

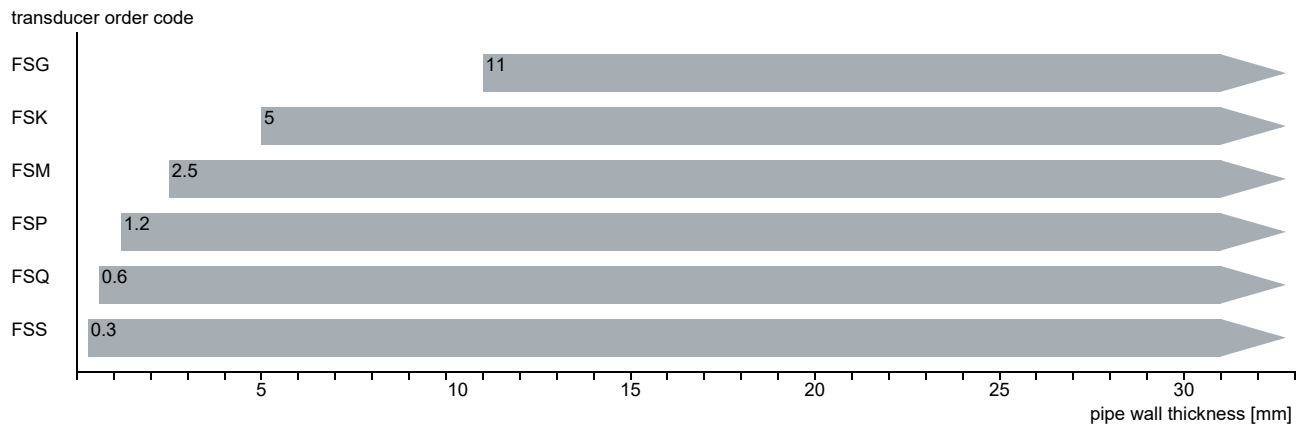
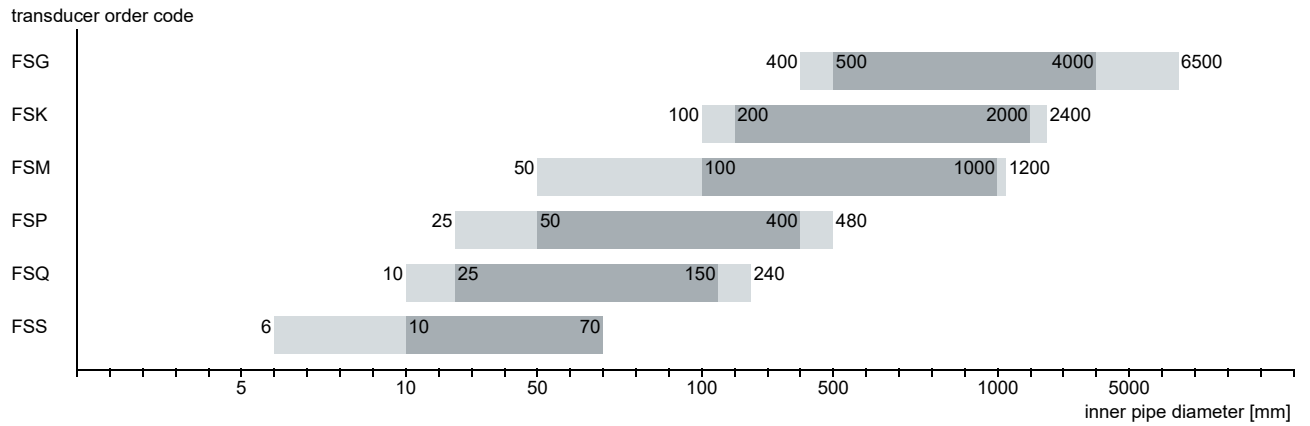
# Flexim Clamp-on Ultrasonic Transducers for FLUXUS F7\*\*, H7\*\*, PIOX S7\*\*



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## Transducer selection

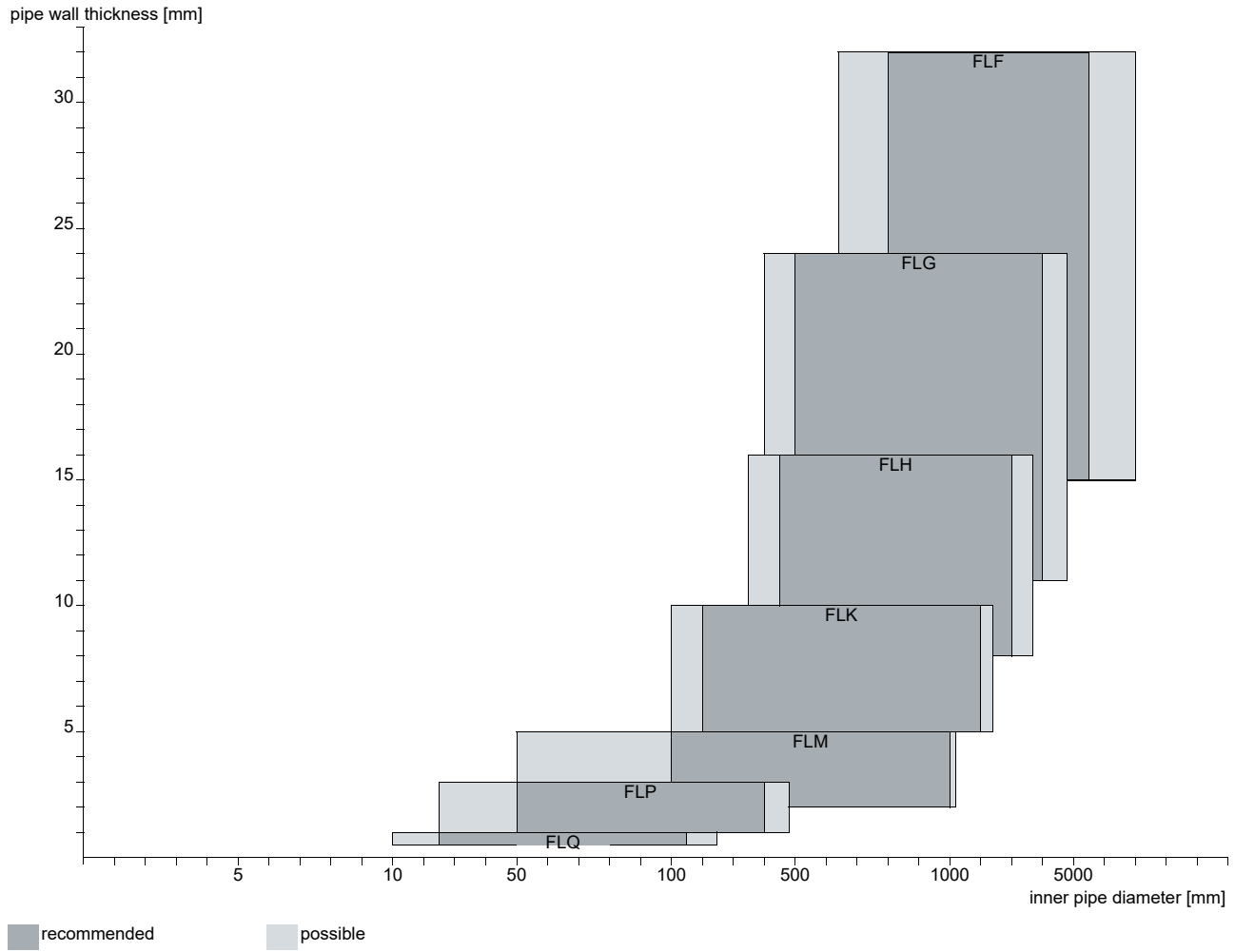
### Shear wave transducers



recommended
  possible

### Lamb wave transducers

If the the damping of the fluid is high or the sound velocity fluctuates strongly, Lamb wave transducers might be preferred. Please contact FLEXIM.



### Transducer order code

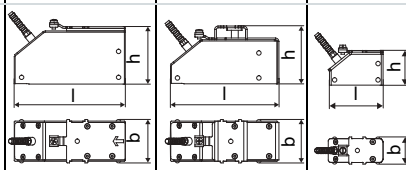
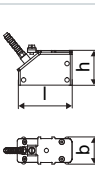
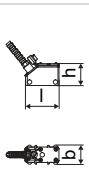
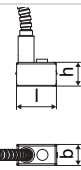

| 1, 2       | 3                    | 4                   | 5...7                | 8, 9          | 10, 11            | 12...14      | no. of character  |
|------------|----------------------|---------------------|----------------------|---------------|-------------------|--------------|---|
| transducer | transducer frequency | ambient temperature | explosion protection | certification | connection system | cable length | option  |
| TS         |                      |                     |                      |               |                   |              | set of ultrasonic flow transducers for Measurement of Liquids, shear wave |
| FL         |                      |                     |                      |               |                   |              | set of ultrasonic flow transducers for Measurement of Liquids, Lamb wave  |
|            | F                    |                     |                      |               |                   |              | 0.15 MHz  |
|            | G                    |                     |                      |               |                   |              | 0.2 MHz   |
|            | H                    |                     |                      |               |                   |              | 0.3 MHz   |
|            | K                    |                     |                      |               |                   |              | 0.5 MHz   |
|            | M                    |                     |                      |               |                   |              | 1 MHz   |
|            | P                    |                     |                      |               |                   |              | 2 MHz   |
|            | Q                    |                     |                      |               |                   |              | 4 MHz   |
|            | S                    |                     |                      |               |                   |              | 8 MHz   |
|            |                      | L                   |                      |               |                   |              | low temperature range   |
|            |                      | N                   |                      |               |                   |              | normal temperature range  |
|            |                      | E                   |                      |               |                   |              | extended temperature range  |
|            |                      | S                   |                      |               |                   |              | higher temperatures   |
|            |                      |                     | NNN                  |               |                   |              | not explosion-proof   |
|            |                      |                     | A2N                  |               |                   |              | ATEX zone 2/IECEX zone 2  |
|            |                      |                     | A1N                  |               |                   |              | ATEX zone 1/IECEX zone 1  |
|            |                      |                     | F2N                  |               |                   |              | FM Class I Div. 2   |
|            |                      |                     |                      | **            |                   |              |   |
|            |                      |                     |                      |               | TS                |              | with SMB connector  |
|            |                      |                     |                      |               | T1                |              | with stripped cable ends  |
|            |                      |                     |                      |               |                   | ***          | in m  |
|            |                      |                     |                      |               |                   |              | H68   |
|            |                      |                     |                      |               |                   |              | degree of protection IP68   |

## Technical data

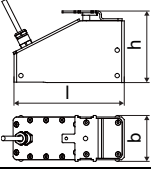
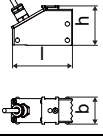

### Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)

| order code                    | FSG-N***-**TS   | FSK-N***-**TS         | FSM-N***-**TS | FSP-N***-**TS | FSQ-N***-**TS | FSS-N***-**TS                |  |
|-------------------------------|---|-----------------------|---------------|---------------|---------------|------------------------------|--|
| technical type                | C(DL)G1N52  | C(DL)K1N52            | C(DL)M2N52    | C(DL)P2N52    | C(DL)Q2N52    | CDS1N52                      |  |
| transducer frequency          | 0.2 MHz   | 0.5                   | 1             | 2             | 4             | 8                            |  |
| <b>inner pipe diameter d</b>  |   |                       |               |               |               |                              |  |
| min. extended                 | mm  | 400                   | 100           | 50            | 25            | 10                           |  |
| min. recommended              | mm  | 500                   | 200           | 100           | 50            | 25                           |  |
| max. recommended              | mm  | 4000                  | 2000          | 1000          | 400           | 150                          |  |
| max. extended                 | mm  | 6500                  | 2400          | 1200          | 480           | 240                          |  |
| <b>pipe wall thickness</b>    |   |                       |               |               |               |                              |  |
| min.                          | mm  | 11                    | 5             | 2.5           | 1.2           | 0.6                          |  |
| <b>material</b>               |   |                       |               |               |               |                              |  |
| housing                       | PEEK with stainless steel cover 316L (1.4404)                                     |                       |               |               |               | stainless steel 304 (1.4301) |  |
| contact surface               | PEEK  |                       |               |               |               | PEI                          |  |
| degree of protection          | IP66  |                       |               | IP66/IP67     |               | IP66                         |  |
| <b>transducer cable</b>       |   |                       |               |               |               |                              |  |
| type                          | 1699  |                       |               |               |               |                              |  |
| length                        | m   | 5                     | 4             | 3             | 2             |                              |  |
| <b>dimensions</b>             |   |                       |               |               |               |                              |  |
| length l                      | mm  | 129.5                 | 126.5         | 64            | 40            | 25                           |  |
| width b                       | mm  | 51                    | 51            | 32            | 22            | 13                           |  |
| height h                      | mm  | 67                    | 67.5          | 40.5          | 25.5          | 17                           |  |
| dimensional drawing           |   |                       |               |               |               |                              |  |
| weight (without cable)        | kg  | 0.47                  | 0.36          | 0.066         | 0.016         | 0.004                        |  |
| pipe surface temperature      | °C  | -40...+130            |               |               |               | -30...+130                   |  |
| ambient temperature           | °C  | -40...+130            |               |               |               | -30...+130                   |  |
| temperature compensation      |   | x                     |               |               |               |                              |  |
| <b>explosion protection</b>   |   |                       |               |               |               |                              |  |
| <b>• ATEX/IECEX</b>           |   |                       |               |               |               |                              |  |
| order code                    | FSG-NA2N-**TS   | FSK-NA2N-**TS         | FSM-NA2N-**TS | FSP-NA2N-**TS | FSQ-NA2N-**TS | -                            |  |
| pipe surface temperature (Ex) |   |                       |               |               |               | -                            |  |
| • min.                        | °C  | -55                   |               |               |               |                              |  |
| • max.                        | °C  | gas: +190, dust: +180 |               |               |               |                              |  |
| marking                       | CE 0637  II 3G<br>II 2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIC T80 °C...T185 °C Db |                       |               |               |               | -                            |  |
| certification                 | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |                       |               |               |               | -                            |  |
| <b>• FM</b>                   |   |                       |               |               |               |                              |  |
| order code                    | FSG-NF2N-**TS   | FSK-NF2N-**TS         | FSM-NF2N-**TS | FSP-NF2N-**TS | FSQ-NF2N-**TS | FSS-NF2N-**TS                |  |
| pipe surface temperature (Ex) |   |                       |               |               |               |                              |  |
| • min.                        | °C  | -40                   |               |               |               |                              |  |
| • max.                        | °C  | +125                  |               |               |               | +190                         |  |
| degree of protection          | IP66  |                       |               |               |               |                              |  |
| marking                       | NI/CI, I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860             |                       |               |               |               |                              |  |

**Shear wave transducers (FM Class I Div. 2, T1)**

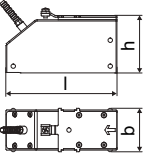
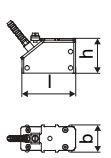
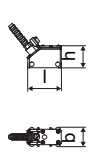

|                               |     |   |               |   |   |               |   |
|-------------------------------|-----|---|---------------|---|---|---------------|---|
| order code                    |     | FSG-N***-**T1   | FSK-N***-**T1 | FSM-N***-**T1   | FSP-N***-**T1   | FSQ-N***-**T1 | FSS-N***-**T1   |
| technical type                |     | C(DL)G1N53  | C(DL)K1N53    | C(DL)M2N53  | C(DL)P2N53  | C(DL)Q2N53    | CDS1N53   |
| transducer frequency          | MHz | 0.2   | 0.5           | 1   | 2   | 4             | 8   |
| <b>inner pipe diameter d</b>  |     |   |               |   |   |               |   |
| min. extended                 | mm  | 400   | 100           | 50  | 25  | 10            | 6   |
| min. recommended              | mm  | 500   | 200           | 100   | 50  | 25            | 10  |
| max. recommended              | mm  | 4000  | 2000          | 1000  | 400   | 150           | 70  |
| max. extended                 | mm  | 6500  | 2400          | 1200  | 480   | 240           | 70  |
| <b>pipe wall thickness</b>    |     |   |               |   |   |               |   |
| min.                          | mm  | 11  | 5             | 2.5   | 1.2   | 0.6           | 0.3   |
| <b>material</b>               |     |   |               |   |   |               |   |
| housing                       |     | PEEK with stainless steel cover 316L (1.4404)   |               |   |   |               | stainless steel 304 (1.4301)  |
| contact surface               |     | PEEK  |               |   |   |               | PEI   |
| degree of protection          |     | IP66  |               |   | IP66/IP67   |               | IP66  |
| <b>transducer cable</b>       |     |   |               |   |   |               |   |
| type                          |     | 1699  |               |   |   |               |   |
| length                        | m   | 5   |               | 4   | 3   |               | 2   |
| <b>dimensions</b>             |     |   |               |   |   |               |   |
| length l                      | mm  | 129.5   | 126.5         | 64  | 40  |               | 25  |
| width b                       | mm  | 51  | 51            | 32  | 22  |               | 13  |
| height h                      | mm  | 67  | 67.5          | 40.5  | 25.5  |               | 17  |
| dimensional drawing           |     |    |               |  |  |               |  |
| weight (without cable)        | kg  | 0.47  | 0.36          | 0.066   | 0.016   |               | 0.004   |
| pipe surface temperature      | °C  | -40...+130  |               |   |   |               | -30...+130  |
| ambient temperature           | °C  | -40...+130  |               |   |   |               | -30...+130  |
| temperature compensation      |     | x   |               |   |   |               | -   |
| <b>explosion protection</b>   |     |   |               |   |   |               |   |
| <b>• ATEX/IECEx</b>           |     |   |               |   |   |               |   |
| order code                    |     | FSG-NA2*-**T1   | FSK-NA2*-**T1 | FSM-NA2*-**T1   | FSP-NA2*-**T1   | FSQ-NA2*-**T1 | -   |
| pipe surface temperature (Ex) | °C  | gas: -55...+190<br>dust: -55...+180   |               |   |   |               | -   |
| marking                       |     | CE 0637 Ex II3G II2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIC T80 °C...T185 °C Db  |               |   |   |               | -   |
| certification                 |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |               |   |   |               | -   |
| <b>• FM</b>                   |     |   |               |   |   |               |   |
| order code                    |     | FSG-NF2*-**T1   | FSK-NF2*-**T1 | FSM-NF2*-**T1   | FSP-NF2*-**T1   | FSQ-NF2*-**T1 | FSS-NF2*-**T1   |
| pipe surface temperature (Ex) | °C  | -40...+125  |               | -40...+190  |   | -40...+125    |   |
| degree of protection          |     | IP66  |               |   |   |               |   |
| marking                       |     |  NI/CI, I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |               |   |   |               |   |

## Shear wave transducers (zone 2 - nonEx, T1, IP68)

| order code                    | FSG-L***-**T1/H68  | FSK-L***-**T1/H68 | FSM-L***-**T1/H68   | FSP-L***-**T1/H68 |
|-------------------------------|--|-------------------|---|-------------------|
| technical type                | CDG1LI8  | CDK1LI8           | CDM2LI8   | CDP2LI8           |
| transducer frequency MHz      | 0.2  | 0.5               | 1   | 2                 |
| <b>inner pipe diameter d</b>  |  |                   |   |                   |
| min. extended                 | mm 400   | 100               | 50  | 25                |
| min. recommended              | mm 500   | 200               | 100   | 50                |
| max. recommended              | mm 4000  | 2000              | 1000  | 400               |
| max. extended                 | mm 6500  | 2400              | 1200  | 480               |
| <b>pipe wall thickness</b>    |  |                   |   |                   |
| min.                          | mm 11  | 5                 | 2.5   | 1.2               |
| <b>material</b>               |  |                   |   |                   |
| housing                       | PEEK with stainless steel cover 316Ti (1.4571)   |                   |   |                   |
| contact surface               | PEEK   |                   |   |                   |
| degree of protection          | IP68 <sup>1</sup>  |                   |   |                   |
| <b>transducer cable</b>       |  |                   |   |                   |
| type                          | 2550   |                   |   |                   |
| length                        | m 12   |                   |   |                   |
| <b>dimensions</b>             |  |                   |   |                   |
| length l                      | mm 130   |                   |   | 72                |
| width b                       | mm 54  |                   |   | 32                |
| height h                      | mm 83.5  |                   |   | 46                |
| dimensional drawing           |   |                   |  |                   |
| weight (without cable)        | kg 0.43  |                   |   | 0.085             |
| pipe surface temperature      | °C -40...+100  |                   |   |                   |
| ambient temperature           | °C -40...+100  |                   |   |                   |
| temperature compensation      | x  |                   |   |                   |
| <b>explosion protection</b>   |  |                   |   |                   |
| <b>• ATEX/IECEx</b>           |  |                   |   |                   |
| order code                    | FSG-LA2N-**T1/H68  | FSK-LA2N-**T1/H68 | FSM-LA2N-**T1/H68   | FSP-LA2N-**T1/H68 |
| pipe surface temperature (Ex) | °C gas: -40...+90<br>dust: -40...+80   |                   |   |                   |
| marking                       | CE 0637 <br>Ex nA IIC T6...T5 Gc<br>Ex tb IIIC T80 °C...T85 °C Db |                   |   |                   |
| certification                 | IBExU10ATEX1163 X, IECEx IBE 12.0005X  |                   |   |                   |

<sup>1</sup> test conditions: 3 months/2 bar (20 m)/20 °C

**Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS, extended temperature range)**

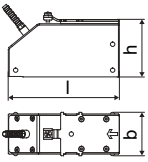
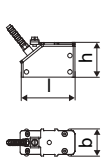
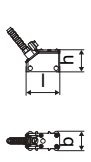

| order code                    |     | FSG-E***-**TS   | FSK-E***-**TS | FSM-E***-**TS   | FSP-E***-**TS | FSQ-E***-**TS   |
|-------------------------------|-----|---|---------------|---|---------------|---|
| technical type                |     | C(DL)G1E52  | C(DL)K1E52    | C(DL)M2E52  | C(DL)P2E52    | C(DL)Q2E52  |
| transducer frequency          | MHz | 0.2   | 0.5           | 1   | 2             | 4   |
| <b>inner pipe diameter d</b>  |     |   |               |   |               |   |
| min. extended                 | mm  | 400   | 100           | 50  | 25            | 10  |
| min. recommended              | mm  | 500   | 200           | 100   | 50            | 25  |
| max. recommended              | mm  | 4000  | 2000          | 1000  | 400           | 150   |
| max. extended                 | mm  | 6500  | 2400          | 1200  | 480           | 240   |
| <b>pipe wall thickness</b>    |     |   |               |   |               |   |
| min.                          | mm  | 11  | 5             | 2.5   | 1.2           | 0.6   |
| <b>material</b>               |     |   |               |   |               |   |
| housing                       |     | PPSU with stainless steel cover<br>316L (1.4404)  |               | PI with stainless steel cover 316L (1.4404)                                       |               |   |
| contact surface               |     | PPSU  |               | PI  |               |   |
| degree of protection          |     | IP66  |               | IP66/IP67   |               |   |
| <b>transducer cable</b>       |     |   |               |   |               |   |
| type                          |     | 1699  |               | 6111  |               |   |
| length                        | m   | 5   |               | 4   |               | 3   |
| <b>dimensions</b>             |     |   |               |   |               |   |
| length l                      | mm  | 129.5   |               | 64  |               | 40  |
| width b                       | mm  | 51  |               | 32  |               | 22  |
| height h                      | mm  | 67  |               | 40.5  |               | 25.5  |
| dimensional drawing           |     |    |               |  |               |  |
| weight (without cable)        | kg  | 0.82  |               | 0.066   |               | 0.017   |
| pipe surface temperature      | °C  | -40...+180  |               | -30...+240 <sup>1</sup>   |               | -30...+200  |
| ambient temperature           | °C  | -40...+180  |               | -30...+40<br>-30...+60 <sup>2</sup><br>-30...+200 <sup>3</sup>                    |               | -30...+200  |
| temperature compensation      |     | x   |               | x   |               |   |
| <b>explosion protection</b>   |     |   |               |   |               |   |
| <b>• ATEX/IECEx</b>           |     |   |               |   |               |   |
| order code                    |     | -   | -             | FSM-EA2*-**TS   | FSP-EA2*-**TS | FSQ-EA2*-**TS   |
| pipe surface temperature (Ex) | °C  | -   | -             | gas: -45...+235<br>dust: -45...+225   |               |   |
| marking                       |     | -   | -             | CE 0637 Ex II3G<br>II2D<br>Ex nA IIC T6...T2 Gc<br>Ex tb IIIA T80 °C...T230 °C Db |               |   |
| certification                 |     | -   | -             | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |               |   |
| <b>• FM</b>                   |     |   |               |   |               |   |
| order code                    |     | FSG-EF2*-**TS   | FSK-EF2*-**TS | FSM-EF2*-**TS   | FSP-EF2*-**TS | FSQ-EF2*-**TS   |
| pipe surface temperature (Ex) | °C  | -40...+165  |               | -40...+235  |               |   |
| degree of protection          |     | IP66  |               |   |               |   |
| marking                       |     |  NI/CI, I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |               |   |               |   |

