

■ Intuitive operation

- The "Easy Set-up" function guides you through the menu step by step, enabling easy, quick, and reliable parameterization. The softkey-based functionality makes handling a breeze - it's just like using a cell phone.

■ Non-contact buttons

- Enable the device to be parameterized without the need to open the housing

■ Diagnostics for real-life situations

- Operational reliability monitoring for the device and the industrial process. Status messages are classified in accordance with NAMUR recommendations. Diagnostics-related help text on the display facilitates troubleshooting.

■ Maximum measuring accuracy

- Modern filtering methods allow maximum accuracy (max. measuring error: 0.2 % of measured value)

■ Universal transmitter

- Reduces spare parts inventory costs and storage costs

■ Flowmeter sensor featuring state-of-the-art memory technology

- Prevents errors and enables quick and reliable commissioning

■ Approvals for explosion protection

- In accordance with ATEX, IECEx
- In accordance with FM, cFM



**A first-class choice for
all hygienic applications**

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications. As part of ABB, a world leader in process automation, we offer customers application expertise, service and support worldwide. We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support. The quality, accuracy and performance of the company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology. Over ten flow calibration plants are operated by ABB, which is indicative of our dedication to quality and accuracy.

Introduction

Setting the Standard

HygienicMaster is designed specifically for the food & beverage, pharmaceutical industries. Manufactured from FDA approved materials and certified in accordance with 3A, HygienicMaster sets a new benchmark.

It is packed with advanced features and functionality that enable you to operate more efficiently, reduce costs and increase profitability.

State-of-the-art Diagnostics and Simplified Troubleshooting

HygienicMaster monitors its own operability and your process.

The diagnostic parameters can be set to a limit value and an alarm can be activated as soon as the limit is exceeded.

The infrared port makes the export of recorded data for further analysis and evaluation very easy. This enables the identification and elimination of critical factors at an early stage. As a result, the process can be optimized for greater productivity and less downtime.

In accordance with NAMUR NE107, alarms and warnings are classified with the status classifications such as 'maintenance required,' 'function check,' 'failure,' and 'outside of specification.'

In an alarm situation, the display simplifies troubleshooting by indicating the steps to be taken to solve the problem.

Superior control through advanced sensor design

The variable process connections simplify installation, reduce inventory requirements, lower replacement costs and provide a great deal of flexibility.

The reinforced PFA liner improves vacuum stability and prevents potential liner deformation. The sensor is fully CIP/SIP cleanable. Using advanced filtering, HygienicMaster improves accuracy by separating the noise from the electrode signal. This leads to an accuracy of up to $\pm 0.2\%$.

All Data is stored in the right place – the Sensor

Advanced data storage inside the sensor eliminates the need to match sensor and transmitter in the field. The on-board sensor memory eliminates the opportunity for errors.

On initial installation, the self-configuration sequence automatically replicates all data into the transmitter leading to increased speed of start-up. The redundant data in both the sensor and the transmitter memory is continually updated during all operations to ensure total integrity of the measurement.

Intuitive navigation and configuration

The user-friendly interface allows quick and simple data entry for all parameters. „Easy Set-up“ guides the operator step-by-step through the menu to set parameters as fast as possible, thereby simplifying the commissioning phase.

With the softkey functionality, the configuration is as simple as using a mobile phone.

Powerful and flexible transmitter

The backlit, graphical display can be easily rotated through 270 degrees without the need for any tools.

'Through-the-glass' control allows access to the meter in hazardous areas without the need to remove the cover.

The ABB universal Human Machine Interface (HMI) simplifies operation, maintenance and training; thereby reducing cost of ownership and providing one common user experience.

All product versions utilize a common electronics cartridge to simplify installation and reduce the number of spare parts. The same cartridge is used in both integral and remote installations and features active/passive current and pulse outputs. Standard HART protocol enables online modification and monitoring of parameters.

HygienicMaster is a universal device according to the pressure equipment directive.

In compliance with the requirements of NAMUR, the devices are categorized under category III for pipelines. This means that they can be used anywhere. This reduces inventory stock costs and increases safety.




Assured Quality

HygienicMaster is designed and manufactured in accordance with international quality procedures (ISO 9001) and all flowmeters are calibrated on nationally-traceable calibration rigs to provide the enduser with complete assurance of both quality and performance of the meter.

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1 HygienicMaster - Overview of technology

| Overview of models | | |
|---|--|---|
| Compact design | Design with remote transmitter | |
| FEH311 (without explosion protection) FEH315 (with explosion protection) | FEH321 (without explosion protection) FEH325 (with explosion protection) | FET321 (without explosion protection) FET325 (with explosion protection) |
|  G00574 |  G00576 Flowmeter sensor |  G00490 Transmitter |
| ATEX II 3 G Ex nA nC IIC T4 ... T3 II 2 D Ex tD A21 IP6X T70 °C ... Tmedium | ATEX II 3 G Ex nA IIC T6 ... T3 II 2 D Ex tD A21 IP6X T85 °C ... Tmedium | |
| IEC Ex nA nC IIC T4 ... T3 Ex tD A21 IP6X T70 °C ... Tmedium | IEC Ex nA IIC T6 ... T3 Ex tD A21 IP6X T85 °C ... Tmedium | |
| FM NI: CL I, II / DIV2 / GP ABCDFG / T4 ... T3 CL III / DIV1, 2 / T4 ... T3 CL I ZN2 AEx nA nC IIC T4 ... T3 DIP: CL II, III / DIV1 / GP EFG / T 70 °C ... Tmedium AEx tD 21 T70 °C ... Tmedium | FM NI: CL I, II / DIV2 / GP ABCDFG / T6 ... T3 CL III / DIV1, 2 / T6 ... T3 CL I ZN2 AEx nA nC IIC T4 ... T3 DIP: CL II, III / DIV1 / GP EFG / T85 °C ... Tmedium AEx tD 21 T70 °C ... Tmedium | FM NI: CL I, II / DIV2 / GP ABCDFG / T4 CL III / DIV1, 2 / T4 DIP: CL II, III / DIV1 / GP EFG / T70 °C |
| cFM NI: CL I, II / DIV2 / GP ABCDFG / T4 ... T3 CL III / DIV1, 2 / T4 ... T3 CL I ZN2 Ex nA nC IIC T4 ... T3 DIP: CL II, III / DIV1 / GP EFG / T70 °C ... Tmedium DIP A21 T _A T70 °C ... Tmedium | cFM NI: CL I, II / DIV2 / GP ABCDFG / T6 ... T3 CL III / DIV1, 2 / T6 ... T3 CL I ZN2 Ex nA nC IIC T4 ... T3 DIP: CL II, III / DIV1 / GP EFG / T85 °C ... Tmedium DIP A21 T _A 85 °C ... Tmedium | cFM NI: CL I, II / DIV2 / GP ABCDFG / T4 CL III / DIV1, 2 / T4 DIP: CL II, III / DIV1 / GP EFG / T70 °C |

| Model number | FEH311, FEH315, FEH321, FEH325 |
|---------------------------------------|---|
| Measured value error | Standard: 0.4 % of measured value Option: 0.2 % of measured value |
| Nominal size | DN 3 ... 100 (1/10 ... 4") |
| Process connection | Wafer flange design DN 3 ... 100 (1/10 ... 4") Flange in acc. with DIN 2501/EN 1092-1 DN 3 ... 100 (1/10 ... 4"), PN 10 ... 40 Flange in acc. with ASME B16.5 DN 3 ... 100 (1/10 ... 4"), ASME CL 150, 300 Flange in acc. with JIS DN 3 ... 100 (1/10 ... 4"), 10K Threaded pipe connection in acc. with DIN 11851 DN 3 ... 100 (1/10 ... 4"), PN 10 ... 40 Weld stubs DN 3 ... 100 (1/10 ... 4"), PN 10 ... 40 Tri-Clamp in acc. with DIN 32676 DN 3 ... 100 (1/10 ... 4"), PN 10 ... 40 Tri-Clamp in acc. with ASME BPE DN 3 ... 100 (1/10 ... 4"), PN 10 ... 40 External thread in acc. with ISO 228 DN 3 ... 25 (1/10 ... 1"), PN16 |
| Lining | PFA (vacuum-tight) |
| Conductivity | > 5 µS/cm (20 µS/cm for demineralized water) |
| Electrodes | Stainless steel 1.4571 [316Ti], 1.4539 [904L], Hastelloy B, Hastelloy C, platinum-iridium, tantalum, titanium |
| Process connection material | Flange: Stainless steel 1.4571 [316Ti], variable process connections: 1.4404 |
| Protection type | IP 65, IP 67 (NEMA 4X), IP 68 |
| Medium temperature | Flange: -25 ... 180 °C (-13 ... 356 °F), variable process connections: -25 ... 130 °C (-13 ... 266 °F) |
| Approvals | |
| Explosion protection approvals | ATEX/IEC Zone 2, 21, 22 FM/cFM Div 2 |
| Pressure Equipment Directive 97/23/EC | Conformity assessment in accordance with category III, fluid group 1 |
| CRN (Canadian Reg. Number) | On request |
| Certificates | |
| | 3A, FDA-approved materials, EHEDG (cleanability) |
| Transmitter | |
| Supply power | 100 ... 230 V AC (-15/+10 %), 24 V AC (-30/+10 %), 24 V DC (-30/+30 %) |
| Current output | 4 ... 20 mA, active or passive |
| Pulse output | Can be configured locally as active or passive using software |
| Contact output | Optocoupler, programmable function |
| Contact input | Optocoupler, programmable function |
| Display | Graphical display, fully configurable |
| Housing | Compact design or design with separate transmitter |
| Communication | HART protocol (standard) |

For applications in the process industry, refer to the ProcessMaster data sheet.

2 Performance specifications

2.1 General

2.1.1 Reference conditions according to EN 29104

| | |
|-------------------------|---|
| Fluid temperature | 20 °C (68 °F) ± 2 K |
| Ambient temperature | 20 °C (68 °F) ± 2 K |
| Supply power | Nominal voltage acc. to name plate $U_n \pm 1 \%$, frequency $f \pm 1 \%$ |
| Installation conditions | <ul style="list-style-type: none"> Upstream >10 x DN, straight section Downstream >5 x DN, straight section |
| Warm-up phase | 30 min. |

2.1.2 Maximum measuring error

Pulse output

- Standard calibration:
 $\pm 0.4 \%$ of measured value, $\pm 0.02 \%$ $Q_{\max DN}$
- Optional calibration:
 $\pm 0.2 \%$ of measured value, $\pm 0.02 \%$ $Q_{\max DN}$

$Q_{\max DN}$: See table in Section 2.4, "Flowmeter sizes, Flow range".

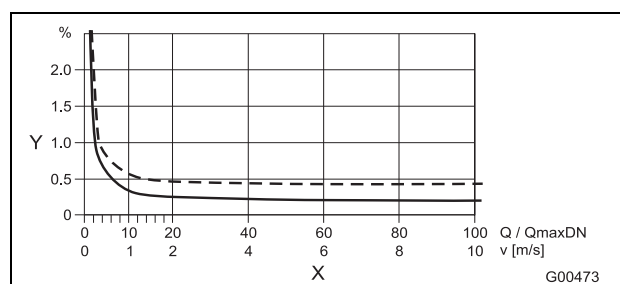


Fig. 1

Y Accuracy \pm of measured value in [%]
X Flow velocity v in [m/s], $Q/Q_{\max DN}$ [%]

Analog output effects

Same as pulse output plus $\pm 0.1 \%$ of measured value ± 0.01 mA

2.2 Reproducibility, response time

| | |
|-----------------|---|
| Reproducibility | $\leq 0.11 \%$ of measured value, $t_{\text{meas}} = 100$ s, $v = 0.5 \dots 10$ m/s |
| Response time | As step function 0 ... 99 % $5 \tau \geq 200$ ms at 25 Hz excitation frequency $5 \tau \geq 400$ ms at 12.5 Hz excitation frequency |

2.3 Transmitter

2.3.1 Electrical properties

| | |
|----------------------|--|
| Supply power | AC: 100 ... 230 V (-15 % / +10 %) AC: 24 V (-30 % / +10 %) DC: 24 V (-30 % / +30 %) Ripple: < 5 % |
| Line frequency | 47 ... 64 Hz |
| Excitation frequency | 6 1/4 Hz, 7 1/2 Hz, 12 1/2 Hz, 15 Hz, 25 Hz, 30 Hz (50/60 Hz supply power) |
| Power consumption | $S \leq 20$ VA (flowmeter sensor incl. transmitter) |
| Electr. connection | Screw terminals |

2.3.1.1 Inputs/outputs

Isolation of input/outputs

The current output, digital outputs DO1 and DO2, and digital input are electrically isolated from the flowmeter sensor input circuit and from each other.

2.3.1.2 Empty pipe detection

The "empty pipe detection" function requires:

Conductivity $\geq 20 \mu\text{S/cm}$, signal cable length ≤ 50 m (164 inch), DN \geq DN 10

2.3.2 Mechanical properties

| Compact design (transmitter mounted directly on the flowmeter sensor) | |
|--|---|
| Housing | Cast aluminum, painted |
| Paint | Paint coat 60 μm thick, RAL 9002 (light gray) |
| Cable gland | Polyamide |
| Design with external transmitter | |
| Housing | Cast aluminum, painted |
| Paint | Paint coat 60 μm thick, mid-section RAL 7012 (dark gray), front cover/rear cover RAL 9002 (light gray) |
| Cable gland | Polyamide |
| Weight | 4.5 kg (9.92 lb) |

2.3.2.1 Storage temperature, ambient temperature

Ambient temp.

-20 ... 60 °C (-4 ... 140 °F) standard
-40 ... 60 °C (-40 ... 140 °F) Advanced mode

Storage Temperature

-20 ... 70 °C (-4 ... 158 °F)

2.3.2.2 Protection class for transmitter housing

IP 65 / IP 67, NEMA 4X

2.3.2.3 Vibration according to EN 60068-2

Transmitter

- In the range 10 ... 58 Hz max. 0.15 mm (0.006 inch) deflection*
- In the range 58 ... 150 Hz max. 2 g acceleration*

* = Peak load

2.4 Flowmeter sizes, Flow range

| Meter size | | Min. flow range end value | Q _{max} _{DN} |
|------------|-------|--|---|
| DN | " | 0.02 x Q _{max} DN (≈ 0.2 m/s) | 0 ... ≈ 10 m/s |
| 3 | 1/10 | 0.08 l/min (0.02 US gal/min) | 4 l/min (1.06 US gal/min) |
| 4 | 5/32 | 0.16 l/min (0.04 US gal/min) | 8 l/min (2.11 US gal/min) |
| 6 | 1/4 | 0.4 l/min (0.11 US gal/min) | 20 l/min (5.28 US gal/min) |
| 8 | 5/16 | 0.6 l/min (0.16 US gal/min) | 30 l/min (7.93 US gal/min) |
| 10 | 3/8 | 0.9 l/min (0.24 US gal/min) | 45 l/min (11.9 US gal/min) |
| 15 | 1/2 | 2 l/min (0.53 US gal/min) | 100 l/min (26.4 US gal/min) |
| 20 | 3/4 | 3 l/min (0.79 US gal/min) | 150 l/min (39.6 US gal/min) |
| 25 | 1 | 4 l/min (1.06 US gal/min) | 200 l/min (52.8 US gal/min) |
| 32 | 1 1/4 | 8 l/min (2.11 US gal/min) | 400 l/min (106 US gal/min) |
| 40 | 1 1/2 | 12 l/min (3.17 US gal/min) | 600 l/min (159 US gal/min) |
| 50 | 2 | 1.2 m ³ /h (5.28 US gal/min) | 60 m ³ /h (264 US gal/min) |
| 65 | 2 1/2 | 2.4 m ³ /h (10.57 US gal/min) | 120 m ³ /h (528 US gal/min) |
| 80 | 3 | 3.6 m ³ /h (15.85 US gal/min) | 180 m ³ /h (793 US gal/min) |
| 100 | 4 | 4.8 m ³ /h (21.13 US gal/min) | 240 m ³ /h (1057 US gal/min) |

The flow range end value can be set between 0.02 x Q_{max} DN and 2 x Q_{max} DN.

