

Gas ultrasonic flowmeter for permanent installation

Features

- 4 measuring channels to compensate highly disturbed flow profiles and to facilitate more accurate and repeatable measurements
- Best suitable for applications with limited straight runs
- High precision at fast and slow flow rates, high temperature and zero point stability

Applications

- Redundant check metering to custody transfer flow measurements
- Flow and density measurement in gas transport systems
- Wet gas flow measurement on wellheads and after separators



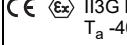
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Transmitter

Technical data

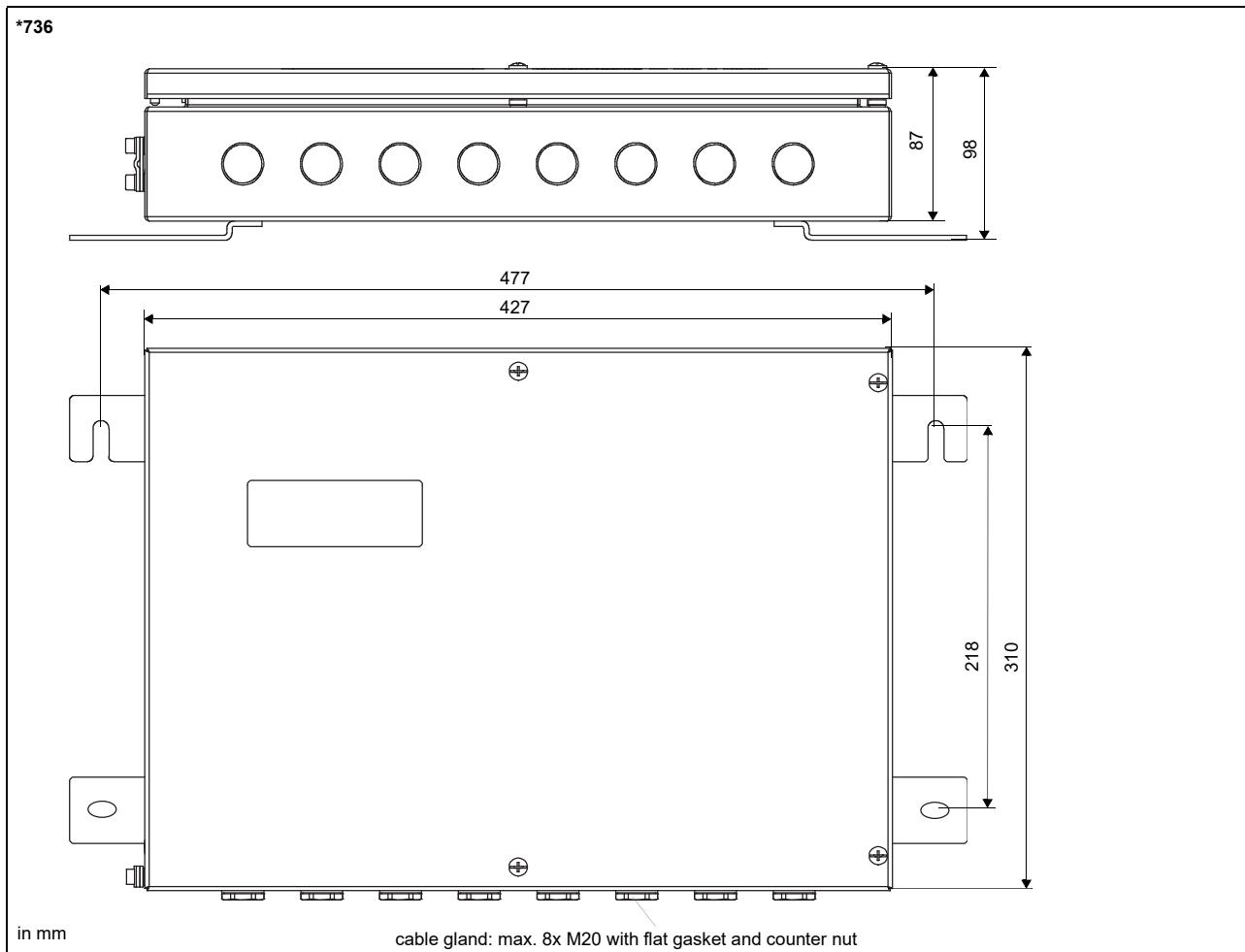
| | FLUXUS G736**-NN | FLUXUS G736**-A2 | FLUXUS G736**-F2 | | |
|---|--|--|--|--|--|
|  | | | | | |
| design | field device with 4 measuring channels in stainless steel housing | | | | |
| measurement | | | | | |
| measurement principle | transit time difference correlation principle | | | | |
| flow direction | bidirectional | | | | |
| synchronised channel averaging | x | | | | |
| flow velocity | m/s | measuring range: 0.01...35, depending on pipe diameter | | | |
| repeatability | | 0.15 % MV ±0.005 m/s | | | |
| fluid | all acoustically conductive gases, e.g. nitrogen, air, oxygen, hydrogen, argon, helium, ethylene, propane | | | | |
| temperature compensation | corresponding to the recommendations in ANSI/ASME MFC-5.1-2011 | | | | |
| measurement uncertainty (volumetric flow rate) | | | | | |
| measurement uncertainty of the measuring system ¹ | ±0.3 % MV ±0.005 m/s | | | | |
| measurement uncertainty at the measuring point | ±1...2 % MV ±0.005 m/s, depending on the application | | | | |
| transmitter | | | | | |
| power supply | <ul style="list-style-type: none"> • 90...250 V/50...60 Hz or • 11...32 V DC | | | | |
| power consumption | W | < 15 | | | |