<sup>1</sup> > +200 °C:  
nonEx: Variotix C without cover or Variotix L  
Ex: Variotix C or Variotix L, ambient temperature max. +40 °C  
observe the insulation instruction

<sup>2</sup> nonEx: pipe surface temperature +200...+240 °C: Variotix C without cover

<sup>3</sup> nonEx: pipe surface temperature max. +200 °C

## Shear wave transducers (FM Class I Div. 2 - nonEx, T1, extended temperature range)

| order code                    | FSG-E***-**T1   | FSK-E***-**T1  | FSM-E***-**T1   | FSP-E***-**T1 | FSQ-E***-**T1  |
|-------------------------------|---|--|---|---------------|--|
| technical type                | C(DL)G1E53  | C(DL)K1E53   | C(DL)M2E53  | C(DL)P2E53    | C(DL)Q2E53   |
| transducer frequency MHz      | 0.2   | 0.5  | 1   | 2             | 4  |
| <b>inner pipe diameter d</b>  |   |  |   |               |  |
| min. extended                 | mm 400  | 100  | 50  | 25            | 10   |
| min. recommended              | mm 500  | 200  | 100   | 50            | 25   |
| max. recommended              | mm 4000   | 2000   | 1000  | 400           | 150  |
| max. extended                 | mm 6500   | 2400   | 1200  | 480           | 240  |
| <b>pipe wall thickness</b>    |   |  |   |               |  |
| min.                          | mm 11   | 5  | 2.5   | 1.2           | 0.6  |
| <b>material</b>               |   |  |   |               |  |
| housing                       | PPSU with stainless steel cover 316L (1.4404)   |  | PI with stainless steel cover 316L (1.4404)   |               |  |
| contact surface               | PPSU  |  | PI  |               |  |
| degree of protection          | IP66  |  | IP66/IP67   |               |  |
| <b>transducer cable</b>       |   |  |   |               |  |
| type                          | 1699  |  | 6111  |               |  |
| length                        | m 5   | 4  |   | 3             |  |
| <b>dimensions</b>             |   |  |   |               |  |
| length l                      | mm 129.5  | 64   |   | 40            |  |
| width b                       | mm 51   | 32   |   | 22            |  |
| height h                      | mm 67   | 40.5   |   | 25.5          |  |
| dimensional drawing           |    |  |    |               |  |
| weight (without cable)        | kg 0.82   | 0.066  |   | 0.017         |  |
| pipe surface temperature      | °C -40...+180   | -30...+240 <sup>1</sup>  |   | -30...+200    |  |
| ambient temperature           | °C -40...+180   | -30...+40<br>-30...+60 <sup>2</sup><br>-30...+200 <sup>3</sup> |   | -30...+200    |  |
| temperature compensation      | x   | x  |   |               |  |
| <b>explosion protection</b>   |   |  |   |               |  |
| <b>• ATEX/IECEx</b>           |   |  |   |               |  |
| order code                    | -   | -  | FSM-EA2*-**T1   | FSP-EA2*-**T1 | FSQ-EA2*-**T1  |
| pipe surface temperature (Ex) | °C -  | -  | gas: -45...+235<br>dust: -45...+225   |               |  |
| marking                       | -   | -  | CE 0637 Ex II 3G<br>II 2D<br>Ex nA IIC T6...T2 Gc<br>Ex tb IIIA T80 °C...T230 °C Db |               |  |
| certification                 | -   | -  | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |               |  |
| <b>• FM</b>                   |   |  |   |               |  |
| order code                    | FSG-EF2*-**T1   | FSK-EF2*-**T1  | FSM-EF2*-**T1   | FSP-EF2*-**T1 | FSQ-EF2*-**T1  |
| pipe surface temperature (Ex) | °C -40...+165   | -40...+235   |   |               |  |
| degree of protection          | IP66  |  |   |               |  |
| marking                       |  NI/Cl. I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |  |   |               |  |

<sup>1</sup> > +200 °C:

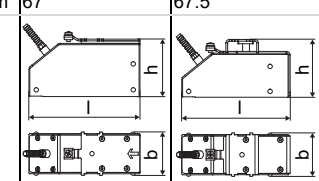
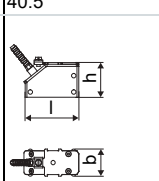
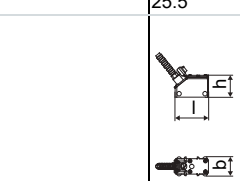
nonEx: Variofix C without cover or Variofix L

Ex: Variofix C or Variofix L, ambient temperature max. +40 °C

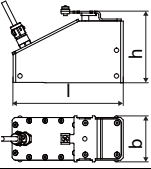
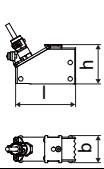

observe the insulation instruction

<sup>2</sup> nonEx: pipe surface temperature +200...+240 °C: Variofix C without cover<sup>3</sup> nonEx: pipe surface temperature max. +200 °C

**Shear wave transducers (zone 1, T1)**

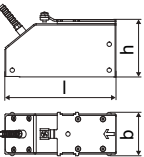
| order code                    |     | FSG-N*1*-**T1   | FSK-N*1*-**T1 | FSM-N*1*-**T1   | FSP-N*1*-**T1  | FSQ-N*1*-**T1 |
|-------------------------------|-----|---|---------------|---|--|---------------|
| technical type                |     | C(DL)G1N81  | C(DL)K1N81    | C(DL)M2N81  | C(DL)P2N81   | C(DL)Q2N81    |
| transducer frequency          | MHz | 0.2   | 0.5           | 1   | 2  | 4             |
| <b>inner pipe diameter d</b>  |     |   |               |   |  |               |
| min. extended                 | mm  | 400   | 100           | 50  | 25   | 10            |
| min. recommended              | mm  | 500   | 200           | 100   | 50   | 25            |
| max. recommended              | mm  | 4000  | 2000          | 1000  | 400  | 150           |
| max. extended                 | mm  | 6500  | 2400          | 1200  | 480  | 240           |
| <b>pipe wall thickness</b>    |     |   |               |   |  |               |
| min.                          | mm  | 11  | 5             | 2.5   | 1.2  | 0.6           |
| <b>material</b>               |     |   |               |   |  |               |
| housing                       |     | PEEK with stainless steel cover 316L (1.4404)                                     |               |   |  |               |
| contact surface               |     | PEEK  |               |   |  |               |
| degree of protection          |     | IP66  |               | IP66/IP67   |  |               |
| <b>transducer cable</b>       |     |   |               |   |  |               |
| type                          |     | 1699  |               |   |  |               |
| length                        | m   | 5   |               | 4   | 3  |               |
| <b>dimensions</b>             |     |   |               |   |  |               |
| length l                      | mm  | 129.5   | 126.5         | 64  | 40   |               |
| width b                       | mm  | 51  | 51            | 32  | 22   |               |
| height h                      | mm  | 67  | 67.5          | 40.5  | 25.5   |               |
| dimensional drawing           |     |  |               |  |  |               |
| weight (without cable)        | kg  | 0.47  | 0.36          | 0.066   | 0.016  |               |
| pipe surface temperature      | °C  | -40...+130  |               |   |  |               |
| ambient temperature           | °C  | -40...+130  |               |   |  |               |
| temperature compensation      |     | x   |               |   |  |               |
| <b>explosion protection</b>   |     |   |               |   |  |               |
| • ATEX/IECEX                  |     |   |               |   |  |               |
| order code                    |     | FSG-NA1*-**T1   | FSK-NA1*-**T1 | FSM-NA1*-**T1   | FSP-NA1*-**T1  | FSQ-NA1*-**T1 |
| pipe surface temperature (Ex) | °C  | -55...+180  |               |   |  |               |
| marking                       |     | CE 0637 (E) II2G<br>II2D<br>Ex q IIC T6...T3 Gb<br>Ex tb IIIC T80 °C...T185 °C Db |               |   |  |               |
| certification                 |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X   |               |   |  |               |

## Shear wave transducers (zone 1, T1, IP68)

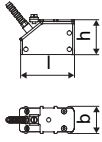
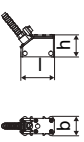

|                               |     |   |                       |   |                       |
|-------------------------------|-----|---|-----------------------|---|-----------------------|
| order code                    |     | FSG-L*1*-**T1/<br>H68   | FSK-L*1*-**T1/H68     | FSM-L*1*-**T1/<br>H68   | FSP-L*1*-**T1/H68     |
| technical type                |     | CDG1LI1   | CDK1LI1               | CDM2LI1   | CDP2LI1               |
| transducer frequency          | MHz | 0.2   | 0.5                   | 1   | 2                     |
| <b>inner pipe diameter d</b>  |     |   |                       |   |                       |
| min. extended                 | mm  | 400   | 100                   | 50  | 25                    |
| min. recommended              | mm  | 500   | 200                   | 100   | 50                    |
| max. recommended              | mm  | 4000  | 2000                  | 1000  | 400                   |
| max. extended                 | mm  | 6500  | 2400                  | 1200  | 480                   |
| <b>pipe wall thickness</b>    |     |   |                       |   |                       |
| min.                          | mm  | 11  | 5                     | 2.5   | 1.2                   |
| <b>material</b>               |     |   |                       |   |                       |
| housing                       |     | PEEK with stainless steel cover 316Ti (1.4571)  |                       |   |                       |
| contact surface               |     | PEEK  |                       |   |                       |
| degree of protection          |     | IP68 <sup>1</sup>   |                       |   |                       |
| <b>transducer cable</b>       |     |   |                       |   |                       |
| type                          |     | 2550  |                       |   |                       |
| length                        | m   | 12  |                       |   |                       |
| <b>dimensions</b>             |     |   |                       |   |                       |
| length l                      | mm  | 130   |                       | 72  |                       |
| width b                       | mm  | 54  |                       | 32  |                       |
| height h                      | mm  | 83.5  |                       | 46  |                       |
| dimensional drawing           |     |    |                       |  |                       |
| weight (without cable)        | kg  | 0.43  |                       | 0.085   |                       |
| pipe surface temperature      | °C  | -40...+80   |                       |   |                       |
| ambient temperature           | °C  | -40...+80   |                       |   |                       |
| temperature compensation      |     | x   |                       |   |                       |
| <b>explosion protection</b>   |     |   |                       |   |                       |
| • ATEX/IECEx                  |     |   |                       |   |                       |
| order code                    |     | FSG-LA1*-**T1/<br>H68   | FSK-LA1*-**T1/<br>H68 | FSM-LA1*-**T1/<br>H68   | FSP-LA1*-**T1/<br>H68 |
| pipe surface temperature (Ex) | °C  | -40...+80   |                       |   |                       |
| marking                       |     | <p>CE 0637  II2G<br/>II2D</p> <p>Ex q IIC T6...T5 Gb<br/>Ex tb IIIC T80 °C...T85 °C Db</p> |                       |   |                       |
| certification                 |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X   |                       |   |                       |

<sup>1</sup> test conditions: 3 months/2 bar (20 m)/20 °C

**Shear wave transducers (zone 1, T1, extended temperature range)**

|                               |     |   |               |
|-------------------------------|-----|---|---------------|
| order code                    |     | FSG-E*1*-**T1   | FSK-E*1*-**T1 |
| technical type                |     | C(DL)G1E83  | C(DL)K1E83    |
| transducer frequency          | MHz | 0.2   | 0.5           |
| <b>inner pipe diameter d</b>  |     |   |               |
| min. extended                 | mm  | 400   | 100           |
| min. recommended              | mm  | 500   | 200           |
| max. recommended              | mm  | 4000  | 2000          |
| max. extended                 | mm  | 6500  | 2400          |
| <b>pipe wall thickness</b>    |     |   |               |
| min.                          | mm  | 11  | 5             |
| <b>material</b>               |     |   |               |
| housing                       |     | PPSU with stainless steel cover<br>316L (1.4404)                                  |               |
| contact surface               |     | PPSU  |               |
| degree of protection          |     | IP66  |               |
| <b>transducer cable</b>       |     |   |               |
| type                          |     | 1699  |               |
| length                        | m   | 5   |               |
| <b>dimensions</b>             |     |   |               |
| length l                      | mm  | 129.5   |               |
| width b                       | mm  | 51  |               |
| height h                      | mm  | 67  |               |
| dimensional drawing           |     |  |               |
| weight (without cable)        | kg  | 0.82  |               |
| pipe surface temperature      | °C  | -40...+155  |               |
| ambient temperature           | °C  | -40...+155  |               |
| temperature compensation      |     | x   |               |
| <b>explosion protection</b>   |     |   |               |
| <b>• ATEX/IECEx</b>           |     |   |               |
| order code                    |     | FSG-EA1*-**T1   | FSK-EA1*-**T1 |
| pipe surface temperature (Ex) | °C  | -50...+155  |               |
| marking                       |     | CE 0637 Ex II2G II2D<br>Ex q IIC T6...T3 Gb<br>Ex tb IIIC T80 °C...T160 °C Db     |               |
| certification                 |     | IBExU07ATEX1168 X,<br>IECEx IBE 08.0007X  |               |

