Кориолисовые массовые расходомеры Promass 83O

Технические характеристики

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Россия +7(495)268-04-70 Казахстан +7(7172)727-132 Киргизия +996(312)96-26-47

эл.почта: ehr@nt-rt.ru || сайт: https://endcounters.nt-rt.ru/

Technical Information
Proline Promass 830
Coriolis flowmeter

The robust high-pressure flowmeter with extended transmitter functionality

Application

- Measuring principle operates independently of physical fluid properties such as viscosity or density
- For premium accuracy and highest process pressures; fully suitable for offshore conditions

Device properties

- Measuring tube in 25Cr Duplex, 1.4410 (UNS S32750)
- Process pressure up to PN 250, Class 1500
- Nominal diameter: DN 80 to 150 (3 to 6")
- 4-line backlit display with touch control
- Device in compact or remote version
- HART, PROFIBUS PA/DP, Modbus RS485, FF, EtherNet/IP

Your benefits

- Maximum safety – highest resistance to stress corrosion cracking
- Fewer process measuring points – multivariable measurement (flow, density, temperature)
- Space-saving installation – no in/outlet run needs
- Quality – software for filling & dosing, density & concentration, advanced diagnostics
- Flexible data transfer options – numerous communication types
- Automatic recovery of data for servicing

Table of contents

Function and system design

Measuring principle

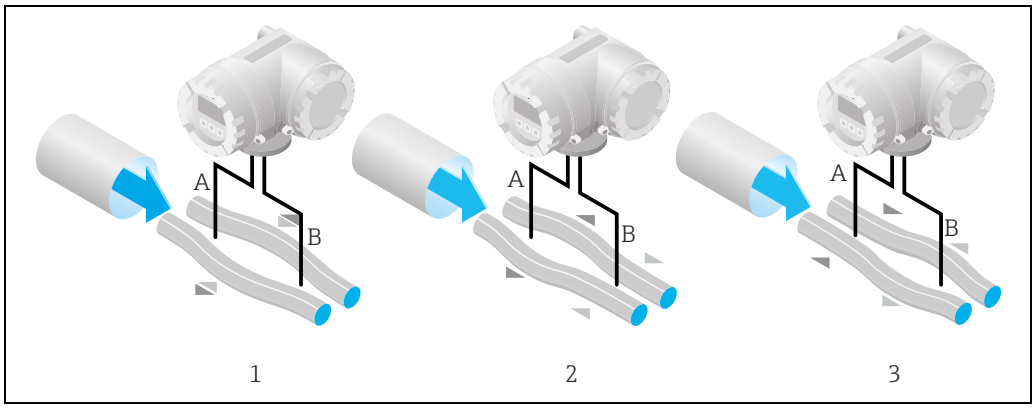
The measuring principle is based on the controlled generation of Coriolis forces. These forces are always present when both translational and rotational movements are superimposed.

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

The measuring tubes through which the measured material flows are brought into oscillation. 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. Electrodynamic 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.

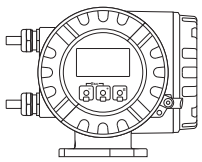
Density measurement
The measuring tubes are continuously excited at their resonance frequency. A change in the mass and thus the density of the oscillating system (comprising measuring tubes and fluid) results in a corresponding, automatic adjustment in the oscillation frequency. Resonance frequency 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.

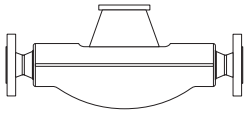
Measuring system

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 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 Promass O

 a0003673	▪ Universal sensor for fluid temperatures up to +200 °C (+392 °F). ▪ Nominal diameters DN 80 to 150 (3" to 6"). ▪ Materials: – Sensor: stainless steel, 1.4404 (316L) – Measuring tube: stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750) – Process connections: stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

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 $\dot{m}_{max(F)}$	
[mm]	[in]	[kg/h]	[lb/min]
80	3"	0 to 180000	0 to 6615
100	4"	0 to 350000	0 to 12860
150	6"	0 to 800000	0 to 29400

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:

$\dot{m}_{max(G)} = \dot{m}_{max(F)} \cdot \rho_{(G)} \div x$ [kg/m³ (lb/ft³)]

$\dot{m}_{max(G)}$ = max. full scale value for gas [kg/h (lb/min)]
$\dot{m}_{max(F)}$ = max. full scale value for liquid [kg/h (lb/min)]
$\rho_{(G)}$ = gas density in [kg/m³ (lb/ft³)] under process conditions

DN		X
[mm]	[in]	
80	3"	110
100	4"	130
150	6"	200

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

Calculation example for gas:

- Sensor type: Promass O, DN 80
- Gas: air with a density of 60.3 kg/m³ (at 20 °C and 50 bar)
- Measuring range (liquid): 180000 kg/h
- x = 110 (for Promass O, DN 80)

Max. possible full scale value:
$\dot{m}_{max(G)} = \dot{m}_{max(F)} \cdot \rho_{(G)} \div x\ [kg/m^3] = 180000\ kg/h \cdot 60.3\ kg/m^3 \div 110\ kg/m^3 = 98672\ kg/h$

Recommended measuring ranges:

See information in the "Limiting flow" Section → 19

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: ±3 to ±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: ±3 to ±30 V DC, independent of polarity.
Configurable for: totalizer reset, positive zero return, error message reset, zero point adjustment start.

Current input

Active/passive selectable, galvanically isolated, resolution: 2 µA
- Active: 4 to 20 mA, R_L < 700 Ω, U_{out} = 24 V DC, short-circuit proof
- Passive: 0/4 to 20 mA, R_i = 150 Ω, U_{max} = 30 V DC

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

Pulse/frequency output

Active/passive selectable, galvanically isolated
- Active: 24 V DC, 25 mA (max. 250 mA during 20 ms), R_L > 100 Ω
- 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)

HART protocol

Order code "Power supply; Display", option A, B, C, D, E, F, G, H, X, 7, 8 (HART 5)
- Valid until software: 3.01.XX

Order code "Power supply; Display", option P, Q, R, S, T, U, 4, 5 (HART 7)
- Valid as of software: 3.07.XX

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 → 🖹 7

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 → 🖹 7

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 → 🖹 7

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 5.01
- Function blocks:
  - 8 × Analog Input (Execution time: each 18 ms)
  - 1 × Digital Output (18 ms)
  - 1 × PID (25 ms)

  - 1 × Arithmetic (20 ms)
  - 1 × Input Selector (20 ms)
  - 1 × Signal Characterizer (20 ms)
  - 1 × Integrator (18 ms)
- Number of VCRs: 38
- Number of link objects in VFD: 40
- 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

Relay output

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

Relay output

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

Power supply

Terminal assignment

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 characteristic for "inputs/outputs"	Terminal No. (inputs/outputs)			
	20 (+) / 21 (–)	22 (+) / 23 (–)	24 (+) / 25 (–)	26 (+) / 27 (–)
Fixed communication boards (permanent assignment)				
A	-	-	Frequency output	Current output, HART
B	Relay output	Relay output	Frequency output	Current output, HART
F	-	-	-	PROFIBUS PA, Ex i
G	-	-	-	FOUNDATION Fieldbus Ex i
H	-	-	-	PROFIBUS PA
J	-	-	+5V (ext. termination)	PROFIBUS DP
K	-	-	-	FOUNDATION Fieldbus
Q	-	-	Status input	Modbus RS485

