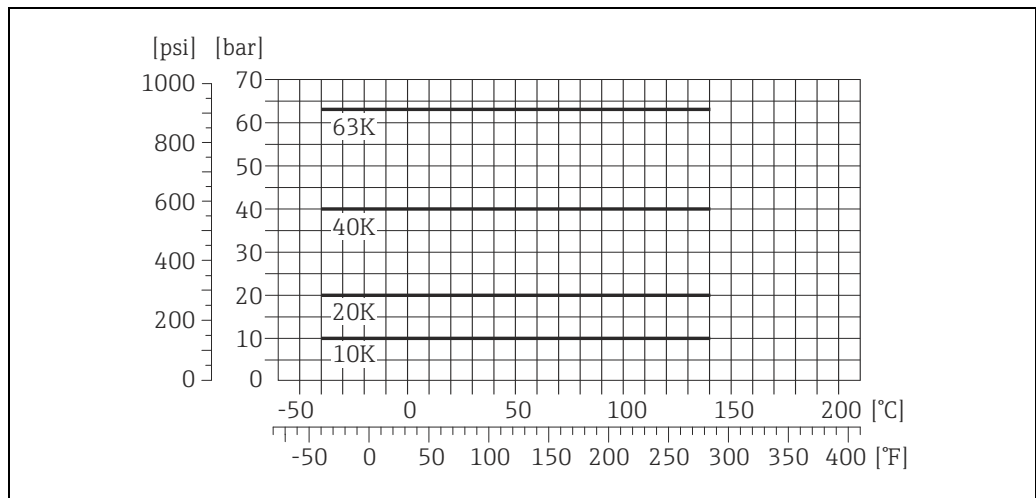
Flange material: 1.4404 (F316/F316L)



A0020973-EN

JIS B2220, flange

Flange material: 1.4404 (F316/F316L)



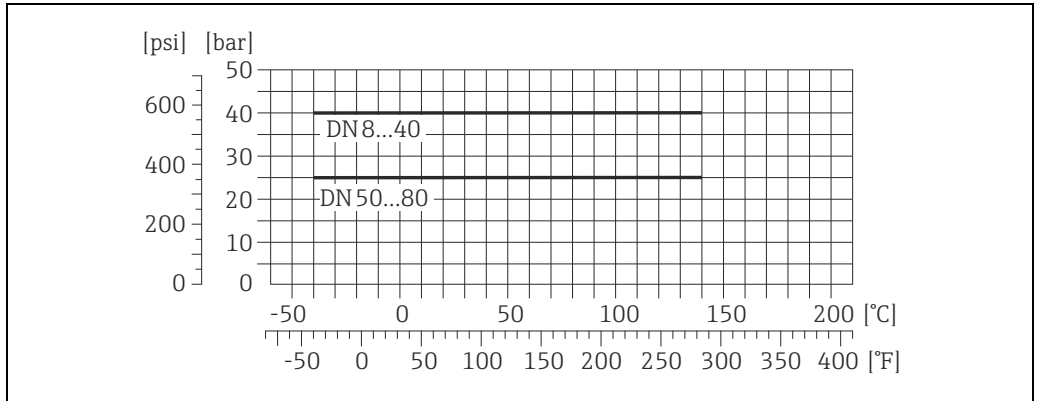
A0020974-EN

Tri-Clamp, DIN 11866 line C

The Clamp connections are suited up to a maximum pressure of 16 bar (232 psi). Please observe the operating limits of the clamp and seal used as they could be under 16 bar (232 psi). The clamp and the seal are not included in the scope of supply.

DIN 11851, thread

Connection material: 1.4404 (316/316L)

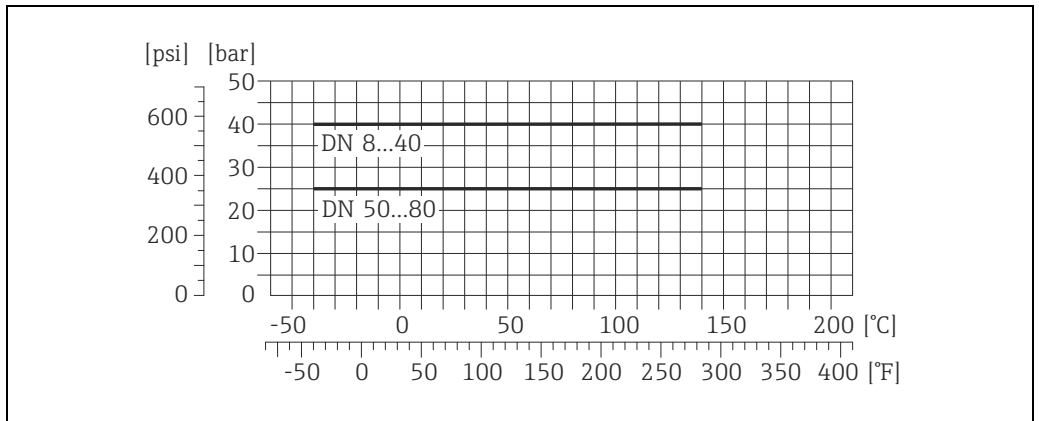


A0020976-EN

DIN 11851 allows for applications up to +140 °C (+284 °F) if suitable sealing materials are used. Please take this into account when selecting seals and counterparts as these components can limit the pressure and temperature range.

DIN 11864-1 Form A, thread

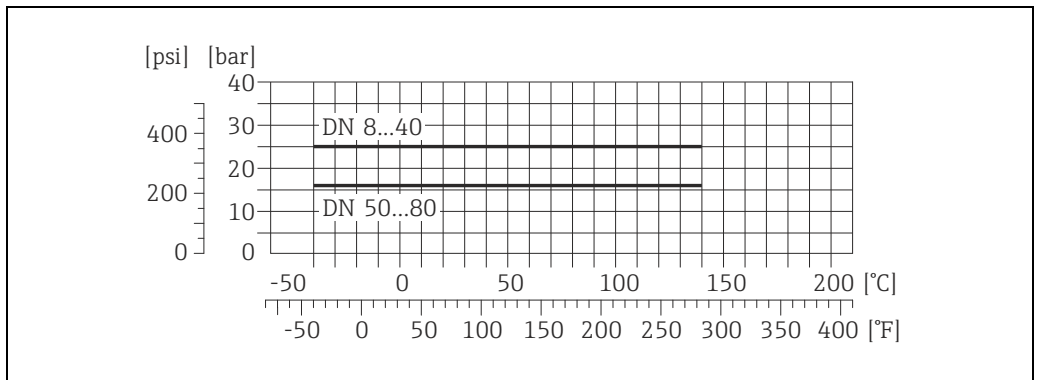
Connection material: 1.4404 (316/316L)



