



## Main features

- Compact and light weight
- Available with 4...20 mA transmitter or Pt100 output
- Available with hygienic as well as industrial process connections
- Programmable by FlexProgrammer 9701

## Applications

- Food & Beverage
- Laboratory & Medical
- Oil & Gas / Chemical
- Water & Waste water
- Energy
- Transportation & Logistics



## Technical specification

|                         |                                                     |
|-------------------------|-----------------------------------------------------|
| Housing                 | Compact Ø 18mm<br>Stainless steel AISI 304 (1.4301) |
| El. connection          | M12 or DIN 43650 plug                               |
| Output                  | Pt100 or 4...20mA                                   |
| Sensor tube material    | Stainless steel AISI 316L (1.4404)<br>PEEK          |
| Sensor diameter outside | Ø 6mm                                               |
| Sensor length           | < 3 000 mm                                          |
| Standard response tip   | Ø 6                                                 |
| Fast response tip       | Ø 4 or Ø 3                                          |

## Time constant $\tau_{0.5}$

|                  |          |           |
|------------------|----------|-----------|
| Sensor tip Ø 6mm | In water | 3.0 sec.  |
| Sensor tip Ø 4mm | In water | 2.5 sec.  |
| Sensor tip Ø 3mm | In water | 1.3 sec.  |
| Conical sensor   | In water | <1.0 sec. |

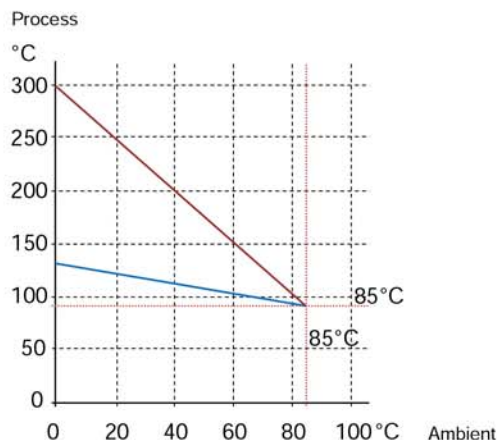
## Sensor element, Pt100 DIN/EN/IEC 60751

|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| Pt100 DIN class B     | $\pm (0.3 + 0.005 \times t) ^\circ\text{C}$            |
| Pt100 1/3 DIN class B | $\pm 1/3 \times (0.3 + 0.005 \times t) ^\circ\text{C}$ |
| Pt100 1/6 DIN class B | $\pm 1/6 \times (0.3 + 0.005 \times t) ^\circ\text{C}$ |
| Pt100 DIN class A     | $\pm (0.15 + 0.002 \times t) ^\circ\text{C}$           |
| Single element        | 1 x Pt100                                              |
| Double element        | 2 x Pt100                                              |
| Connection            | 4-wire, 2 x 2 wire                                     |

## Environment

|                     |                                |                               |
|---------------------|--------------------------------|-------------------------------|
| Ambient temperature | Pt100 output<br>w. transmitter | -40...125°C<br>-40...85°C     |
| Process temperature |                                | -50...250°C                   |
| Protection class    |                                | M12 : IP67 / DIN 43650 : IP65 |
| Humidity            |                                | <100% RH, condensing          |
| Vibrations          |                                | GL, test 2                    |