Order characteristic for "inputs/outputs"	Terminal No. (inputs/outputs)			
	20 (+) / 21 (–)	22 (+) / 23 (–)	24 (+) / 25 (–)	26 (+) / 27 (–)
R	-	-	Current output 2 Ex i, active	Current output 1 Ex i active, 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
U	-	-	Current output 2 Ex i, passive	Current output 1 Ex i passive, HART
Flexible communication boards				
C	Relay output 2	Relay output 1	Frequency output	Current output, HART
D	Status input	Relay output	Frequency output	Current output, HART
E	Status input	Relay output	Current output 2	Current output, HART
L	Status input	Relay output 2	Relay output 1	Current output, HART
M	Status input	Frequency output 2	Frequency output 1	Current output, HART
N	Current output	Frequency output	Status input	Modbus RS485
P	Current output	Frequency output	Status input	PROFIBUS DP
V	Relay output 2	Relay output 1	Status input	PROFIBUS DP
W	Relay output	Current output 3	Current output 2	Current output 1, HART
0	Status input	Current output 3	Current output 2	Current output 1, HART
2	Relay output	Current output 2	Frequency output	Current output 1, HART
3	Current input	Relay output	Current output 2	Current output 1, HART
4	Current input	Relay output	Frequency output	Current output, HART
5	Status input	Current input	Frequency output	Current output, HART
6	Status input	Current input	Current output 2	Current output 1, HART
7	Relay output 2	Relay output 1	Status input	Modbus RS485

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

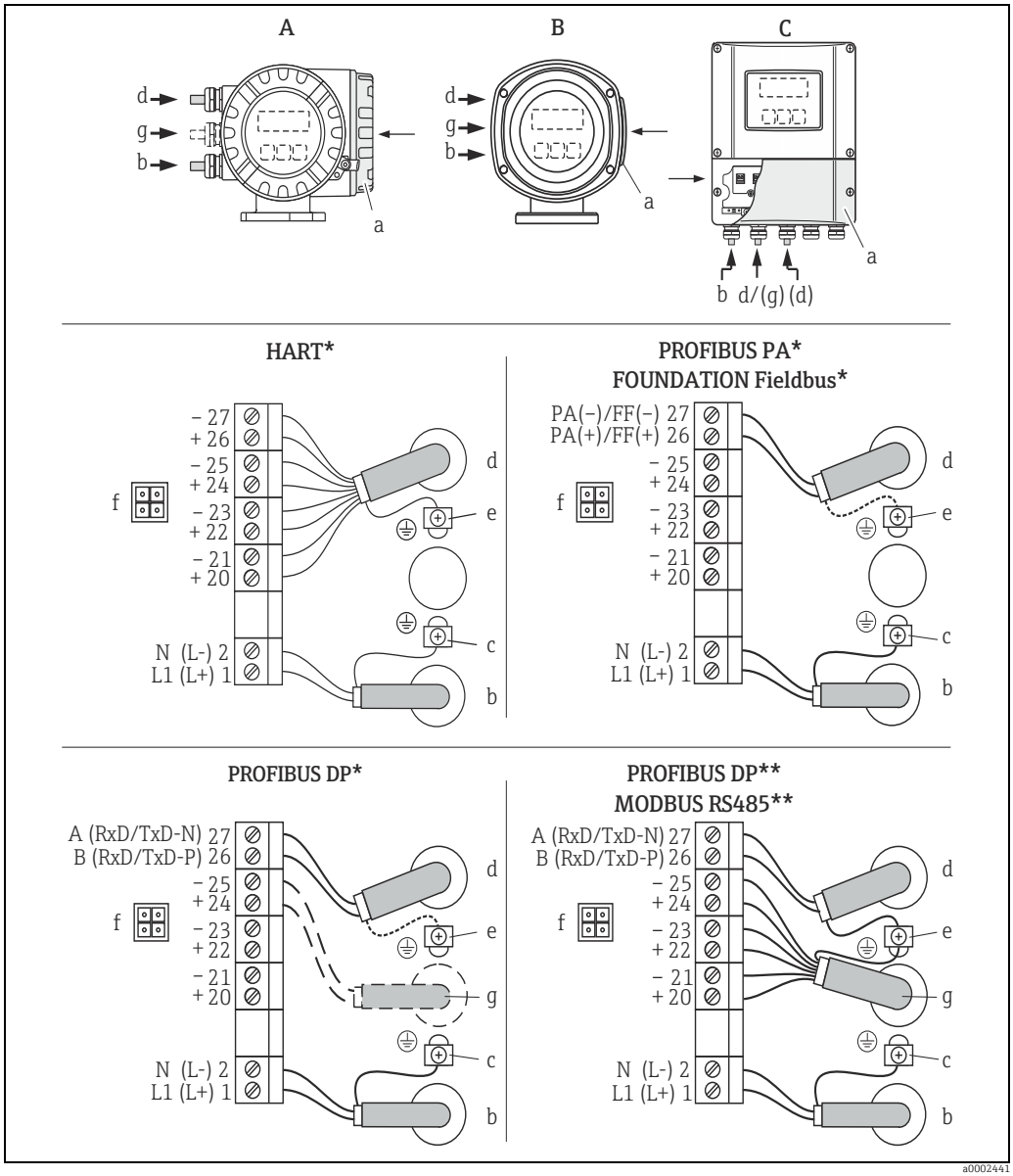
AC: <15 VA (including sensor)
DC: <15 W (including sensor)

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 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.)

Electrical connection

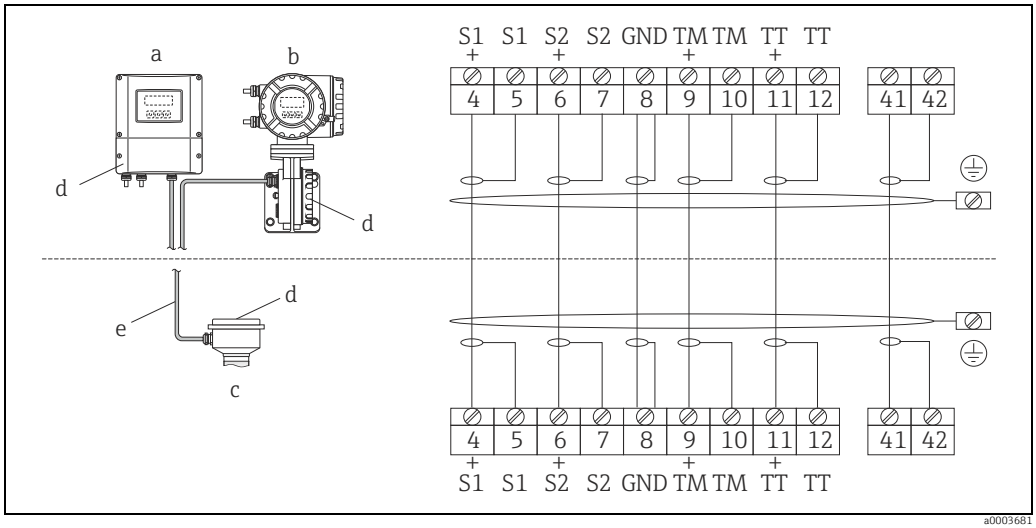


Connecting the transmitter, cable cross-section: max. 2.5 mm²

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 → 🖹 7
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 → 🖹 7
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 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 Connection housing sensor
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

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"

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

Remote version cable specification

- 6 × 0.38 mm² (PVC cable with common shield and individually shielded cores
- Conductor resistance: ≤50 Ω/km (≤0.015 Ω/ft)
- Capacitance: core/shield: ≤420 pF/m (≤128 pF/ft)
- Cable length: max. 20 m (65 ft)
- Permanent operating temperature: max. +105 °C (+221 °F)

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 EN 61326/A1, and NAMUR recommendation NE 21/43.

Performance characteristics

Reference operating conditions

- Error limits following ISO 11631
- Water, typically +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*: → 🖹 34.

Maximum measured error

Design fundamentals → 🖹 13

o.r. = of reading; 1 g/cm³= 1 kg/l; T = fluid temperature

Base accuracy

Mass flow and volume flow (liquids)

- ±0.05% o.r. (PremiumCal for mass flow)
- ±0.10% o.r.

Mass flow (gases)

±0.35% o.r.

Density (liquids)

- Reference conditions: ±0.0005 g/cm³
- Field density calibration: ±0.0005 g/cm³ (valid after field density calibration under process conditions)
- Standard density calibrations: ±0.01 g/cm³ (valid over the entire measuring range of the sensor → 🖹 17)
- Special density calibration: ±0.001 g/cm³ (optional, valid range: +5 to +80 °C (+41 to +176 °F) and 0.0 to 2.0 g/cm³)

Temperature

±0.5 °C ± 0.005 · T °C (±1 °F ± 0.003 · (T - 32) °F)

Zero point stability

DN		Zero point stability	
[mm]	[in]	[kg/h]	[lb/min]
80	3"	9.00	0.330
100	4"	14.00	0.514
150	6"	32.00	1.17

Flow values

Flow values as turndown parameter depending on nominal diameter.