A0020977-EN

DIN 11864-2 Form A, flange

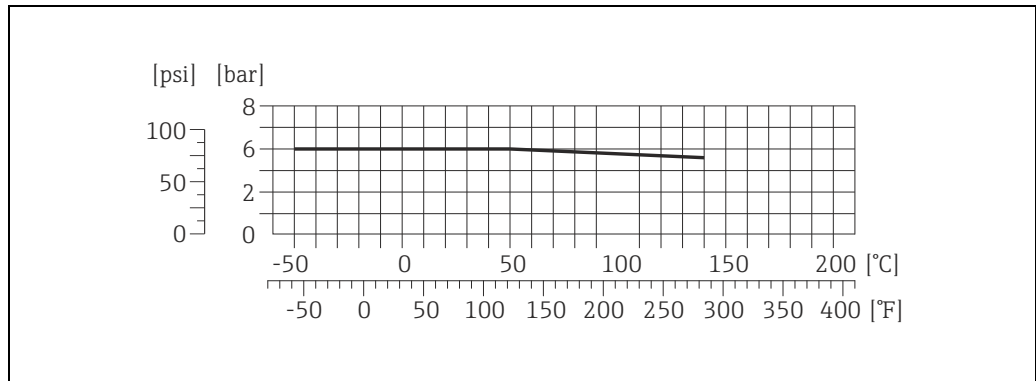
Flange material: 1.4404 (316/316L)



A0020978-EN

SMS 1145, thread

Connection material: 1.4404 (316/316L)

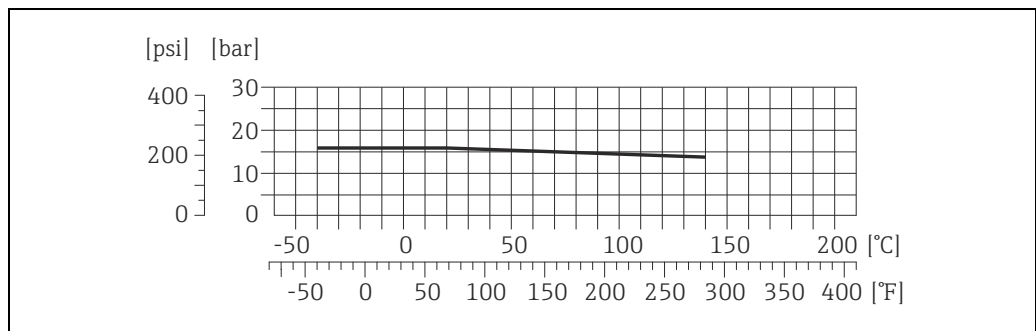


A0020986-EN

SMS 1145 allows for applications up to 6 bar (87 psi) if suitable sealing materials are used. Please take this into account when selecting seals and counterparts as these components can limit the pressure and temperature range.

ISO 2853, thread

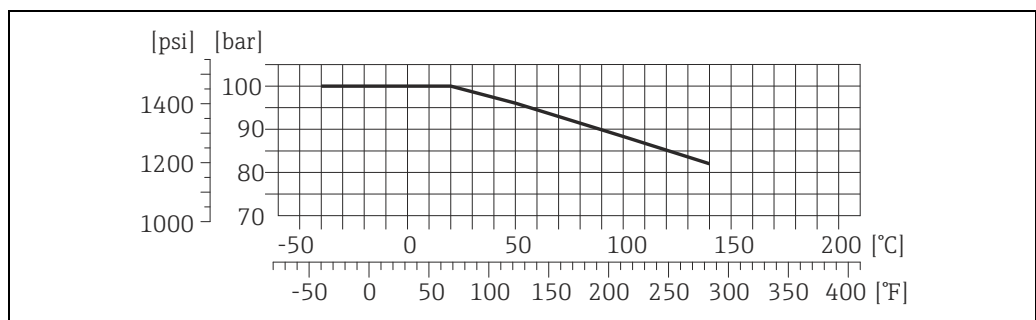
Connection material: 1.4404 (316/316L)



A0020988-EN

VCO

Flange material: 1.4404 (316/316L)




A0020975-EN


Rupture disk

To increase the level of safety, a device version with a rupture disk with a triggering pressure of 10 to 15 bar (145 to 217.5 psi) can be used. Special mounting instructions: (→ 12). Rupture disks cannot be combined with the separately available heating jacket (→ 35).


Limiting flow

See information in the "Measuring range" section →  4

Select nominal diameter by optimizing between required flow range and permissible pressure loss. See the "Measuring range" section for a list of maximum possible full scale values.

- 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 (< 3 ft/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 →  4

Pressure loss

To calculate the pressure loss, use the *Applicator* sizing tool (→  36).

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.

Therefore, the following locations should be preferred for installation:

- Downstream from pumps (no danger of vacuum)
- At the lowest point in a vertical pipe

Thermal insulation

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

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.




Note!

- 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 cases, the sensor must be magnetically shielded.

The secondary containment can be shielded with tin plates or electric sheets without preferential direction (e.g. V330-35A) with the following properties:

- Relative magnetic permeability $\mu_r \geq 300$
- Plate thickness $d \geq 0.35$ mm ($d \geq 0.014$ ")

- Information on permitted temperature ranges →  13.

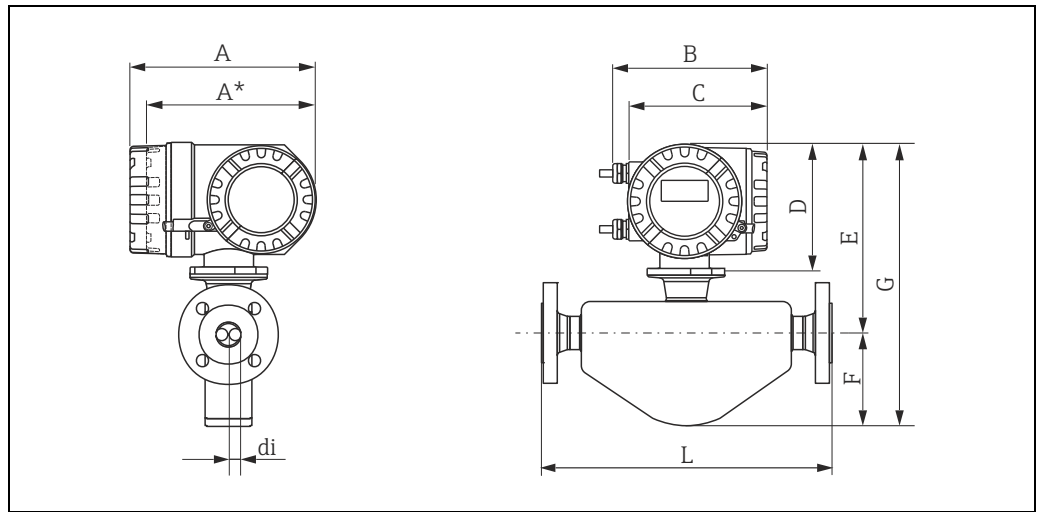
Special heating jackets, which can be ordered separately from Endress+Hauser as an accessory, are available for the sensors.