3 Functional and technical properties - HygienicMaster

3.1 Flowmeter sensor

3.1.1 Protection type according to EN 60529

IP 65, IP 67, NEMA 4X

IP 68 (for external flowmeter sensors only)

3.1.2 Pipeline vibration according to EN 60068-2-6

The following applies to compact devices:

(transmitter mounted directly on the flowmeter sensor)

- In the 10 ... 58 Hz range with max. 0.15 mm (0.006 inch) deflection
- In the 58 ... 150 Hz range with max. 2 g acceleration

The following applies to devices with a separate transmitter:

Transmitter

- In the 10 ... 58 Hz range with max. 0.15 mm (0.006 inch) deflection
- In the 58 ... 150 Hz range with max. 2 g acceleration

Flowmeter sensor

- In the 10 ... 58 Hz range with max. 0.15 mm (0.006 inch) deflection
- In the 58 ... 150 Hz range with max. 2 g acceleration

3.1.3 Installation length

The flanged units comply with the installation lengths specified in VDI/VDE 2641, ISO 13359, or according to DVGW (process sheet W420, design WP, ISO 4064 short).

3.1.4 Signal cable (for external transmitters only)

A 5 m (16.4 ft) cable is supplied.

If you require more than 5 m (16.4 ft), a cable can be purchased using order number D173D027U01.

Preamplifier

Max. signal cable length between flowmeter sensor and transmitter:

a) Without preamplifier:

- Max. 50 m (164 ft) for conductivity $\geq 5 \mu\text{S/cm}$

A preamplifier is required for cables > 50 m (164 ft).

b) With preamplifier

- Max. 200 m (656 ft) for conductivity $\geq 5 \mu\text{S/cm}$

3.1.5 Temperature range

Storage temperature

- 20 ... 70 °C (-4 ... 158 °F)

Min. permissible pressure as a function of fluid temperature

| Lining | Nominal size | P _{operating} at T _{operating} * |
|--------|----------------------------|--|
| PFA | 3 ... 100 (1/10 ... 4") | 0 < 180 °C (356 °F) |

* For CIP/SIP cleaning, higher temperatures are permitted for limited time periods; refer to the table titled "Maximum permissible cleaning temperature".

Max. permissible cleaning temperature

| CIP cleaning | Flowmeter sensor lining | T _{max} | T _{max} minutes | T _{amb.} |
|-----------------|-------------------------|--------------------|--------------------------|-------------------|
| Steam cleaning | PFA | 150 °C (302 °F) | 60 | 25 °C (77 °F) |
| Liquid cleaning | PFA | 140 °C (284 °F) | 60 | 25 °C (77 °F) |

If the ambient temperature is > 25 °C, the difference must be subtracted from the max. cleaning temperature. $T_{\text{max}} - \Delta$ °C.

(Δ °C = $T_{\text{amb}} - 25$ °C)

Max. permissible temperature shock

| Lining | Max. temp. shock Temp. diff. in °C | Temp. gradient °C/min |
|--------|------------------------------------|-----------------------|
| PFA | Any | Any |

Max. ambient temperature as a function of fluid temperature**Important**

When using the device in potentially explosive areas, please observe the additional temperature specifications in the section of this data sheet titled "Ex relevant specifications", and Ex safety instructions.

Models FEH311, FEH315 (standard temperature version)

| Lining | Process connection | Ambient temperature | | Fluid temperature | |
|--------|------------------------------|---------------------|----------------------------------|-------------------|------------------------------------|
| | | Min. temp. | Max. temp. | Min. temp. | Max. temp. |
| PFA | Flange | -20 °C (-4 °F) | 60 °C (140 °F) 40 °C (104 °F) | -25 °C (-13 °F) | 100 °C (212 °F) 130 °C (266 °F) |
| PFA | Variable process connections | -20 °C (-4 °F) | 60 °C (140 °F) 40 °C (104 °F) | -25 °C (-13 °F) | 100 °C (212 °F) 130 °C (266 °F) |

Models FEH311, FEH315 (high-temperature version)

| Lining | Process connection | Ambient temperature | | Fluid temperature | |
|--------|--------------------|---------------------|----------------|-------------------|-----------------|
| | | Min. temp. | Max. temp. | Min. temp. | Max. temp. |
| PFA | Flange | -20 °C (-4 °F) | 60 °C (140 °F) | -25 °C (-13 °F) | 180 °C (356 °F) |

Comment:

PFA (high-temperature version) can be obtained for nominal sizes \geq DN 10

Models FEH321, FEH325 (standard temperature version)

| Lining | Process connection | Ambient temperature | | Fluid temperature | |
|--------|------------------------------|---------------------|----------------------------------|-------------------|------------------------------------|
| | | Min. temp. | Max. temp. | Min. temp. | Max. temp. |
| PFA | Flange | -25 °C (-13 °F) | 60 °C (140 °F) 40 °C (104 °F) | -25 °C (-13 °F) | 100 °C (212 °F) 130 °C (266 °F) |
| PFA | Variable process connections | -25 °C (-13 °F) | 60 °C (140 °F) 40 °C (104 °F) | -25 °C (-13 °F) | 100 °C (212 °F) 130 °C (266 °F) |

Models FEH321, FEH325 (high-temperature version)

| Lining | Process connection | Ambient temperature | | Fluid temperature | |
|--------|--------------------|---------------------|----------------|-------------------|-----------------|
| | | Min. temp. | Max. temp. | Min. temp. | Max. temp. |
| PFA | Flange | -25 °C (-13 °F) | 60 °C (140 °F) | -25 °C (-13 °F) | 180 °C (356 °F) |

3.1.6 Material load

Limits for the permissible fluid temperature (TS) and permissible pressure (PS) are calculated on the basis of the lining and flange material used in the device (refer to the name plate on the device).

| Process connection | Nominal size | PS _{max} bar (PSI) | TS |
|---|----------------------------------|-----------------------------------|------------------------------------|
| Wafer flange | DN 3 ... 50 (1/10 ... 2") | 40 (580) | -25 ... 130 °C (-13 ... 266 °F) |
| | DN 65 ... 100 (2 1/2 ... 4") | 16 (232) | |
| Weld stubs | DN 3 ... 40 (1/10 ... 1 1/2") | 40 (580) | -25 ... 130 °C (-13 ... 266 °F) |
| | DN 50, DN 80 (2", 3") | 16 (232) | |
| | DN 65, DN 100 (2 1/2", 4") | 10 (145) | |
| Threaded pipe connection in acc. with DIN 11851 | DN 3 ... 40 (1/10 ... 1 1/2") | 40 (580) | -25 ... 130 °C (-13 ... 266 °F) |
| | DN 50, DN 80 (2", 3") | 16 (232) | |
| | DN 65, DN 100 (2 1/2", 4") | 10 (145) | |
| Tri-Clamp in acc. with DIN 32676 | DN 3 ... 50 (1/10 ... 2") | 16 (232) | -25 ... 121 °C (-13 ... 250 °F) |
| | DN 65 ... 100 (2 1/2 ... 4") | 10 (145) | |
| Tri-Clamp in acc. with ASME BPE | DN 3 ... 100 (1/10 ... 4") | 10 (145) | -25 ... 130 °C (-13 ... 266 °F) |
| External threads ISO 228 | DN 3 ... 25 (1/10 ... 1") | 16 (232) | -25 ... 130 °C (-13 ... 266 °F) |
| OD tubing | DN 3 ... 100 (1/10 ... 4") | 10 (145) | -25 ... 130 °C (-13 ... 266 °F) |

DIN flange, stainless steel, 1.4571 [316Ti] up to DN 100 (4")

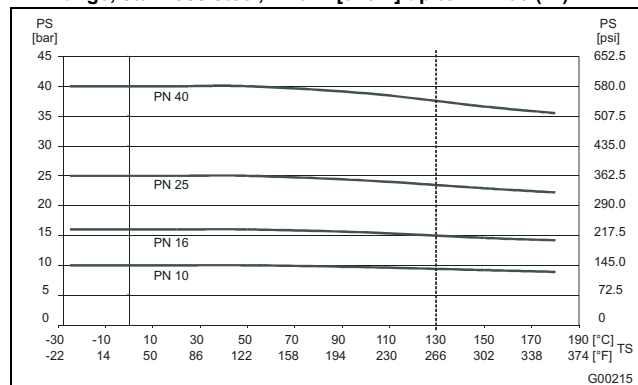


Fig. 2

ASME flange, stainless steel 1.4571 [316Ti], up to DN 100 (4") (CL150/300)

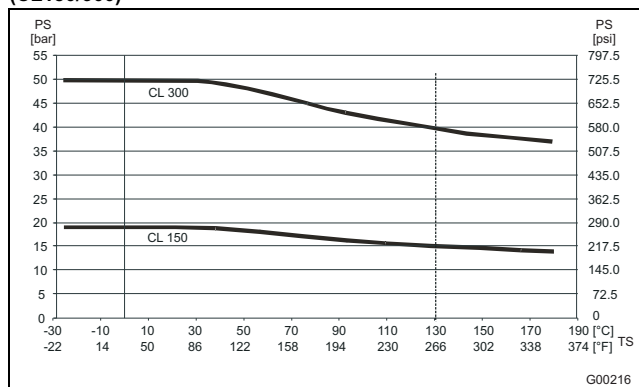


Fig. 3

For CIP/SIP cleaning, higher temperatures are permitted for limited time periods; refer to the table titled "Maximum permissible cleaning temperature".

JIS 10K-B2210 flange

| Nominal size | Material | PN | TS | PS [bar] |
|--------------------------|--------------------------------|----|------------------------------------|-----------------|
| 25 ... 100 (1 ... 4") | Stainless steel 1.4571 [316Ti] | 10 | -25 ... 180 °C (-13 ... 356 °F) | 10 (145 psi) |

Wafer flange design

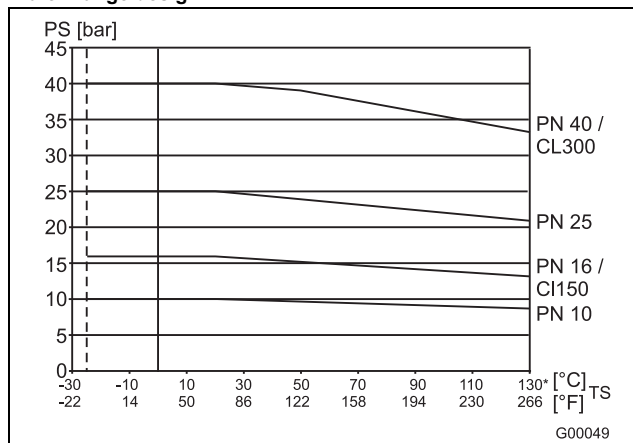


Fig. 4

JIS 10K-B2210 wafer flange design

| Nominal size | Material | PN | TS | PS [bar] |
|---------------------------------|----------------------------|----|------------------------------------|-----------------|
| DN 32 ... 100 (1 1/4 ... 4") | 1.4404 1.4435 1.4301 | 10 | -25 ... 130 °C (-13 ... 266 °F) | 10 (145 psi) |

3.1.7 Mechanical properties

Parts that come into contact with fluid

| Part | Standard | Option |
|--|-------------------------------|--|
| Lining | PFA | - |
| Signal and grounding electrode | Stainless steel 1.4539 [904L] | Stainless steel 1.4571 [316Ti] Hast. C-4 (2.4610) Hast. B-3 (2.4600) Titanium, tantalum, platinum-iridium |
| Gaskets | EPDM | Silicone |
| Process connection (welded stubs, Tri-Clamp, etc.) | Stainless steel 1.4404 [316L] | - |

Parts that do not come into contact with fluid

| | Standard | Option |
|--------|--------------------------------|--------|
| Flange | Stainless steel 1.4571 [316Ti] | - |

Flowmeter sensor housing

| | Standard | Option |
|----------------|--|--------|
| Housing | Deep-drawn housing Stainless steel 1.4301 [304], 1.4308 | — |
| Connection box | Stainless steel 1.4308 [304] | — |
| Meter tube | Stainless steel 1.4301 [304] | — |
| PG cable gland | Polyamide | — |

3.1.8 Electrical connection diagram

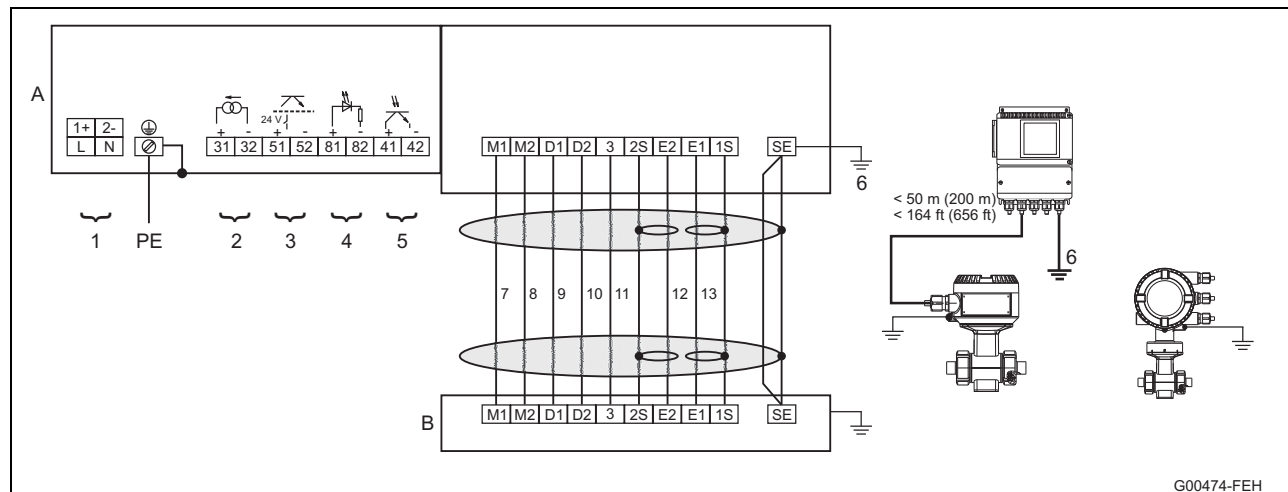


Fig. 5

A Transmitter

B Flowmeter sensor

1 Supply power:

See name plate

2 Current output (terminals 31/32)

The current output can be operated in "active" or "passive" mode.

- Active: 4 ... 20 mA, HART protocol (standard), load: $250 \Omega \leq R \leq 650 \Omega$
 - Passive: 4 ... 20 mA, HART protocol (standard), load: $250 \Omega \leq R \leq 650 \Omega$
- Supply voltage for the current output: Min. 17 V, max. 30 V

3 Digital output DO1 (terminals 51/52) (pulse output or digital output)

Function can be configured locally as "Pulse Output" or "Digital Output" using software. Factory setting is "Pulse Output".

The output can be configured as an "active" or "passive" output.

Configuration is performed using software.

- Configuration as pulse output
Max. pulse frequency: 5,250 Hz.
Pulse width: 0.1 ... 2,000 ms.
The pulse factor and pulse width are interdependent and are calculated dynamically.
- Configuration as contact output
Function: System alarm, empty pipe alarm, max./min. alarm, flow direction signaling, other
- Configuration as "active" output
 $U = 19 \dots 21 \text{ V}$, $I_{\text{max}} = 220 \text{ mA}$, $f_{\text{max}} \leq 5,250 \text{ Hz}$
- Configuration as "passive" output
 $U_{\text{max}} = 30 \text{ V}$, $I_{\text{max}} = 220 \text{ mA}$, $f_{\text{max}} \leq 5,250 \text{ Hz}$

4 Digital input (terminals 81/82) (contact input)

Function can be configured locally using software:

External output switch-off, external totalizer reset, external totalizer stop, other

Data for the optocoupler: $16 \text{ V} \leq U \leq 30 \text{ V}$, $R_i = 2 \text{ k}\Omega$

5 Digital output DO2 (terminals 41/42) (pulse output or digital output)

Function can be configured locally as "Pulse Output" or "Digital Output" using software.

Factory setting is "Digital Output", flow direction signaling.

The output is always a "passive" output (optocoupler).