SI units

DN [mm]	1:1 [kg/h]	1:10 [kg/h]	1:20 [kg/h]	1:50 [kg/h]	1:100 [kg/h]	1:500 [kg/h]
80	180000	18000	9000	3600	1800	360.0
100	350000	35000	17500	7000	3500	700.0
150	800000	80000	40000	16000	8000	1600

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"	6615	661.5	330.8	132.3	66.15	13.23
4"	12860	1286	643.0	257.2	128.6	25.72
6"	29400	2940	1470	588.0	294.0	58.80

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. ±0,05 % o.f.s. or ±5 µA

Pulse/frequency output

Accuracy: Max. ±50 % ppm o.r.

Repeatability

Design fundamentals → 🖹 13

o.r. = of reading; 1 g/cm³= 1 kg/l; T = fluid temperature

Base repeatability

Mass flow and volume flow (liquids)

- ±0.025% o.r. (PremiumCal, for mass flow)
- ±0.05% o.r.

Mass flow (gases)

±0.25% o.r.

Density (liquids)

±0.00025 g/cm³

Temperature

±0.25 °C ± 0.0025 · T °C (±0.45 °F ± 0.0015 · (T − 32) °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 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 ±0.0002% of the full scale value/°C (±0.0001% of the full scale value/°F).

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		[% o.r./bar]
[mm]	[in]	
80	3"	−0.0055
100	4"	−0.0035
150	6"	−0.002

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 → 🖹 11)
ZeroPoint = zero point stability

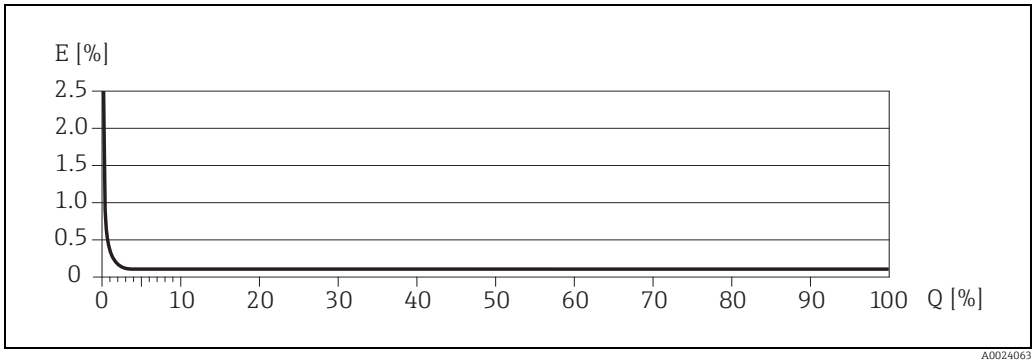
Calculation of the maximum measured error depending on flowrate

Flowrate (in flow units consistent with the zero point stability value → 🖹 11)	Maximum measured error in % o.r.
$\geq \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$ A0021332	$\pm \text{BaseAccu}$ A0021339
$< \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$ A002133	$\pm \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100$ A0021334

Calculation of the repeatability depending on flowrate

Flowrate (in flow units consistent with the zero point stability value → 🖹 11)	Repeatability in % o.r.
$\geq \frac{½ \cdot \text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100$ A0021335	$\pm \text{BaseRepeat}$ A0021340
$< \frac{½ \cdot \text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100$ A0021336	$\pm ½ \cdot \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100$ A0021337

Example for maximum measured error



A0024063

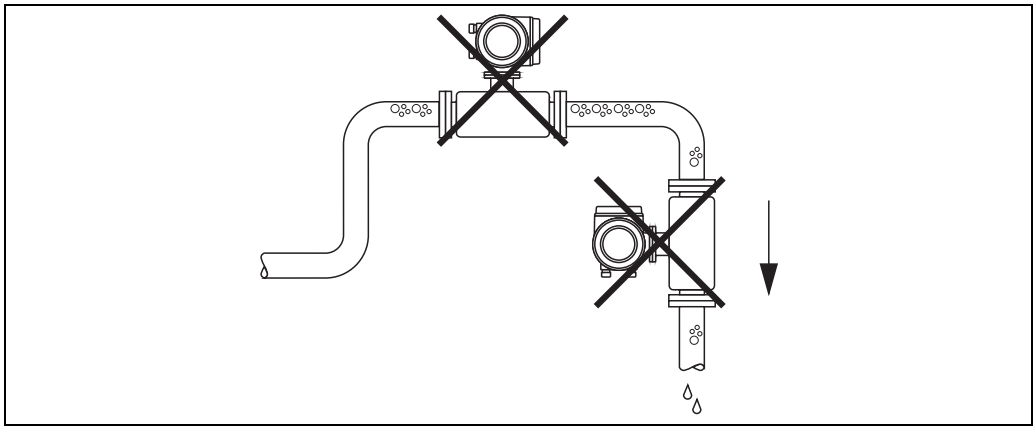
E = Error: Maximum measured error as % o.r.

Q = Flow rate as %

Installation

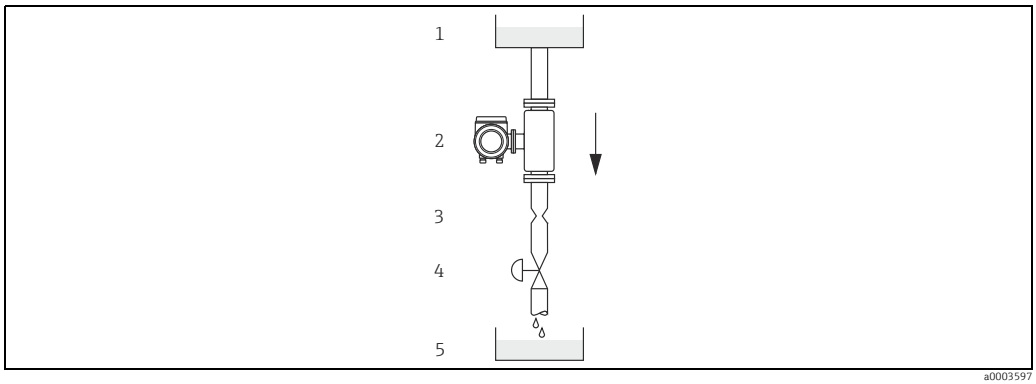
Mounting location

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



a0003605

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.



a0003597

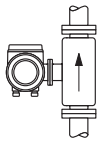
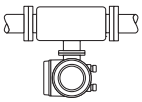
Installation in a down pipe (e.g. for batching applications)

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

DN		Ø Orifice plate, pipe restriction	
[mm]	[in]	[mm]	[in]
80	3"	50	2.00
100	4"	65	2.60
150	6"	90	3.54

Orientation

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

Orientation	Vertical	Horizontal, Transmitter head up	Horizontal, Transmitter head down
	 a0004572 *View V*	 a0004576 *View H1*	 a0004580 *View H2*
Standard, Compact version	✓✓	✓✓	✓✓
Standard, Remote version	✓✓	✓✓	✓✓

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

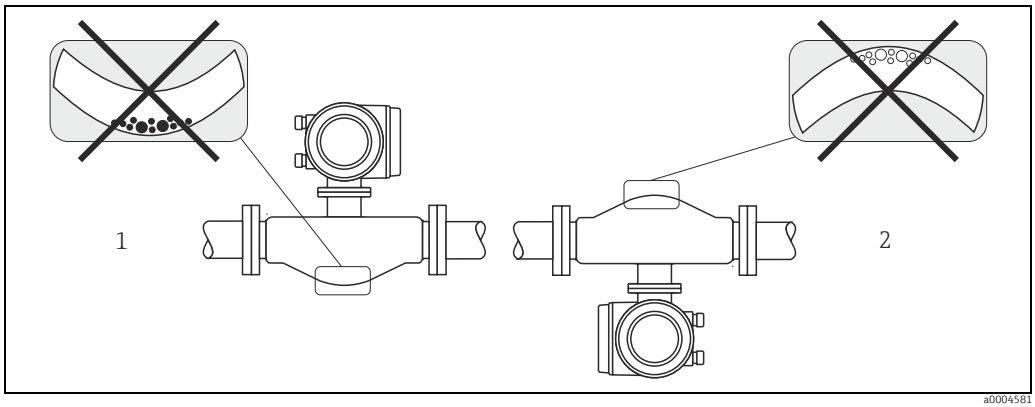
Vertical (View V)

Recommended orientation with upward direction of flow (View V). 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 build-up.