Mechanical construction

Design, dimensions

Dimensions:	
Field housing compact version, powder-coated die-cast aluminum	→ 19
Process connections in SI units	
Flange connections EN 1092-1 (DIN 2501/DIN 2512N))	→ 20
Flange connections ASME B16.5	→ 22
Flange connections JIS	→ 23
Tri-Clamp, DIN 11866 line C	→ 24
DIN 11851, thread, DIN11866 line A	→ 25
DIN 11864-1 Form A, thread, DIN11866 line A	→ 26
DIN 11864-2 Form A, flange, DIN11866 line A, flange with notch	→ 27
ISO 2853, thread, ISO2037	→ 28
SMS 1145, thread	→ 29
VCO	→ 29
Process connections in SI units	
Flange connections ASME B16.5	→ 30
Tri-Clamp, DIN 11866 line C	→ 31
SMS 1145, thread	→ 32
VCO	→ 32

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



A0007638

Dimensions SI units

DN	A	A*	B	C	D	E	F	G	L	di
8	227	207	187	168	160	224	93	317	1)	1)
15	227	207	187	168	160	226	105	331	1)	1)
25	227	207	187	168	160	231	106	337	1)	1)
40	227	207	187	168	160	237	121	358	1)	1)
50	227	207	187	168	160	253	170	423	1)	1)
80	227	207	187	168	160	282	205	487	1)	1)

¹⁾ dependent on respective process connection

* Blind version (without local display)

All dimensions in [mm]

Dimensions in US units

DN	A	A*	B	C	D	E	F	G	L	di
3/8"	9.08	8.28	7.48	6.72	6.40	8.82	3.66	12.48	2)	2)
1/2"	9.08	8.28	7.48	6.72	6.40	8.90	4.13	13.03	2)	2)
1"	9.08	8.28	7.48	6.72	6.40	9.09	4.17	13.27	2)	2)
1 1/2"	9.08	8.28	7.48	6.72	6.40	9.33	4.76	14.09	2)	2)
2"	9.08	8.28	7.48	6.72	6.40	9.96	6.69	16.65	2)	2)
3"	9.08	8.28	7.48	6.72	6.40	11.10	8.07	19.17	2)	2)

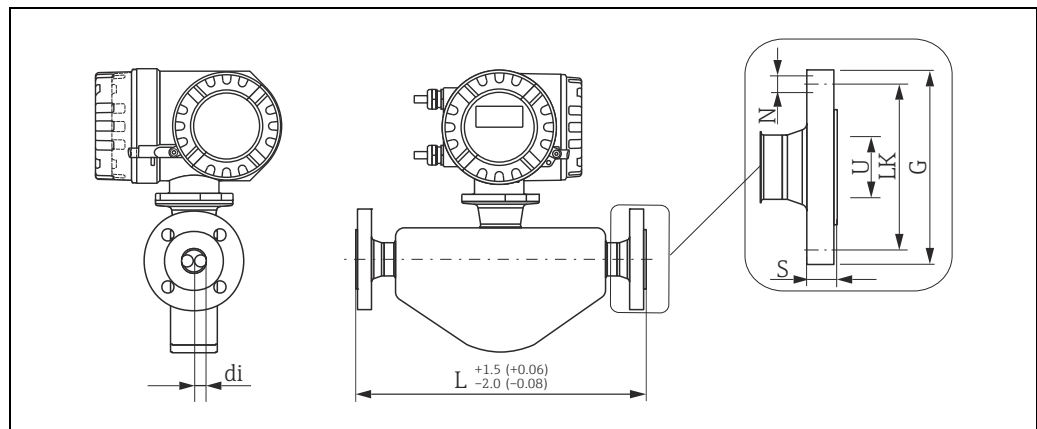
¹⁾ dependent on respective process connection

* Blind version (without local display)

All dimensions in [inch]

Process connections in SI units

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



Dimension unit in mm (in)

A0021285

Flange connections EN 1092-1 (DIN 2501/DIN 2512N))

Flange according to EN 1092-1 (DIN 2501), PN 40: 1.4404 (F316/F316L)
 Order code for "Process connection", option D2S

Flange with groove according to EN 1092-1 (DIN 2512N), PN 40: 1.4404 (F316/F316L)
 Order code for "Process connection", option D6S

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	232/510 ¹⁾	4 × Ø14	16	65	17.3	5.35
15	95	279/510 ¹⁾	4 × Ø14	16	65	17.3	8.30
25	115	329/600 ¹⁾	4 × Ø14	18	85	28.5	12.0
40	150	445	4 × Ø18	18	110	43.1	17.6
50	165	556/715 ¹⁾	4 × Ø18	20	125	54.5	26.0
80	200	610/915 ¹⁾	8 × Ø18	24	160	82.5	40.5

¹⁾ Installation length according to NAMUR recommendation NE 132: order code for "Process connection", option D2N (with groove D6N)
 All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501), PN 40 (with DN 25-flanges): 1.4404 (F316/F316L)
 Order code for "Process connection", option R2S

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	329	4 × Ø14	18	85	28.5	5.35
15	115	329	4 × Ø14	18	85	28.5	8.30

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501), PN 63: 1.4404 (F316/F316L)
 Order code for "Process connection", option D3S
Flange with groove according to EN 1092-1 (DIN 2512N), PN 63: 1.4404 (F316/F316L)
 Order code for "Process connection", option D7S

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	565	4 × Ø22	26	135	54.5	26.0
80	215	650	8 × Ø22	28	170	81.7	40.5

All dimensions in [mm]

Flange EN 1092-1 (DIN 2501), PN 100: 1.4404 (F316/F316L)
 Order code for "Process connection", option D4S
Flange with groove according to EN 1092-1 (DIN 2512N), PN 100: 1.4404 (F316/F316L)
 Order code for "Process connection", option D8S

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	261	4 × Ø14	20	75	17.3	5.35
15	105	295	4 × Ø14	20	75	17.3	8.30
25	140	360	4 × Ø18	24	100	28.5	12.0
40	170	486	4 × Ø22	26	125	42.5	17.6
50	195	581	4 × Ø26	28	145	53.9	26.0
80	230	660	8 × Ø26	32	180	80.9	40.5

All dimensions in [mm]

Flange connections ASME B16.5

Flange according to ASME B16.5, CI 150: 1.4404 (F316/F316L)							
Order code for "Process connection", option AAS							
DN	G	L	N	S	LK	U	di
8	88.9	232	4 × Ø15.7	11.2	60.5	15.7	5.35
15	88.9	279	4 × Ø15.7	11.2	60.5	15.7	8.30
25	108.0	329	4 × Ø15.7	14.2	79.2	26.7	12.0
40	127.0	445	4 × Ø15.7	17.5	98.6	40.9	17.6
50	152.4	556	4 × Ø19.1	19.1	120.7	52.6	26.0
80	190.5	610	4 × Ø19.1	23.9	152.4	78.0	40.5

All dimensions in [mm]

Flange according to ASME B16.5, CI 300: 1.4404 (F316/F316L)							
Order code for "Process connection", option ABS							
DN	G	L	N	S	LK	U	di
8	95.2	232	4 × Ø15.7	14.2	66.5	15.7	5.35
15	95.2	279	4 × Ø15.7	14.2	66.5	15.7	8.30
25	123.9	329	4 × Ø19.0	17.5	88.9	26.7	12.0
40	155.4	445	4 × Ø22.3	20.6	114.3	40.9	17.6
50	165.1	556	8 × Ø19.0	22.3	127.0	52.6	26.0
80	209.5	610	8 × Ø22.3	28.4	168.1	78.0	40.5