## Temperature curve

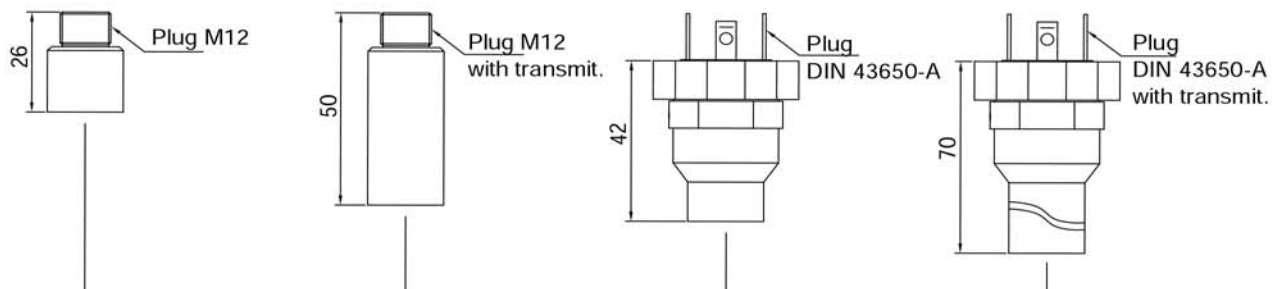


— with cooling neck

— without cooling neck



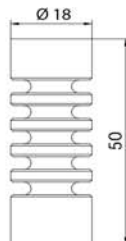