Horizontal (Views 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 (Views H1, H2). Always avoid having the transmitter housing in the same horizontal plane as the pipe.

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



a0004581

Horizontal installation

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.
- For mechanical reasons and to protect the pipe, support is recommended for heavy sensors.

Inlet and outlet runs

There are no installation requirements regarding inlet and outlet runs.

Length of connecting cable

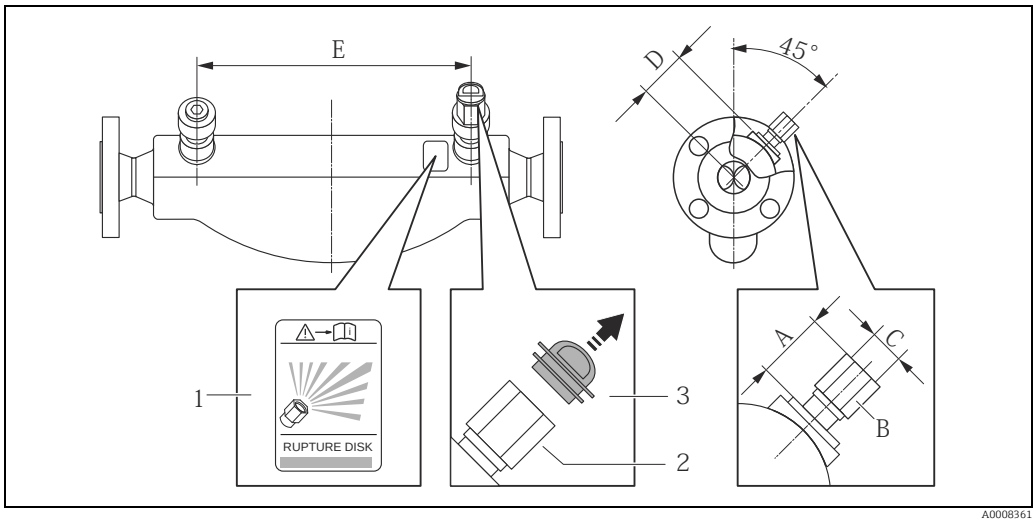
max. 20 m (65 ft), remote version

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 beside it. For additional information that is relevant to the process (→ 29).

The existing connecting nozzles are not designed for a rinse or pressure monitoring function.



1 Indication label for the rupture disk

2 ½" NPT internal screw thread with 1" width across flat

3 Transport protection

DN		E		F	G	H		L	
[mm]	[in]	[mm]	[in]			[mm]	[in]	[mm]	[in]
80	3"	approx. 42	approx. 1.65	SW 1"	½"-NPT	101	3.98	560	22.0
100	4"	approx. 42	approx. 1.65	SW 1"	½"-NPT	120	4.72	684	27.0
150	6"	approx. 42	approx. 1.65	SW 1"	½"-NPT	141	5.55	880	34.6

Zero point adjustment

All measuring devices are calibrated to state-of-the-art technology. Calibration takes place under reference operating conditions → 10. 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 and 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 +176 °F), preferably +20 °C (+68 °F)

Degree of protection

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

Shock resistance

In accordance with IEC/EN 60068-2-31

Vibration resistance

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

Electromagnetic compatibility (EMC)

To IEC/EN 61326 and NAMUR Recommendation NE 21

Process

Medium temperature range

Sensor

−40 to +200 °C (−40 to +392 °F)

Fluid density range

0 to 5000 kg/m^3 (0 to 312 lb/ft^3)

Medium pressure range (nominal pressure)

Flanges
- According to DIN PN 160, PN 250
- According to ASME B16.5 Cl 900, Cl 1500

Secondary containment pressure rating

The sensor housing is filled with dry nitrogen and protects the electronics and mechanics inside.

The following secondary containment pressure rating is only valid for a fully welded sensor housing and/or a device equipped with closed purge connections (never opened, as delivered).

Nominal pressure according to ASME BPVC.

DN		Secondary containment rating (designed with a safety factor ≥ 4)		Burst pressure of secondary containment	
[mm]	[in]	[bar]	[psi]	[bar]	[psi]
80	3"	16	232	95	1440
100	4"	16	232	90	1360
150	6"	16	232	85	1270

Note!
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 → 📄 20).

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 (72.5 psi).

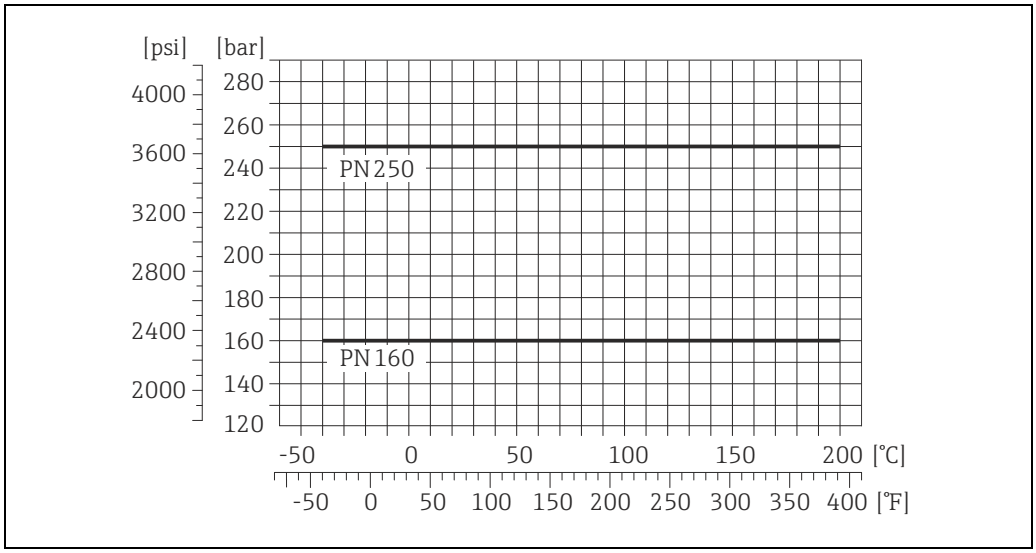
If a device equipped with purge connections is connected to the purge system, the maximum pressure rating is defined by the purge system itself or the device, whichever is lower. If the device is equipped with a rupture disk, the maximum pressure rating is defined by the rupture disk properties (→ 📄 29).