## Shear wave transducers (zone 1, T1, extended temperature range)

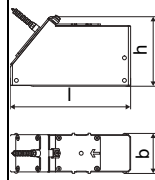
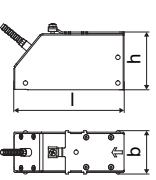
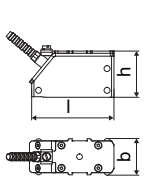
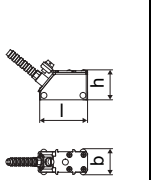

| order code                    |     | FSM-E*1*-**T1   | FSP-E*1*-**T1 | FSQ-E*1*-**T1   |
|-------------------------------|-----|---|---------------|---|
| technical type                |     | C(DL)M2E85  | C(DL)P2E85    | C(DL)Q2E85  |
| transducer frequency          | MHz | 1   | 2             | 4   |
| <b>inner pipe diameter d</b>  |     |   |               |   |
| min. extended                 | mm  | 50  | 25            | 10  |
| min. recommended              | mm  | 100   | 50            | 25  |
| max. recommended              | mm  | 1000  | 400           | 150   |
| max. extended                 | mm  | 1200  | 480           | 240   |
| <b>pipe wall thickness</b>    |     |   |               |   |
| min.                          | mm  | 2.5   | 1.2           | 0.6   |
| <b>material</b>               |     |   |               |   |
| housing                       |     | PI with stainless steel cover 316L (1.4404)   |               |   |
| contact surface               |     | PI  |               |   |
| degree of protection          |     | IP66/IP67   |               |   |
| <b>transducer cable</b>       |     |   |               |   |
| type                          |     | 6111  |               |   |
| length                        | m   | 4   |               | 3   |
| <b>dimensions</b>             |     |   |               |   |
| length l                      | mm  | 64  |               | 40  |
| width b                       | mm  | 32  |               | 22  |
| height h                      | mm  | 40.5  |               | 25.5  |
| dimensional drawing           |     |    |               |  |
| weight (without cable)        | kg  | 0.066   |               | 0.017   |
| pipe surface temperature      | °C  | -30...+225 <sup>1</sup>   |               | -30...+200  |
| ambient temperature           | °C  | -30...+40<br>-30...+200 <sup>2</sup>  |               | -30...+200  |
| temperature compensation      |     | x   |               |   |
| <b>explosion protection</b>   |     |   |               |   |
| <b>• ATEX/IECEx</b>           |     |   |               |   |
| order code                    |     | FSM-EA1*-**T1   | FSP-EA1*-**T1 | FSQ-EA1*-**T1   |
| pipe surface temperature (Ex) | °C  | -45...+225  |               |   |
| marking                       |     | CE 0637  II2G<br>II2D<br>Ex q IIC T6...T2 Gb<br>Ex tb IIIA T80 °C...T230 °C Db |               |   |
| certification                 |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X   |               |   |

<sup>1</sup> > +200 °C :

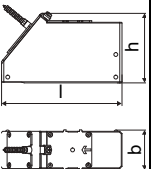
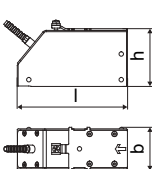

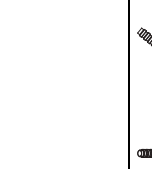

Variofix L or Variofix C  
 observe the insulation instruction  
 ambient temperature max. +40 °C

<sup>2</sup> pipe surface temperature max. +200 °C

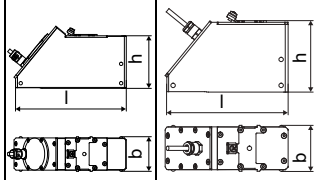
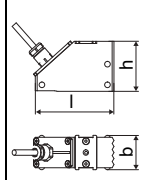
**Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)**

| order code                               |     | FLF-N***-**TS   | FLG-N***-**TS  | FLH-N***-**TS | FLK-N***-**TS  | FLM-N***-**TS | FLP-N***-**TS  | FLQ-N***-**TS |  |  |
|--|-----|---|--|---------------|--|---------------|--|---------------|--|--|
| technical type                           |     | C(RT)F1N52  | C(RT)G1N52   | C(RT)H1N52    | C(RT)K1N52   | C(RT)M1N52    | C(RT)P1N52   | C(RT)Q1N52    |  |  |
| transducer frequency                     | MHz | 0.15  | 0.2  | 0.3           | 0.5  | 1             | 2  | 4             |  |  |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |  |               |  |               |  |               |  |  |
| min. extended                            | mm  | 640   | 400  | 350           | 100  | 50            | 25   | 10            |  |  |
| min. recommended                         | mm  | 800   | 500  | 450           | 200  | 100           | 50   | 25            |  |  |
| max. recommended                         | mm  | 5500  | 4000   | 3000          | 2000   | 1000          | 400  | 150           |  |  |
| max. extended                            | mm  | 6600  | 4800   | 3600          | 2400   | 1200          | 480  | 240           |  |  |
| <b>pipe wall thickness</b>               |     |   |  |               |  |               |  |               |  |  |
| min.                                     | mm  | 15  | 11   | 8             | 5  | 2.5           | 1.2  | 0.6           |  |  |
| max.                                     | mm  | 32  | 24   | 16            | 10   | 5             | 3  | 1.2           |  |  |
| <b>material</b>                          |     |   |  |               |  |               |  |               |  |  |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)  | PPSU with stainless steel cover 316L (1.4404)                                    |               |  |               |  |               |  |  |
| contact surface                          |     | PPSU  |  |               |  |               |  |               |  |  |
| degree of protection                     |     | IP66/IP67   | IP66   |               |  |               |  |               |  |  |
| <b>transducer cable</b>                  |     |   |  |               |  |               |  |               |  |  |
| type                                     |     | 1699  |  |               |  |               |  |               |  |  |
| length                                   | m   | 5   |  |               |  | 4             |  | 3             |  |  |
| <b>dimensions</b>                        |     |   |  |               |  |               |  |               |  |  |
| length l                                 | mm  | 163   | 128.5  |               |  | 74            |  | 42            |  |  |
| width b                                  | mm  | 54  | 51   |               |  | 32            |  | 22            |  |  |
| height h                                 | mm  | 91.3  | 67.5   |               |  | 40.5          |  | 25.5          |  |  |
| dimensional drawing                      |     |   |  |               |  |               |  |               |  |  |
| weight (without cable)                   | kg  | 0.935   | 0.471  |               |  | 0.077         |  | 0.019         |  |  |
| pipe surface temperature                 | °C  | -40...+130  |  |               |  |               |  |               |  |  |
| ambient temperature                      | °C  | -40...+130  |  |               |  |               |  |               |  |  |
| temperature compensation                 |     | x   |  |               |  |               |  |               |  |  |
| <b>explosion protection</b>              |     |   |  |               |  |               |  |               |  |  |
| <b>• ATEX/IECEx</b>                      |     |   |  |               |  |               |  |               |  |  |
| order code                               |     | FLF-NA2N-**TS   | FLG-NA2N-**TS  | FLH-NA2N-**TS | FLK-NA2N-**TS  | FLM-NA2N-**TS | FLP-NA2N-**TS  | FLQ-NA2N-**TS |  |  |
| pipe surface temperature (Ex)            | °C  | gas: -50...+165<br>dust: -50...+155   |  |               |  |               |  |               |  |  |
| marking                                  |     | CE 0637 Ex II 3G II 2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIA T80 °C...T160 °C Db  | CE 0637 Ex II 3G II 2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIA T80 °C...T160 °C Db |               |  |               |  |               |  |  |
| certification                            |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |  |               |  |               |  |               |  |  |
| <b>• FM</b>                              |     |   |  |               |  |               |  |               |  |  |
| order code                               |     | FLF-NF2N-**TS   | FLG-NF2N-**TS  | FLH-NF2N-**TS | FLK-NF2N-**TS  | FLM-NF2N-**TS | FLP-NF2N-**TS  | FLQ-NF2N-**TS |  |  |
| pipe surface temperature (Ex)            | °C  | -40...+165  |  |               |  |               |  |               |  |  |
| degree of protection                     |     | IP66  |  |               |  |               |  |               |  |  |
| marking                                  |     |  NI/Cl. I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |  |               |  |               |  |               |  |  |

## Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, T1)

| order code                               |     | FLF-N***-**T1   | FLG-N***-**T1  | FLH-N***-**T1 | FLK-N***-**T1   | FLM-N***-**T1 | FLP-N***-**T1   | FLQ-N***-**T1 |   |  |
|--|-----|---|--|---------------|---|---------------|---|---------------|---|--|
| technical type                           |     | C(RT)F1N53  | C(RT)G1N53   | C(RT)H1N53    | C(RT)K1N53  | C(RT)M1N53    | C(RT)P1N53  | C(RT)Q1N53    |   |  |
| transducer frequency                     | MHz | 0.15  | 0.2  | 0.3           | 0.5   | 1             | 2   | 4             |   |  |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |  |               |   |               |   |               |   |  |
| min. extended                            | mm  | 640   | 400  | 350           | 100   | 50            | 25  | 10            |   |  |
| min. recommended                         | mm  | 800   | 500  | 450           | 200   | 100           | 50  | 25            |   |  |
| max. recommended                         | mm  | 5500  | 4000   | 3000          | 2000  | 1000          | 400   | 150           |   |  |
| max. extended                            | mm  | 6600  | 4800   | 3600          | 2400  | 1200          | 480   | 240           |   |  |
| <b>pipe wall thickness</b>               |     |   |  |               |   |               |   |               |   |  |
| min.                                     | mm  | 15  | 11   | 8             | 5   | 2.5           | 1.2   | 0.6           |   |  |
| max.                                     | mm  | 32  | 24   | 16            | 10  | 5             | 3   | 1.2           |   |  |
| <b>material</b>                          |     |   |  |               |   |               |   |               |   |  |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)  | PPSU with stainless steel cover 316L (1.4404)                                    |               |   |               |   |               |   |  |
| contact surface                          |     | PPSU  |  |               |   |               |   |               |   |  |
| degree of protection                     |     | IP66/IP67   | IP66   |               |   |               |   |               |   |  |
| <b>transducer cable</b>                  |     |   |  |               |   |               |   |               |   |  |
| type                                     |     | 1699  |  |               |   |               |   |               |   |  |
| length                                   | m   | 5   |  |               |   | 4             |   | 3             |   |  |
| <b>dimensions</b>                        |     |   |  |               |   |               |   |               |   |  |
| length l                                 | mm  | 163   | 128.5  |               |   | 74            |   | 42            |   |  |
| width b                                  | mm  | 54  | 51   |               |   | 32            |   | 22            |   |  |
| height h                                 | mm  | 91.3  | 67.5   |               |   | 40.5          |   | 25.5          |   |  |
| dimensional drawing                      |     |    |  |               |  |               |  |               |  |  |
| weight (without cable)                   | kg  | 0.935   | 0.471  |               |   | 0.077         |   | 0.019         |   |  |
| pipe surface temperature                 | °C  | -40...+130  |  |               |   |               |   |               |   |  |
| ambient temperature                      | °C  | -40...+130  |  |               |   |               |   |               |   |  |
| temperature compensation                 |     | x   |  |               |   |               |   |               |   |  |
| <b>explosion protection</b>              |     |   |  |               |   |               |   |               |   |  |
| <b>• ATEX/IECEx</b>                      |     |   |  |               |   |               |   |               |   |  |
| order code                               |     | FLF-NA2*-**T1   | FLG-NA2*-**T1  | FLH-NA2*-**T1 | FLK-NA2*-**T1   | FLM-NA2*-**T1 | FLP-NA2*-**T1   | FLQ-NA2*-**T1 |   |  |
| pipe surface temperature (Ex)            | °C  | gas: -50...+165<br>dust: -50...+155   |  |               |   |               |   |               |   |  |
| marking                                  |     | CE 0637 (Ex) II3G II2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIA T80 °C...T160 °C Db  | CE 0637 (Ex) II3G II2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIC T80 °C...T160 °C Db |               |   |               |   |               |   |  |
| certification                            |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |  |               |   |               |   |               |   |  |
| <b>• FM</b>                              |     |   |  |               |   |               |   |               |   |  |
| order code                               |     | FLF-NF2*-**T1   | FLG-NF2*-**T1  | FLH-NF2*-**T1 | FLK-NF2*-**T1   | FLM-NF2*-**T1 | FLP-NF2*-**T1   | FLQ-NF2*-**T1 |   |  |
| pipe surface temperature (Ex)            | °C  | -40...+165  |  |               |   |               |   |               |   |  |
| degree of protection                     |     | IP66  |  |               |   |               |   |               |   |  |
| marking                                  |     |  NI/CI, I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |  |               |   |               |   |               |   |  |