All dimensions in [mm]

Flange according to ASME B16.5, CI 600: 1.4404 (F316/F316L)							
Order code for "Process connection", option ACS							
DN	G	L	N	S	LK	U	di
8	95.3	261	4 × Ø15.7	20.6	66.5	13.9	5.35
15	95.3	295	4 × Ø15.7	20.6	66.5	13.9	8.30
25	124.0	380	4 × Ø19.1	23.9	88.9	24.3	12.0
40	155.4	496	4 × Ø22.4	28.7	114.3	38.1	17.6
50	165.1	583	8 × Ø19.1	31.8	127.0	49.2	26.0
80	209.6	672	8 × Ø22.4	38.2	168.1	73.7	40.5

All dimensions in [mm]

Flange connections JIS

JIS B2220, flange, 10K: 1.4404 (F316/F316L) Order code for "Process connection", option NDS							
DN	G	L	N	S	LK	U	di
50	155	556	4 × Ø19	16	120	50	26.0
80	185	605	8 × Ø19	18	150	80	40.5

All dimensions in [mm]

JIS B2220, flange, 20K: 1.4404 (F316/F316L) Order code for "Process connection", option NES							
DN	G	L	N	S	LK	U	di
8	95	232	4 × Ø15	14	70	15	5.35
15	95	279	4 × Ø15	14	70	15	8.30
25	125	329	4 × Ø19	16	90	25	12.0
40	140	445	4 × Ø19	18	105	40	17.6
50	155	556	8 × Ø19	18	120	50	26.0
80	200	605	8 × Ø23	22	160	80	40.5

All dimensions in [mm]

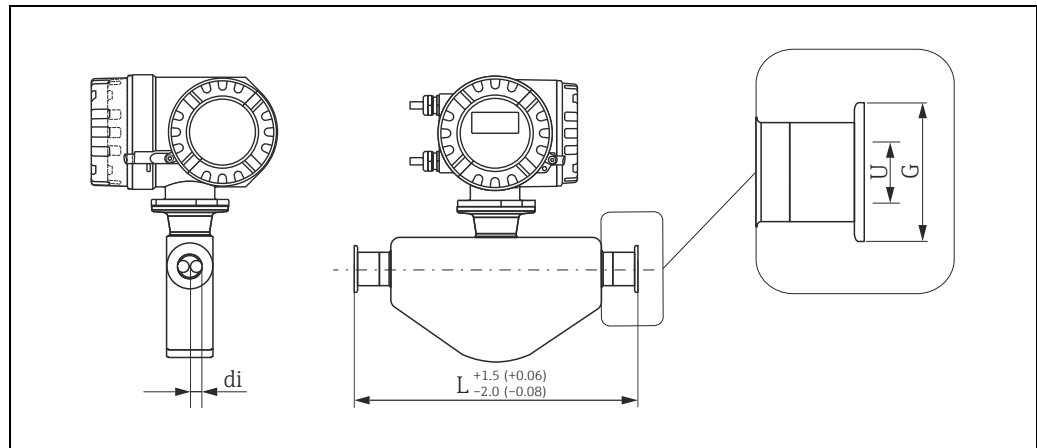
JIS B2220, flange, 40K: 1.4404 (F316/F316L) Order code for "Process connection", option NGS							
DN	G	L	N	S	LK	U	di
8	115	261	4 × Ø19	20	80	15	5.35
15	115	300	4 × Ø19	20	80	15	8.30
25	130	375	4 × Ø19	22	95	25	12.0
40	160	496	4 × Ø23	24	120	38	17.6
50	165	601	8 × Ø19	26	130	50	26.0
80	210	662	8 × Ø23	32	170	75	40.5

All dimensions in [mm]

JIS B2220, flange, 63K: 1.4404 (F316/F316L) Order code for "Process connection", option NHS							
DN	G	L	N	S	LK	U	di
8	120	282	4 × Ø19	23	85	12	5.35
15	120	315	4 × Ø19	23	85	12	8.30
25	140	383	4 × Ø23	27	100	22	12.0
40	175	515	4 × Ø25	32	130	35	17.6
50	185	616	8 × Ø23	34	145	48	26.0
80	230	687	8 × Ø25	40	185	73	40.5

All dimensions in [mm]

Tri-Clamp, DIN 11866 line C



Dimension in mm (in)

1", 1½", 2" -Tri-Clamp, DIN 11866 line C: 1.4404 (316/316L)					
Order code for "Process connection", option FTS					
DN	Clamp	G	L	U	di
8	1"	50.4	229	22.1	5.35
15	1"	50.4	273	22.1	8.30
25	1"	50.4	324	22.1	12.0
40	1½"	50.4	456	34.8	17.6
50	2"	63.9	562	47.5	26.0
80	3"	90.9	672	72.9	40.5

3A version, $R_a \leq 0.8 \mu\text{m}$ (150 grit): order code for "Process connection", option FTA3A version, $R_a \leq 0.4 \mu\text{m}$ (240 grit): order code for "Process connection", option FTD

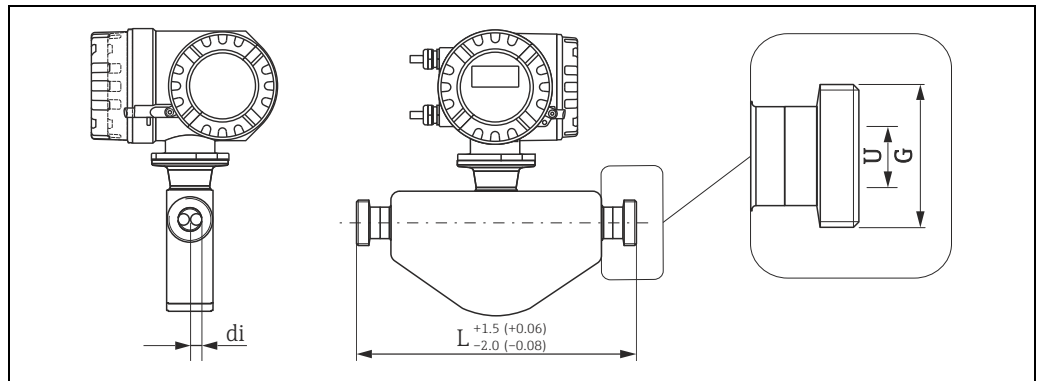
All dimensions in [mm]

½"-Tri-Clamp, DIN 11866 line C: 1.4404 (316/316L)					
Order code for "Process connection", option FUW					
DN	Clamp	G	L	U	di
8	½"	25.0	229	9.5	5.35
15	½"	25.0	273	9.5	8.30

3A version, $R_a \leq 0.8 \mu\text{m}$ (150 grit): order code for "Process connection", option FUA3A version, $R_a \leq 0.4 \mu\text{m}$ (240 grit): order code for "Process connection", option FUD