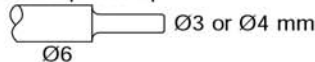
## Dimensions (mm) and constructions details



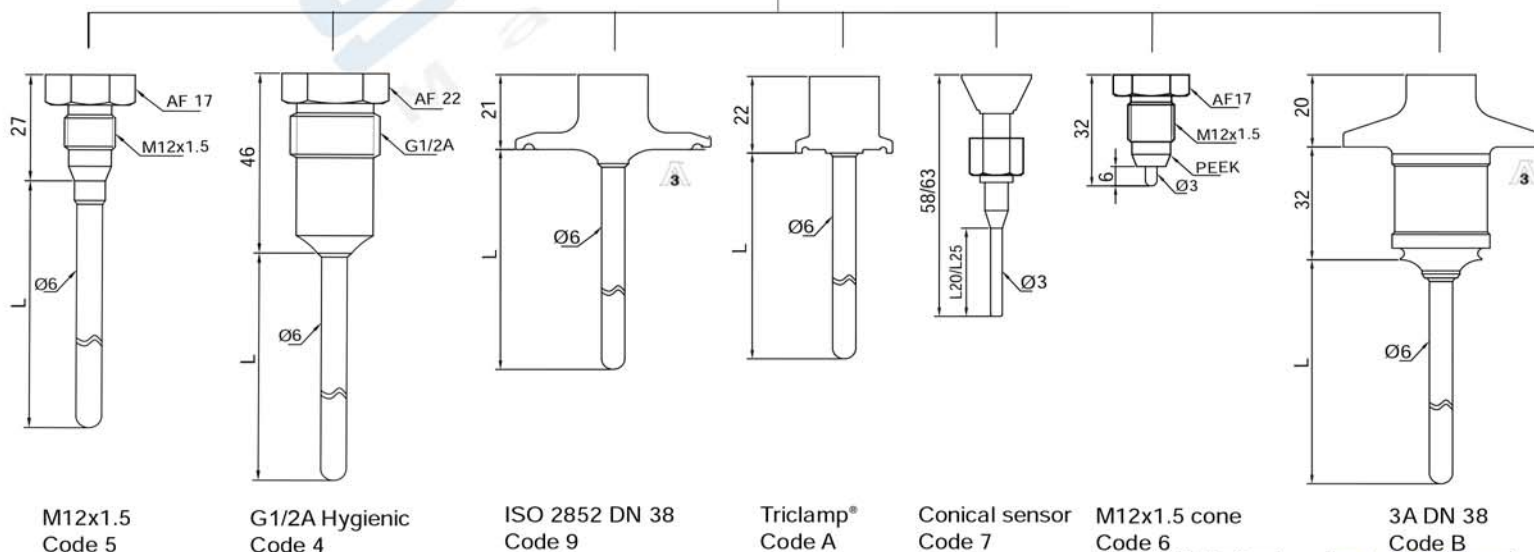
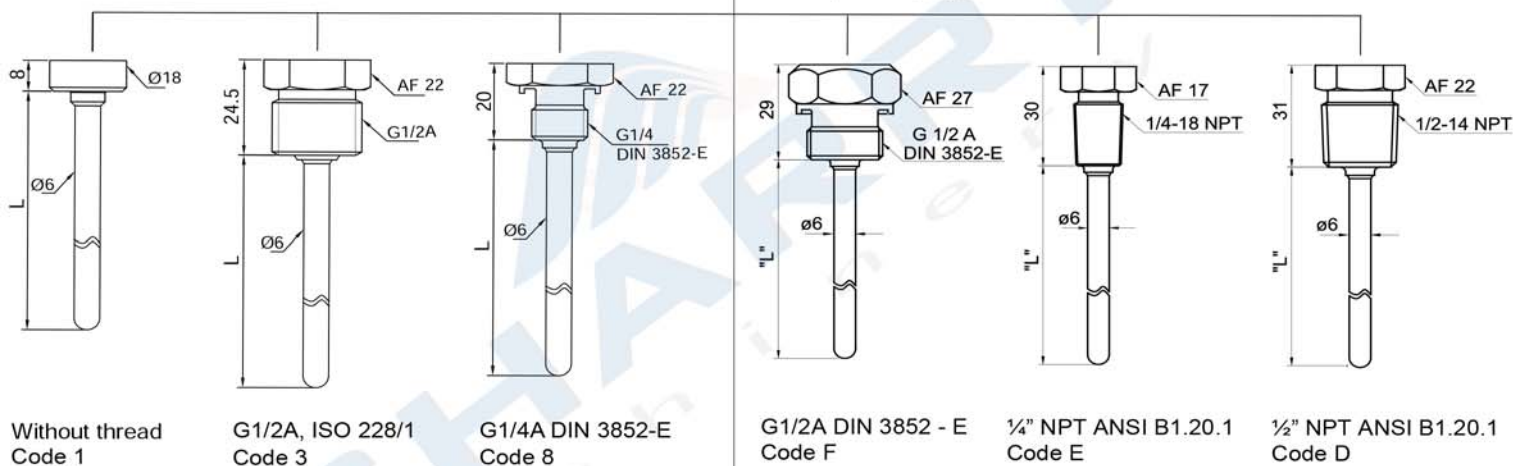
Standard tip