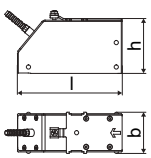
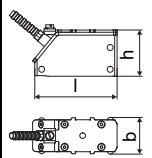

**Lamb wave transducers (zone 2 - nonEx, T1, IP68)**

|  |     |   |                       |                       |   |                       |                       |
|--|-----|---|-----------------------|-----------------------|---|-----------------------|-----------------------|
| order code                               |     | FLF-L***-**T1/<br>H68   | FLG-L***-**T1/<br>H68 | FLH-L***-**T1/<br>H68 | FLK-L***-**T1/<br>H68   | FLM-L***-**T1/<br>H68 | FLP-L***-**T1/<br>H68 |
| technical type                           |     | CRF1LI8   | CRG1LI8               | CRH1LI8               | CRK1LI8   | CRM1LI8               | CRP1LI8               |
| transducer frequency                     | MHz | 0.15  | 0.2                   | 0.3                   | 0.5   | 1                     | 2                     |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |                       |                       |   |                       |                       |
| min. extended                            | mm  | 640   | 400                   | 350                   | 100   | 50                    | 25                    |
| min. recommended                         | mm  | 800   | 500                   | 450                   | 200   | 100                   | 50                    |
| max. recommended                         | mm  | 5500  | 4000                  | 3000                  | 2000  | 1000                  | 400                   |
| max. extended                            | mm  | 6600  | 4800                  | 3600                  | 2400  | 1200                  | 480                   |
| <b>pipe wall thickness</b>               |     |   |                       |                       |   |                       |                       |
| min.                                     | mm  | 15  | 11                    | 8                     | 5   | 2.5                   | 1.2                   |
| max.                                     | mm  | 32  | 24                    | 16                    | 10  | 5                     | 3                     |
| <b>material</b>                          |     |   |                       |                       |   |                       |                       |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)                                    |                       |                       |   |                       |                       |
| contact surface                          |     | PPSU  |                       |                       |   |                       |                       |
| degree of protection                     |     | IP68 <sup>2</sup>   |                       |                       |   |                       |                       |
| <b>transducer cable</b>                  |     |   |                       |                       |   |                       |                       |
| type                                     |     | 2550  |                       |                       |   |                       |                       |
| length                                   | m   | 12  |                       |                       |   |                       |                       |
| <b>dimensions</b>                        |     |   |                       |                       |   |                       |                       |
| length l                                 | mm  | 173   | 143.5                 |                       |   |                       | 73                    |
| width b                                  | mm  | 54  | 54                    |                       |   |                       | 31.6                  |
| height h                                 | mm  | 91.5  | 83.5                  |                       |   |                       | 46                    |
| dimensional drawing                      |     |  |                       |                       |  |                       |                       |
| weight (without cable)                   | kg  | 1.36  | 0.639                 |                       |   |                       | 0.093                 |
| pipe surface temperature                 | °C  | -40...+100  |                       |                       |   |                       |                       |
| ambient temperature                      | °C  | -40...+100  |                       |                       |   |                       |                       |
| temperature compensation                 |     | x   |                       |                       |   |                       |                       |
| <b>explosion protection</b>              |     |   |                       |                       |   |                       |                       |
| • ATEX/IECEx                             |     |   |                       |                       |   |                       |                       |
| order code                               |     | FLF-LA2N-**T1/<br>H68   | FLG-LA2N-**T1/<br>H68 | FLH-LA2N-**T1/<br>H68 | FLK-LA2N-**T1/<br>H68   | FLM-LA2N-**T1/<br>H68 | FLP-LA2N-**T1/<br>H68 |
| pipe surface temperature (Ex)            | °C  | gas: -40...+90<br>dust: -40...+80   |                       |                       |   |                       |                       |
| marking                                  |     | CE0637 II3G<br>II2D<br>Ex nA IIC T6...T5 Gc<br>Ex tb IIIC T80 °C...T85 °C Db      |                       |                       |   |                       |                       |
| certification                            |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |                       |                       |   |                       |                       |

<sup>1</sup> Lamb wave transducer:  
 typical values for water; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

<sup>2</sup> test conditions: 3 months/2 bar (20 m)/20 °C

## Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS, higher temperatures)

| order code                               |     | FLG-S***-**TS   | FLH-S***-**TS | FLK-S***-**TS | FLM-S***-**TS   | FLP-SNNN-**TS |
|--|-----|---|---------------|---------------|---|---------------|
| technical type                           |     | C(RT)G1S52  | C(RT)H1S52    | C(RT)K1S52    | C(RT)M1S52  | C(RT)P1S52    |
| transducer frequency                     | MHz | 0.2   | 0.3           | 0.5           | 1   | 2             |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |               |               |   |               |
| min. extended                            | mm  | 400   | 350           | 100           | 50  | 25            |
| min. recommended                         | mm  | 500   | 450           | 200           | 100   | 50            |
| max. recommended                         | mm  | 4000  | 3000          | 2000          | 1000  | 400           |
| max. extended                            | mm  | 4800  | 3600          | 2400          | 1200  | 480           |
| <b>pipe wall thickness</b>               |     |   |               |               |   |               |
| min.                                     | mm  | 10.6  | 7.1           | 4.2           | 2.1   | 1.1           |
| max.                                     | mm  | 23.7  | 15.8          | 9.5           | 4.7   | 2.4           |
| <b>material</b>                          |     |   |               |               |   |               |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)  |               |               |   |               |
| contact surface                          |     | PPSU  |               |               |   |               |
| degree of protection                     |     | IP66  |               |               |   |               |
| <b>transducer cable</b>                  |     |   |               |               |   |               |
| type                                     |     | 1699  |               |               |   |               |
| length                                   | m   | 5   |               |               |   | 4             |
| <b>dimensions</b>                        |     |   |               |               |   |               |
| length l                                 | mm  | 128.5   |               |               | 74  |               |
| width b                                  | mm  | 51  |               |               | 32  |               |
| height h                                 | mm  | 67.5  |               |               | 40.5  |               |
| dimensional drawing                      |     |    |               |               |  |               |
| weight (without cable)                   | kg  | 0.8   |               |               | 0.16  |               |
| storing temperature                      | °C  | -40...+165  |               |               |   |               |
| operating temperature                    | °C  | 100...180   |               |               |   |               |
| warm-up time                             | h   | 3   |               |               |   | 1             |
| temperature compensation                 |     | x   |               |               |   |               |
| <b>explosion protection</b>              |     |   |               |               |   |               |
| <b>• ATEX/IECEX</b>                      |     |   |               |               |   |               |
| order code                               |     | FLG-SA2N-**TS   | FLH-SA2N-**TS | FLK-SA2N-**TS | FLM-SA2N-**TS   | -             |
| pipe surface temperature (Ex)            | °C  | gas: -50...+165<br>dust: -50...+155   |               |               |   |               |
| marking                                  |     | CE 0637 Ex II 3G II 2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIC T80 °C...T160 °C Db  |               |               |   |               |
| certification                            |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |               |               |   |               |
| <b>• FM</b>                              |     |   |               |               |   |               |
| order code                               |     | FLG-SF2N-**TS   | FLH-SF2N-**TS | FLK-SF2N-**TS | FLM-SF2N-**TS   | -             |
| pipe surface temperature (Ex)            | °C  | -40...+165  |               |               |   |               |
| degree of protection                     |     | IP66  |               |               |   |               |
| marking                                  |     |  NI/CI, I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |               |               |   |               |

completely thermally insulated transducer installation necessary

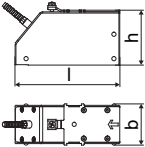
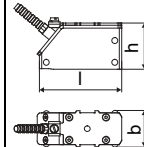

<sup>1</sup> Lamb wave transducer:

typical values for water; pipe diameters for other fluids on request

inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)

inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

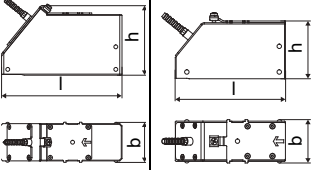
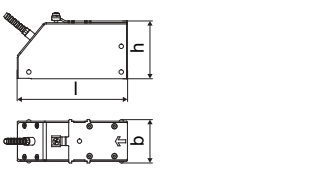
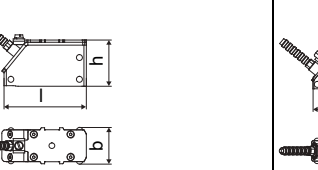
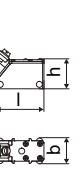
**Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, T1, higher temperatures)**

| order code                               |     | FLG-S***-**T1   | FLH-S***-**T1 | FLK-S***-**T1 | FLM-S***-**T1  | FLP-S***-**T1 |
|--|-----|---|---------------|---------------|--|---------------|
| technical type                           |     | C(RT)G1S53  | C(RT)H1S53    | C(RT)K1S53    | C(RT)M1S53   | C(RT)P1S53    |
| transducer frequency                     | MHz | 0.2   | 0.3           | 0.5           | 1  | 2             |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |               |               |  |               |
| min. extended                            | mm  | 400   | 350           | 100           | 50   | 25            |
| min. recommended                         | mm  | 500   | 450           | 200           | 100  | 50            |
| max. recommended                         | mm  | 4000  | 3000          | 2000          | 1000   | 400           |
| max. extended                            | mm  | 4800  | 3600          | 2400          | 1200   | 480           |
| <b>pipe wall thickness</b>               |     |   |               |               |  |               |
| min.                                     | mm  | 10.6  | 7.1           | 4.2           | 2.1  | 1.1           |
| max.                                     | mm  | 23.7  | 15.8          | 9.5           | 4.7  | 2.4           |
| <b>material</b>                          |     |   |               |               |  |               |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)  |               |               |  |               |
| contact surface                          |     | PPSU  |               |               |  |               |
| degree of protection                     |     | IP66  |               |               |  |               |
| <b>transducer cable</b>                  |     |   |               |               |  |               |
| type                                     |     | 1699  |               |               |  |               |
| length                                   | m   | 5   |               |               |  | 4             |
| <b>dimensions</b>                        |     |   |               |               |  |               |
| length l                                 | mm  | 128.5   |               |               | 74   |               |
| width b                                  | mm  | 51  |               |               | 32   |               |
| height h                                 | mm  | 67.5  |               |               | 40.5   |               |
| dimensional drawing                      |     |    |               |               |  |               |
| weight (without cable)                   | kg  | 0.8   |               |               | 0.16   |               |
| storing temperature                      | °C  | -40...+165  |               |               |  |               |
| operating temperature                    | °C  | 100...180   |               |               |  |               |
| warm-up time                             | h   | 3   |               |               |  | 1             |
| temperature compensation                 |     | x   |               |               |  |               |
| <b>explosion protection</b>              |     |   |               |               |  |               |
| <b>• ATEX/IECEX</b>                      |     |   |               |               |  |               |
| order code                               |     | FLG-SA2*-**T1   | FLH-SA2*-**T1 | FLK-SA2*-**T1 | FLM-SA2*-**T1  | -             |
| pipe surface temperature (Ex)            | °C  | gas: -50...+165<br>dust: -50...+155   |               |               |  |               |
| marking                                  |     | CE 0637 Ex II 3G II 2D<br>Ex nA IIC T6...T3 Gc<br>Ex tb IIIC T80 °C...T160 °C Db  |               |               |  |               |
| certification                            |     | IBExU10ATEX1163 X, IECEx IBE 12.0005X   |               |               |  |               |
| <b>• FM</b>                              |     |   |               |               |  |               |
| order code                               |     | FLG-SF2*-**T1   | FLH-SF2*-**T1 | FLK-SF2*-**T1 | FLM-SF2*-**T1  | -             |
| pipe surface temperature (Ex)            | °C  | -40...+165  |               |               |  |               |
| degree of protection                     |     | IP66  |               |               |  |               |
| marking                                  |     |  NI/Cl. I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>Temp. Codes dwg 3860 |               |               |  |               |

completely thermally insulated transducer installation necessary

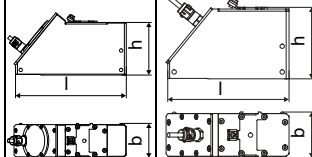
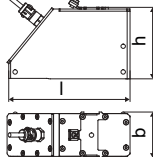
<sup>1</sup> Lamb wave transducer:  
 typical values for water; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