Pressure-temperature ratings

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

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

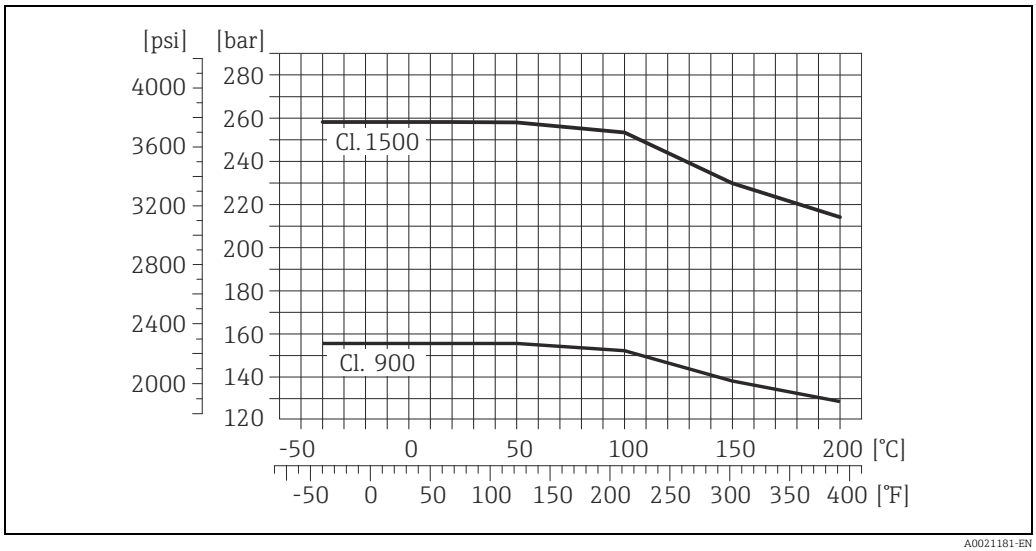
Flange material: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)



A0015620

Flange connection according to ASME B16.5

Flange material: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)



A0021181-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: (→ 🖹 19).
Rupture disks cannot be combined with the separately available heating jacket (→ 🖹 33).

Limiting flow

See information in the "Measuring range" Section → 🖹 4

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 (<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 (→ 🖹 34).

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

Heating

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

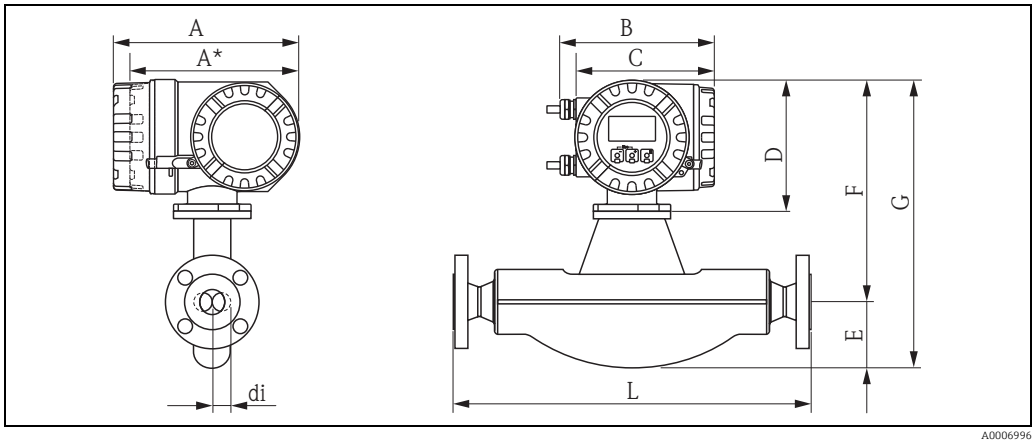
Caution!
- Risk of electronics overheating! Make sure that the maximum permissible ambient temperature for the transmitter is not exceeded. Consequently, make sure that the adapter between sensor and transmitter and the connection housing of the remote version always remain free of insulating material. Note that a certain orientation might be required, depending on the fluid temperature → 🖹 17. For fluid temperature of 150°C (302°F) or above the usage of the remote version with separate connection housing is recommended.
- When using electrical heat tracing whose heat is regulated using phase control or by pulse packs, it cannot be ruled out that the measured values are influenced by magnetic fields which may occur, (i.e. at values greater than those permitted by the EC standard (Sinus 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 privileged direction (e.g. V330-35A) with the following properties:
  - Relative magnetic permeability $\mu_r \geq 300$
  - Plate thickness $d \geq 0.35$ mm ($d \geq 0.01$")
- Information on permissible temperature ranges → 🖹 17

Mechanical construction

Design, dimensions

Dimensions:	
Field housing compact version, powder-coated die-cast aluminum	→ 21
Field housing compact version, powder-coated die-cast aluminum (II2G/Zone1)	→ 22
Transmitter compact version, stainless steel	→ 23
Transmitter remote version, connection housing (II2G/Zone 1)	→ 23
Transmitter remote version, wall-mount housing (non Ex-zone and II3G/Zone 2)	→ 24
Sensor remote version, connection housing	→ 25
Process connections in SI units	
Flange connections EN (DIN)	→ 26
Flange connections ASME B16.5	→ 27
Process connection in US units	
Process connections in US units	→ 28
Purge connections / secondary containment monitoring	→ 29

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



A0006996

Dimensions in SI units

DN	A	A*	B	C	D	E	F	G	L	di
80	227	207	187	168	160	200	305	505	1)	1)
100	227	207	187	168	160	254	324	578	1)	1)
150	227	207	187	168	160	378	362	740	1)	1)

*Blind version (without display
1) dependent on respective process connection
All dimensions in [mm];

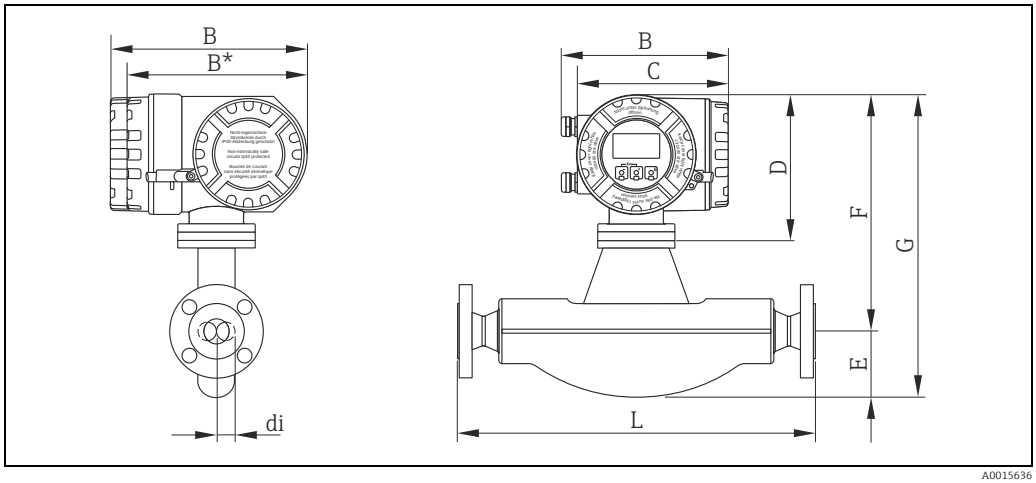
Dimensions in US units

DN	A	A*	B	C	D	E	F	G	L	di
3"	8.94	8.15	7.68	6.61	6.30	7.87	12.0	19.9	1)	1)
4"	8.94	8.15	7.68	6.61	6.30	10.0	12.8	22.8	1)	1)
6"	8.94	8.15	7.68	6.61	6.30	14.9	14.3	29.1	1)	1)

*Blind version (without display
1) dependent on respective process connection
All dimensions in [in];

Note!
Dimensions for transmitters II2G/Zone 1 → 22

Field housing compact version, powder-coated die-cast aluminum (II2G/Zone1)



A0015636

Dimensions in SI units

DN	A	A*	B	C	D	E	F	G	L	di
80	240	217	206	186	178	200	323	523	1)	1)
100	240	217	206	186	178	254	342	589	1)	1)
150	240	217	206	186	178	378	380	758	1)	1)

*Blind version (without display)
1) dependent on respective process connection
All dimensions in [mm];

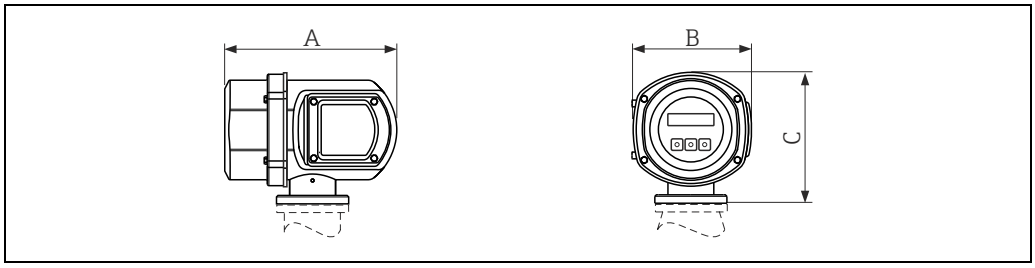
Dimensions in US units

DN	A	A*	B	C	D	E	F	G	L	di
3"	9.45	8.54	8.11	7.32	7.01	7.87	12.72	20.59	1)	1)
4"	9.45	8.54	8.11	7.32	7.01	10.00	13.46	23.19	1)	1)
6"	9.45	8.54	8.11	7.32	7.01	14.88	14.96	29.84	1)	1)