Data for the optocoupler: $U_{\text{max}} = 30 \text{ V}$, $I_{\text{max}} = 220 \text{ mA}$, $f_{\text{max}} \leq 5,250 \text{ Hz}$

6 Functional ground

- 7 Brown
- 8 Red
- 9 Orange
- 10 Yellow
- 11 Green
- 12 Blue
- 13 Violet

Connection examples for the peripherals

Current output

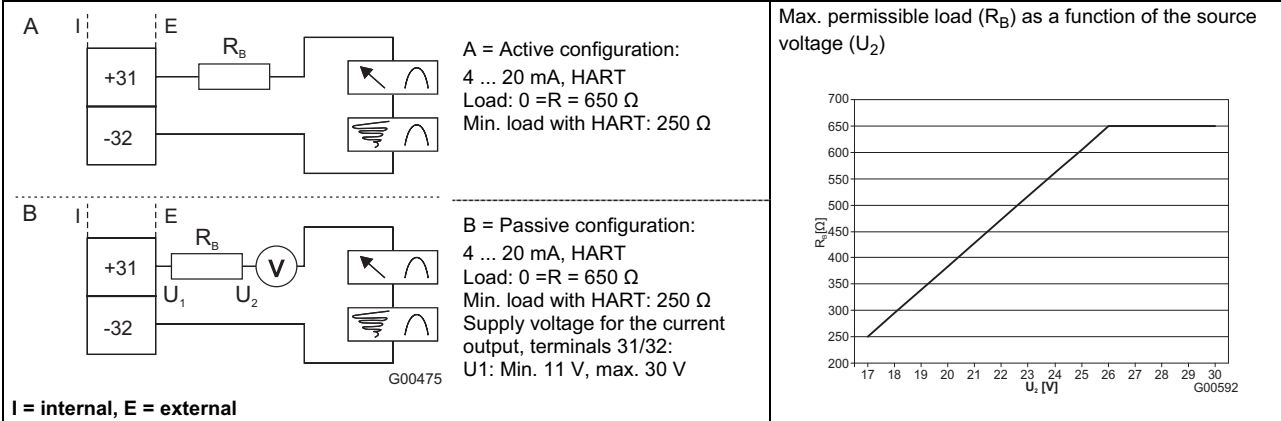


Fig. 6

Digital output DO1

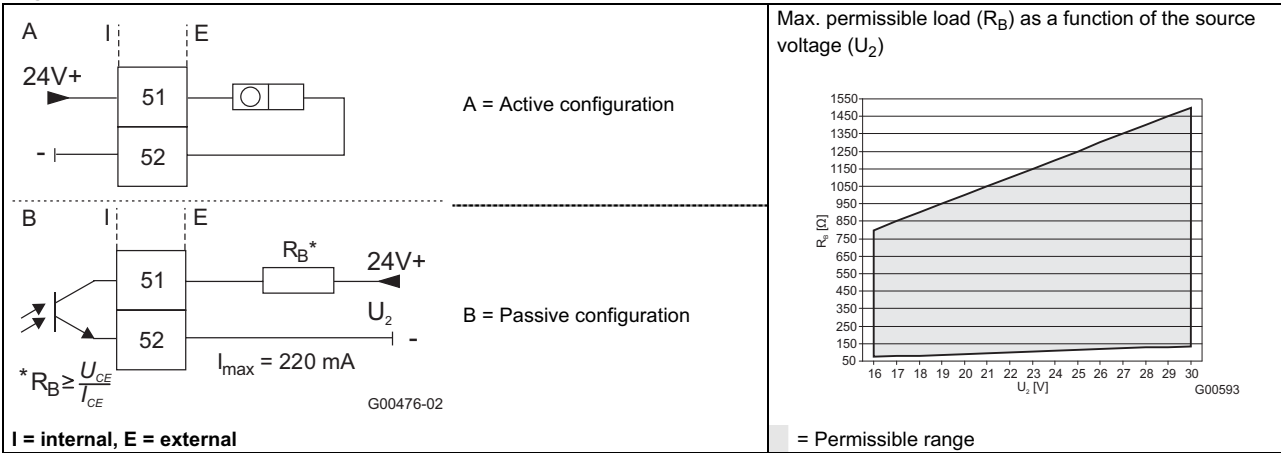
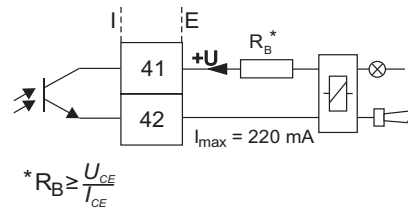


Fig. 7

Digital output DO2, e.g., for system monitoring, max./min. alarm, empty meter tube or forward/reverse signal, or counting pulses (function can be configured using software)



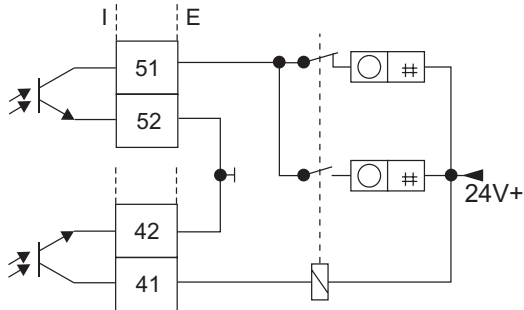
G00792

I = internal, E = external

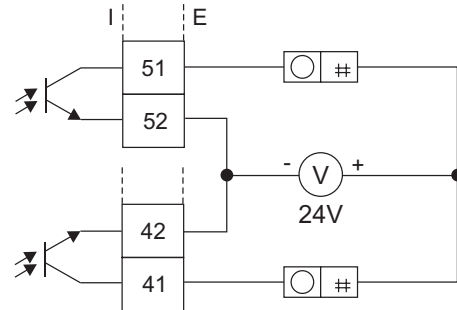
Fig. 8

Digital outputs DO1 and DO2, separate forward and reverse pulses

Digital outputs DO1 and DO2, separate forward and reverse pulses (alternative connection)



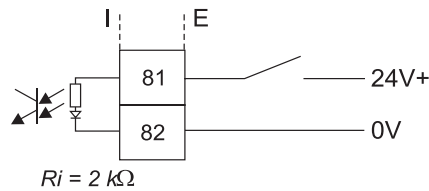
I = internal, E = external



G00791

Fig. 9

Digital input for external output switch-off or external totalizer reset



G00477

I = internal, E = external

Fig. 10

4 Ex relevant specifications

4.1 General

Devices with model names FEH315 and FEH325 are approved for operation in the following potentially explosive areas:

- ATEX/IECEx Zone 2, 21, 22
- FM Div 2
- cFM Div 2



Important

For detailed information on the individual approvals, refer to Section 1, "HygienicMaster - Overview of technology".

4.2 Electrical data

When operating in potentially explosive areas, observe the following electrical data for the signal inputs and outputs of the transmitter.

| | Ex data | | Operating values | |
|-------------------------------|--------------------|-----------------------------------|--------------------|-----------------------------------|
| | Ex n/NI | | | |
| Signal inputs/outputs | U _i [V] | I _i [mA] | U _i [V] | I _i [mA] |
| Current output | | | | |
| Active/passive Terminal 31/32 | 30 | 30 | 30 | 30 |
| Digital output DO1 | | | | |
| Active/passive Terminal 51/52 | 30 | 220 | 30 | 220 |
| Digital output DO2 | | | | |
| Passive Terminal 41/42 | 30 | 220 (ATEX/IECEx) 30 (FM / cFM) | 30 | 220 (ATEX/IECEx) 30 (FM / cFM) |
| Digital input DI | | | | |
| Terminal 81/82 | 30 | 10 | 30 | 10 |

4.3 Temperature values

4.3.1 Transmitter

| Model name | Temperature class | Surface temperature |
|------------|-------------------|---------------------|
| FET325 | T4 | 70 °C (158 °F) |

4.3.2 Flowmeter sensor

| Model name | Surface temperature |
|-----------------|---------------------|
| FEP315 / FEH315 | 70 °C (158 °F) |
| FEP325 / FEH325 | 85 °C (185 °F) |

The surface temperature depends on the fluid temperature.

With increasing fluid temperature > 70 °C (> 158 °F) or > 85 °C (> 185 °F) the surface temperature also increases to the level of the fluid temperature.

4.3.3 Temperature limit values



Important

The maximum permissible fluid temperature depends on the lining and flange material, and is limited by the operating values in Table 1 and the Ex relevant specifications in Tables 2 and 3.

Table 1: Fluid temperature as a function of lining and flange material

Models FEH315/FEH325

| Lining | Process connection | Material | Fluid temperature (operating values) | |
|--------|-----------------------------|-----------------|--------------------------------------|-----------------|
| | | | Minimum | Maximum |
| PFA | Flange | Stainless steel | -25 °C (-13 °F) | 180 °C (356 °F) |
| PFA | Wafer flange | - | -25 °C (-13 °F) | 130 °C (266 °F) |
| PFA | Variable process connection | Stainless steel | -25 °C (-13 °F) | 130 °C (266 °F) |

Table 2: Fluid temperature (Ex data) for ProcessMaster model FEP315 and HygienicMaster model FEH315

| Nominal size | Design | Temperature class | Ambient temperature | | | | | | | | | | | |
|--|----------|-------------------|-----------------------------------|------------|---------------------|------------|-----------------------------------|--|---------------------|------------|-----------------------------------|------------|---------------------|------------|
| | | | - 20 °C ... + 40 °C | | | | - 20 °C ... + 50 °C | | | | - 20 °C ... + 60 °C | | | |
| | | | - 40 °C ... + 40 °C ¹⁾ | | | | - 40 °C ... + 50 °C ¹⁾ | | | | - 40 °C ... + 60 °C ¹⁾ | | | |
| | | | Not thermally insulated | | Thermally insulated | | Not thermally insulated | | Thermally insulated | | Not thermally insulated | | Thermally insulated | |
| | | | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust |
| ProcessMaster DN 3 ... DN 2000 HygienicMaster DN 3 ... DN 100 | NT HT | T1 | 130 °C | 130 °C | --- | --- | 130 °C | 100 °C ²⁾ 110 °C ³⁾ | --- | --- | 80 °C | 40 °C | --- | --- |
| | | | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 40 °C | 180 °C | 40 °C |
| | NT HT | T2 | 130 °C | 130 °C | --- | --- | 130 °C | 100 °C ²⁾ 110 °C ³⁾ | --- | --- | 80 °C | 40 °C | --- | --- |
| | | | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 40 °C | 180 °C | 40 °C |
| | NT HT | T3 | 130 °C | 130 °C | --- | --- | 130 °C | 100 °C ²⁾ 110 °C ³⁾ | --- | --- | 80 °C | 40 °C | --- | --- |
| | | | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 40 °C | 180 °C | 40 °C |
| | NT HT | T4 | 130 °C | 130 °C | --- | --- | 130 °C | 100 °C ²⁾ 110 °C ³⁾ | --- | --- | 80 °C | 40 °C | --- | --- |
| | | | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 40 °C | 130 °C | 40 °C |

1) Low-temperature version (option)

2) Temperature values for ProcessMaster

3) Temperature values for HygienicMaster

NT standard version, Tmedium maximum 130 °C (266 °F)

HT high-temperature version, Tmedium maximum 180 °C (356 °F)

Not thermally insulated: The flowmeter sensor is not surrounded by pipe insulation material.

Thermally insulated: The flowmeter sensor is surrounded by pipe insulation material.



Important

The standard version includes explosion protection for gases and dust.

- If the installation location for the device is classified as a potentially explosive area for gases and dust, the temperature data in the "Gas & dust" columns in the table must be taken into consideration.
- If the installation location for the device is classified as a potentially explosive area for gases only, the temperature data in the "Gas" columns in the table must be taken into consideration.

Table 3: Fluid temperature (Ex data) for ProcessMaster model FEP325 and HygienicMaster model FEH325

| Nominal size | Design | Temperature class | Ambient temperature | | | | | | | | | | | |
|--|--------|-------------------|-----------------------------------|------------|---------------------|------------|-----------------------------------|------------|---------------------|------------|--|------------|---------------------|------------|
| | | | - 20 °C ... + 40 °C | | | | - 20 °C ... + 50 °C | | | | - 20 °C ... + 60 °C | | | |
| | | | - 40 °C ... + 40 °C ¹⁾ | | | | - 40 °C ... + 50 °C ¹⁾ | | | | - 40 °C ... + 60 °C ¹⁾ | | | |
| | | | Not thermally insulated | | Thermally insulated | | Not thermally insulated | | Thermally insulated | | Not thermally insulated | | Thermally insulated | |
| | | | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust | Gas | Gas & dust |
| ProcessMaster DN 3 ... DN 2000 HygienicMaster DN 3 ... DN 100 | NT | T1 | 130 °C | 130 °C | --- | --- | 130 °C | 130 °C | --- | --- | 110 °C ²⁾ 120 °C ³⁾ | 110 °C | --- | --- |
| | HT | T1 | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C |
| | NT | T2 | 130 °C | 130 °C | --- | --- | 130 °C | 130 °C | --- | --- | 110 °C ²⁾ 120 °C ³⁾ | 110 °C | --- | --- |
| | HT | T2 | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C |
| | NT | T3 | 130 °C | 130 °C | --- | --- | 130 °C | 130 °C | --- | --- | 110 °C ²⁾ 120 °C ³⁾ | 110 °C | --- | --- |
| | HT | T3 | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C | 180 °C |
| | NT | T4 | 130 °C | 130 °C | --- | --- | 130 °C | 130 °C | --- | --- | 110 °C ²⁾ 120 °C ³⁾ | 110 °C | --- | --- |
| | HT | T4 | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C | 130 °C |
| | NT | T5 | 95 °C | 95 °C | --- | --- | 95 °C | 95 °C | --- | --- | 95 °C | 95 °C | --- | --- |
| | HT | T5 | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C | 95 °C |
| | NT | T6 | 80 °C | 80 °C | --- | --- | 80 °C | 80 °C | --- | --- | 80 °C | 80 °C | --- | --- |
| | HT | T6 | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C | 80 °C |

1) Low-temperature version (option)

2) Temperature values for ProcessMaster

3) Temperature values for HygienicMaster

NT standard version, T_{medium} maximum 130 °C (266 °F)HT high-temperature version, T_{medium} maximum 180 °C (356 °F)

Not thermally insulated: The flowmeter sensor is not surrounded by pipe insulation material.

Thermally insulated: The flowmeter sensor is surrounded by pipe insulation material.

i

Important

The standard version includes explosion protection for gases and dust.

- If the installation location for the device is classified as a potentially explosive area for gases and dust, the temperature data in the "Gas & dust" columns in the table must be taken into consideration.
- If the installation location for the device is classified as a potentially explosive area for gases only, the temperature data in the "Gas" columns in the table must be taken into consideration.

5 Installation requirements

5.1 Grounding

The flowmeter sensor must be connected to ground potential. For technical reasons, this potential should be identical to the potential of the metering fluid.

For plastic or insulated lined pipelines, the fluid is grounded by installing ground plates. When there are stray potentials present in the pipeline, a ground plate is recommended on both ends of the meter sensor.

For flowmeter sensor with hardrubber liners, sizes DN 100/4" and larger, a conductive element is incorporated in the liner. This assures that the fluid is grounded.

5.2 Mounting

The following points must be observed for the installation:

- The meter tube must always be completely full.
- The flow direction must correspond to the identification if present.
- The maximum torque for all flange connections must be complied with. The max torque depends on the temperature, pressure, material of the flange bolts and gaskets and has to be chosen accordingly.
- The devices must be installed without mechanical tension (torsion, bending).
- Flowmeters with coplanar counter flanges may only be installed with suitable seals.
- Use flange seals made from a compatible material for the fluid and fluid temperatures.
- Seals must not extend into the flow area since possible turbulence could influence the device accuracy.
- The pipeline may not exert any unallowable forces and torques on the device.
- Do not remove the plugs in the cable connectors until you are ready to install the electrical cable.
- Install the separate converter at a largely vibration-free location.
- Do not expose the converter to direct sunlight or provide for appropriate sun protection where necessary.

The device measures the flowrate in both directions. Forward flow is the factory setting, as shown in Fig. 11.

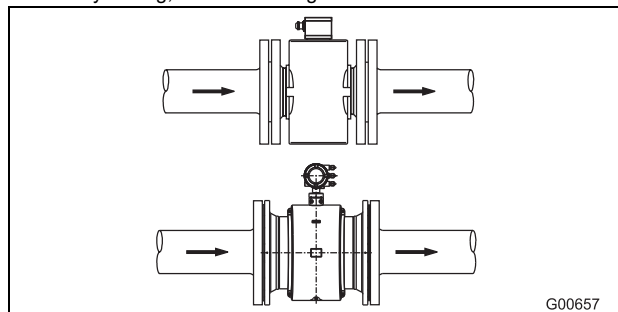


Fig. 11

5.2.1 Electrode axis

Electrode axis (1) should be horizontal if at all possible or no more than 45° from horizontal.

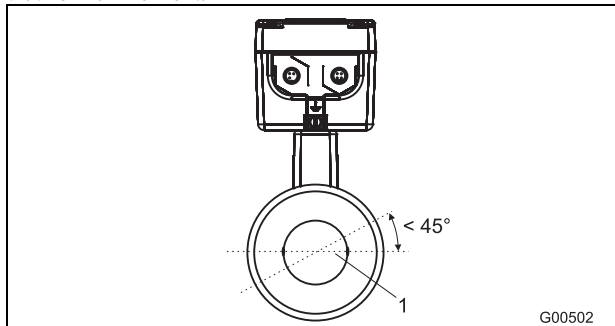


Fig. 12

5.2.2 In- and outlet pipe sections

| Straight inlet section | Straight outlet section |
|---------------------------|---------------------------|
| $\geq 3 \times \text{DN}$ | $\geq 2 \times \text{DN}$ |

DN = Flowmeter primary size

- Do not install fittings, manifolds, valves etc. directly in front of the meter tube (1).
- Butterfly valves must be installed so that the valve plate does not extend into the flowmeter primary.
- Valves or other turn-off components should be installed in the outlet pipe section (2).
- For compliance with the measuring accuracy, observe the inlet and outlet pipe sections.