All dimensions in [mm]

DIN 11851, thread, DIN11866 line A



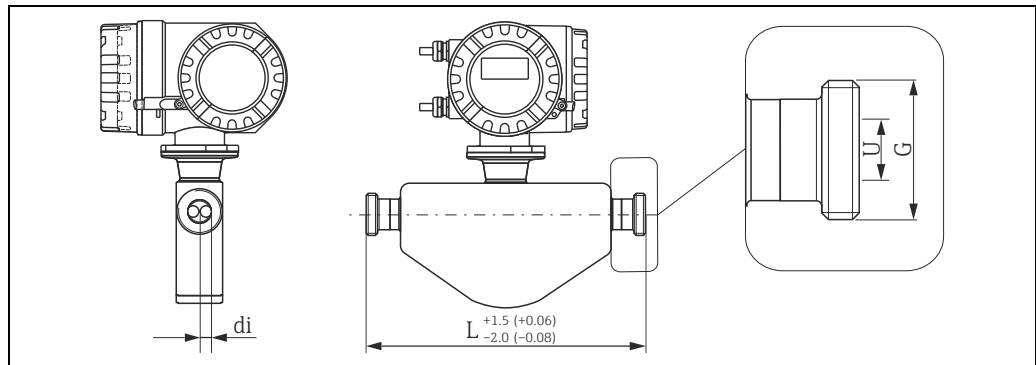
A0021288

Dimension in mm (in)

DIN 11851, thread, DIN11866 line A: 1.4404 (316/316L)				
Order code for "Process connection", option FMW				
DN	G	L	U	di
8	Rd 34 × 1/8"	229	16	5.35
15	Rd 34 × 1/8"	273	16	8.30
25	Rd 52 × 1/6"	324	26	12.0
40	Rd 65 × 1/6"	456	38	17.6
50	Rd 78 × 1/6"	562	50	26.0
80	Rd 110 × 1/4"	672	81	40.5

3A version, Ra ≤ 0.8 μm (150 grit): order code for "Process connection", option FMA
 All dimensions in [mm]

DIN 11864-1 Form A, thread, DIN11866 line A

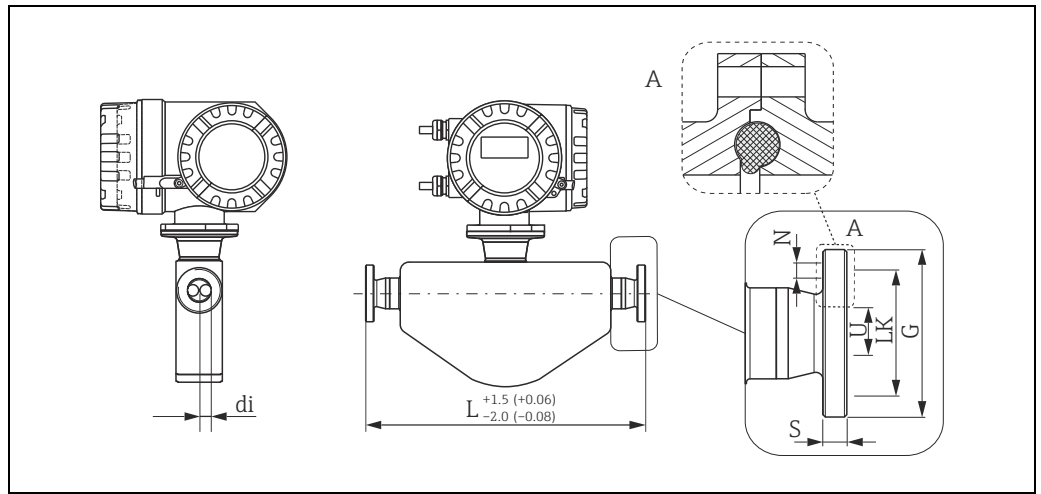


Dimension unit in mm (in)

DIN 11864-1 Form A, thread, DIN11866 line A: 1.4404 (316/316L)				
Order code for "Process connection", option FLW				
DN	G	L	U	di
8	Rd 28 × 1/8"	229	10	5.35
15	Rd 34 × 1/8"	273	16	8.30
25	Rd 52 × 1/6"	324	26	12.00
40	Rd 65 × 1/6"	456	38	17.60
50	Rd 78 × 1/6"	562	50	26.00
80	Rd 110 × 1/4"	672	81	40.5

3A version, Ra ≤ 0.8 μm (150 grit): order code for "Process connection", option FLA
 All dimensions in [mm]

DIN 11864-2 Form A, flange, DIN11866 line A, flange with notch



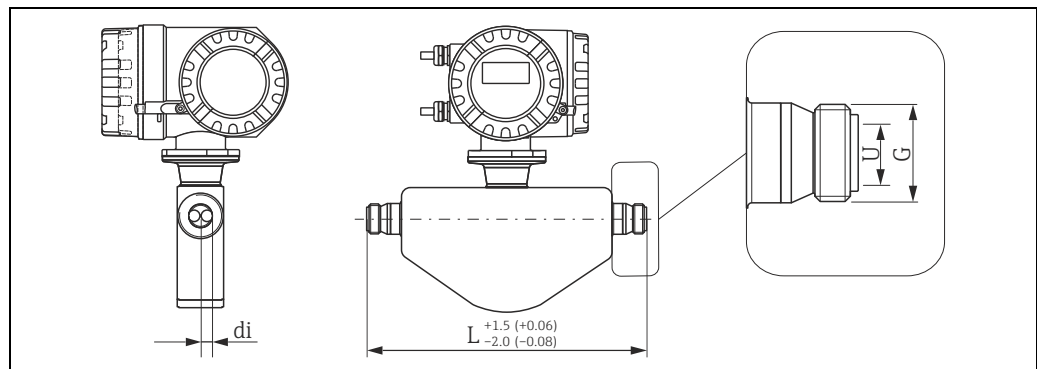
Dimension unit in mm (in)

A0021294

DIN 11864-2 Form A, flange, DIN11866 line A, flange with notch: 1.4404 (316/316L)							
Order code for "Process connection", option FKW							
DN	G	L	N	S	LK	U	di
8	54	249	4 × Ø9	10	37	10	5.35
15	59	293	4 × Ø9	10	42	16	8.30
25	70	344	4 × Ø9	10	53	26	12.0
40	82	456	4 × Ø9	10	65	38	17.6
50	94	562	4 × Ø9	10	77	50	26.0
80	133	672	8 × Ø11	12	112	81	40.5

3A version, Ra ≤ 0.8 µm (150 grit): order code for "Process connection", option FKA
 All dimensions in [mm]

ISO 2853, thread, ISO2037



Dimension in mm (in)