*Blind version (without display
1) dependent on respective process connection
All dimensions in [in];

Note!
Dimensions for remote version II2G/Zone 1 → 23

Transmitter compact version, stainless steel

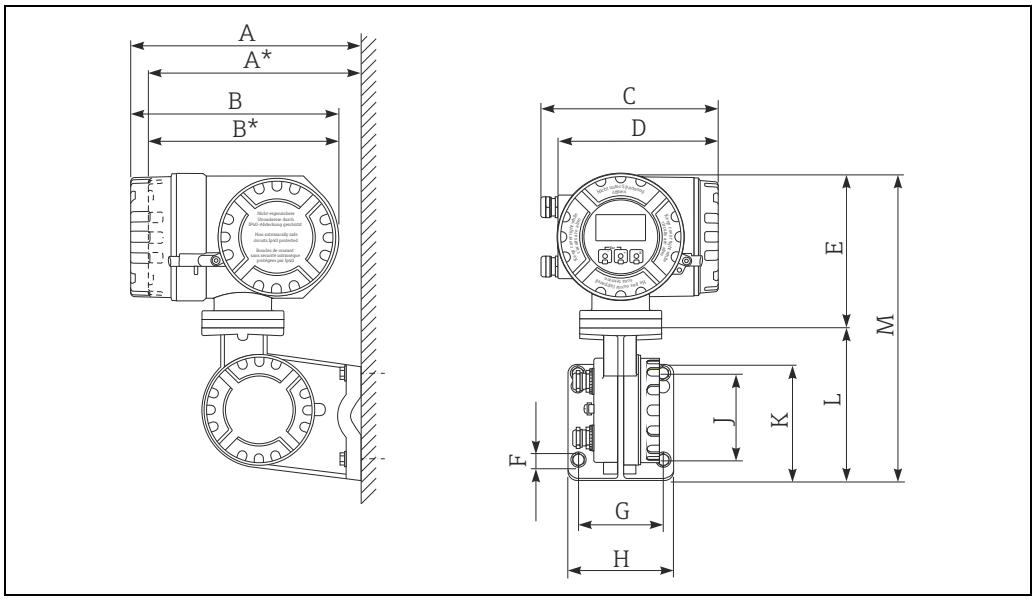


a0002245

Dimensions in SI and US units

A		B		C	
[mm]	[in]	[mm]	[in]	[mm]	[in]
225	8.86	153	6.02	168	6.61

Transmitter remote version, connection housing (II2G/Zone 1)



a0002128

Dimensions in SI units

A	A*	B	B*	C	D	E	F Ø	G	H	J	K	L	M
265	242	240	217	206	186	178	8.6 (M8)	100	130	100	144	170	348

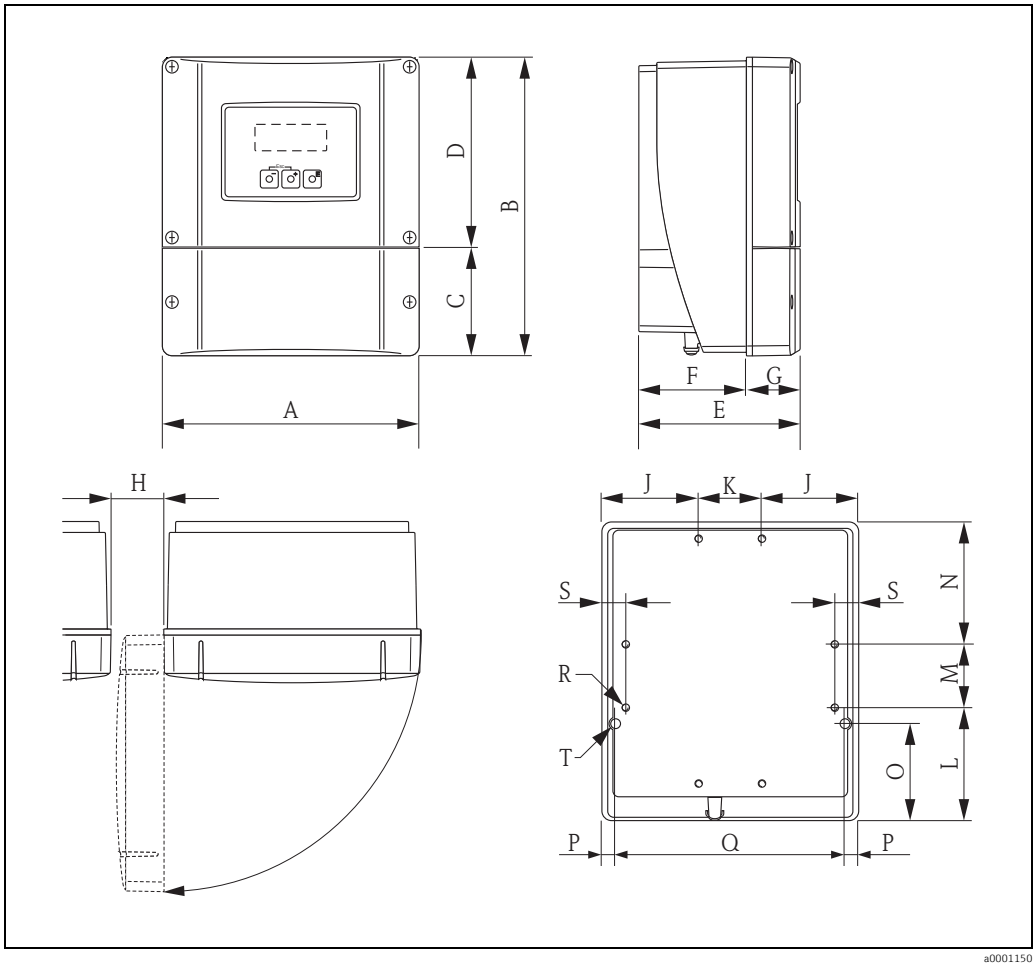
* Blind version (without display)
All dimensions in [mm]

Dimensions in US units

A	A*	B	B*	C	D	E	F Ø	G	H	J	K	L	M
10.4	9.53	9.45	8.54	8.11	7.32	7.01	0.34 (M8)	3.94	5.12	3.94	5.67	6.69	13.7

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

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



a0001150

Dimensions in SI units

A	B	C	D	E	F	G	H	J	K
215	250	90.5	159.5	135	90	45	>50	81	53
L	M	N	O	P	Q	R	S	T [1]	
95	53	102	81.5	11.5	192	8 × M5	20	2 × Ø 6.5	

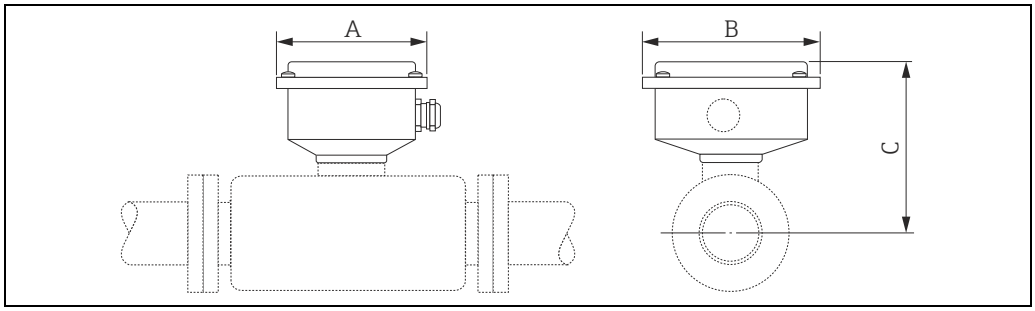
[1] Fixing bolt for wall assembly: M6 (screw head max. 10.5 mm)
All dimensions in [mm]