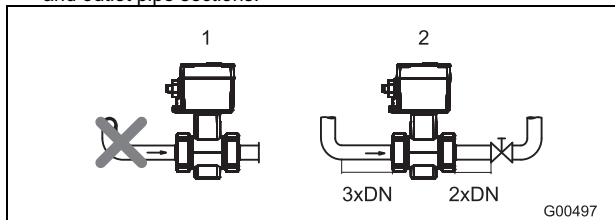


Fig. 13

5.2.3 Vertical connections

- Vertical installation for measurement of abrasive fluids, flow preferably from below to above.

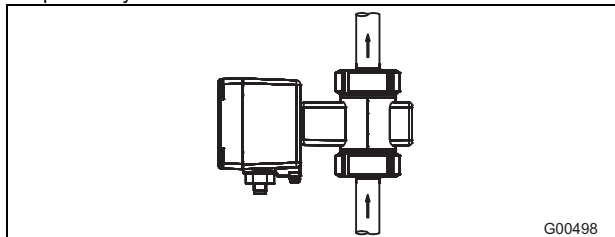


Fig. 14

5.2.4 Horizontal connections

- Meter tube must always be completely full.
- Provide for a slight incline of the connection for degassing.

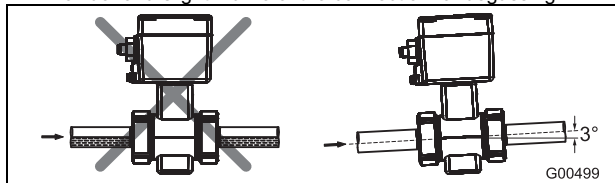


Fig. 15

5.2.5 Free inlet or outlet

- Do not install the flowmeter at the highest point or in the draining-off side of the pipeline, flowmeter runs empty, air bubbles can form (1).
- Provide for a siphon fluid intake for free inlets or outlets so that the pipeline is always full (2).

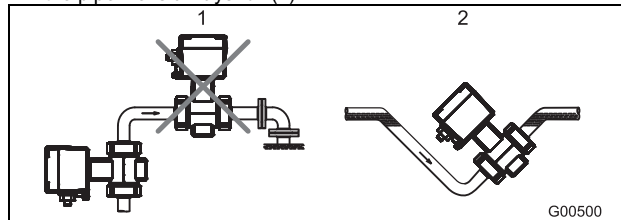


Fig. 16

5.2.6 Strongly contaminated fluids

- For strongly contaminated fluids, a bypass connection according to the figure is recommended so that operation of the system can continue to run without interruption during the mechanical cleaning.

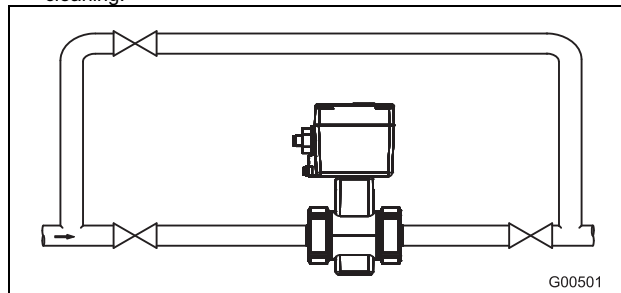


Fig. 17

5.2.7 Installation in the vicinity of pumps

- For flowmeter primaries which are to be installed in the vicinity of pumps or other vibration generating equipment, the utilization of mechanical snubbers is advantageous.

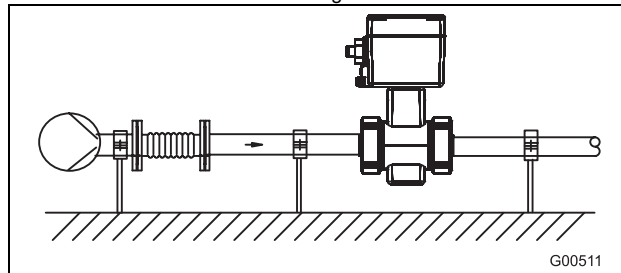


Fig. 18

5.2.8 Installing the high temperature design

The high temperature design allows for complete thermal insulation of the sensor. The pipeline and sensor must be insulated after installing the unit according to the following illustration.

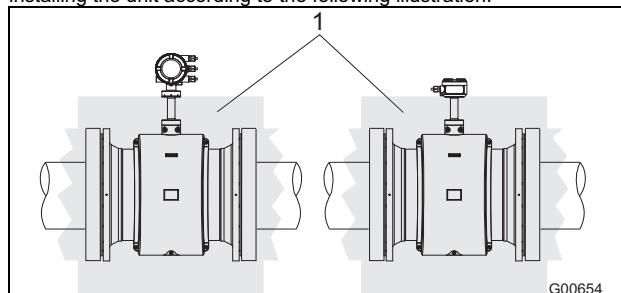


Fig. 19

1 Insulation

5.2.9 Installation in pipelines with larger nominal diameters

Determine the resulting pressure loss when using reduction pieces (1):

- Calculate the diameter ratio d/D .
- Determine the flow velocity based on the flow range nomograph (Fig. 21).
- Read the pressure drop on the Y-axis in Fig. 21.

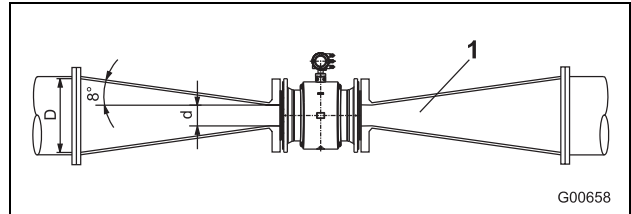


Fig. 20

- 1 = Flange transition piece
 d = Inside diameter of the flowmeter
 V = flow velocity [m/s]
 Δp = pressure loss [mbar]
 D = Inside diameter of the pipeline

Nomograph for pressure drop calculations

For flange transition piece with $\alpha/2 = 8^\circ$

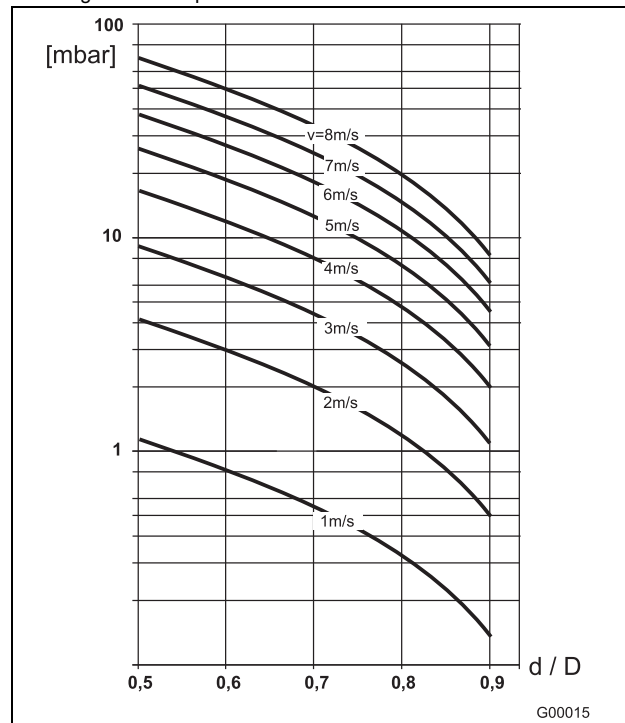


Fig. 21

6 Dimensions

6.1 Flange, DN 3 ... 40 (1/10 ... 1 1/2")

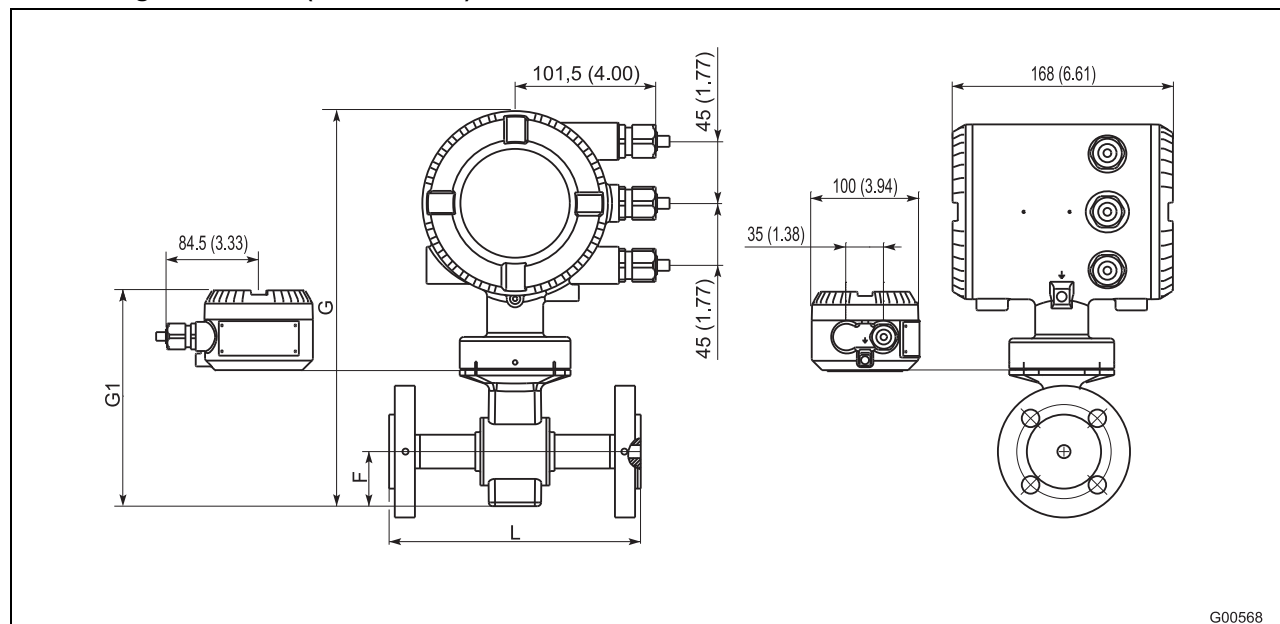


Fig. 22: Dimensions in mm (inch)

Flange in acc. with DIN/EN 1092-1 ¹⁾

| DN | PN ²⁾ | Dimensions [mm (inch)] | | | | Approx. weight [kg (lb)] | |
|-----------------------|------------------|------------------------|-----------------|------------------|-------------|--------------------------|------------------|
| | | L ³⁾ | G ⁴⁾ | G1 ⁴⁾ | F | Compact design | Ext. transmitter |
| 3 ... 8 ⁵⁾ | 10 ... 40 | 130 (5.12) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 7 (15.43) | 5 (11.02) |
| 10 | 10 ... 40 | 200 (7.78) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 7 (15.43) | 5 (11.02) |
| 15 | 10 ... 40 | 200 (7.78) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 8 (17.64) | 8 (17.64) |
| 20 | 10 ... 40 | 200 (7.78) | 302 (11.89) | 190 (7.84) | 43 (1.69) | 8 (17.64) | 8 (17.64) |
| 25 | 10 ... 40 | 200 (7.78) | 311 (12.24) | 199 (7.83) | 48 (1.89) | 9 (19.84) | 9 (19.84) |
| 32 | 10 ... 40 | 200 (7.78) | 321 (12.64) | 208 (8.19) | 53 (2.09) | 11 (24.25) | 11 (24.25) |
| 40 | 10 ... 40 | 200 (7.78) | 330 (12.99) | 217 (8.54) | 57 (2.24) | 11 (24.25) | 11 (24.25) |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

Flange in acc. with ASME B16.5

| DN | Inch | Dimensions [mm (inch)] | | | | Approx. weight [kg (lb)] | |
|---------|----------------------------|------------------------|-----------------|------------------|-------------|--------------------------|------------------|
| | | L ³⁾ | G ⁴⁾ | G1 ⁴⁾ | F | Compact design | Ext. transmitter |
| 3 ... 8 | 1/8 ... 5/16 ⁶⁾ | 130 (5.12) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 7 (15.43) | 5 (11.02) |
| 10 | 3/8 ⁶⁾ | 200 (7.78) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 7 (15.43) | 5 (11.02) |
| 15 | 1/2 | 200 (7.78) | 293 (11.54) | 180 (7.09) | 38.5 (1.52) | 8 (17.64) | 8 (17.64) |
| 20 | 3/4 | 200 (7.78) | 302 (11.89) | 190 (7.84) | 43 (1.69) | 8 (17.64) | 8 (17.64) |
| 25 | 1 | 200 (7.78) | 311 (12.24) | 199 (7.83) | 48 (1.89) | 9 (19.84) | 9 (19.84) |
| 32 | 1 1/4 | 200 (7.78) | 321 (12.64) | 208 (8.19) | 53 (2.09) | 11 (24.25) | 11 (24.25) |
| 40 | 1 1/2 | 200 (7.78) | 330 (12.99) | 217 (8.54) | 57 (2.24) | 11 (24.25) | 11 (24.25) |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

1) Connecting dimensions in acc. with EN 1092-1. For DN 65, PN 16 in acc. with EN 1092-1, please order PN 40.

2) Other pressure ratings available on request.

3) If grounding plates are installed (attached to both sides of the flange), this increases dimension L as follows: DN 3 ... 100 by 3 mm (0.118 inch).

4) With the high-temperature version, the dimension is increased by 112 mm (4.41 inch).

5) Connection flange DN 10.

6) Connection flange 1/2".

6.2 Flange, DN 50 ... 100 (2 ... 4")

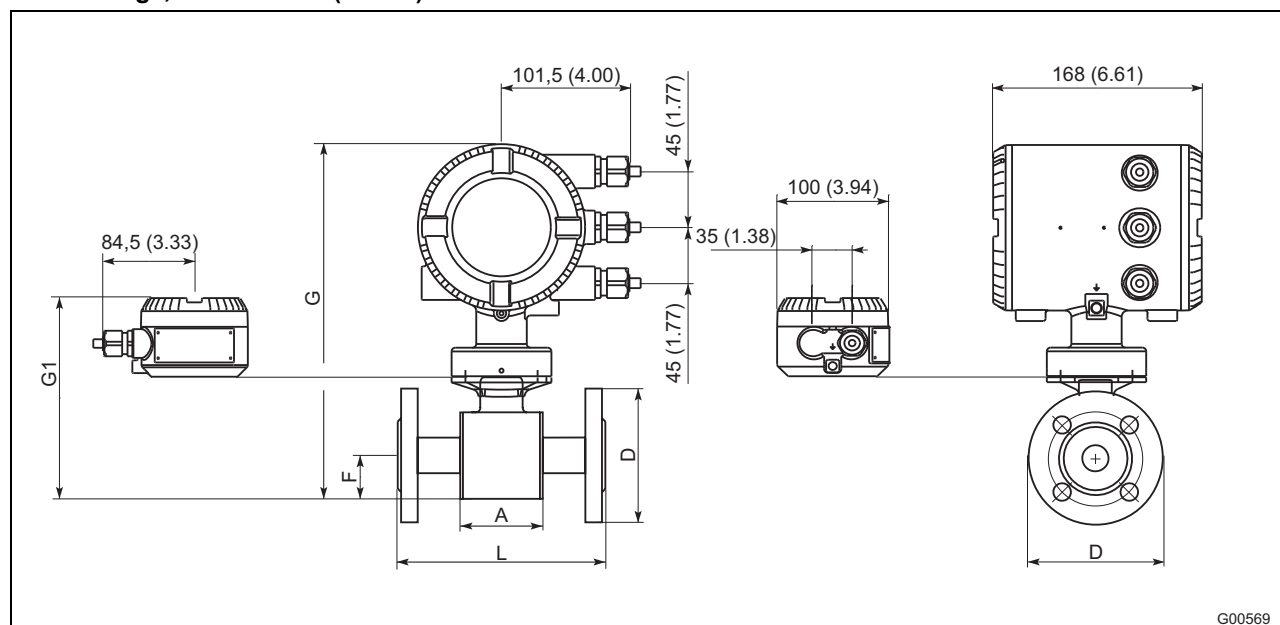


Fig. 23: Dimensions in mm (inch)

Flange in acc. with DIN/EN 1092-1

| Dimensions [mm (inch)] | | | | | | | Approx. weight [kg (lb)] | |
|------------------------|------------------|------------|-----------------|-----------------|------------------|-------------|--------------------------|------------------|
| DN | PN ¹⁾ | D | L ²⁾ | G ³⁾ | G1 ³⁾ | F | Compact design | Ext. transmitter |
| 50 | 10 ... 40 | 165 (6,50) | 200 (7,87) | 332 (13,06) | 213 (8,39) | 50 (1,97) | 13 (28,66) | 11 (24,25) |
| 65 | 10 ... 40 | 185 (7,28) | 200 (7,87) | 348 (13,7) | 235 (9,26) | 58 (2,28) | 17 (37,48) | 15 (33,07) |
| 80 | 10 ... 40 | 200 (7,87) | 200 (7,87) | 365 (14,37) | 252 (9,92) | 66,5 (2,62) | 20 (44,09) | 18 (39,68) |
| 100 | 16 | 220 (8,66) | 250 (9,84) | 392 (15,45) | 280 (11,01) | 80,2 (3,16) | 23 (50,71) | 21 (46,30) |

Tolerance L: +0 / -3 mm, (+0 / -0.118 inch)

Flange in acc. with ASME B16.5

| Dimensions [mm (inch)] | | | | | | | | Approx. weight [kg (lb)] | |
|------------------------|-------|------------|------------|------------------------------|-------------|-------------|-------------|--------------------------|------------------|
| DN | Inch | CL150 D | CL300 D | ISO 13359 L ²⁾ | G 3) | G1 3) | F | Compact design | Ext. transmitter |
| 50 | 2 | 153 (6.02) | 165 (6.50) | 200 (7.87) | 332 (13.06) | 213 (8.39) | 50 (1.97) | 13 (28.66) | 11 (24.25) |
| 65 | 2 1/2 | 178 (7.01) | 191 (7.52) | 200 (7.87) | 348 (13.7) | 235 (9.26) | 58 (2.28) | 17 (37.48) | 15 (33.07) |
| 80 | 3 | 191 (7.52) | 210 (8.27) | 200 (7.87) | 365 (14.37) | 252 (9.92) | 66.5 (2.62) | 20 (44.09) | 18 (39.68) |
| 100 | 4 | 229 (9.02) | 254 (10) | 250 (9.84) | 392 (15.45) | 280 (11.01) | 80.2 (3.16) | 23 (50.71) | 21 (46.30) |

Tolerance L: +0 / -3 mm, (+0 / -0.118 inch)

1) Other pressure ratings available on request.