| number of measuring channels | | 4 (1 measuring point) | | | |
| damping | s | 0...100 (adjustable) | | | |
| measuring cycle | Hz | 100...1000 | | | |
| response time | s | 1 | | | |
| housing material | stainless steel 316L (1.4404) | | | | |
| degree of protection | IP66 | | | | |
| dimensions | mm | see dimensional drawing | | | |
| weight | kg | 7.2 | | | |
| fixation | wall mounting, optional: 2" pipe mounting | | | | |
| ambient temperature | °C | -40...+60 (<-20 without operation of the display) | -20...+55 | | |
| display | 128 x 64 pixels, backlight | | | | |
| menu language | English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese | | | | |
| explosion protection | | | | | |
| • ATEX | | | | | |
| marking | - | CE  Ta -40...+60 °C | - | | |
| • FM | | | | | |
| marking | - | - |  NI/Cl. I, II, III / Div. 2 / GP. A, B, C, D, E, F, G / T5 -20 °C ≤ Ta ≤ 55 °C IP64 | | |
| certification | - | - | FM23US0080, FM23CA0059 | | |
| measuring functions | | | | | |
| physical quantities | operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity, optional: gas energy flow rate (DGM) | | | | |
| totaliser | volume, mass, optional: gas energy (DGM) | | | | |
| diagnostic functions | sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times | | | | |
| communication interfaces | | | | | |
| service interfaces | measured value transmission, parametrisation of the transmitter: <ul style="list-style-type: none"> • USB² • LAN² | | | | |
| process interfaces | max. 1 option: | max. 1 option: | max. 1 option: | | |
| | <ul style="list-style-type: none"> • Modbus RTU • BACnet MS/TP • M-Bus • HART • Modbus TCP • BACnet IP • Profibus PA • FF H1 | <ul style="list-style-type: none"> • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 | <ul style="list-style-type: none"> • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 | | |