Dimensions in US units

A	B	C	D	E	F	G	H	J	K
8.46	9.84	3.56	6.27	5.31	3.54	1.77	>1.97	3.18	2.08
L	M	N	O	P	Q	R	S	T [1]	
3.74	2.08	4.01	3.20	0.45	7.55	8 × M5	0.79	2 × Ø 0.26	

[1] Fixing bolt for wall assembly: M6 (screw head max. 0.41 in)
All dimensions in [in]

Sensor remote version, connection housing



a0002516

Dimensions in SI units

DN	A	B	C
80	118.5	137.5	152
100	118.5	137.5	171
150	118.5	137.5	209

All dimensions in [mm]

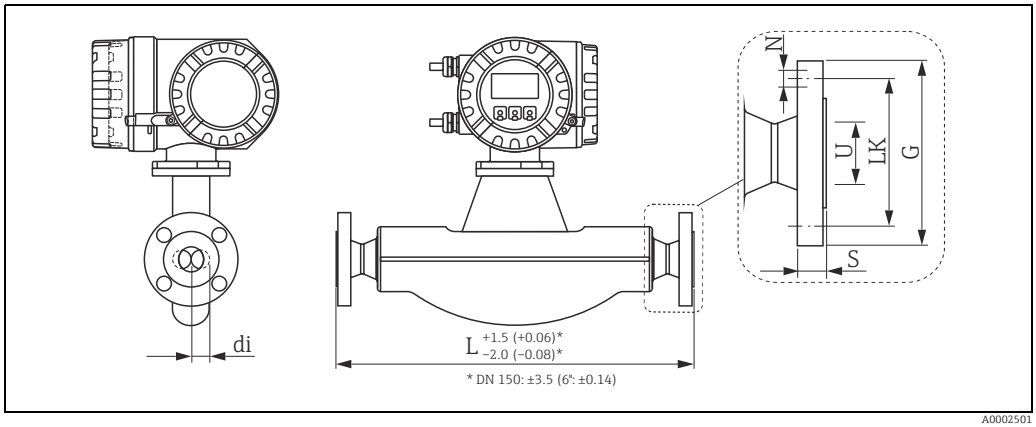
Dimensions in US units

DN	A	B	C
3"	4.67	5.41	6.08
4"	4.67	5.41	6.84
6"	4.67	5.41	8.36

All dimensions in [in]

Process connections in SI units

Flange connections EN (DIN), ASME B16.5



Dimension unit in mm (in)

Flange connections EN (DIN)

Flange according to EN 1092-1 (DIN 2501) / PN 160: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750) Optionally supplied with or without notch (Form D). Surface roughness (flange): EN 1092-1 Form B2 or Form D (DIN 2526 Form E), Ra 0.8 to 3.2 µm							
DN	**G**	**L**	**N**	**S**	**LK**	**U**	**di**
80	230	916	8 × Ø 26	36	180	80.9	38.5
100	265	1208	8 × Ø 30	40	210	104.3	49.0
150	355	1476	12 × Ø 33	50	290	155.7	66.1

All dimensions in [mm]

Flange according to EN 1092-1 (DIN 2501) / PN 250: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750) Optionally supplied with or without notch (Form D). Surface roughness (flange): EN 1092-1 Form B2 or Form D (DIN 2526 Form E), Ra 0.8 to 3.2 µm							
DN	**G**	**L**	**N**	**S**	**LK**	**U**	**di**
80	255	948	8 × Ø 30	46	200	77.7	38.5
100	300	1248	8 × Ø 33	54	235	100.3	49.0
150	390	1540	12 × Ø 36	68	320	148.3	66.1

All dimensions in [mm]

Flange connections ASME B16.5

Flange according to ASME B16.5 / Cl 900 Sched 40/Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U		di
						Sched 40	Sched 80	
80	241.3	962	8 × Ø 25.4	45.1	190.5	78.0	73.7	38.5
100	292.1	1251	8 × Ø 31.8	51.4	234.9	102.4	97.3	49.0
150	381.0	1513	12 × Ø 31.8	62.6	317.5	154.1	146.3	66.1

All dimensions in [mm]

Flange according to ASME B16.5 / Cl 1500 Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
80	266.7	993	8 × Ø 31.8	54.8	203.2	73.7	38.5
100	311.2	1270	8 × Ø 35.1	60.8	241.3	97.3	49.0
150	393.7	1577	12 × Ø 38.1	89.6	317.5	146.3	66.1

All dimensions in [mm]

RTJ-Flange according to ASME B16.5 / Cl 900 Sched 40/Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U		di
						Sched 40	Sched 80	
80	241.3	963	8 × Ø 25.4	46.0	190.5	78.0	73.7	38.5
100	292.1	1252	8 × Ø 31.8	52.3	234.9	102.4	97.3	49.0
150	381.0	1515	12 × Ø 31.8	63.5	317.5	154.1	146.3	66.1

All dimensions in [mm]

RTJ-Flange according to ASME B16.5 / Cl 1500 Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

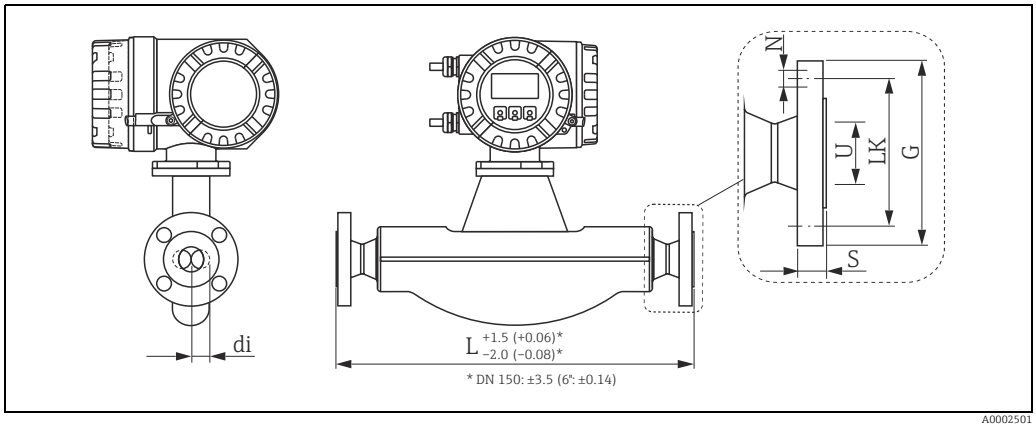
Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
80	266.7	995	8 × Ø 31.8	55.7	203.2	73.7	38.5
100	311.2	1272	8 × Ø 35.1	61.7	241.3	97.3	49.0
150	393.7	1582	12 × Ø 38.1	92.1	317.5	146.3	66.1

All dimensions in [mm]

Process connections in US units

Flange connections ASME B16.5



Dimension unit in mm (in)

Flange according to ASME B16.5 / Cl 900 Sched 40/Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U		di
						Sched 40	Sched 80	
3"	9.50	37.87	8 × Ø 1.00	1.78	7.50	3.07	2.90	1.52
4"	11.50	49.25	8 × Ø 1.25	2.02	9.25	4.03	3.83	1.93
6"	15.00	59.57	12 × Ø 1.25	2.46	12.50	6.07	5.76	2.60

All dimensions in [in]

Flange according to ASME B16.5 / Cl 1500 Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

DN	G	L	N	S	LK	U	di
3"	10.50	39.09	8 × Ø 1.00	2.16	8.00	2.90	1.52
4"	12.25	50.00	8 × Ø 1.38	2.39	9.50	3.83	1.93
6"	15.50	62.09	12 × Ø 1.50	3.53	12.50	5.76	2.60

All dimensions in [in]

RTJ-Flange according to ASME B16.5 / Cl 900 Sched 40/Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Surface roughness (flange): Ra 3.2 to 6.3 µm