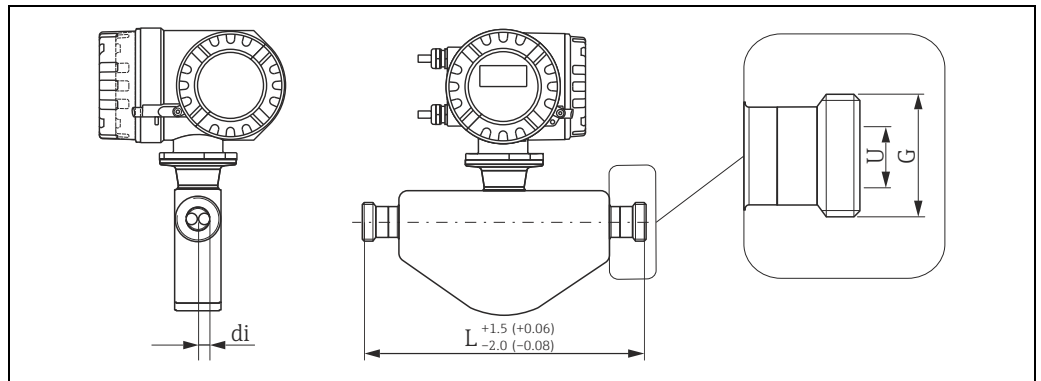
ISO 2853, thread, ISO2037: 1.4404 (316/316L) Order code for "Process connection", option FJW				
DN	G ¹⁾	L	U	di
8	37.13	229	22.6	5.35
15	37.13	273	22.6	8.30
25	37.13	324	22.6	12.0
40	50.68	456	35.6	17.6
50	64.16	562	48.6	26.0
80	91.19	672	72.9	40.5

¹⁾ Max. thread diameter to ISO 2853 Annex A

3A version, Ra ≤ 0.8 μm (150 grit): order code for "Process connection", option FJA

All dimensions in [mm]

SMS 1145, thread



A0021291

Dimension unit in mm (in)

SMS 1145, thread: 1.4404 (316/316L)

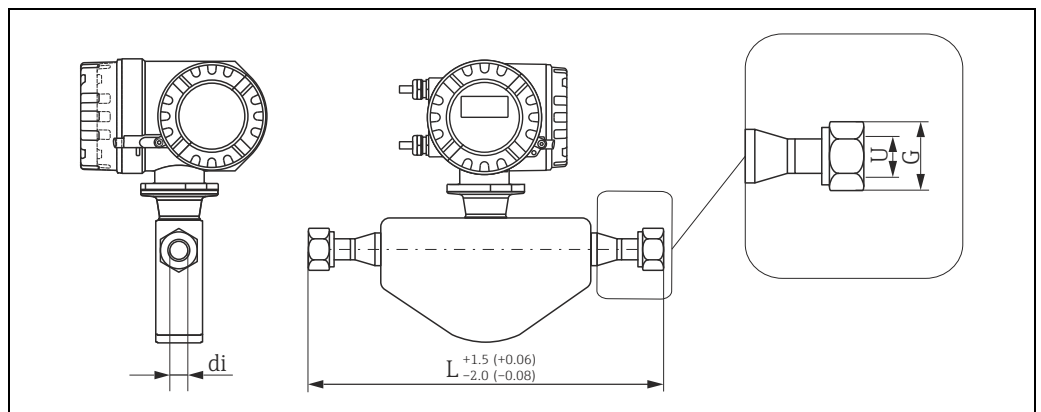
Order code for "Process connection", option FSW

DN	G	L	U	di
8	Rd 40 × 1/6"	229	22.5	5.35
15	Rd 40 × 1/6"	273	22.5	8.30
25	Rd 40 × 1/6"	324	22.5	12.0
40	Rd 60 × 1/6"	456	35.5	17.6
50	Rd 70 × 1/6"	562	48.5	26.0
80	Rd 98 × 1/6"	672	72.9	40.5

3A version, Ra ≤ 0.8 μm (150 grit): order code for "Process connection", option FSA

All dimensions in [mm]

VCO



A0021286

Dimension unit in mm (in)

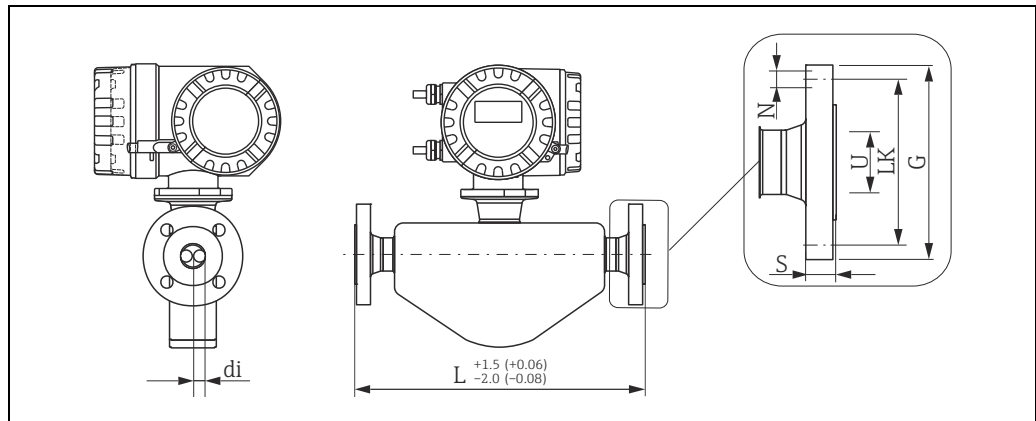
VCO: 1.4404 (316/316L)

DN	G	Order code for "Process connection", option	L	U	di
8	1" AF	CVS	252	10.2	5.35
15	1 1/2" AF	CWS	305	15.7	8.30

All dimensions in [mm]

Process connections in US units

Flange connections ASME B16.5



A0021285

Dimension unit in mm (in)

Flange according to ASME B16.5, CI 150: 1.4404 (316/316L)							
Order code for "Process connection", option AAS							
DN	G	L	N	S	LK	U	di
3/8"	3.50	9.13	4 × Ø0.62	0.44	2.38	0.62	0.21
1/2"	3.50	10.98	4 × Ø0.62	0.44	2.38	0.62	0.33
1"	4.25	12.95	4 × Ø0.62	0.56	3.12	1.05	0.47
1 1/2"	5.00	17.52	4 × Ø0.62	0.69	3.88	1.61	0.69
2"	6.00	21.89	4 × Ø0.75	0.75	4.75	2.07	1.02
3"	7.50	24.02	4 × Ø0.75	0.94	6.00	3.07	1.59

All dimensions in [inch]

Flange according to ASME B16.5, CI 300: 1.4404 (316/316L)							
Order code for "Process connection", option ABS							
DN	G	L	N	S	LK	U	di
3/8"	3.75	9.13	4 × Ø0.62	0.56	2.62	0.62	0.21
1/2"	3.75	10.98	4 × Ø0.62	0.56	2.62	0.62	0.33
1"	4.88	12.95	4 × Ø0.75	0.69	3.50	1.05	0.47
1 1/2"	6.12	17.52	4 × Ø0.88	0.81	4.50	1.61	0.69
2"	6.50	21.89	4 × Ø0.75	0.88	5.00	2.07	1.02
3"	8.25	24.02	8 × Ø0.88	1.12	6.62	3.07	1.59