¹ with aperture calibration of the transducers² outside the explosive atmosphere (housing cover open)

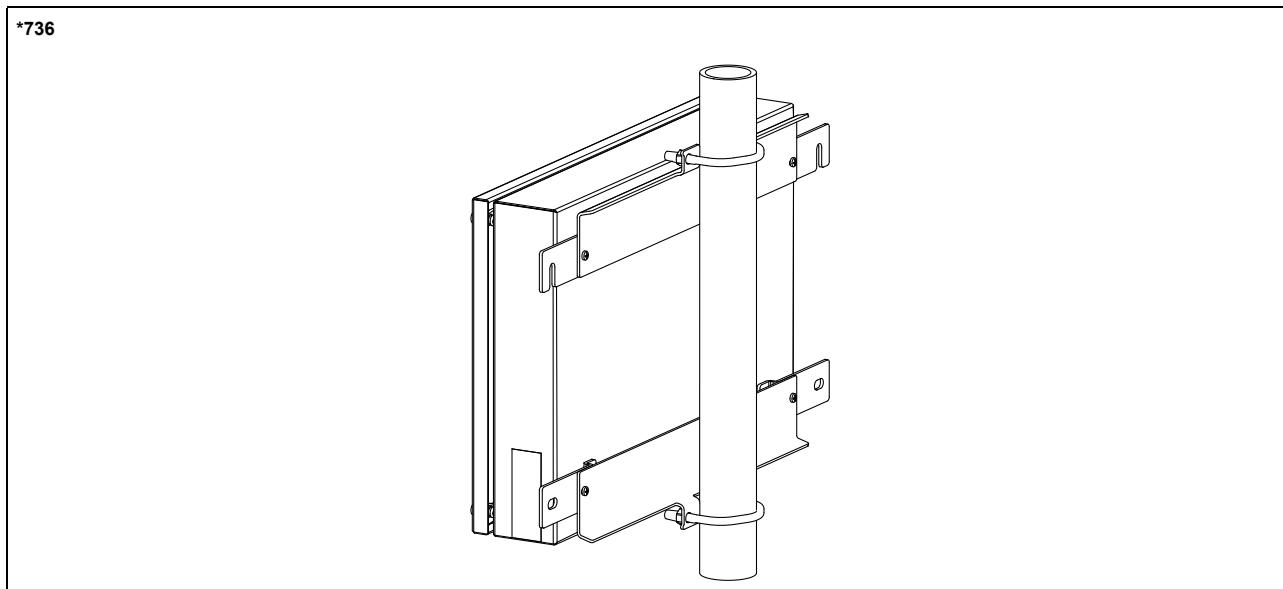
| | | FLUXUS G736**-NN | FLUXUS G736**-A2 | FLUXUS G736**-F2 |
|------------------------------------|-------|--|-------------------------|-------------------------|
| accessories | | | | |
| data transmission kit | | USB cable | | |
| software | | <ul style="list-style-type: none"> FluxDiagReader: reading of measured values and parameters, graphical representation FluxDiag (optional): reading of measurement data, graphical representation, report generation, parametrisation of the transmitter | | |
| data logger | | | | |
| loggable values | | all physical quantities, totalised physical quantities and diagnostic values | | |
| capacity | | max. 800 000 measured values | | |
| outputs | | | | |
| | | The outputs are galvanically isolated from the transmitter. | | |
| number | | active current inputs and outputs: max. 4 | | |
| • switchable current output | | | | |
| | | configurable according to NAMUR NE 43 All switchable current outputs are jointly switched to active or passive. | | |
| number | | max. 4 | | |
| range | mA | 4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2) | | |
| uncertainty | | 0.04 % of output value $\pm 3 \mu\text{A}$ | | |
| active output | | $R_{\text{ext}} = 250\ldots 530 \Omega$, $U_{\text{opencircuit}} = 28 \text{ V DC}$ | | |
| passive output | | $U_{\text{ext}} = 9\ldots 30 \text{ V DC}$, depending on R_{ext} ($R_{\text{ext}} < 458 \Omega$ at 20 V) | | |
| current output in HART mode | | option | | |
| • range | mA | 4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2) | | |
| • active output | | $R_{\text{ext}} = 250\ldots 530 \Omega$, $U_{\text{opencircuit}} = 28 \text{ V DC}$ | | |
| • passive output | | $U_{\text{ext}} = 9\ldots 30 \text{ V DC}$, depending on R_{ext} ($R_{\text{ext}} = 250\ldots 458 \Omega$ at 20 V) | | |
| • digital output | | | | |
| number | | max. 4 | | |
| functions | | <ul style="list-style-type: none"> frequency output binary output pulse output | | |
| type | | open collector (passive) | | |
| operating parameters | | 8.2 V/30 mA (NAMUR) | | |
| max. values | | 8 mA at 29 V DC | | |
| frequency output | | | | |
| • range | kHz | 2...10 | | |
| • damping | s | 0...999.9 | | |
| • pulse-to-pause ratio | | 1:1 | | |
| binary output | | | | |
| • binary output as alarm output | | limit, change of flow direction or error | | |
| pulse output | | | | |
| • pulse value | units | 0.01...1000 | | |
| • pulse width | ms | 0.05...1000 | | |
| • pulse rate | | max. 10 000 pulses | | |
| inputs | | | | |
| | | The inputs are galvanically isolated from the transmitter. | | |
| number | | active current inputs and outputs: max. 4 | | |
| • temperature input | | | | |
| number | | max. 4 | | |
| type | | Pt100/Pt1000 | | |
| connection | | 4-wire | | |
| range | °C | -150...+560 | | |
| resolution | K | 0.01 | | |
| accuracy | | $\pm 0.01 \% \text{ MV} \pm 0.03 \text{ K}$ at $18\ldots 28 \text{ }^{\circ}\text{C}$ $\pm 0.01 \% \text{ MV} \pm 0.03 \text{ K} \pm 0.0005 \%/\text{K}$ at $<18 \text{ }^{\circ}\text{C}/>28 \text{ }^{\circ}\text{C}$ | | |
| cable resistance | Ω | max. 1000 | | |
| • switchable current input | | | | |
| | | All switchable current inputs are jointly switched to active or passive. | | |
| number | | max. 4 | | |
| accuracy | | $\pm 0.1 \% \text{ MV} \pm 0.01 \text{ mA}$ at $18\ldots 28 \text{ }^{\circ}\text{C}$ $\pm 0.1 \% \text{ MV} \pm 0.01 \text{ mA} \pm 0.005 \%/\text{K}$ at $<18 \text{ }^{\circ}\text{C}/>28 \text{ }^{\circ}\text{C}$ | | |
| resolution | µA | 0.1 | | |
| active input | | $R_{\text{int}} = 75 \Omega$, $I_{\text{max}} \leq 30 \text{ mA}$ $U_{\text{opencircuit}} = 28 \text{ V}$ (open circuit) $U_{\text{min}} = 21.4 \text{ V}$ at 20 mA | | |
| • range | mA | 0...20 | | |
| passive input | | $U_{\text{ext}} = 24 \text{ V}$, $R_{\text{int}} = 35 \Omega$, $I_{\text{max}} \leq 24 \text{ mA}$ | | |
| • range | mA | 0...20 | | |