Fast response tip

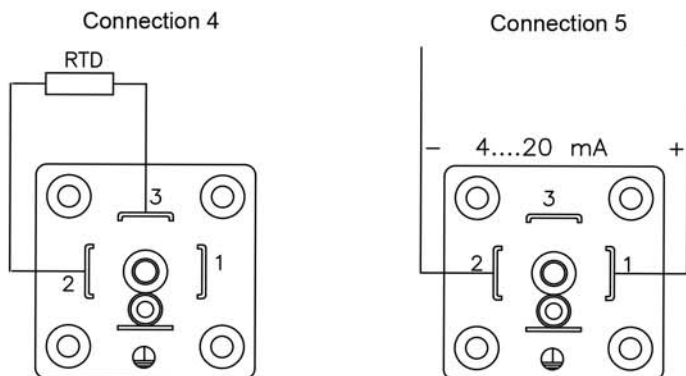


Cooling neck

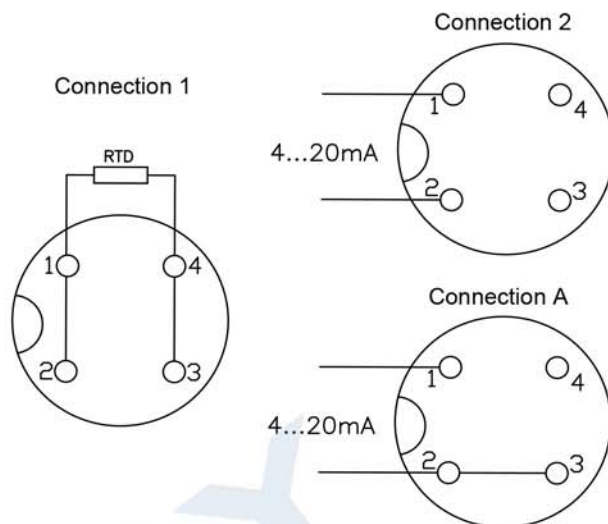


## Electrical connections

Plug DIN 43650-A



M12 Plug



## Transmitter

### Input

|                           |                      |
|---------------------------|----------------------|
| Accuracy                  | < 0.25°C (@ ≤ 100°C) |
| Sample time               | < 0.7 sec.           |
| Pt100 standard            | IEC/DIN/EN 60 751-2  |
| RTD measuring current     | 0.3 mA, continuously |
| Error detection delay     | < 10 sec.            |
| Measuring unit            | °C or °F             |
| Minimum span              | 25°C                 |
| Protection                | ± 35 VDC             |
| Suppression               | 50 and 60 Hz         |
| Resolution                | 14 bit               |
| Repeatability             | < 0.1°C              |
| Ripple immunity           | IEC 770 6.2.4.2      |
| Offset adjustment         | Max. ± 10°C          |
| Isolation, sensor to case | 50 VAC (test 500V)   |

### Other data

|                   |                                         |
|-------------------|-----------------------------------------|
| Temperature drift | Typ. 0.003% per °C<br>Max. 0.01% per °C |
| Power-on time     | 20 sec.                                 |

### Output

|                                        |                               |
|----------------------------------------|-------------------------------|
| Signal span                            | 4...20 mA, 2-wire             |
| Accuracy                               | < 0.1% of signal span         |
| Supply range                           | 8...35 VDC                    |
| Ripple immunity                        | 3 Vms                         |
| Load equation                          | $RL \leq (VDC - 8)/23$ [kOhm] |
| Up/Down scaling limits                 | 23 mA/3.5 mA                  |
| Damping                                | 0...30 sec.                   |
| Protection                             | Reserved polarity protection  |
| Resolution                             | 12 bit                        |
| Effect of variations in supply voltage |                               |
| Output current                         | 0.01% per volt                |

### Environmental conditions

|                       |               |
|-----------------------|---------------|
| Operating temperature | -40...85°C    |
| Storage temperature   | -55...90°C    |
| Long-term test        | IEC 770 6.3.2 |

### EMC data

|                   |                            |
|-------------------|----------------------------|
| Generic standards | EN 61000-6-3, EN 61000-6-2 |
| Product standard  | EN 61326                   |
| Namur             | NE21                       |





## Ordering details TE2

TE2 \_ x . x . x x x x . xxxx . x

### Model

Compact temperature sensor

TE2

### Sensor tip

|               |                                               |   |
|---------------|-----------------------------------------------|---|
| Not specified | For connection code 6 & 7                     | 0 |
| Standard      | Normal response                               | 1 |
| Fast          | Fast response Ø4 mm Sensor length 35...300 mm | 2 |
| Fast          | Fast response Ø3 mm Sensor length 35...300 mm | 3 |

### Process connection

|                         |                     |            |                                |   |
|-------------------------|---------------------|------------|--------------------------------|---|
| Tube without connection |                     |            | PN40                           | 1 |
| Nipple, male            | G1/2A               | ISO 228/1  | PN100                          | 3 |
| Nipple, male            | G1/2A hygienic      | ISO 228/1  | PN40                           | 4 |
| Nipple, male            | M12 x 1.5 hygienic  | ISO 228/1  | PN40                           | 5 |
| Nipple, male            | M12 x 1.5 hygienic  | ISO 228/1  | PEEK cone Ø3 x 5 mm tip        | 6 |
| G½" union nut           | Conical sensor      |            | Ø3 x 20 mm or 25 mm sensor tip | 7 |
| Nipple, male            | G1/4A               | DIN 3852-E | PN100                          | 8 |
| DN25/DN38 clamp, 3-A    | (1", 1½")           | ISO 2852   | PN40                           | 9 |
| Triclamp® ½", ¾"        | (DN15/DN20)         |            | PN40                           | A |
| 3A/DN38, BHC            | Hygienic connection |            | PN40                           | B |
| NPT                     | ½-14                |            | PN100                          | D |
| NPT                     | ¼-18                |            | PN100                          | E |
| Nipple, male            | G1/2A               | DIN 3852-E | PN100                          | F |