2) If grounding plates are installed (attached to both sides of the flange), this increases dimension L by 3 mm (0.118 inch).

3) With the high-temperature version, the dimension is increased by 112 mm (4.41 inch).

6.3 Wafer flange, DN 3 ... 40 (1/10 ... 1 1/2")

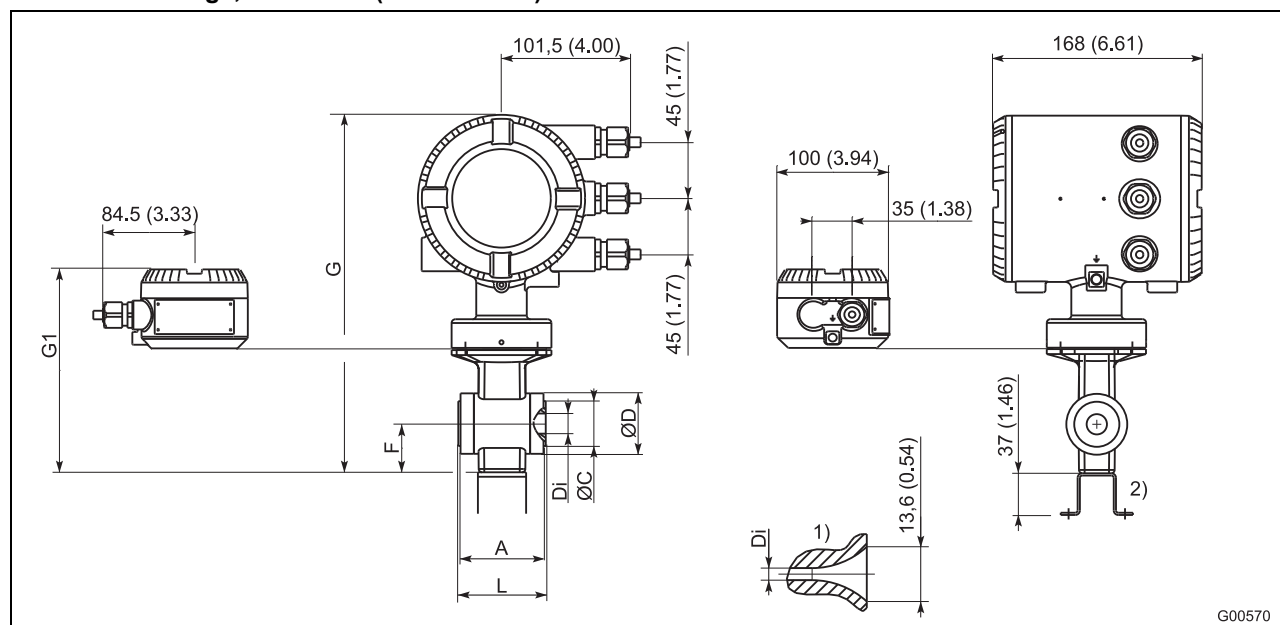


Fig. 24: Dimensions in mm (inch)

| Dimensions [mm] | | | | | | | | | Approx. weight [kg] | |
|-----------------|-----------|----|----|---------|------|-----|-----|-----------------|---------------------|------------------|
| DN | PN | C | D | Di | F | G | G1 | L ³⁾ | Compact design | Ext. transmitter |
| 3 ... 8 | 10 ... 40 | 50 | 45 | 3 ... 8 | 38,5 | 293 | 180 | 68 | 3,5 | 1,5 |
| 10 | 10 ... 40 | 50 | 45 | 10 | 38,5 | 293 | 180 | 68 | 3,5 | 1,5 |
| 15 | 10 ... 40 | 50 | 45 | 13 | 38,5 | 293 | 180 | 68 | 3,5 | 1,5 |
| 20 | 10 ... 40 | 50 | 54 | 18 | 43 | 302 | 190 | 78 | 4 | 2 |
| 25 | 10 ... 40 | 70 | 63 | 24 | 48 | 311 | 199 | 90 | 4,5 | 2,5 |
| 32 | 10 ... 40 | 70 | 73 | 30 | 53 | 321 | 208 | 98 | 4,5 | 2,5 |
| 40 | 10 ... 40 | 70 | 82 | 36 | 57 | 330 | 217 | 103 | 5 | 3 |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

| Dimensions [inch] | | | | | | | | | | Approx. weight [lb] | |
|-------------------|--------------|---------------|------|------|---------------|-----|------|-----|-----------------|---------------------|------------------|
| DN | Inch | | C | D | Di | F | G | G1) | L ³⁾ | Compact design | Ext. transmitter |
| 3 ... 8 | 1/8 ... 5/16 | CL150 / CL300 | 1.97 | 1.77 | 0.12 ... 0.31 | 1.5 | 11.5 | 7.1 | 2.7 | 7.72 | 3.31 |
| 10 | 3/8 | CL150 / CL300 | 1.97 | 1.77 | 0.39 | 1.5 | 11.5 | 7.1 | 2.7 | 7.72 | 3.31 |
| 15 | 1/2 | CL150 / CL300 | 1.97 | 1.77 | 0.51 | 1.5 | 11.5 | 7.1 | 2.7 | 7.72 | 3.31 |
| 20 | 3/4 | CL150 / CL300 | 1.97 | 2.13 | 0.71 | 1.7 | 11.9 | 7.5 | 3.1 | 8.82 | 4.41 |
| 25 | 1 | CL150 / CL300 | 2.76 | 2.48 | 0.94 | 1.9 | 12.2 | 7.8 | 3.5 | 9.92 | 5.51 |
| 32 | 1 1/4 | CL150 / CL300 | 2.76 | 2.87 | 1.18 | 2.1 | 12.6 | 8.2 | 3.9 | 9.92 | 5.51 |
| 40 | 1 1/2 | CL150 / CL300 | 2.76 | 3.23 | 1.42 | 2.2 | 13 | 8.5 | 4.1 | 11.02 | 6.61 |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

1) Only with DN 3 ... 8.

2) Bracket (optional), not available for 3A approval.

3) If a grounding plate is installed (attached to one side of the flange), this increases dimension L by 3 mm (0.118 inch).

6.4 Wafer flange, DN 50 ... 100 (2 ... 4")

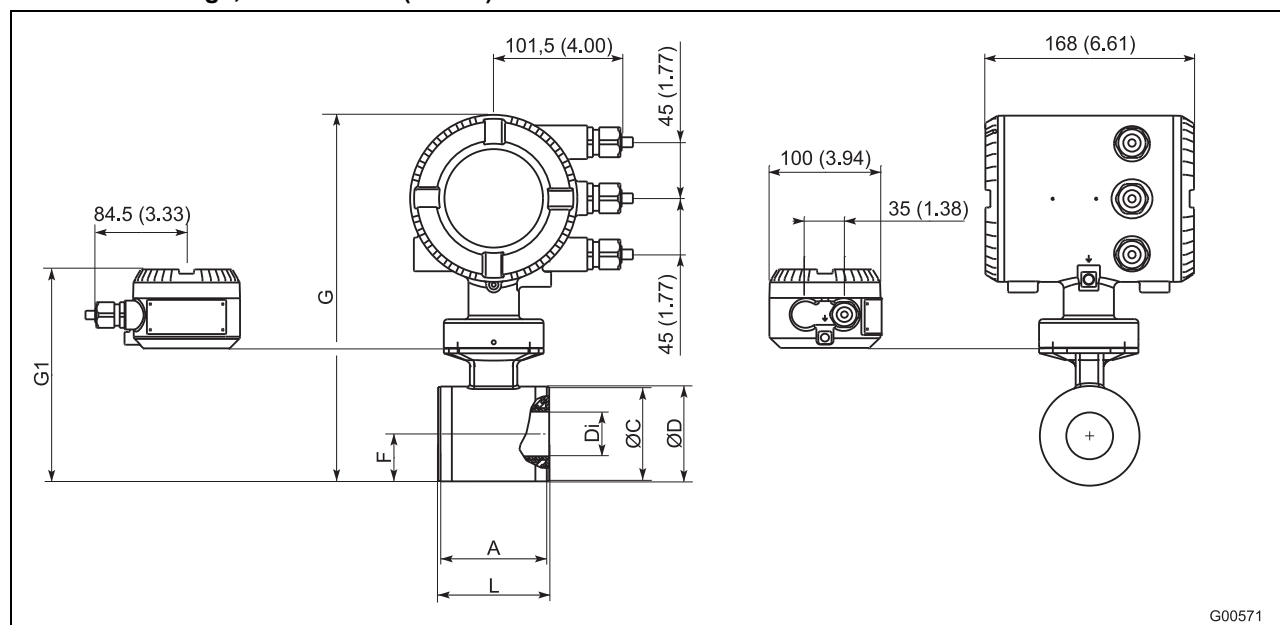


Fig. 25: Dimensions in mm (inch)

| Dimensions [mm] | | | | | | | | | Approx. weight [kg] | |
|-----------------|-----------|-----|-----|----|------|-----|-----|-----------------|---------------------|------------------|
| DN | PN | C | D | Di | F | G | G1 | L ¹⁾ | Compact design | Ext. transmitter |
| 50 | 10 ... 40 | 95 | 100 | 47 | 50 | 332 | 213 | 117 | 6.5 | 4.5 |
| 65 | 16 | 111 | 116 | 62 | 58 | 348 | 235 | 103 | 7 | 5 |
| 80 | 16 | 128 | 133 | 74 | 66,5 | 365 | 252 | 103 | 8.5 | 6.5 |
| 100 | 16 | 155 | 160 | 96 | 80,2 | 392 | 280 | 133 | 11 | 9 |

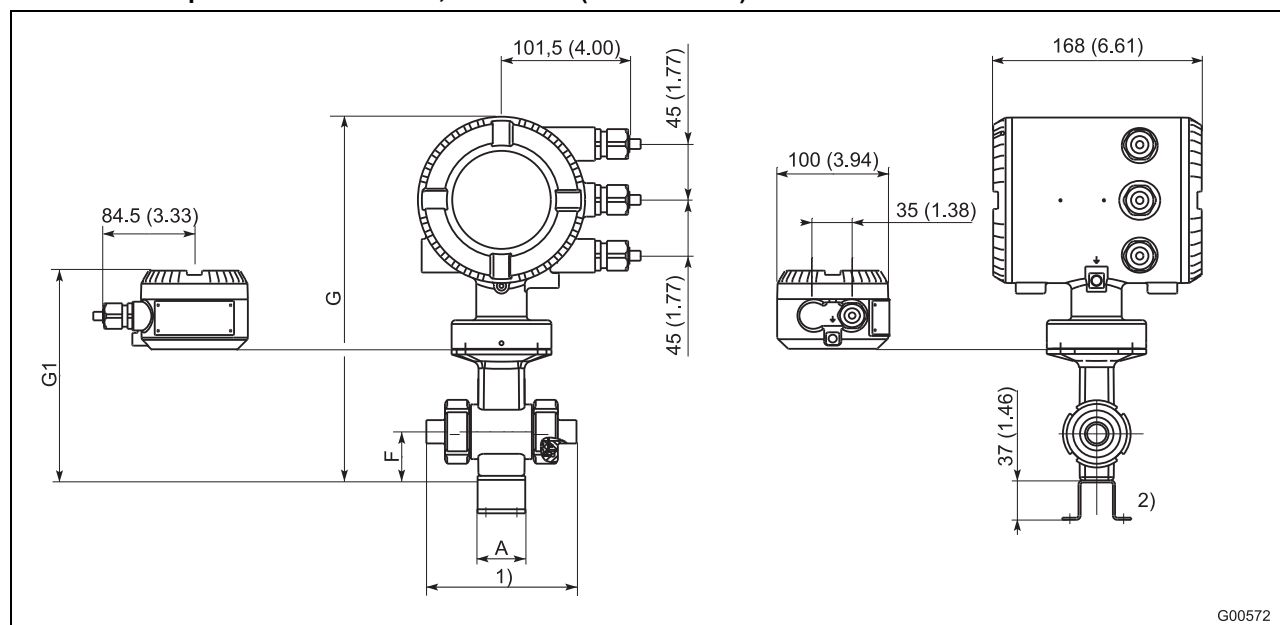
Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

| Dimensions [inch] | | | | | | | | | | Approx. weight [lb] | |
|-------------------|-------|--------------|------|------|------|------|-------|-------|-----------------|---------------------|------------------|
| DN | Inch | PN | C | D | Di | F | G | G1 | L ¹⁾ | Compact design | Ext. transmitter |
| 50 | 2 | CL 150 / 300 | 3.74 | 3.94 | 1.85 | 1.97 | 13.07 | 8.39 | 4.61 | 14.33 | 9.92 |
| 65 | 2 1/2 | CL 150 | 4.37 | 4.57 | 2.44 | 2.28 | 13.70 | 9.25 | 4.06 | 15.43 | 11.02 |
| 80 | 3 | CL 150 | 5.04 | 5.24 | 2.91 | 2.62 | 14.37 | 9.92 | 4.06 | 18.74 | 14.33 |
| 100 | 4 | CL 150 | 6.10 | 6.30 | 3.78 | 3.16 | 15.43 | 11.02 | 5.24 | 24.25 | 19.84 |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

1) If a grounding plate is installed (attached to one side of the flange), this increases dimension L by 3 mm (0.118 inch). The bracket is optional and cannot be obtained for the 3A version.