¹ with aperture calibration of the transducers² outside the explosive atmosphere (housing cover open)

Dimensions



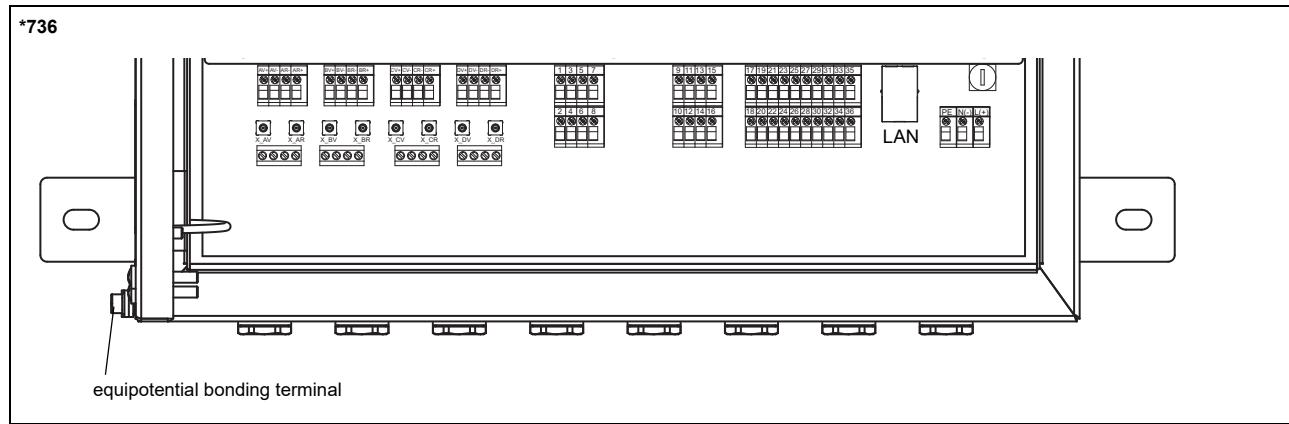
Wall and 2" pipe mounting kit



Storage

- do not store outdoors
- store within the original package
- store in a dry and dust-free place
- protect against sunlight
- keep all openings closed
- storing temperature: -20...+60 °C