## Lamb wave transducers (zone 1, T1)

| order code                               |     | FLF-N*1*-**T1  | FLG-N*1*-**T1 | FLH-N*1*-**T1   | FLK-N*1*-**T1 | FLM-N*1*-**T1  | FLP-N*1*-**T1 | FLQ-N*1*-**T1   |
|--|-----|--|---------------|---|---------------|--|---------------|---|
| technical type                           |     | C(RT)F1N83   | C(RT)G1N83    | C(RT)H1N83  | C(RT)K1N83    | C(RT)M1N83   | C(RT)P1N83    | C(RT)Q1N83  |
| transducer frequency                     | MHz | 0.15   | 0.2           | 0.3   | 0.5           | 1  | 2             | 4   |
| <b>inner pipe diameter d<sup>1</sup></b> |     |  |               |   |               |  |               |   |
| min. extended                            | mm  | 640  | 400           | 350   | 100           | 50   | 25            | 10  |
| min. recommended                         | mm  | 800  | 500           | 450   | 200           | 100  | 50            | 25  |
| max. recommended                         | mm  | 5500   | 4000          | 3000  | 2000          | 1000   | 400           | 150   |
| max. extended                            | mm  | 6600   | 4800          | 3600  | 2400          | 1200   | 480           | 240   |
| <b>pipe wall thickness</b>               |     |  |               |   |               |  |               |   |
| min.                                     | mm  | 15   | 11            | 8   | 5             | 2.5  | 1.2           | 0.6   |
| max.                                     | mm  | 32   | 24            | 16  | 10            | 5  | 3             | 1.2   |
| <b>material</b>                          |     |  |               |   |               |  |               |   |
| housing                                  |     | PPSU with stainless steel cover 316L, 316Ti (1.4404, 1.4571)   |               |   |               | PPSU with stainless steel cover 316L (1.4404)                                      |               |   |
| contact surface                          |     | PPSU   |               |   |               |  |               |   |
| degree of protection                     |     | IP66/IP67  |               | IP66  |               |  |               |   |
| <b>transducer cable</b>                  |     |  |               |   |               |  |               |   |
| type                                     |     | 1699   |               |   |               |  |               |   |
| length                                   | m   | 5  |               |   |               | 4  |               | 3   |
| <b>dimensions</b>                        |     |  |               |   |               |  |               |   |
| length l                                 | mm  | 163  |               | 128.5   |               | 74   |               | 42  |
| width b                                  | mm  | 54   |               | 51  |               | 32   |               | 22  |
| height h                                 | mm  | 91.3   |               | 67.5  |               | 40.5   |               | 25.5  |
| dimensional drawing                      |     |                     |               |            |               |  |               |  |
| weight (without cable)                   | kg  | 0.935  |               | 0.471   |               | 0.077  |               | 0.019   |
| pipe surface temperature                 | °C  | -40...+130   |               |   |               |  |               |   |
| ambient temperature                      | °C  | -40...+130   |               |   |               |  |               |   |
| temperature compensation                 |     | x  |               |   |               |  |               |   |
| <b>explosion protection</b>              |     |  |               |   |               |  |               |   |
| <b>• ATEX/IECEX</b>                      |     |  |               |   |               |  |               |   |
| order code                               |     | FLF-NA1N-**T1  | FLG-NA1N-**T1 | FLH-NA1N-**T1   | FLK-NA1N-**T1 | FLM-NA1N-**T1  | FLP-NA1N-**T1 | FLQ-NA1N-**T1   |
| pipe surface temperature (Ex)            | °C  | -50...+155   |               |   |               |  |               |   |
| marking                                  |     | <b>CE</b> 0637 <b>Ex</b> II2G II2D<br>Ex q IIC T6...T3<br>Gb<br>Ex tb IIIA<br>T80 °C...T160 °C<br>Db |               | <b>CE</b> 0637 <b>Ex</b> II2G II2D<br>Ex q IIC T6...T3 Gb<br>Ex tb IIIC T80 °C...T160 °C Db |               |  |               |   |
| certification                            |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X  |               |   |               |  |               |   |

<sup>1</sup> Lamb wave transducer:  
 typical values for water; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

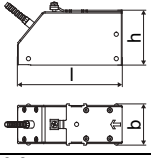
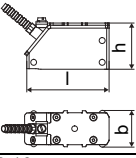

**Lamb wave transducers (zone 1, T1, IP68)**

| order code                               |     | FLF-L*1*-**T1/<br>H68   | FLG-L*1*-**T1/<br>H68                          | FLH-L*1*-**T1/<br>H68 | FLK-L*1*-**T1/<br>H68   | FLM-L*1*-**T1/<br>H68 | FLP-L*1*-**T1/<br>H68 |
|--|-----|---|--|-----------------------|---|-----------------------|-----------------------|
| technical type                           |     | CRF1LI3   | CRG1LI3  | CRH1LI3               | CRK1LI3   | CRM1LI3               | CRP1LI3               |
| transducer frequency                     | MHz | 0.15  | 0.2  | 0.3                   | 0.5   | 1                     | 2                     |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |  |                       |   |                       |                       |
| min. extended                            | mm  | 640   | 400  | 350                   | 100   | 50                    | 25                    |
| min. recommended                         | mm  | 800   | 500  | 450                   | 200   | 100                   | 50                    |
| max. recommended                         | mm  | 5500  | 4000   | 3000                  | 2000  | 1000                  | 400                   |
| max. extended                            | mm  | 6600  | 4800   | 3600                  | 2400  | 1200                  | 480                   |
| <b>pipe wall thickness</b>               |     |   |  |                       |   |                       |                       |
| min.                                     | mm  | 15  | 11   | 8                     | 5   | 2.5                   | 1.2                   |
| max.                                     | mm  | 32  | 24   | 16                    | 10  | 5                     | 3                     |
| <b>material</b>                          |     |   |  |                       |   |                       |                       |
| housing                                  |     | PPSU with stain-<br>less steel cover<br>316Ti (1.4571)                            | PPSU with stainless steel cover 316Ti (1.4571) |                       |   |                       |                       |
| contact surface                          |     | PPSU  | PPSU   |                       |   |                       |                       |
| degree of protection                     |     | IP68 <sup>2</sup>   | IP68 <sup>2</sup>                              |                       |   |                       |                       |
| <b>transducer cable</b>                  |     |   |  |                       |   |                       |                       |
| type                                     |     | 2550  | 2550   |                       |   |                       |                       |
| length                                   | m   | 12  | 12   |                       |   |                       |                       |
| <b>dimensions</b>                        |     |   |  |                       |   |                       |                       |
| length l                                 | mm  | 173   | 143.5  |                       |   | 73                    |                       |
| width b                                  | mm  | 54  | 54   |                       |   | 31.6                  |                       |
| height h                                 | mm  | 91.5  | 83.5   |                       |   | 46                    |                       |
| dimensional drawing                      |     |  |  |                       |  |                       |                       |
| weight (without cable)                   | kg  | 1.36  | 0.639  |                       |   | 0.093                 |                       |
| pipe surface temperature                 | °C  | -40...+80   | -40...+80                                      |                       |   |                       |                       |
| ambient temperature                      | °C  | -40...+80   | -40...+80                                      |                       |   |                       |                       |
| temperature compensation                 |     | x   | x  |                       |   |                       |                       |
| <b>explosion protection</b>              |     |   |  |                       |   |                       |                       |
| <b>• ATEX/IECEx</b>                      |     |   |  |                       |   |                       |                       |
| order code                               |     | FLF-LA1N-**T1/<br>H68   | FLG-LA1N-**T1/<br>H68                          | FLH-LA1N-**T1/<br>H68 | FLK-LA1N-**T1/<br>H68   | FLM-LA1N-**T1/<br>H68 | FLP-LA1N-**T1/<br>H68 |
| pipe surface temperature (Ex)            | °C  | -40...+80   |  |                       |   |                       |                       |
| marking                                  |     | CE 0637 Ex II 2G II 2D<br>Ex q IIC T6...T5 Gb<br>Ex tb IIIC T80 °C...T85 °C Db    |  |                       |   |                       |                       |
| certification                            |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X   |  |                       |   |                       |                       |

<sup>1</sup> Lamb wave transducer:  
 typical values for water; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

<sup>2</sup> test conditions: 3 months/2 bar (20 m)/20 °C

## Lamb wave transducers (zone 1, higher temperatures, T1)

| order code                               |     | FLG-S*1N-**T1   | FLH-S*1N-**T1 | FLK-S*1N-**T1 | FLM-S*1N-**T1   |
|--|-----|---|---------------|---------------|---|
| technical type                           |     | C(RT)G1S83  | C(RT)H1S83    | C(RT)K1S83    | C(RT)M1S83  |
| transducer frequency                     | MHz | 0.2   | 0.3           | 0.5           | 1   |
| <b>inner pipe diameter d<sup>1</sup></b> |     |   |               |               |   |
| min. extended                            | mm  | 400   | 350           | 100           | 50  |
| min. recommended                         | mm  | 500   | 450           | 200           | 100   |
| max. recommended                         | mm  | 4000  | 3000          | 2000          | 1000  |
| max. extended                            | mm  | 4800  | 3600          | 2400          | 1200  |
| <b>pipe wall thickness</b>               |     |   |               |               |   |
| min.                                     | mm  | 10.6  | 7.1           | 4.2           | 2.1   |
| max.                                     | mm  | 23.7  | 15.8          | 9.5           | 4.7   |
| <b>material</b>                          |     |   |               |               |   |
| housing                                  |     | PPSU with stainless steel cover 316Ti (1.4571)  |               |               |   |
| contact surface                          |     | PPSU  |               |               |   |
| degree of protection                     |     | IP66  |               |               |   |
| <b>transducer cable</b>                  |     |   |               |               |   |
| type                                     |     | 1699  |               |               |   |
| length                                   | m   | 5   |               |               | 4   |
| <b>dimensions</b>                        |     |   |               |               |   |
| length l                                 | mm  | 128.5   |               |               | 74  |
| width b                                  | mm  | 51  |               |               | 32  |
| height h                                 | mm  | 67.5  |               |               | 40.5  |
| dimensional drawing                      |     |    |               |               |  |
| weight (without cable)                   | kg  | 0.8   |               |               | 0.16  |
| storing temperature                      | °C  | -40...+155  |               |               |   |
| operating temperature                    | °C  | 100...155   |               |               |   |
| warm-up time                             | h   | 3   |               |               | 1   |
| temperature compensation                 |     | x   |               |               |   |
| <b>explosion protection</b>              |     |   |               |               |   |
| • ATEX/IECEx                             |     |   |               |               |   |
| order code                               |     | FLG-SA1N-**T1   | FLH-SA1N-**T1 | FLK-SA1N-**T1 | FLM-SA1N-**T1   |
| pipe surface temperature (Ex)            | °C  | -50...+155  |               |               |   |
| marking                                  |     | CE 0637  II2G<br>II2D<br>Ex q IIC T6...T3 Gb<br>Ex tb IIIC T80 °C...T160 °C Db |               |               |   |
| certification                            |     | IBExU07ATEX1168 X, IECEx IBE 08.0007X   |               |               |   |

completely thermally insulated transducer installation necessary

<sup>1</sup> Lamb wave transducer:

typical values for water; pipe diameters for other fluids on request

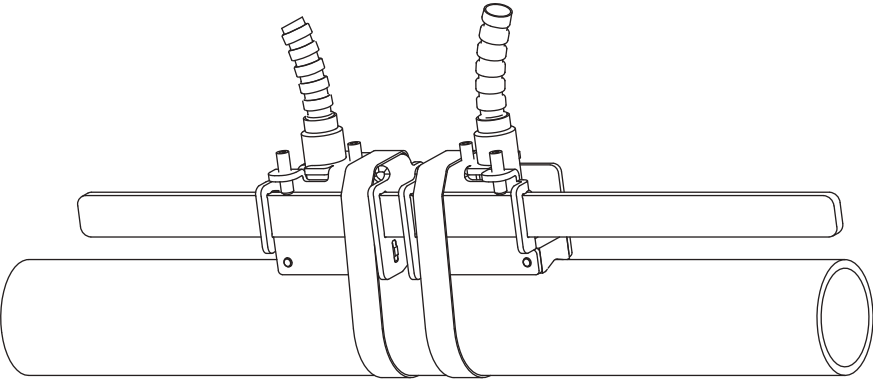
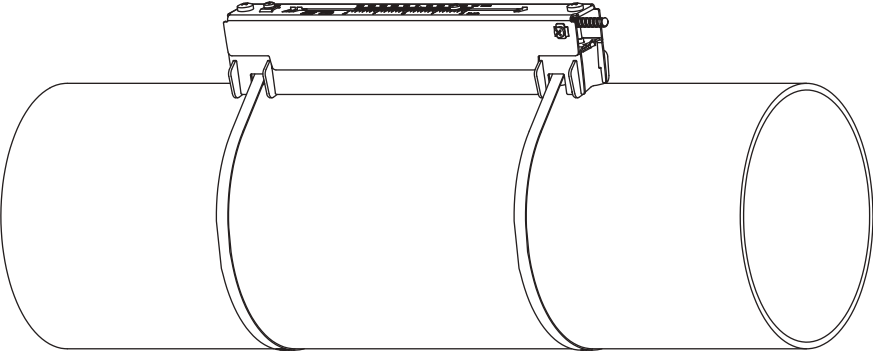
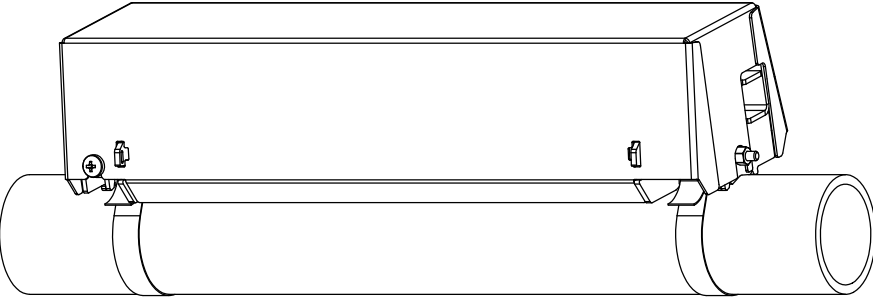
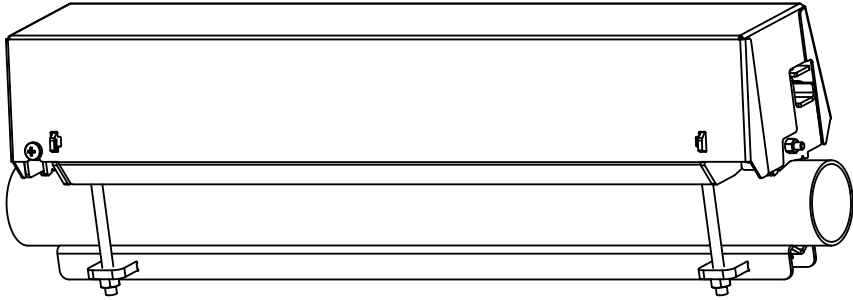
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)

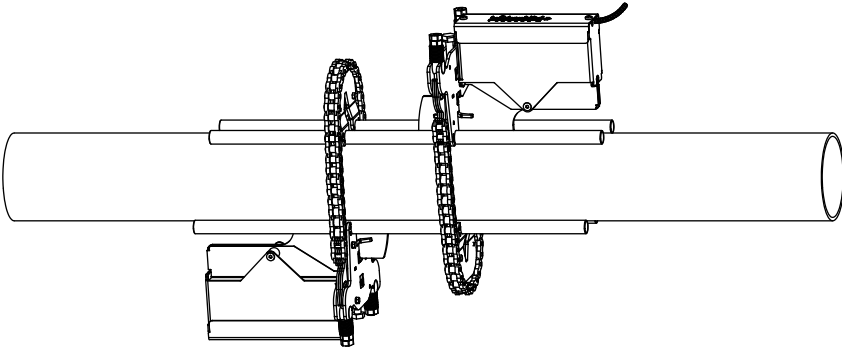
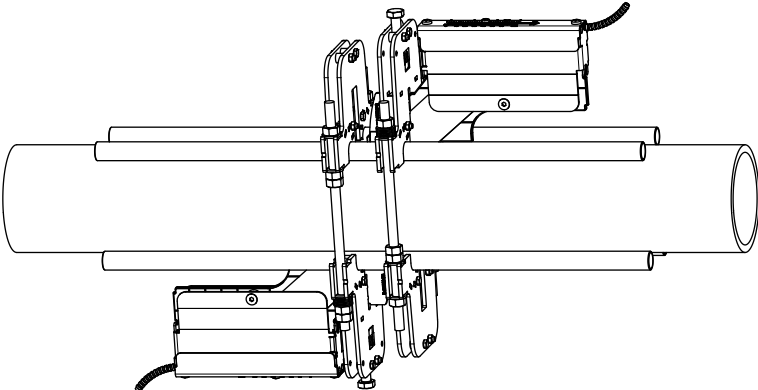
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

## Transducer mounting fixture

### Order code

| 1, 2                        | 3          | 4                       | 5    | 6        | 7...10              | no. of character                                   |
|-----------------------------|------------|-------------------------|------|----------|---------------------|--|
| transducer mounting fixture | transducer | measurement arrangement | size | fixation | outer pipe diameter | option   |
|                             |            |                         |      |          |                     | description  |
| VL                          |            |                         |      |          |                     | Variofix L   |
| VC                          |            |                         |      |          |                     | Variofix C   |
| WN                          |            |                         |      |          |                     | WaveInjector WI-550                                |
| WH                          |            |                         |      |          |                     | WaveInjector WI-630                                |
|                             | F          |                         |      |          |                     | transducers with transducer frequency F            |
|                             | G          |                         |      |          |                     | transducers with transducer frequency G            |
|                             | H          |                         |      |          |                     | transducers with transducer frequency H            |
|                             | K          |                         |      |          |                     | transducers with transducer frequency K            |
|                             | M          |                         |      |          |                     | transducers with transducer frequency M            |
|                             | P          |                         |      |          |                     | transducers with transducer frequency P            |
|                             | Q          |                         |      |          |                     | transducers with transducer frequency Q            |
|                             | S          |                         |      |          |                     | transducers with transducer frequency S            |
|                             |            | D                       |      |          |                     | reflection arrangement or diagonal arrangement     |
|                             |            | R                       |      |          |                     | reflection arrangement                             |
|                             |            |                         | S    |          |                     | small  |
|                             |            |                         | M    |          |                     | medium   |
|                             |            |                         | L    |          |                     | large  |
|                             |            |                         |      | B        |                     | bolts  |
|                             |            |                         |      | S        |                     | tension straps                                     |
|                             |            |                         |      | W        |                     | welding  |
|                             |            |                         |      | N        |                     | without fixation                                   |
|                             |            |                         |      |          | 0020                | 10...20 mm   |
|                             |            |                         |      |          | 0040                | 20...40 mm   |
|                             |            |                         |      |          | T360                | 40...360 mm  |
|                             |            |                         |      |          | 0130                | 10...130 mm  |
|                             |            |                         |      |          | 0360                | 130...360 mm                                       |
|                             |            |                         |      |          | 0920                | 360...920 mm                                       |
|                             |            |                         |      |          | 2000                | 920...2000 mm                                      |
|                             |            |                         |      |          | 4500                | 2000...4500 mm                                     |
|                             |            |                         |      |          | 9400                | 4500...9400 mm                                     |
|                             |            |                         |      |          | NODR                | any  |
|                             |            |                         |      |          |                     | H68 for transducers with degree of protection IP68 |

|   |   |
|---|---|
| <p><b>Variofix L (VLS)</b></p>                                        | <p>transducer frequency: S<br/> material: stainless steel 304 (1.4301),<br/> 303 (1.4305)</p>   |
| <p><b>Variofix L (VL)</b></p>                                        | <p>material: stainless steel 316Ti<br/> (1.4571), 316L (1.4404), 17-7PH<br/> (1.4568)<br/> inner length:<br/> <b>VL(GHK)</b>: 348 mm,<br/> option H68: 368 mm<br/> <b>VL(MP)</b>: 234 mm<br/> <b>VLQ</b>: 176 mm<br/> dimensions:<br/> <b>VL(GHK)</b>: 423 x 90 x 93 mm<br/> option H68: 443 x 94 x 105 mm<br/> <b>VL(MP)</b>: 309 x 57 x 63 mm<br/> <b>VLQ</b>: 247 x 43 x 47 mm</p> |
| <p><b>Variofix C (VC)</b></p>                                       | <p>material: stainless steel 316Ti (1.4571)<br/> inner length:<br/> <b>VC(GK)-L</b>: 500 mm<br/> <b>VC(GK)-S</b>: 350 mm<br/> <b>VC(M)</b>: 400 mm<br/> <b>VCQ</b>: 250 mm<br/> dimensions:<br/> <b>VC(GK)-L</b>: 560 x 126 x 125 mm<br/> <b>VC(GK)-S</b>: 410 x 126 x 125 mm<br/> <b>VC(MP)</b>: 460 x 96 x 82 mm<br/> <b>VCQ</b>: 310 x 85 x 71 mm</p>                              |
| <p><b>Variofix C (VC) with bolt mounting plates (VC*-**-B)</b></p>  | <p>material: stainless steel 316Ti (1.4571)<br/> inner length:<br/> <b>VC(MP)</b>: 400 mm<br/> <b>VCQ</b>: 250 mm<br/> dimensions:<br/> <b>VC(MP)</b>: 460 x 96 x 82 mm<br/> <b>VCQ</b>: 310 x 85 x 71 mm<br/> outer pipe diameter:<br/> <b>VC(MP)</b>: max. 46 mm<br/> <b>VCQ</b>: max. 36 mm</p>  |

|  |  |
|--|--|
| <p><b>Waveinjector with chains</b></p>         | <p>see Technical specification<br/>TSWaveInjectorVx-x</p>  |
| <p><b>Waveinjector with threaded rods</b></p>  | <p>outer pipe diameter:<br/>35...380 mm<br/>see Technical specification<br/>TSWaveInjectorVx-x</p> |

## Coupling materials for transducers

|                       | normal temperature range<br>(4th character of transducer order code = N) |   | extended temperature range<br>higher temperatures<br>(4th character of transducer order code = E, S) |   |   | Waveinjector                                   |  |
|-----------------------|--|---|--|---|---|--|--|
|                       | < 100 °C   | < 130 °C  | < 180 °C   | < 200 °C  | 200...240 °C                                      | < 280 °C                                       | 280...630 °C                                   |
| < 24 h                | coupling compound type N or coupling foil type VT                        | coupling compound type type N or E 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 H or coupling foil type TF | coupling foil type A and coupling foil type VT | coupling foil type B and coupling foil type VT |
| long time measurement | coupling foil type VT  | coupling foil type VT                                       | coupling foil type VT  | coupling foil type VT                             | coupling foil type TF                             | coupling foil type A and coupling foil type VT | coupling foil type B and coupling foil type VT |

### Technical data

| type                     | ambient temperature<br>°C | remark                                 |
|--------------------------|---------------------------|--|
| coupling compound type N | -30...+130                |  |
| coupling compound type E | -30...+200                |  |
| coupling compound type H | -30...+250                |  |
| coupling foil type A     | max. 280                  |  |
| coupling foil type B     | 280...630                 |  |
| coupling foil type VT    | -10...+200                | fluid temperature 200 °C: min. 2 years |
| coupling foil type TF    | 200...240                 |  |

### Connection systems

| connection system T1            |                   |                            |
|---------------------------------|-------------------|----------------------------|
| connection with extension cable | direct connection | transducers technical type |
| <p>JBP2, JBP3, JB06</p>         |                   | <p>****53</p>              |
| <p>JB01</p>                     |                   | <p>****8*</p>              |
| <p>JB01, JBP2, JBP3</p>         |                   | <p>****L1*</p>             |
| connection system TS            |                   |                            |
| connection with extension cable | direct connection | transducers technical type |
| <p>JB02, JB03, JB04</p>         |                   | <p>****52</p>              |