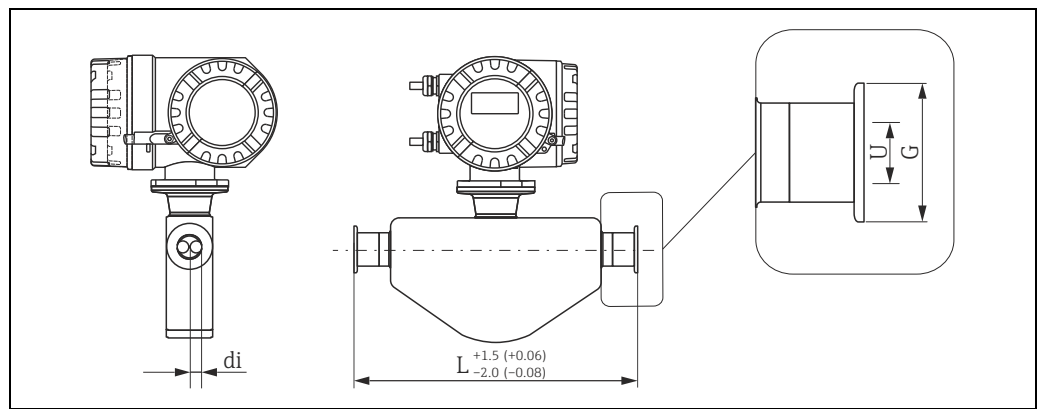
All dimensions in [inch]

Flange according to ASME B16.5, Cl 600: 1.4404 (316/316L)
 Order code for "Process connection", option ACS

DN	G	L	N	S	LK	U	di
3/8"	3.75	10.28	4 × Ø0.62	0.81	2.62	0.55	0.21
1/2"	3.75	11.61	4 × Ø0.62	0.81	2.62	0.55	0.33
1"	4.88	14.96	4 × Ø0.75	0.94	3.50	0.96	0.47
1 1/2"	6.12	19.53	4 × Ø0.88	1.13	4.50	1.50	0.69
2"	6.50	22.95	4 × Ø0.75	1.25	5.00	1.94	1.02
3"	8.25	24.46	8 × Ø0.88	1.50	6.62	2.90	1.59

All dimensions in [inch]

Tri-Clamp, DIN 11866 line C



Dimension in mm (in)

1", 1 1/2", 2" -Tri-Clamp, DIN 11866 line C: 1.4404 (316/316L)
 Order code for "Process connection", option FTS

DN	Clamp	G	L	U	di
3/8"	1"	1.98	9.02	0.87	0.21
1/2"	1"	1.98	10.75	0.87	0.33
1"	1"	1.98	12.76	0.87	0.47
1 1/2"	1 1/2"	1.98	17.95	1.37	0.69
2"	2"	2.52	22.13	1.87	1.02
3"	3"	3.58	26.46	2.87	1.59

3A version, $Ra \leq 32 \mu\text{in}$ (150 grit): order code for "Process connection", option FTA

3A version, $Ra \leq 16 \mu\text{in}$ (240 grit): order code for "Process connection", option FTD

All dimensions in [inch]

1/2"-Tri-Clamp, DIN 11866 line C: 1.4404 (316/316L)
 Order code for "Process connection", option FUW

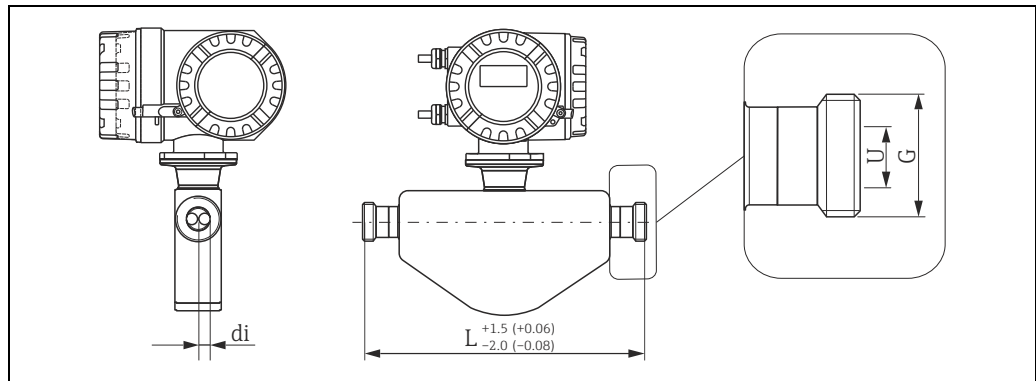
DN	Clamp	G	L	U	di
3/8"	1/2"	0.98	9.02	0.37	0.21
1/2"	1/2"	0.98	10.75	0.37	0.33

3A version, $Ra \leq 32 \mu\text{in}$ (150 grit): order code for "Process connection", option FUA

3A version, $Ra \leq 16 \mu\text{in}$ (240 grit): order code for "Process connection", option FUD

All dimensions in [inch]

SMS 1145, thread



A0021291

Dimension unit in mm (in)

SMS 1145, thread: 1.4404 (316/316L)

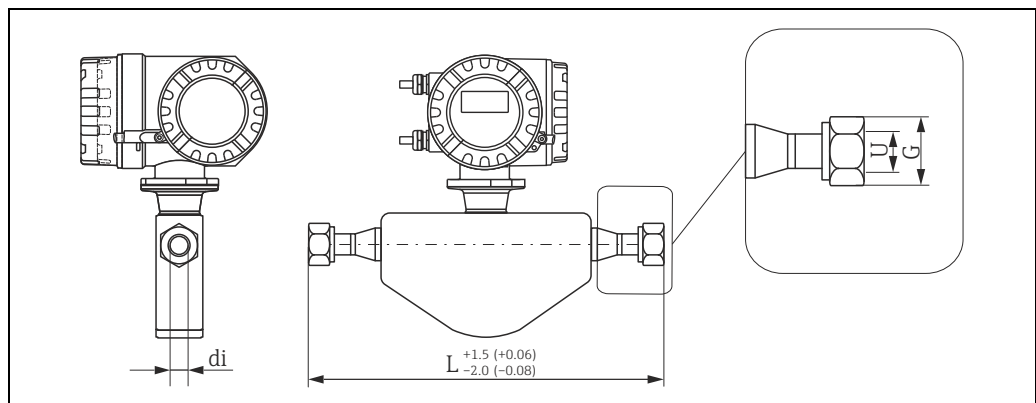
Order code for "Process connection", option FSW

DN	G	L	U	di
3/8"	Rd 40 × 1/6"	9.02	0.89	0.21
1/2"	Rd 40 × 1/6"	10.75	0.89	0.33
1"	Rd 40 × 1/6"	12.76	0.89	0.47
1 1/2"	Rd 60 × 1/6"	17.95	1.40	0.69
2"	Rd 70 × 1/6"	22.13	1.91	1.02
3"	Rd 98 × 1/6"	26.46	2.87	1.59

3A version, Ra ≤ 16 µin (240 grit): order code for "Process connection", option FSA