Terminal assignment



power supply¹

| AC | | DC | |
|----------|----------------------|----------|----------------------|
| terminal | connection | terminal | connection |
| L | outer conductor | (+) | + |
| N | neutral conductor | (-) | - |
| | protective conductor | | protective conductor |

¹ cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

transducers, extension cable

| measuring channel A | | measuring channel B | | transducer |
|---------------------|-----------------|---------------------|-----------------|------------|
| terminal | connection | terminal | connection | |
| AV | signal | BV | signal | |
| AVS | internal shield | BVS | internal shield | |
| ARS | internal shield | BRS | internal shield | |
| AR | signal | BR | signal | |

outputs, inputs^{1, 2}

| terminal | connection |
|---|---|
| depending on configuration | current output, digital output, current input |
| 1, 2, 3, 4 5, 6, 7, 8 9, 10, 11, 12 13, 14, 15, 16 | temperature input |
| 33+, 34- | passive current output/HART |
| 33-, 34+ | active current output/HART |
| 33, 34 | Modbus RTU, BACnet MS/TP, M-Bus, Profibus PA, FF H1 |

temperature probe

| terminal | direct connection | connection with extension cable |
|--------------|-------------------|---------------------------------|
| 1, 5, 9, 13 | red | red |
| 2, 6, 10, 14 | white | white |
| 3, 7, 11, 15 | red/blue | grey |
| 4, 8, 12, 16 | white/blue | blue |

| | | |
|-----|-----------------------------------|--|
| USB | type C Hi-Speed USB 2.0 Device | service (FluxDiag/FluxDiagReader) |
| LAN | RJ45 10/100 Mbps Ethernet | <ul style="list-style-type: none"> • service (FluxDiag/FluxDiagReader) • Modbus TCP • BACnet IP |

¹ cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

² The number, type and terminal assignment are customised.

Transducers

Overview

Shear wave transducers

| | | technical type | | | | |
|---|-----|--------------------|---------------------------------|--------------------|--------------------|--------------------|
| | | G | K | M | P | Q |
| zone 2 - FM Class I Div. 2 - nonEx normal temperature range | | GDG1N52 GLG1N52 | GDK1N52 GLK1N52 | GDM2N52 GLM2N52 | GDP2N52 GLP2N52 | GDQ2N52 GLQ2N52 |
| zone 2 - nonEx IP68 | | GDG1L18 | GDK1L18 | GDM2L18 | GDP2L18 | |
| zone 2 - FM Class I Div. 2 - nonEx extended temperature range | | GDG1E52 GLG1E52 | GDK1E52 GLK1E52 | GDM2E52 GLM2E52 | GDP2E52 GLP2E52 | GDQ2E52 GLQ2E52 |
| zone 1 normal temperature range | | GDG1N81 GLG1N81 | GDK1N81 GLK1N81 | GDM2N81 GLM2N81 | GDP2N81 GLP2N81 | GDQ2N81 GLQ2N81 |
| zone 1 IP68 | | GDG1L11 | GDK1L11 | GDM2L11 | GDP2L11 | |
| zone 1 extended temperature range | | GDG1E83 GLG1E83 | GDK1E83 GLK1E83 | GDM2E85 GLM2E85 | GDP2E85 GLP2E85 | GDQ2E85 GLQ2E85 |
| inner pipe diameter d | | | | | | |
| min. extended | mm | 180 | 60 | 30 | 15 | 7 |
| min. recommended | mm | 220 | 80 | 40 | 20 | 10 |
| max. recommended | mm | 900 | 300 | 150 | 50 | 22 |
| max. extended | mm | 1100 | 360 | 180 | 60 | 30 |
| pipe wall thickness | | | | | | |
| min. | mm | 11 | 5 | 2.5 | 1.2 | 0.6 |
| fluid pressure | | | | | | |
| min. extended | bar | | metal pipe: 20 | | | |
| min. | bar | | metal pipe: 30, plastic pipe: 1 | | | |