6.5 Variable process connections, DN 3 ... 40 (1/10 ... 1 1/2")



G00572

Fig. 26: Dimensions in mm (inch)

| Dimensions [mm] | | | | | | Approx. weight [kg] ³⁾ | |
|-----------------------|------------------|----|------|-----|-----|-----------------------------------|------------------|
| DN | PN ²⁾ | A | F | G | G1 | Compact design | Ext. transmitter |
| 3 ... 8 ⁵⁾ | 10 ... 40 | 37 | 38,5 | 293 | 180 | 4 | 2 |
| 10 | 10 ... 40 | 37 | 38,5 | 293 | 180 | 4 | 2 |
| 15 | 10 ... 40 | 37 | 38,5 | 293 | 180 | 4 | 2 |
| 20 | 10 ... 40 | 37 | 43 | 302 | 190 | 4,5 | 2,5 |
| 25 | 10 ... 40 | 37 | 48 | 311 | 199 | 5 | 3 |
| 32 | 10 ... 40 | 37 | 53 | 321 | 208 | 5 | 3 |
| 40 | 10 ... 40 | 37 | 57 | 330 | 217 | 5,5 | 3,5 |

Tolerance L: +0 / -3 mm

| Dimensions [inch] | | | | | | Approx. weight [lb] ³⁾ | |
|-------------------|--------------|-----|------|------|-----|-----------------------------------|------------------|
| DN | Inch | A | F | G | G1 | Compact design | Ext. transmitter |
| 3 ... 8 | 1/8 ... 5/16 | 1.5 | 1.52 | 11.5 | 7.1 | 8.82 | 4.41 |
| 10 | 3/8 | 1.5 | 1.52 | 11.5 | 7.1 | 8.82 | 4.41 |
| 15 | 1/2 | 1.5 | 1.52 | 11.5 | 7.1 | 8.82 | 4.41 |
| 20 | 3/4 | 1.5 | 1.69 | 11.9 | 7.5 | 9.92 | 5.51 |
| 25 | 1 | 1.5 | 1.89 | 12.2 | 7.8 | 11.02 | 6.61 |
| 32 | 1 1/4 | 1.5 | 2.09 | 12.6 | 8.2 | 11.02 | 6.61 |
| 40 | 1 1/2 | 1.5 | 2.24 | 13.0 | 8.5 | 12.13 | 7.72 |

Tolerance L: +0 / -0.118 inch

1) Installation length including process connection: Refer to page 25.

2) Bracket (optional), not available for 3A approval.

3) Plus process connection weight: Refer to page 25.

6.6 Variable process connections, DN 50 ... 100 (2 ... 4")

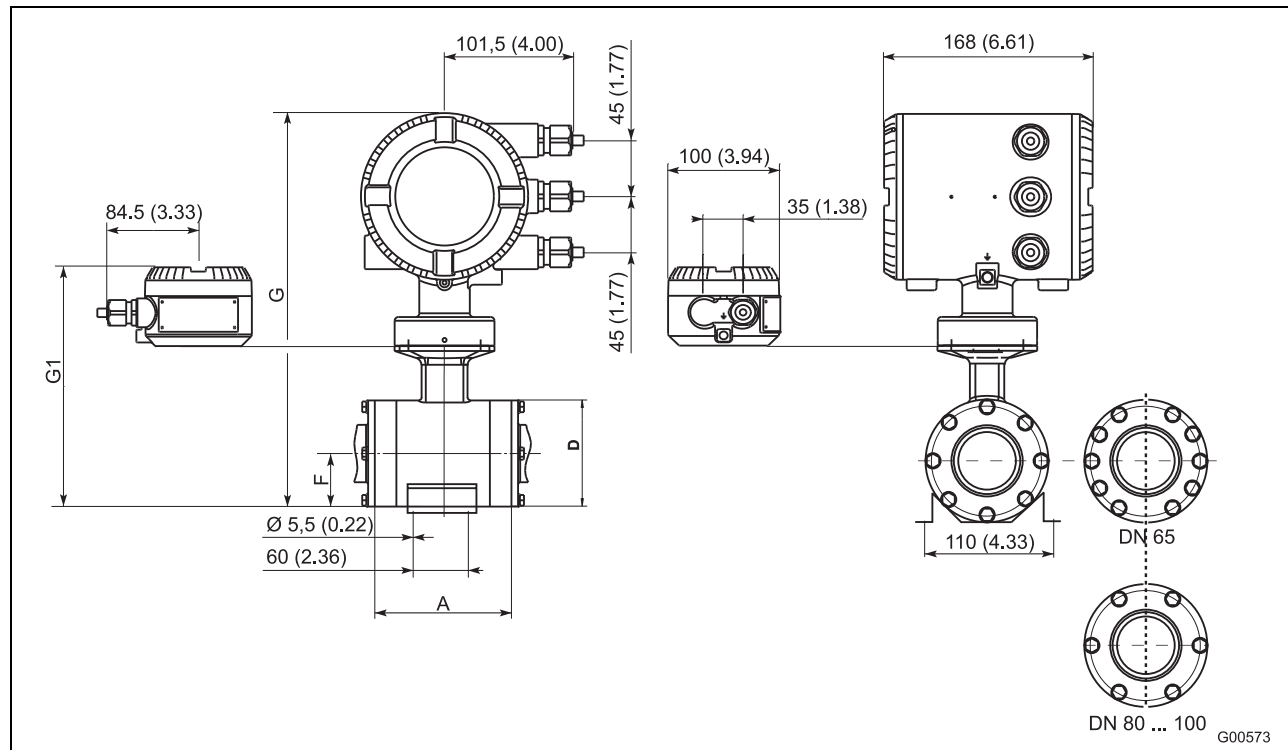


Fig. 27: Dimensions in mm (inch)

| Dimensions [mm] | | | | | | Approx. weight [kg] ³⁾ | |
|-----------------|------------------|----|----|-----|-----|-----------------------------------|------------------|
| DN | PN ²⁾ | A | F | G | G1 | Compact design | Ext. transmitter |
| 50 | 10 ... 40 | 37 | 50 | 332 | 213 | 4 | 2 |
| 65 | 10 ... 40 | 37 | 58 | 348 | 235 | 4 | 2 |
| 80 | 10 ... 40 | 37 | 67 | 365 | 252 | 4 | 2 |
| 100 | 10 ... 40 | 37 | 81 | 393 | 280 | 4,5 | 2,5 |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

| Dimensions [inch] | | | | | | Approx. weight [lb] ³⁾ | |
|-------------------|-------|-----|------|-------|-------|-----------------------------------|------------------|
| DN | Inch | A | F | G | G1 | Compact design | Ext. transmitter |
| 50 | 2 | 1.5 | 1.97 | 13.06 | 8.39 | 8.82 | 4.41 |
| 65 | 2 1/2 | 1.5 | 2.28 | 13.70 | 9.26 | 8.82 | 4.41 |
| 80 | 3 | 1.5 | 2.64 | 14.37 | 9.92 | 8.82 | 4.41 |
| 100 | 4 | 1.5 | 3.19 | 15.45 | 11.01 | 9.92 | 5.51 |

Tolerance L: +0 / -3 mm (+0 / -0.118 inch)

1) Installation length including process connection: Refer to page 25.

2) Bracket (optional), not available for 3A approval.

3) Plus process connection weight: Refer to page 25.

6.7 Adaptor for variable process connections DN 3 ... 100 (1/10 ... 4")

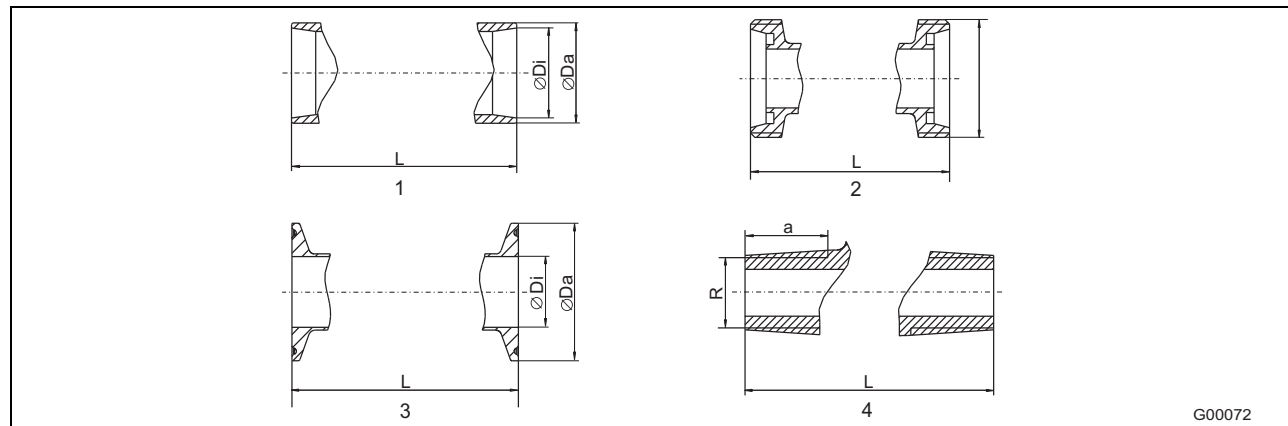


Abb. 28

- | | |
|------------------------------------|--------------------|
| 1 Weld stubs | 3 Tri-Clamp |
| 2 Food ind. fittings per DIN 11851 | 4 External threads |

Weld stubs

Dimensions in mm

| DN | ISO 2037 | | DIN 11850 | | | SMS | | DIN 2463 | | ISO 1127 | | | L | Weight [kg] |
|----------|----------|-------|-----------|------|--------|------|------|----------|------|----------|-------|--------|-----|----------------|
| | Ø Di | Ø Da | Ø Di | Ø Da | series | Ø Di | Ø Da | Ø Di | Ø Da | Ø Di | Ø Da | series | | |
| 3 ... 10 | 10 | 12 | 10 | 13 | 2 | - | - | 10.3 | 13.5 | 10.3 | 13.5 | 1 | 127 | 0.4 |
| 15 | 15.2 | 17.2 | 16 | 19 | 2 | - | - | 18.1 | 21.3 | 18.1 | 21.3 | 1 | 127 | 0.4 |
| 20 | 19.3 | 21.3 | 20 | 23 | 2 | - | - | 23.7 | 26.9 | 23.7 | 26.9 | 1 | 132 | 0.7 |
| 25 | 22.6 | 25 | 26 | 29 | 2 | 22.6 | 25 | 25 | 28 | 23.7 | 26.9 | 1 | 149 | 0.7 |
| 32 | 31.3 | 33.7 | 32 | 34 | 1 | - | - | 32 | 35 | 30.5 | 33.7 | 1 | 166 | 1 |
| 40 | 35.6 | 38 | 38 | 41 | 2 | 35.6 | 38 | 36.8 | 40 | 39 | 42.2 | 1 | 171 | 1 |
| 50 | 48.6 | 51 | 50 | 54 | 3 | 48.6 | 51 | 49 | 52 | 47.8 | 51 | 2 | 173 | 1 |
| 65 | 60.3 | 63.5 | 66 | 70 | 2 | 60.3 | 63.5 | 66 | 70 | 66 | 70 | 2 | 165 | 1.4 |
| 80 | 72.9 | 76.1 | 81 | 85 | 2 | 72.9 | 76.1 | 81 | 85 | 72.9 | 76.1 | 1 | 169 | 2 |
| 100 | 97.6 | 101.6 | 100 | 104 | 2 | 100 | 104 | 100 | 104 | 97.6 | 101.6 | 2 | 199 | 3 |

Dimensions in inch

| DN | ISO 2037 | | DIN 11850 | | | SMS | | DIN 2463 | | ISO 1127 | | | L | Weight [lb] |
|--------------|----------|------|-----------|------|--------|------|------|----------|------|----------|------|--------|------|----------------|
| | Ø Di | Ø Da | Ø Di | Ø Da | series | Ø Di | Ø Da | Ø Di | Ø Da | Ø Di | Ø Da | series | | |
| 1/10 ... 3/8 | 0.39 | 0.47 | 0.39 | 0.51 | 2 | - | - | 0.41 | 0.53 | 0.41 | 0.53 | 1 | 5 | 0.88 |
| 1/2 | 0.60 | 0.68 | 0.63 | 0.75 | 2 | - | - | 0.71 | 0.84 | 0.71 | 0.84 | 1 | 5 | 0.88 |
| 3/4 | 0.76 | 0.84 | 0.79 | 0.91 | 2 | - | - | 0.93 | 1.06 | 0.93 | 1.06 | 1 | 5.20 | 1.54 |
| 1 | 0.89 | 0.98 | 1.02 | 1.14 | 2 | 0.89 | 0.98 | 0.98 | 1.10 | 0.93 | 1.06 | 1 | 5.87 | 1.54 |
| 1 1/4 | 1.23 | 1.33 | 1.26 | 1.34 | 1 | - | - | 1.26 | 1.38 | 1.20 | 1.33 | 1 | 6.54 | 2.20 |
| 1 1/2 | 1.40 | 1.50 | 1.50 | 1.61 | 2 | 1.40 | 1.50 | 1.45 | 1.57 | 1.54 | 1.66 | 1 | 6.73 | 2.20 |
| 2 | 1.91 | 2.01 | 1.97 | 2.13 | 3 | 1.91 | 2.01 | 1.93 | 2.05 | 1.88 | 2.01 | 2 | 6.81 | 2.20 |
| 2 1/2 | 2.37 | 2.50 | 2.60 | 2.76 | 2 | 2.37 | 2.50 | 2.60 | 2.76 | 2.60 | 2.76 | 2 | 6.50 | 3.09 |
| 3 | 2.87 | 3 | 3.19 | 3.35 | 2 | 2.87 | 3 | 3.19 | 3.35 | 2.87 | 3 | 1 | 6.65 | 4.41 |
| 4 | 3.84 | 4 | 3.94 | 4.09 | 2 | 3.94 | 4.09 | 3.94 | 4.09 | 3.84 | 4 | 2 | 7.83 | 6.61 |

Other variable process connections

Dimensions in mm

| DN | Food ind. fitting | | | Tri-Clamp | | | | | | | | | |
|----------|-------------------|-----|-------------|-----------|------|--------|-----|-------------|-----------|------|-------|-----|-------------|
| | DIN 11851 | | | DIN 32676 | | | | | ASME BPE | | | | |
| | Rd. Gew. | L | Weight [kg] | Ø Di | Ø Da | series | L | Weight [kg] | Tri-Clamp | Ø Di | Ø Da | L | Weight [kg] |
| 3 ... 10 | 28 x 1/8" | 169 | 0.5 | 10 | 34 | 3 | 163 | 0.5 | 1/2" | 9.4 | 25 | 143 | 0.5 |
| 15 | 34 x 1/8" | 169 | 0.5 | 16 | 34 | 3 | 163 | 0.5 | 3/4" | 15.7 | 25 | 143 | 0.5 |
| 20 | 44 x 1/6" | 180 | 0.9 | 20 | 34 | 3 | 168 | 0.7 | 1" | 22.1 | 50.4 | 143 | 0.7 |
| 25 | 52 x 1/6" | 207 | 0.9 | 26 | 50.5 | 3 | 192 | 0.8 | 1" | 22.1 | 50.4 | 143 | 1.2 |
| 32 | 58 x 1/6" | 230 | 1.4 | 32 | 50.5 | 3 | 209 | 1.5 | - | - | - | - | - |
| 40 | 65 x 1/6" | 237 | 1.4 | 38 | 50.5 | 3 | 214 | 1.4 | 1 1/2" | 34.8 | 50.4 | 277 | 1.8 |
| 50 | 78 x 1/6" | 243 | 1.4 | 50 | 64.0 | 3 | 216 | 1.2 | 2" | 47.5 | 63.9 | 277 | 1.8 |
| 65 | 96 x 1/6" | 245 | 2.2 | 66 | 91.0 | 1 | 221 | 1.6 | 2 1/2" | 60.2 | 77.4 | 277 | 2.0 |
| 80 | 110 x 1/4" | 259 | 3.2 | 81 | 106 | 1 | 225 | 2.4 | 3" | 72.9 | 90.9 | 337 | 3.6 |
| 100 | 130 x 1/4" | 307 | 4.4 | 100 | 119 | 1 | 225 | 3.1 | 4" | 97.4 | 118.9 | 337 | 4.1 |

Dimensions in inch

| DN | Food ind. fitting | | | Tri-Clamp | | | | | | | | | |
|--------------|-------------------|-------|-------------|-----------|------|--------|-------|-------------|-----------|------|------|-------|-------------|
| | DIN 11851 | | | DIN 32676 | | | | | ASME BPE | | | | |
| | Rd. Gew. | L | Weight [lb] | Ø Di | Ø Da | series | L | Weight [lb] | Tri-Clamp | Ø Di | Ø Da | L | Weight [lb] |
| 1/10 ... 3/8 | 1.10 x 1/8" | 6.65 | 1.10 | 0.39 | 1.34 | 3 | 6.42 | 1.10 | 1/2" | 0.37 | 0.98 | 5.63 | 1.10 |
| 1/2 | 1.34 x 1/8" | 6.65 | 1.10 | 0.63 | 1.34 | 3 | 6.42 | 1.10 | 3/4" | 0.62 | 0.98 | 5.63 | 1.10 |
| 3/4 | 1.73 x 1/6" | 7.09 | 1.98 | 0.79 | 1.34 | 3 | 6.61 | 1.54 | 1" | 0.87 | 1.98 | 5.63 | 1.54 |
| 1 | 2.05 x 1/6" | 8.15 | 1.98 | 1.02 | 1.99 | 3 | 7.56 | 1.76 | 1" | 0.87 | 1.98 | 5.63 | 2.65 |
| 1 1/4 | 2.28 x 1/6" | 9.06 | 3.09 | 1.26 | 1.99 | 3 | 8.23 | 3.31 | - | - | - | - | - |
| 1 1/2 | 2.56 x 1/6" | 9.33 | 3.09 | 1.50 | 1.99 | 3 | 8.43 | 3.09 | 1 1/2" | 1.37 | 1.98 | 10.91 | 3.97 |
| 2 | 3.07 x 1/6" | 9.57 | 3.09 | 1.97 | 2.52 | 3 | 8.50 | 2.65 | 2" | 1.87 | 2.52 | 10.91 | 3.97 |
| 2 1/2 | 3.78 x 1/6" | 9.65 | 4.85 | 2.60 | 3.58 | 1 | 8.70 | 3.53 | 2 1/2" | 2.37 | 3.05 | 10.91 | 4.41 |
| 3 | 4.33 x 1/4" | 10.20 | 7.05 | 3.19 | 4.17 | 1 | 8.86 | 5.29 | 3" | 2.87 | 3.58 | 13.27 | 7.94 |
| 4 | 5.12 x 1/4" | 12.09 | 9.70 | 3.94 | 4.69 | 1 | 10.04 | 6.83 | 4" | 3.83 | 4.68 | 13.27 | 8.84 |