## Cable

| transducer cable    |      |                                |                         |                                |
|---------------------|------|--------------------------------|-------------------------|--------------------------------|
| type                |      | 1699                           | 2550                    | 6111                           |
| weight              | kg/m | 0.094                          | 0.035                   | 0.092                          |
| ambient temperature | °C   | -55...+200                     | -40...+100              | -100...+225                    |
| properties          |      |                                | longitudinal watertight |                                |
| cable jacket        |      |                                |                         |                                |
| material            |      | PTFE                           | PUR                     | PFA                            |
| outer diameter      | mm   | 2.9                            | 5.2 ±0.2                | 2.7                            |
| thickness           | mm   | 0.3                            | 0.9                     | 0.5                            |
| colour              |      | brown                          | grey                    | white                          |
| shield              |      | x                              | x                       | x                              |
| sheath              |      |                                |                         |                                |
| material            |      | stainless steel 316Ti (1.4571) | -                       | stainless steel 316Ti (1.4571) |
| outer diameter      | mm   | 8                              | -                       | 8                              |

| extension cable     |      |  |  |  |
|---------------------|------|--|--|--|
| type                |      | 2615   | 5245   |  |
| weight              | kg/m | 0.18   | 0.38   |  |
| ambient temperature | °C   | -30...+70  | -30...+70  |  |
| properties          |      | halogen-free<br>fire propagation test according to IEC 60332-1<br>combustion test according to IEC 60754-2 | halogen-free<br>fire propagation test according to IEC 60332-1<br>combustion test according to IEC 60754-2 |  |
| cable jacket        |      |  |  |  |
| material            |      | PUR  | PUR  |  |
| outer diameter      | mm   | max. 12  | max. 12  |  |
| thickness           | mm   | 2  | 2  |  |
| colour              |      | black  | black  |  |
| shield              |      | x  | x  |  |
| sheath              |      |  |  |  |
| material            |      | -  | steel wire braid with copolymer sheath   |  |
| outer diameter      | mm   | -  | max. 15.5  |  |

## Cable length

| transducer frequency       |   | F, G, H, K |       | M, P |       | Q |      | S |      |
|----------------------------|---|------------|-------|------|-------|---|------|---|------|
| transducers technical type |   | x          |       | x    |       | x |      | x |      |
| *(DR)***5*                 | m | 5          | ≤ 300 | 4    | ≤ 300 | 3 | ≤ 90 | 2 | ≤ 40 |
| *(LT)***5*                 | m | 9          | ≤ 300 | 9    | ≤ 300 | 9 | ≤ 90 | - | -    |
| transducers technical type |   | x          |       | x    |       | x |      | x |      |
| *(DR)***8*                 | m | 5          | ≤ 300 | 4    | ≤ 300 | 3 | ≤ 90 | - | -    |
| *(LT)***8*                 | m | 9          | ≤ 300 | 9    | ≤ 300 | 9 | ≤ 90 | - | -    |
| option H68: ****L*         | m | 12         | ≤ 300 | 12   | ≤ 300 | - | -    | - | -    |



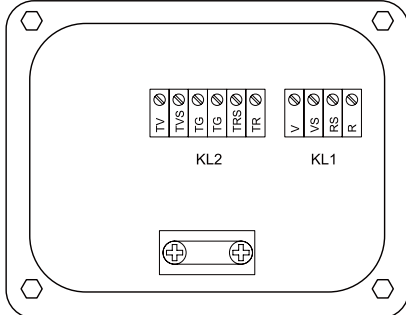
x - transducer cable length

| - max. length of extension cable (depending on the application)

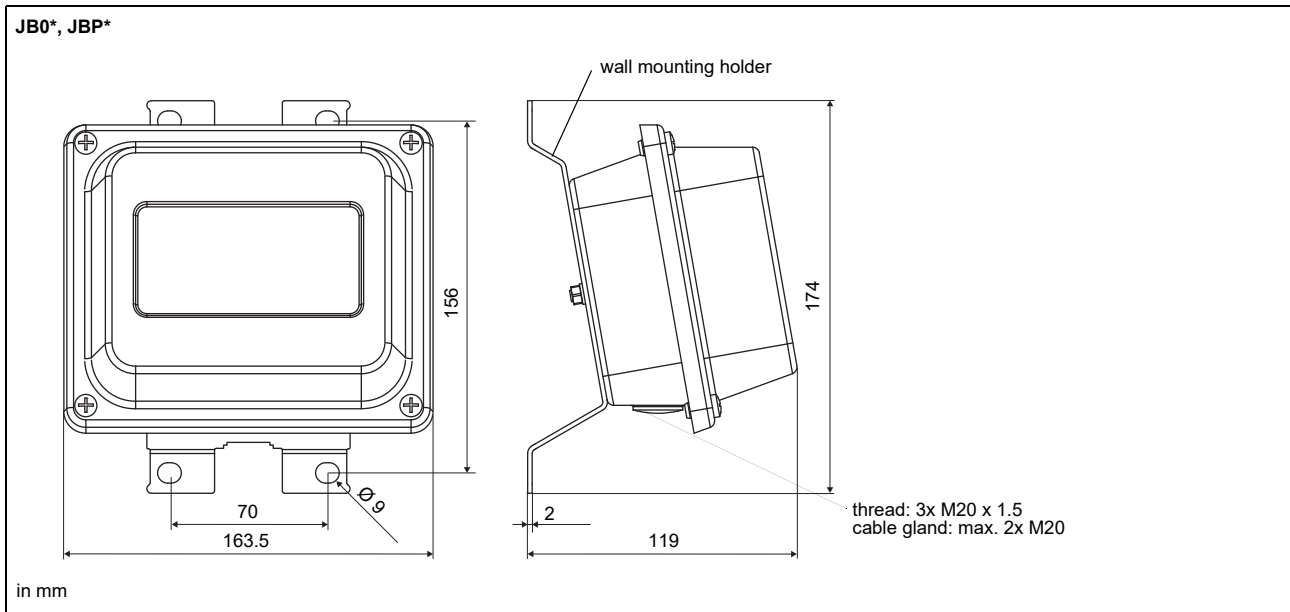
# Junction box

## Technical data

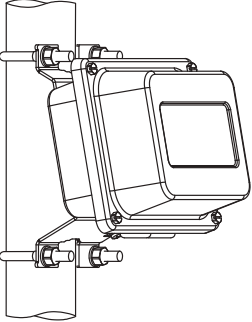
| JB01S4E3M                   |          |  |            |
|-----------------------------|----------|--|------------|
| weight                      | kg       | 1.2 kg   |            |
| fixation                    |          | wall mounting<br>optional: 2" pipe mounting  |            |
| <b>material</b>             |          |  |            |
| housing                     |          | stainless steel 316L (1.4404)  |            |
| gasket                      |          | silicone   |            |
| degree of protection        |          | IP66/IP67  |            |
| ambient temperature         | °C       | -40...+80  |            |
| <b>explosion protection</b> |          |  |            |
| • ATEX/IECEX                |          |  |            |
| marking                     |          | CE 0637 Ex II2G II2D<br>Ex eb mb IIC T6...T4 Gb<br>Ex tb IIIC T100 °C Db<br>Ta -40...+70/80 °C   |            |
| certification               |          | IBExU06ATEX1161<br>IECEX IBE 08.0006   |            |
| type of protection          |          | gas: increased safety<br>decoupling network: encapsulation<br>dust: protection by enclosure      |            |
| <b>Connection</b>           |          |  |            |
|                             |          |  |            |
| <b>Transducers</b>          |          |  |            |
| terminal strip              | terminal | connection   | transducer |
| KL1                         | V        | signal   | ↑          |
|                             | VS       | internal shield  |            |
|                             | RS       | internal shield  | ⌋          |
|                             | R        | signal   |            |
| <b>Extension cable</b>      |          |  |            |
| terminal strip              | terminal | connection   |            |
| KL2                         | TV       | signal   |            |
|                             | TVS      | internal shield  |            |
|                             | TRS      | internal shield  |            |
|                             | TR       | signal   |            |
| JB02, JB03, JB04            |          |  |            |
| weight                      | kg       | 1.2 kg   |            |
| fixation                    |          | wall mounting<br>optional: 2" pipe mounting  |            |
| <b>material</b>             |          |  |            |
| housing                     |          | stainless steel 316L (1.4404)  |            |
| gasket                      |          | silicone   |            |
| degree of protection        |          | JB02, JB03: IP66/IP67<br>JB04: Type 4X, IP66   |            |
| ambient temperature         | °C       | -40...+80  |            |
| <b>explosion protection</b> |          |  |            |
| • ATEX/UKCA                 |          |  |            |
| junction box                |          | JB02   |            |
| marking                     |          | CE UK CA Ex II3G Ex nA IIC T6...T4 Gc<br>II3D Ex tc IIIC T 100 °C Dc<br>-40 ≤ Ta ≤ +70 °C/+80 °C |            |
| • FM                        |          |  |            |
| junction box                |          | JB04   |            |
| certification type          |          | JBC24  |            |
| marking                     |          | NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C                                  |            |
| <b>Connection</b>           |          |  |            |
|                             |          |  |            |
| <b>Transducers</b>          |          |  |            |
| terminal strip              | terminal | connection   | transducer |
|                             | XV       | SMB connector  | ↑          |
|                             | XR       | SMB connector  | ⌋          |
| <b>Extension cable</b>      |          |  |            |
| terminal strip              | terminal | connection   |            |
| KL2                         | TV       | signal   |            |
|                             | TVS      | internal shield  |            |
|                             | TRS      | internal shield  |            |
|                             | TR       | signal   |            |

| JBP2, JBP3, JB06  |   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|---|---|-----------------|------------|------------|------------|-----|---|--------|---|----|-----------------|--|----|-----------------|---|---|--------|--|----------------|----------|------------|-----|----|--------|-----|-----------------|-----|-----------------|----|--------|
| weight  | kg 1.2 kg   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| fixation  | wall mounting<br>optional: 2" pipe mounting   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| <b>material</b>   |   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| housing   | stainless steel 316L (1.4404)   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| gasket  | silicone  |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| degree of protection  | JBP2, JBP3: IP66/IP67<br>JB06: Type 4X, IP66  |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| ambient temperature °C  | -40...+80   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| <b>explosion protection</b>   |   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| • ATEX/UKCA   |   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| junction box  | JBP2  |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| marking   | <br>II3G Ex nA IIC T6...T4 Gc<br>II3D Ex tc IIIC T 100 °C Dc<br>-40 ≤ Ta ≤ +70 °C/+80 °C |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| • FM  |   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| junction box  | JB06  |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| certification type  | JBC23   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| marking   |  NI/CI. I,II,III/Div. 2 /<br>GP A,B,C,D,E,F,G/<br>T6 Ta = -40...+60 °C                   |                 |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>Connection</b></p>  </div> <div style="width: 45%;"> <p><b>Transducers</b></p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> <th>transducer</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL1</td> <td>V</td> <td>signal</td> <td>↑</td> </tr> <tr> <td>VS</td> <td>internal shield</td> <td></td> </tr> <tr> <td>RS</td> <td>internal shield</td> <td>↕</td> </tr> <tr> <td>R</td> <td>signal</td> <td></td> </tr> </tbody> </table> <p><b>Extension cable</b></p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL2</td> <td>TV</td> <td>signal</td> </tr> <tr> <td>TVS</td> <td>internal shield</td> </tr> <tr> <td>TRS</td> <td>internal shield</td> </tr> <tr> <td>TR</td> <td>signal</td> </tr> </tbody> </table> </div> </div> |   | terminal strip  | terminal   | connection | transducer | KL1 | V | signal | ↑ | VS | internal shield |  | RS | internal shield | ↕ | R | signal |  | terminal strip | terminal | connection | KL2 | TV | signal | TVS | internal shield | TRS | internal shield | TR | signal |
| terminal strip  | terminal  | connection      | transducer |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| KL1   | V   | signal          | ↑          |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | VS  | internal shield |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | RS  | internal shield | ↕          |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | R   | signal          |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| terminal strip  | terminal  | connection      |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
| KL2   | TV  | signal          |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | TVS   | internal shield |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | TRS   | internal shield |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |
|   | TR  | signal          |            |            |            |     |   |        |   |    |                 |  |    |                 |   |   |        |  |                |          |            |     |    |        |     |                 |     |                 |    |        |

**Dimensions**



### 2" pipe mounting kit

|   |                              |
|---|------------------------------|
| <p>JB**</p>  | <p>item number: 751035-2</p> |
|---|------------------------------|

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