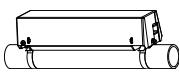
for further data see Technical specification TS_G7xx-transducersVx-xxx_Leu

Lamb wave transducers

| | | technical type | | | | | | |
|---|--------------------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|--|---|---|
| | | F | G | H | K | M | P | Q |
| zone 2 - FM Class I Div. 2 - nonEx normal temperature range | GRF1N52 GTF1N52 | GRG1N52 GTG1N52 | GRH1N52 GTH1N52 | GRK1N52 GTH1N52 | GRM1N52 GTM1N52 | GRP1N52 GTP1N52 | GRQ1N52 GTQ1N52 | |
| zone 2 - nonEx IP68 | GRF1L18 GTF1L18 | GRG1L18 GTG1L18 | GRH1L18 GTH1L18 | GRK1L18 GTH1L18 | GRM1L18 GTM1L18 | GRP1L18 GTP1L18 | | |
| zone 2 - FM Class I Div. 2 - nonEx higher temperatures | | GRG1S52 GTG1S52 | GRH1S52 GTH1S52 | GRK1S52 GTH1S52 | GRM1S52 GTM1S52 | GRP1S52 GTP1S52 | | |
| zone 1 normal temperature range | GRF1N83 GTF1N83 | GRG1N83 GTG1N83 | GRH1N83 GTH1N83 | GRK1N83 GTH1N83 | GRM1N83 GTM1N83 | GRP1N83 GTP1N83 | GRQ1N83 GTQ1N83 | |
| zone 1 IP68 | GRF1L13 | GRG1L13 | GRH1L13 | GRK1L13 | GRM1L13 | GRP1L13 | | |
| zone 1 higher temperatures | | GRG1S83 GTG1S83 | GRH1S83 GTH1S83 | GRK1S83 GTH1S83 | GRM1S83 GTM1S83 | | | |
| fluid pressure | | | | | | | | |
| min. extended | bar | | metal pipe: 10 | metal pipe: 10 | metal pipe: 10 | metal pipe: 10 (d > 120 mm) 3 (d < 120 mm) | metal pipe: 3 (d < 60 mm) | metal pipe: 3 (d < 35 mm) |
| min. | bar | | metal pipe: 15 plastic pipe: 1 | metal pipe: 15 plastic pipe: 1 | metal pipe: 15 plastic pipe: 1 | metal pipe: 15 (d > 120 mm) 10 (d < 120 mm) plastic pipe: 1 | metal pipe: 10 (d > 60 mm) 5 (d < 60 mm) plastic pipe: 1 | metal pipe: 10 (d > 15 mm) 5 (d < 15 mm) plastic pipe: 1 |
| inner pipe diameter d | | | | | | | | |
| min. extended | mm | 220 | 180 | 110 | 60 | 30 | 15 | 7 |
| min. recommended | mm | 270 | 220 | 140 | 80 | 40 | 20 | 10 |
| max. recommended | mm | 1200 | 900 | 600 | 300 | 150 | 50 | 22 |
| max. extended | mm | 1600 | 1400 | 1000 | 360 | 180 | 60 | 30 |
| pipe wall thickness ****N**, ****L** | | | | | | | | |
| min. | mm | 15 | 11 | 8 | 5 | 2.5 | 1.2 | 0.6 |
| max. | mm | 32 | 24 | 16 | 10 | 5 | 3 | 1.2 |
| max. extended | mm | 35 | - | - | - | - | - | - |
| pipe wall thickness ****S** | | | | | | | | |
| min. | mm | | | 10.6 | 7.1 | 4.2 | 2.1 | |
| max. | mm | | | 23.7 | 15.8 | 9.5 | 4.7 | |

for further data see Technical specification TS_G7xx-transducersVx-xxx_Leu

Transducer mounting fixture

| Variofix L | Variofix C |
|---|---|
|  |  |
| | Variofix C with bolt mounting plates |
| |  <p>outer pipe diameter: VCM: max. 46 mm VCQ: max. 36 mm</p> |

for further data see Technical specification TS_G7xx-transducersVx-XXX_Leu

Coupling materials for transducers

| | normal temperature range | | extended temperature range | | |
|-----------------------|---|---|---|--|-----------------------|
| | < 100 °C | < 170 °C | < 150 °C | < 200 °C | 200...240 °C |
| < 24 h | coupling compound type N or coupling foil type VT | coupling compound type E or coupling foil type VT | coupling compound type E or coupling foil type VT | coupling compound type E or H or coupling foil type VT | coupling foil type TF |
| long time measurement | coupling foil type VT | |