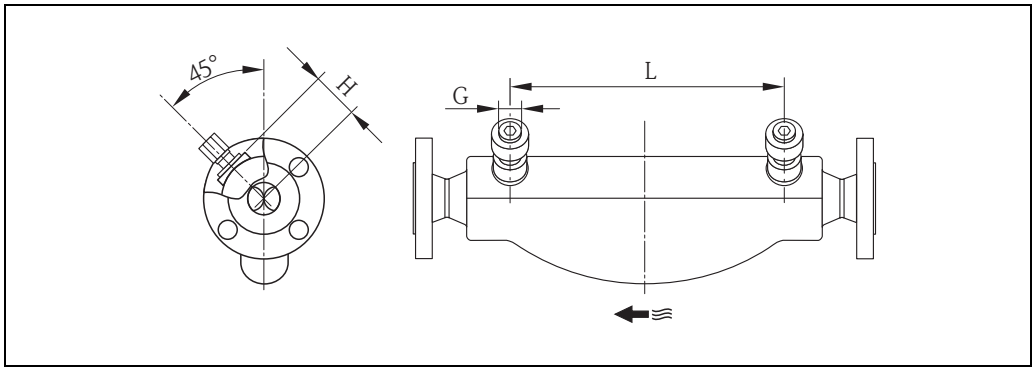
DN	G	L	N	S	LK	U		di
						Sched 40	Sched 80	
3"	9.50	37.91	8 × Ø 1.00	1.81	7.50	3.07	2.90	1.52
4"	11.50	49.29	8 × Ø 1.25	2.06	9.25	4.03	3.83	1.93
6"	15.00	59.65	12 × Ø 1.25	2.50	12.50	6.07	5.76	2.60

All dimensions in [in]

RTJ-Flange according to ASME B16.5 / Cl 1500 Sched 80: 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750) Surface roughness (flange): Ra 3.2 to 6.3 µm							
DN	**G**	**L**	**N**	**S**	**LK**	**U**	**di**
80	10.50	39.17	8 × Ø 1.00	2.19	8.00	2.90	1.52
100	12.25	50.08	8 × Ø 1.38	2.43	9.50	3.83	1.93
150	15.50	62.28	12 × Ø 1.50	3.63	12.50	5.76	2.60

All dimensions in [in]

Purge connections / secondary containment monitoring



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DN		G	H		L	
[mm]	**[in]**		**[mm]**	**[in]**	**[mm]**	**[in]**
80	3"	½"-NPT	101	3.98	560	22.0
100	4"	½"-NPT	120	4.72	684	27.0
150	6"	½"-NPT	141	5.55	880	34.6

Weight

- Compact version: see tables below
- Remote version
  - Transmitter: see the tables below
  - Wall-mount housing: 5 kg (11 lbs)
  - Compact version Ex d (stainless steel): + 9kg (+ 20 lb)

Weight information in SI units

DN [mm]	80	100	150
Compact version	75	141	246
Remote version	73	139	244

All values (weight) refer to devices with Cl 900 flanges according to ASME
Weight information in [kg]

Weight information in US

DN [in]	3"	4"	6"
Compact version	165	311	542
Remote version	161	306	538

All values (weight) refer to devices with Cl 900 flanges according to ASME
Weight information in [lbs]

Material

Transmitter housing

Compact version
- Stainless steel housing: stainless steel, 1.4301 (304)
- Stainless steel housing (II2G/Zone 1): stainless steel, 1.4404 (316/316L)
- Powder coated die-cast aluminum
- Window material: Glass or polycarbonate

Remote version
- Remote field housing: powder coated die-cast aluminum
- Wall-mount housing: powder coated die-cast aluminum
- Window material: Glass

Sensor housing / containment

- Acid and alkali-resistant outer surface
- Stainless steel, 1.4404 (316L)

Connection housing, sensor (remote version)

- Stainless steel, 1.4301 (304) (standard)
- Powder coated die-cast aluminum

Process connections

Flanges according to EN 1092-1 (DIN 2501) / according to ASME B16.5:
- Stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Measuring tubes

- Stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S32750)

Process connections

Welded process connections

Flanges according to EN 1092-1 (DIN 2501) and according to ASME B16.5

Operability

Local operation

Display elements

- Liquid-crystal display: backlit and four lines with 16 characters per line.
- Selectable display of different measured values and status variables.
- At ambient temperatures below −20 °C (−4 °F) the readability of the display may be impaired.

Operating elements

- Local operation with three optical keys (⊟⊞Ⓔ).
- Application-specific Quick Setup menus for straightforward commissioning.

Language group

Language groups available for operation in different countries:

Valid until software version 3.01.xx			
Order code	**Option**		**Inhalt**
Power Supply; Display	WEA	Western Europe and America	English, German, Spanish, Italian, French, Dutch and Portuguese
	EES	Eastern Europe and Scandinavia	English, Russian, Polish, Norwegian, Finnish, Swedish and Czech
	SEA	South and East Asia	English, Japanese, Indonesian
	CN	China	English, Chinese

Valid as of software version 3.07.xx		
Order code	**Option**	**Inhalt**
Power Supply; Display	P, Q	English, German, Spanish, Italian, French
	R, S	English, Russian, Portuguese, Dutch, Czech
	T, U	English, Japanese, Swedish, Norwegian, Finnish
	4, 5	English, Chinese, Indonesian, Polish

You can change the language group via the operating program "FieldCare".

Remote operation

Remote operation via HART, PROFIBUS DP/PA, FOUNDATION Fieldbus, Modbus RS485

Certificates and approvals

CE mark

The measuring system is in conformity with the statutory requirements of the EC Directives. 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 Sales Center on request. All explosion protection data are contained in separate explosion protection documentation which you can order if required.

Functional safety

SIL -2: accordance IEC 61508/IEC 61511-1 (FDIS)

"4–20 mA" - output according to the following options in the order characteristic for "Input/Output": A, B, C, D, E, L, M, R, S, T, U, W, 0, 2, 3, 4, 5, 6.
See also "Terminal assignment" → 7

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 5.01(Certification on request)
- 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.

Pressure equipment directive

The measuring devices can be ordered with or without PED (Pressure Equipment Directive). If a device with PED is required, this must be ordered explicitly.

- With the identification PED/G1/III on the sensor nameplate, confirms conformity with the "Basic safety requirements" of Appendix I of the Pressure Equipment Directive 97/23/EC.
- Devices with this identification (with PED) are suitable for the following types of fluid:
  - Fluids of Group 1 and 2 with a steam pressure of greater, or less than and equal to 0.5 bar (7.3 psi)
  - Unstable gases
- Devices without this identification (without PED) are designed and manufactured according to good engineering practice. They correspond to the requirements of Art. 3, Section 3 of the Pressure Equipment Directive 97/23/EC. Their application is illustrated in Diagrams 6 to 9 in Appendix II of the Pressure Equipment Directive 97/23/EC.

Optionally flowmeters in accordance to the guidelines AD 2000 are available on request.

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code)
- EN 61010-1
  Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures
- EN 61508
  Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems
- 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 r website: → Select country → Instruments → Select device → Product page function: Configure this product
-

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
-

Accessories

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

Device-specific accessories

For the Transmitter

Accessories	Description
Transmitter	Transmitter for replacement or for stock. Use the order code to define the following specifications: ▪ Approvals ▪ Degree of protection / version ▪ Cable entries, ▪ Display / power supply / operation ▪ Software ▪ Outputs / inputs
Inputs/outputs for Proline Promass 83 HART	Conversion kit with appropriate plug-in point modules for converting the input/ output configuration in place to date to a new version.
Software packages for Proline Promass 83	Software add-ons on F-Chip, can be ordered individually: ▪ Advanced diagnostics ▪ Batching functions ▪ Concentration measurement
Mounting set for transmitter	Mounting set for wall-mount housing (remote version). Suitable for: ▪ Wall mounting ▪ Pipe mounting ▪ Installation in control panel Mounting set for aluminum field housing: Suitable for pipe mounting (3/4" to 3")

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 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 yourpresentative 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.

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70 Казахстан +7(7172)727-132 Киргизия +996(312)96-26-47

эл.почта: ehr@nt-rt.ru || сайт: https://endcounters.nt-rt.ru/