External threads according to ISO 228 / DIN 2999 conical

Dimensions in mm

| DN | R | a | L | Weight [kg] |
|----------|------|----|-----|-------------|
| 3 ... 10 | 3/8" | 18 | 139 | 0.4 |
| 15 | 1/2" | 18 | 139 | 0.4 |
| 20 | 3/4" | 25 | 164 | 0.8 |
| 25 | 1" | 25 | 179 | 0.8 |

Dimensions in inch

| DN | R | a | L | Weight [lb] |
|--------------|------|------|------|-------------|
| 1/10 ... 3/8 | 3/8" | 0.71 | 5.47 | 0.88 |
| 1/2 | 1/2" | 0.71 | 5.47 | 0.88 |
| 3/4 | 3/4" | 0.98 | 6.46 | 1.76 |
| 1 | 1" | 0.98 | 7.05 | 1.76 |

Weld stubs for OD-Tubing

Dimensions in mm

| DN | Size of weld stub | Di | Da | L | Weight [kg] |
|-------------|-------------------|-------|-------|-----|-------------|
| 10 (3/8") | 1/2" | 9.40 | 12.70 | 127 | 0.4 |
| 15 (1/2") | 3/4" | 15.75 | 19.05 | 127 | 0.4 |
| 20 (1") | 1" | 22.10 | 25.40 | 132 | 0.7 |
| 25 (1") | 1" | 22.10 | 25.40 | 149 | 1 |
| 40 (1 1/2") | 1 1/2" | 34.80 | 38.10 | 171 | 1 |
| 50 (2") | 2" | 47.50 | 50.80 | 173 | 1 |

Dimensions in inch

| DN | Size of weld stub | Di | Da | L | Weight [kg] |
|-------------|-------------------|------|------|------|-------------|
| 10 (3/8") | 1/2" | 0.37 | 0.50 | 5 | 0.9 |
| 15 (1/2") | 3/4" | 0.62 | 0.75 | 5 | 0.9 |
| 20 (1") | 1" | 0.87 | 1 | 5.20 | 1.5 |
| 25 (1") | 1" | 0.87 | 1 | 5.87 | 2.2 |
| 40 (1 1/2") | 1 1/2" | 1.37 | 1.50 | 6.73 | 2.2 |
| 50 (2") | 2" | 1.87 | 2 | 6.81 | 2.2 |

6.8 Transmitter housing and suggested installation method

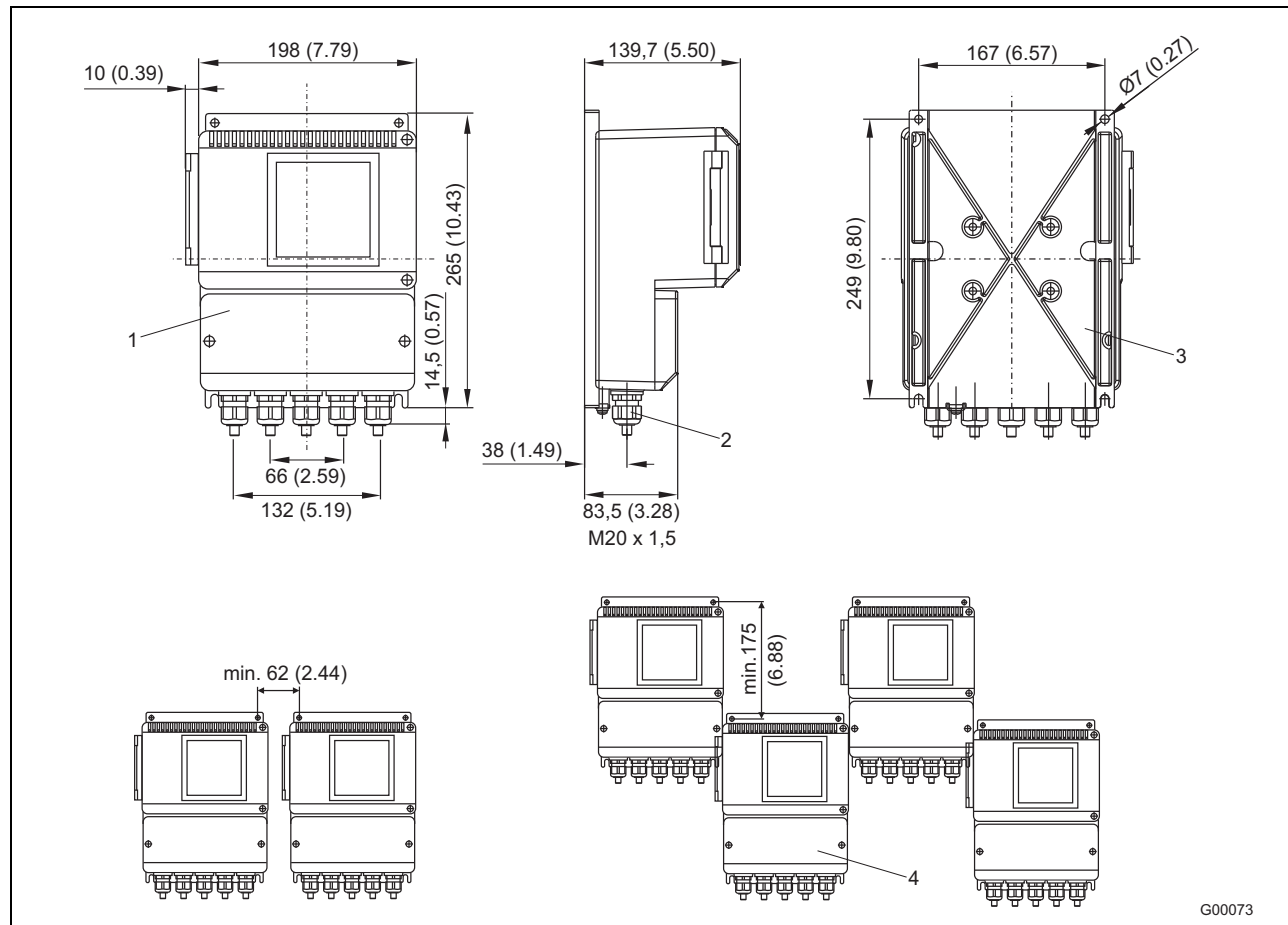


Fig. 29: Dimensions in mm (inch)

- 1 Field-mount housing with window
- 2 Cable gland M20 x 1.5
- 3 Installation holes for pipe mounting set, for 2" pipe installation; mounting set available on request (order no. 3KXF081100L0001)
- 4 Protection type IP 67

Continued

| | | Main order number | | | | | | | | | | | | | | | | | | | | | | | | | | | Additional order no. | | |
|--|--|-------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---------|----|----|----|----|----|----|----|----|----|----|----------------------|----|--|
| Version number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | |
| Without explosion protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | XX | | |
| FEH311 | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | |
| With explosion protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | XX | | |
| FEH315 | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | |
| Process connection material | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel flange 1.4571 (316 Ti) | | | | | | | | | | | | | | | | | | D | | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with EPDM gasket | | | | | | | | | | | | | | | | | | E | | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with EPDM gasket and attachment | | | | | | | | | | | | | | | | | | 6) F | | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with silicone gasket | | | | | | | | | | | | | | | | | | G | | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with silicone gasket and attachment | | | | | | | | | | | | | | | | | | 6) H | | | | | | | | | | | | | |
| Without process connection or gasket; with attachment | | | | | | | | | | | | | | | | | | 6) 7) W | | | | | | | | | | | | | |
| Without process connection, gasket, or attachment | | | | | | | | | | | | | | | | | | 6) 7) Y | | | | | | | | | | | | | |
| Certificates | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Meter tube with DGRL approval | | | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.1 to EN 10204 | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | |
| Pressure test to AD-2000 | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.1 to EN 10204 and pressure test to AD-2000 | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.2 to EN 10204 | | | | | | | | | | | | | | | | | | 7 | | | | | | | | | | | | | |
| Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard accuracy | | | | | | | | | | | | | | | | | | 8) A | | | | | | | | | | | | | |
| Increased accuracy | | | | | | | | | | | | | | | | | | 9) B | | | | | | | | | | | | | |
| Standard accuracy for certified calibration | | | | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| 5-point DKD calibration | | | | | | | | | | | | | | | | | | T | | | | | | | | | | | | | |
| Sensor temperature range / Ambient temperature range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | | | | | | | 10) 1 | | | | | | | | | | | | | |
| High-temperature sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | | | | | | | 11) 3 | | | | | | | | | | | | | |
| Name plate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sticker | | | | | | | | | | | | | | | | | | A | | | | | | | | | | | | | |
| Stainless steel | | | | | | | | | | | | | | | | | | B | | | | | | | | | | | | | |
| Stainless steel and stainless steel tag plate | | | | | | | | | | | | | | | | | | C | | | | | | | | | | | | | |
| Signal cable length | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No cable | | | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | |
| Explosion protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | A | | | | | | | | | | | | | |
| ATEX/IEC Zone 2/21 | | | | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| usFMc Div 2 Zone 2 | | | | | | | | | | | | | | | | | | P | | | | | | | | | | | | | |
| Protection type for transmitter/sensor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP67 (NEMA 4X) / IP67 (NEMA 4X) | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| Cable gland | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M20 x 1.5 | | | | | | | | | | | | | | | | | | A | | | | | | | | | | | | | |
| 1/2 in. NPT | | | | | | | | | | | | | | | | | | B | | | | | | | | | | | | | |
| PF 1/2 in. | | | | | | | | | | | | | | | | | | C | | | | | | | | | | | | | |

Continued on next page

- 6) 3A conformity not available.
- 7) Must be specified for "wafer flange" and "without adapter" process connection types.
- 8) Standard accuracy (0.4% of measured value) assumes 2 calibration points. If more than 2 calibration points are required, you must specify 3 or 5 points under "Number of test points".
- 9) Increased accuracy (0.2% of measured value) assumes 3 calibration points. If more than 3 calibration points are required, you must specify 5 points under "Number of test points" (increased accuracy is available for DN 10 ... 100).
- 10) Maximum fluid temperature for standard sensor design: 130 °C (266 °F) with PFA.
- 11) Maximum fluid temperature for high-temperature sensor design: 180 °C (356 °F) with PFA.

Continued

| Main order number | | | | | | | | | | | | | | | | | | | | | | | | | | | Additional order no. | |
|--|--|--------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|-----|----|----------------------|--|
| Version number | | 1 - 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | | | |
| Without explosion protection | | FEH311 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | | | |
| With explosion protection | | FEH315 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | | | |
| Supply power | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 ... 230 V AC, 50 Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 V AC/DC, 50 Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 ... 230 V AC, 60 Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 V AC/DC, 60 Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal inputs and outputs | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HART + 20 mA passive + pulses + contact input/output | | | | | | | | | | | | | | | | | | | | | | | | | B | | | |
| HART + 20 mA active + pulses + contact input/output | | | | | | | | | | | | | | | | | | | | | | | | | C | | | |
| Default settings / Diagnostics | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters are at factory settings / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| Parameters set according to customer specifications / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | |
| Additional options | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With Gore-Tex diaphragm | | | | | | | | | | | | | | | | | | | | | | | | | 12) | KG | | |
| Language of documentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| German | | | | | | | | | | | | | | | | | | | | | | | | | | M1 | | |
| English | | | | | | | | | | | | | | | | | | | | | | | | | | M5 | | |
| Western Europe/Scandinavia language package | | | | | | | | | | | | | | | | | | | | | | | | | | MW | | |
| Eastern Europe language package | | | | | | | | | | | | | | | | | | | | | | | | | | ME | | |
| Number of test points | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 points | | | | | | | | | | | | | | | | | | | | | | | | | | P3 | | |
| 5 points | | | | | | | | | | | | | | | | | | | | | | | | | | P5 | | |

12) Only available for model FEH311.

7.2 HygienicMaster FEH321, FEH325 electromagnetic flowmeter, with remote transmitter

| Main order number | | | | | | | | | | | | | | | | | | | | | | | | | | | Additional order no. | |
|---|--|--------|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----------------------|--|
| Version number | | 1 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | | |
| Without explosion protection | | FEH321 | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | | |
| With explosion protection | | FEH325 | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | | |
| Nominal size | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DN 3 (1/10 in.) | | | | 0 | 0 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| DN 4 (5/32 in.) | | | | 0 | 0 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| DN 6 (1/4 in.) | | | | 0 | 0 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| DN 8 (5/16 in.) | | | | 0 | 0 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| DN 10 (3/8 in.) | | | | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| DN 15 (1/2 in.) | | | | 0 | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| DN 20 (3/4 in.) | | | | 0 | 2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| DN 25 (1 in.) | | | | 0 | 2 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| DN 32 (1-1/4 in.) | | | | 0 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| DN 40 (1-1/2 in.) | | | | 0 | 4 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| DN 50 (2 in.) | | | | 0 | 5 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| DN 65 (2-1/2 in.) | | | | 0 | 6 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| DN 80 (3 in.) | | | | 0 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| DN 100 (4 in.) | | | | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| Lining material | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PFA | | P | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electrode design | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pointed head | | 1) 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal electrode material | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel 1.4539 (904) | | A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C-4 (2.4610) | | D | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | F | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B-3 (2.4600) | | H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Platinum-iridium | | J | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel 1.4571 (316 Ti) | | S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grounding accessories | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grounding electrodes (for material, refer to "Signal electrode material") | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Process connection | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flange, DIN PN 16 | | 2) D 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flange, DIN PN 40 | | 3) D 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flange, ASME CL 150, ISO-compliant installation length | | A 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flange, ASME CL 300, ISO-compliant installation length | | A 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flange, JIS 10K | | J 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External thread in acc. with ISO 228/DIN 2999 (tapered) | | 4) M 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cable gland in acc. with DIN 11851 | | 4) F 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs in acc. with ISO 2037 | | 4) R 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs in acc. with DIN 2463 | | 4) R 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs in acc. with DIN 11850 | | 4) R 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs in acc. with ISO 1127 | | 4) R 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs suitable for OD tubing | | 4) R 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weld stubs in acc. with SMS | | 4) R 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tri-Clamp in acc. with DIN 32676 | | 4) T 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tri-Clamp in acc. with ASME BPE | | 4) T 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wafer flange | | 4) W 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Without adapter | | 5) Y 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |

Continued on next page

- 1) Signal electrode material: 1.4539 (904).
- 2) For nominal size DN 100 only.
- 3) Applies for nominal sizes DN 3-80.
- 4) For details of nominal sizes available and max. permissible pressure, refer to Section 3.1.6, "Material load".
- 5) Spare sensor, for replacement purposes only.