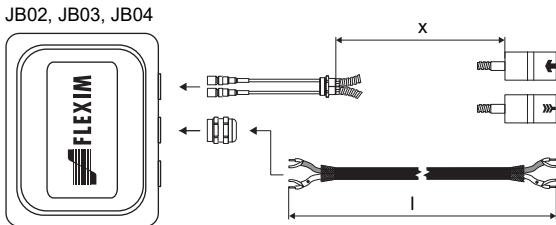
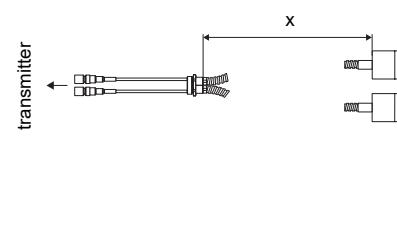
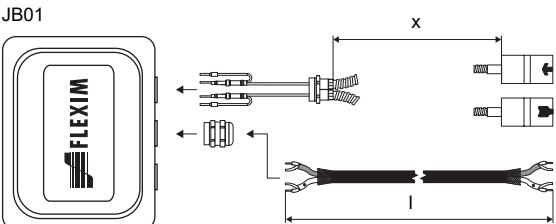
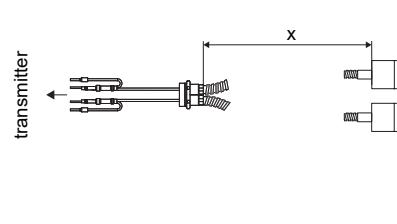
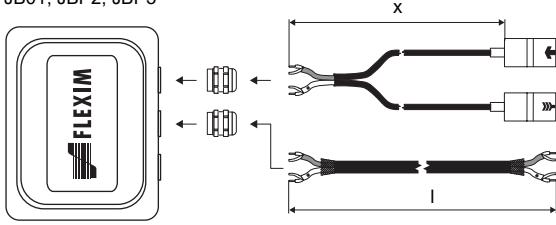
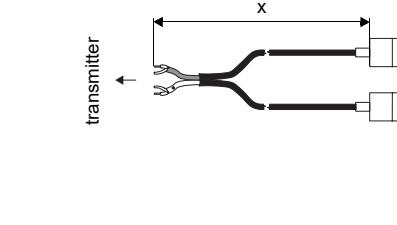
for further data see Technical specification TS_G7xx-transducersVx-XXX_Leu

Damping material

| | damping mat | | damping coat |
|-------------|-------------|-----------|--------------|
| item number | 992080-11 | 992080-10 | 992080-13 |
| type | E30R4 | E30R3 | |

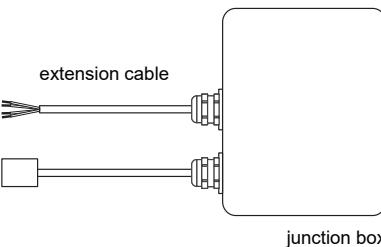
for further data see Technical specification TS_G7xx-transducersVx-XXX_Leu

Connection systems

| connection system TS | | |
|--|---|-------------------------------|
| connection with extension cable | direct connection | transducers technical type |
| JB02, JB03, JB04  |  | ****52 |
| connection system T1 | | |
| connection with extension cable | direct connection | transducers technical type |
| JB01  |  | ****8* |
| JB01, JBP2, JBP3  |  | ****LI* |

for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Temperature probes

| PT12N | PT12F |
|---|--|
| item number: • 770415-1 • 770414-2 (matched) | item number: • 770415-1A2 • 770414-1A2 (matched) |
| • Pt100 • clamp-on • -30...+250 °C | • Pt100 • clamp-on • -30...+250 °C • ATEX/UKCA |
| direct connection | item number: • 770415-2 |
|  | • Pt100 • clamp-on • -45...+250 °C • response time: 8 s |
| connection with extension cable | |
|  | |

see Technical specification TS_PTVx-xXX_Leu