All dimensions in [inch]

VCO



A0021286

Dimension unit in mm (in)

VCO: 1.4404 (316/316L)

DN	G	Order code for "Process connection", option	L	U	di
3/8"	1" AF	CVS	9.92	0.40	0.21
1/2"	1 1/2" AF	CWS	12.01	0.62	0.33

All dimensions in [inch]

Weight**Weight in SI units**

DN [mm]	8	15	25	40	50	80
Compact version	8	8	10	15	22	31

All values (weight) refer to devices with EN/DIN PN 40 flanges.
Weight information in [kg]

Weight in US units

DN [in]	3/8"	1/2"	1"	1 1/2"	2"	3"
Compact version	18	18	22	33	49	69

All values (weight) refer to devices with EN/DIN PN 40 flanges.
Weight information in [lb]

Materials**Transmitter housing**

- Powder coated die-cast aluminum
- Window material: glass or polycarbonate

Sensor housing, containment

- Acid and alkali-resistant outer surface
- Stainless steel, 1.4301 (304)

Process connections

- Stainless steel 1.4404 (F316/F316L)
 - Flanges according to EN 1092-1 (DIN 2501)
 - Flanges according to ASME B16.5
 - Flanges to JIS B2220
- Stainless steel 1.4404 (316/316L)
 - Flange DIN 11864-2 Form A
 - Threads DIN 11851, SMS 1145, ISO 2853, DIN 11864-1 Form A
 - Tri-Clamp, DIN 11866 line C
 - VCO

Measuring tubes

- Stainless steel, 1.4539 (904L); manifold: 1.4404 (316/316L)

Seals

Welded process connections without internal seals

Process connections**Welded process connections**

- Flanges: according to EN 1092-1 (DIN 2501), Namur lengths in accordance with NE 132, according to ASME B16.5, JIS B2220
- VCO
- Sanitary connections: Tri-Clamp, threads (DIN 11851, SMS 1145, ISO 2853, DIN 11864-1), flange (DIN 11864-2 Form A)

Surface roughness

All data relate to parts in contact with fluid.

- Not polished
- $Ra_{max} = 0.8 \mu\text{m}$ (32 μin) mechanically polished
- $Ra_{max} = 0.4 \mu\text{m}$ (16 μin) mechanically polished

Operability

Local display	Display elements <ul style="list-style-type: none"> ▪ Liquid-crystal display: backlit, two lines with 16 characters per line ▪ Selectable display of different measured values and status variables ▪ At ambient temperatures below $-20\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$) the readability of the display may be impaired.
Languages	Display languages: French, Spanish, Italian, Dutch, Portuguese, German, English
Remote operation	<ul style="list-style-type: none"> ▪ HART protocol (handheld communicator) ▪ Configuration and service software or "FieldCare" from Endress+Hauser ▪ AMS configuration programs (Fisher Rosemount), SIMATIC PDM (Siemens)

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 etc.) can be supplied by your Endress+Hauser Sales Center on request. All information relevant to explosion protection is available in separate Ex documents that you can order as necessary.
Hygienic compatibility	3A approval
Pressure Equipment Directive	Measuring devices with a nominal diameter smaller than or equal to DN 25 correspond to Article 3(3) of the EC Directive 97/23/EC (Pressure Equipment Directive) and have been designed and manufactured according to good engineering practice. For larger nominal diameters, optional approvals according to Cat. II/III are available when required (depends on fluid and process pressure).
Other standards and guidelines	<ul style="list-style-type: none"> ▪ EN 60529 Degrees of protection by housing (IP code) ▪ EN 61010-1 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

Ordering Information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



Note!

Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Device-specific accessories

For the Transmitter

Accessories	Description
Transmitter	Transmitter for replacement or for stock. Use the order code to define the following specifications: <ul style="list-style-type: none"> ■ Approvals ■ Degree of protection, version ■ Cable entries, ■ Display, power supply, operation ■ Software ■ Outputs, inputs

For the Sensor

Accessories	Description
Heating jacket	Is used to stabilize the temperature of the fluids in the sensor. Water, water vapor and other non-corrosive liquids are permitted for use as fluids. If using oil as a heating medium, please consult with Endress+Hauser. Heating jackets cannot be used with sensors fitted with a rupture disk. For details, see Operating Instructions BA00099D

Communication-specific accessories

Accessories	Description
HART Communicator Field Xpert handheld terminal	Handheld terminal for remote parameterization and for obtaining measured values via the current output HART (4 to 20 mA). Contact your Endress +Hauser representative for more information.
Commubox FXA195 HART	The Commubox FXA195 connects intrinsically safe smart transmitters with the HART protocol with the USB port of a personal computer. This enables remote operation of the transmitter with operating software (e.g. FieldCare). Power is supplied to the Commubox via the USB port.

Service-specific accessories

Accessories	Description
Applicator	<p>Software for selecting and sizing Endress+Hauser measuring devices:</p> <ul style="list-style-type: none"> Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, accuracy or process connections Graphic illustration of the calculation results <p>Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project.</p> <p>Applicator is available:</p> <ul style="list-style-type: none"> Via the Internet: https://wapps.endress.com/applicator On CD-ROM for local PC installation
W@M	<p>Life cycle management for your plant.</p> <p>W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records.</p> <p>W@M is available:</p> <ul style="list-style-type: none"> Via the Internet: www.endress.com/lifecyclemanagement On CD-ROM for local PC installation
Fieldcheck	<p>Tester/simulator for testing flowmeters in the field.</p> <p>When used in conjunction with the "FieldCare" software package, test results can be imported into a database, printed and used for official certification. Contact your Endress+Hauser representative for more information.</p>
FieldCare	<p>FieldCare is Endress+Hauser's FDT-based plant asset management tool and allows the configuration and diagnosis of intelligent field devices. By using status information, you also have a simple but effective tool for monitoring devices. The Proline flowmeters are accessed via a service interface or via the service interface FXA193.</p>
FXA193	<p>Service interface from the measuring device to the PC for operation via FieldCare.</p>

System components

Accessories	Description
Memograph M graphic display recorder	<p>The Memograph M graphic display recorder provides information on all the relevant process variables. Measured values are recorded correctly, limit values are monitored and measuring points analyzed. The data are stored in the 256 MB internal memory and also on a DSD card or USB stick. Memograph M boasts a modular design, intuitive operation and a comprehensive security concept. The ReadWin[®] 2000 PC software is part of the standard package and is used for configuring, visualizing and archiving the data captured. The mathematics channels which are optionally available enable continuous monitoring of specific power consumption, boiler efficiency and other parameters which are important for efficient energy management.</p>

Documentation

- Flow measuring technology (FA00005D)
- Operating Instructions/Description of Device Functions
 - Promass 40 HART (BA00061D/BA00062D)
- Supplementary documentation on Ex-ratings: ATEX, FM, CSA, IECEx NEPSI

Registered trademarks

TRI-CLAMP®

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

HART®

Registered trademark of HART Communication Foundation, Austin, USA

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

Registered or registration-pending trademarks of the Endress+Hauser Group

www.addresses.endress.com