Continued

| | | Main order number | | | | | | | | | | | | | | | | Additional order no. | | | | | | |
|--|---------------|-------------------|---|---|---|----|----|----|----|----|----|-------|----|----|----|----|----|----------------------|----|----|----|----|----|----|
| Version number | 1 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | |
| Without explosion protection | FEH321 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX |
| With explosion protection | FEH325 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX |
| Process connection material | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel flange 1.4571 (316 Ti) | | | | | | | | | | | | D | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with EPDM gasket | | | | | | | | | | | | E | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with EPDM gasket and attachment | | | | | | | | | | | | 6) F | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with silicone gasket | | | | | | | | | | | | G | | | | | | | | | | | | |
| Stainless steel 1.4404 (316 L) with silicone gasket and attachment | | | | | | | | | | | | 6) H | | | | | | | | | | | | |
| Without process connection or gasket; with attachment | | | | | | | | | | | | 6) W | | | | | | | | | | | | |
| Without process connection, gasket, or attachment | | | | | | | | | | | | 6) Y | | | | | | | | | | | | |
| Certificates | | | | | | | | | | | | | | | | | | | | | | | | |
| Meter tube with DGRL approval | | | | | | | | | | | | 0 | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.1 to EN 10204 | | | | | | | | | | | | 2 | | | | | | | | | | | | |
| Pressure test to AD-2000 | | | | | | | | | | | | 3 | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.1 to EN 10204 and pressure test to AD-2000 | | | | | | | | | | | | 4 | | | | | | | | | | | | |
| Material confirmation with inspection certificate 3.2 to EN 10204 | | | | | | | | | | | | 7 | | | | | | | | | | | | |
| Calibration | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard accuracy | | | | | | | | | | | | 8) A | | | | | | | | | | | | |
| Increased accuracy | | | | | | | | | | | | 9) B | | | | | | | | | | | | |
| Standard accuracy for certified calibration | | | | | | | | | | | | M | | | | | | | | | | | | |
| 5-point DKD calibration | | | | | | | | | | | | T | | | | | | | | | | | | |
| Sensor temperature range / Ambient temperature range | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | 10) 1 | | | | | | | | | | | | |
| High-temperature sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | 11) 3 | | | | | | | | | | | | |
| Name plate | | | | | | | | | | | | | | | | | | | | | | | | |
| Sticker | | | | | | | | | | | | A | | | | | | | | | | | | |
| Stainless steel | | | | | | | | | | | | B | | | | | | | | | | | | |
| Stainless steel and stainless steel tag plate | | | | | | | | | | | | C | | | | | | | | | | | | |
| Signal cable length | | | | | | | | | | | | | | | | | | | | | | | | |
| No cable | | | | | | | | | | | | 0 | | | | | | | | | | | | |
| 5 m (approx. 15 ft.) standard cable | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 10 m (approx. 30 ft.) standard cable | | | | | | | | | | | | 2 | | | | | | | | | | | | |
| 20 m (approx. 60 ft.) standard cable | | | | | | | | | | | | 3 | | | | | | | | | | | | |
| 30 m (approx. 100 ft.) standard cable | | | | | | | | | | | | 4 | | | | | | | | | | | | |
| 50 m (approx. 165 ft.) standard cable | | | | | | | | | | | | 5 | | | | | | | | | | | | |
| 80 m (approx. 260 ft.) standard cable | | | | | | | | | | | | 6 | | | | | | | | | | | | |
| 100 m (approx. 325 ft.) standard cable | | | | | | | | | | | | 7 | | | | | | | | | | | | |
| 150 m (approx. 490 ft.) standard cable | | | | | | | | | | | | 8 | | | | | | | | | | | | |
| Explosion protection | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | A | | | | | | | | | | | | |
| ATEX/IEC Zone 2/21 | | | | | | | | | | | | M | | | | | | | | | | | | |
| usFMc Div 2 Zone 2 | | | | | | | | | | | | P | | | | | | | | | | | | |
| Protection type for transmitter/sensor | | | | | | | | | | | | | | | | | | | | | | | | |
| IP67 (NEMA 4X) / IP67 (NEMA 4X) | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| IP67 (NEMA 4X) / IP68 (NEMA 6X) | | | | | | | | | | | | 12) 2 | | | | | | | | | | | | |
| IP67 (NEMA 4X) / IP68 (NEMA 6X), signal cable connected and sealed in | | | | | | | | | | | | 13) 3 | | | | | | | | | | | | |
| Cable gland | | | | | | | | | | | | | | | | | | | | | | | | |
| M20 x 1.5 | | | | | | | | | | | | A | | | | | | | | | | | | |
| 1/2 in. NPT | | | | | | | | | | | | B | | | | | | | | | | | | |
| PF 1/2 in. | | | | | | | | | | | | C | | | | | | | | | | | | |

Continued on next page

- 6) 3A conformity not available.
- 7) Must be specified for "wafer flange" and "without adapter" process connection types.
- 8) Standard accuracy (0.4% of measured value) assumes 2 calibration points. If more than 2 calibration points are required, you must specify 3 or 5 points under "Number of test points".
- 9) Increased accuracy (0.2% of measured value) assumes 3 calibration points. If more than 3 calibration points are required, you must specify 5 points under "Number of test points" (increased accuracy is available for DN 10 ... 100).
- 10) Maximum fluid temperature for standard sensor design: 130 °C (266 °F) with PFA.
- 11) Maximum fluid temperature for high-temperature sensor design: 180 °C (356 °F) with PFA.
- 12) Only with external transmitter, sealing compound (optional) D141B038U01.
- 13) Not with NPT cable gland.

Continued

| Main order number | | | | | | | | | | | | | | | | | | | | | | | | | | | Additional order no. |
|--|--------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|----|-------------------------|
| Version number | 1 - 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | | | |
| Without explosion protection | FEH321 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | |
| With explosion protection | FEH325 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | XX | |
| Supply power | | | | | | | | | | | | | | | | | | | | | | 0 | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal inputs and outputs | | | | | | | | | | | | | | | | | | | | | | Y | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Default settings / Diagnostics | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters are at factory settings / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters set according to customer specifications / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Accessories | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With preamplifier, integrated into sensor housing | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional options | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With Gore-Tex diaphragm | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Language of documentation | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| German | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| English | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Western Europe/Scandinavia language package | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eastern Europe language package | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of test points | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 points | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 points | | | | | | | | | | | | | | | | | | | | | | | | | | | |

14) Preamplifier required if signal cable length is > 50 m (approx. 165 ft.) or with nominal sizes DN 3 ... DN 8.

15) Only available for model FEH321.

7.3 FET321, FET325 external transmitter for ProcessMaster/HygienicMaster

| Main order number | | | | | | | | | | | | | | | Additional order no. | | | | | | | | | | | |
|--|---|---|---|----|----|----|----|----|----|--|--|--|--|--|----------------------|---|----|---|---|---|---|----|---|----|----|----|
| Version number | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 - 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | | | | | | | | | | | | | | | | |
| Without explosion protection | | | | | | | | | | | | | | | FET321 | X | X | X | X | X | X | X | X | X | X | XX |
| With explosion protection | | | | | | | | | | | | | | | FET325 | X | X | X | X | X | X | X | X | X | X | XX |
| Sensor temperature range / Ambient temperature range | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| High-temperature sensor design / -20 ... 60 °C (-4 ... 140 °F) | | | | | | | | | | | | | | | | 3 | | | | | | | | | | |
| Name plate | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sticker | | | | | | | | | | | | | | | | | A | | | | | | | | | |
| Stainless steel | | | | | | | | | | | | | | | | | B | | | | | | | | | |
| Stainless steel and stainless steel tag plate | | | | | | | | | | | | | | | | | C | | | | | | | | | |
| Signal cable length | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No signal cable | | | | | | | | | | | | | | | | 0 | | | | | | | | | | |
| Explosion protection | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | 1) | A | | | | | | | | |
| usFMc Div 2 Zone 2 | | | | | | | | | | | | | | | | | 2) | P | | | | | | | | |
| Protection type for transmitter/sensor | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP 67 (NEMA 4X) / IP 67 (NEMA 4X) | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| Cable gland | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M20 x 1.5 | | | | | | | | | | | | | | | | | | | | | A | | | | | |
| 1/2 in. NPT | | | | | | | | | | | | | | | | | | | | | B | | | | | |
| PF 1/2 in. | | | | | | | | | | | | | | | | | | | | | C | | | | | |
| Supply power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 ... 230 V AC, 50 Hz | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| 24 V AC/DC, 50 Hz | | | | | | | | | | | | | | | | | | | | | | 2 | | | | |
| 100 ... 230 V AC, 60 Hz | | | | | | | | | | | | | | | | | | | | | | 3 | | | | |
| 24 V AC/DC, 60 Hz | | | | | | | | | | | | | | | | | | | | | | 4 | | | | |
| Signal inputs and outputs | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HART + 20 mA passive + pulses + contact input/output | | | | | | | | | | | | | | | | | | | | | | | B | | | |
| HART + 20 mA active + pulses + contact input/output | | | | | | | | | | | | | | | | | | | | | | | C | | | |
| Default settings / Diagnostics | | | | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | 3) | 0 | | | |
| Parameters are at factory settings / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| Parameters set according to customer specifications / Standard diagnostics functions activated | | | | | | | | | | | | | | | | | | | | | | | | 3 | | |
| Additional options | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With Gore-Tex diaphragm | | | | | | | | | | | | | | | | | | | | | | | | 4) | KG | |
| Language of documentation | | | | | | | | | | | | | | | | | | | | | | | | | | |
| German | | | | | | | | | | | | | | | | | | | | | | | | | M1 | |
| English | | | | | | | | | | | | | | | | | | | | | | | | | M5 | |
| Western Europe/Scandinavia language package | | | | | | | | | | | | | | | | | | | | | | | | | MW | |
| Eastern Europe language package | | | | | | | | | | | | | | | | | | | | | | | | | ME | |

- 1) Must be selected for combination of FEP321 sensor and FET321 transmitter, or for combination of FEP325 sensor (ATEX/IEC Zone 2) and FET325 transmitter.
- 2) Must be selected for combination of FEP325 sensor (Div 2) and FET325 transmitter.
- 3) Must be selected if transmitter is being ordered as a spare part or without a sensor.
- 4) Model FET321 only.

7.4 FET301 transmitter plug-in module for ProcessMaster/HygienicMaster

| | | Main order number | | | | | | | | | | | | | | | Additional order no. |
|---|--|-------------------|---|---|---|----|----|----|----|----|----|----|--|--|--|--|----------------------|
| Version number | | 1 - 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | | | | | |
| Transmitter plug-in module | | FET301 | X | X | X | X | X | X | X | X | X | | | | | | |
| Sensor temperature range / Ambient temperature range | | | | | | | | | | | | | | | | | |
| Standard sensor design / -20 ... 60 °C (-4 ... 140 °F) | | 1 | | | | | | | | | | | | | | | |
| Name plate | | | | | | | | | | | | | | | | | |
| Sticker | | | A | | | | | | | | | | | | | | |
| Signal cable length | | | | | | | | | | | | | | | | | |
| No signal cable | | 0 | | | | | | | | | | | | | | | |
| Explosion protection | | | | | | | | | | | | | | | | | |
| None | | | A | | | | | | | | | | | | | | |
| Protection type for transmitter/sensor | | | | | | | | | | | | | | | | | |
| Other | | | | 9 | | | | | | | | | | | | | |
| Cable gland | | | | | | | | | | | | | | | | | |
| Other | | | | | | Z | | | | | | | | | | | |
| Supply power | | | | | | | | | | | | | | | | | |
| 100 ... 230 V AC, 50 Hz | | | | | | | | | 1 | | | | | | | | |
| 24 V AC/DC, 50 Hz | | | | | | | | | 2 | | | | | | | | |
| 100 ... 230 V AC, 60 Hz | | | | | | | | | 3 | | | | | | | | |
| 24 V AC/DC, 60 Hz | | | | | | | | | 4 | | | | | | | | |
| Signal inputs and outputs | | | | | | | | | | | | | | | | | |
| HART + 20 mA passive + pulses + contact input/output | | | | | | | | | | B | | | | | | | |
| HART + 20 mA active + pulses + contact input/output | | | | | | | | | | C | | | | | | | |
| Default settings / Diagnostics | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | 0 | | | | | | | |
| Language of documentation | | | | | | | | | | | | | | | | | |
| German | | | | | | | | | | | | M1 | | | | | |
| English | | | | | | | | | | | | M5 | | | | | |
| Western Europe/Scandinavia language package | | | | | | | | | | | | MW | | | | | |
| Eastern Europe language package | | | | | | | | | | | | ME | | | | | |

7.5 Ordering information: Wafer flange accessories (Table H)

Wafer flange accessories

| Material | Nominal size | Nominal pressure rating | Order number |
|------------------------|------------------------------------|--|--|
| Stainless steel, A4-70 | DN 3 ... DN 10 (1/10 ... 3/8 inch) | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L265U03 D614L265U03 D614L265U04 |
| | DN 15 (1/2 inch) | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L265U03 D614L266U05 D614L266U06 |
| | DN 20 3/4 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L267U04 D614L267U05 D614L267U06 |
| | DN 25 1 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L268U04 D614L268U05 D614L268U06 |
| | DN 32 1-1/4 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L269U04 D614L269U05 D614L269U06 |
| | DN 40 1-1/2 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L270U04 D614L270U05 D614L270U06 |
| | DN 50 2 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L296U04 D614L296U05 D614L296U06 |
| | DN 65 2-1/2 in. | PN 10 ... PN 16 PN 25 ... PN 40 ASME CL 150 ASME CL 300 | D614L297U08 D614L297U09 D614L297U10 D614L297U11 |
| | DN 80 3 in. | PN 10 ... PN 40 ASME CL 150 ASME CL 300 | D614L298U08 D614L298U09 D614L298U10 |
| | DN 100 4 in. | PN 10 ... PN 16 PN 25 ... PN 40 ASME CL 150 | D614L299U07 D614L299U08 D614L299U09 |

Welding adapter

| Material | Nominal size | Order number |
|------------------------------|---------------------------------|--------------|
| Stainless steel 1.4301 (304) | DN 3 ... DN 10 1/10 ... 3/8 in. | D413C470U01 |
| | DN 15 1/2 in. | D413C471U01 |
| | DN 20 3/4 in. | D413C472U01 |
| | DN 25 1 in. | D413C473U01 |
| | DN 32 1-1/4 in. | D413C474U01 |
| | DN 40 1-1/2 in. | D413C475U01 |
| | DN 50 2 in. | D413C488U03 |
| | DN 65 2-1/2 in. | D413C461U09 |
| | DN 80 3 in. | D413C496U03 |
| | DN 100 4 in. | D413C498U03 |

The adapter is a tool for sensors that feature weld stubs as the process connection type. It enables these weld stubs to be welded into the pipeline in a coplanar manner.

7.6 FXC4000 flowmeter sensor simulator

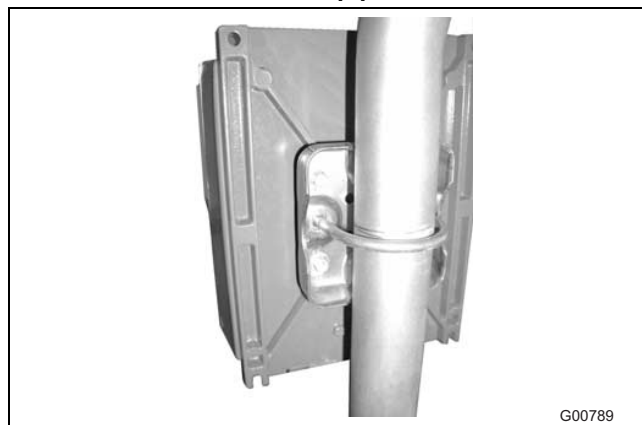
| | | | | | Main order number | | | | | |
|---|--|--|--|--|-------------------|----------|----------|----------|----------|----------|
| Version number | | | | | 1 - 5 | 6 | 7 | 8 | 9 | 10 |
| FXC4000 flowmeter sensor simulator | | | | | 55XC4 | X | X | X | X | X |
| Flow signal setting | | | | | | | | | | |
| None (adapter only) | | | | | 0 | | | | | |
| 3-digit switch in 1,000 increments | | | | | 1 | | | | | |
| Other | | | | | 9 | | | | | |
| Power supply | | | | | | | | | | |
| None (adapter only) | | | | | | 0 | | | | |
| Grounding plug for 110 ... 240 V AC, 50/60 Hz | | | | | | 1 | | | | |
| With 4 mm plug, 24 ... 48 V AC/DC | | | | | | 2 | | | | |
| With US plug, 110 ... 240 V AC, 50/60 Hz | | | | | | 3 | | | | |
| Other | | | | | | 9 | | | | |
| Additional equipment | | | | | | | | | | |
| None | | | | | | | 0 | | | |
| Adapter for FXE4000-E4, FXM2000-XM2, FXF2000-DF23 transmitter | | | | | | | 1 | | | |
| Adapter board for FSM4000-S4 transmitter | | | | | | | 5 | | | |
| Adapter board for FET321, FET325 transmitter | | | | | | | 6 | | | |
| Other | | | | | | | 9 | | | |
| Design level (specified by ABB) | | | | | | | | | | * |
| Name plate | | | | | | | | | | |
| German | | | | | | | | | | 1 |
| English | | | | | | | | | | 2 |
| French | | | | | | | | | | 3 |
| Other | | | | | | | | | | 9 |

1) Power supply for transmitter.

7.7 Infrared service port adapter type FZA100



7.8 Installation set for 2" pipe installation in field-mount housing



Part number: 3KXF081100L0001

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