### Sensor element

|                     |                            |   |
|---------------------|----------------------------|---|
| 1 x Pt100 Cl. B     |                            | 1 |
| 2 x Pt100 Cl. B     | For 6 mm standard tip only | 2 |
| 1 x Pt100 Cl. 1/3 B |                            | 3 |
| 2 x Pt100 Cl. 1/3 B | For 6 mm standard tip only | 4 |
| 1 x Pt100 Cl. 1/6 B |                            | 5 |
| 1 x Pt100 Cl. A     |                            | 7 |
| 2 x Pt100 Cl. A     | For 6 mm standard tip only | 8 |

### Cooling neck

|              |                  |   |
|--------------|------------------|---|
| None         |                  | 0 |
| Cooling neck | See table page 1 | 4 |

### Electrical connection

|                                 |                            |   |
|---------------------------------|----------------------------|---|
| M12 plug, 4 pole                |                            | 1 |
| M12 plug, 4 pole, Iout pin 2    | with 4...20 mA transmitter | 2 |
| M12 plug, 4 pole, Iout pin 2, 3 | with 4...20 mA transmitter | A |
| DIN 43650-A                     |                            | 4 |
| DIN 43650-A                     | with 4...20 mA transmitter | 5 |

### Certificates

|                                      |  |   |
|--------------------------------------|--|---|
| Not specified                        |  | 0 |
| Ex ia Simple apparatus, gas and dust |  | 9 |

### Sensor tube length

|                                  |      |
|----------------------------------|------|
| 5 mm for connection code 6       | 0005 |
| 20 mm for connection code 7      | 0020 |
| 25 mm for connection code 7      | 0025 |
| Length in mm (e.g. 60 mm = 0060) | xxxx |

### Configuration

|                        |   |
|------------------------|---|
| No configuration       | 0 |
| Configuration of range | C |





## Main Features

- For corrosive gasses and liquids
- Reinforced version for harsh conditions
- Class 1 and 2 according to EN 13190
- Wetted parts Stainless steel
- Option : case material 1.4404 (316L) for aggressive atmosphere
- Option : filling fluid in the case to avoid moisture and for applications with vibrations

## Applications

- Oil & Gas / Chemical
- Water & Waste water
- Energy

## Technical Data

|                    |                                                                                              |                          |                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal size       | 100, 130 mm                                                                                  | Minimum immersion length | Immersion tube Ø 6 mm: L2 ≥ 65 mm<br>Immersion tube Ø 8 mm: L2 ≥ 50 mm                                                                                                                     |
| Temperature ranges | -70 ... 600 °C / -100 ... 1100 °F                                                            | Temperature limit        | ranges ≤ 400 °C: 135 % F.S.<br>ranges > 400 °C: 100 % F.S.                                                                                                                                 |
| Accuracy           | According to EN 13190<br>up to 250 °C: class 1<br>above 250 °C: class 2 (class 1 on request) | ATEX                     | Ex II2GDc<br>(with option 0078)                                                                                                                                                            |
| Protection rating  | IP 68 (EN 60529)                                                                             | Vibrations               | According to IEC 60068-2-6:<br>10-58 Hz: 0.15 mm amplitude<br>58-150 Hz: 2g<br>According to MIL STD 810E, Meth. 514.4<br>10 Hz: 0.015 g2/Hz<br>40 Hz: 0.015 g2/Hz<br>500 Hz: 0.00015 g2/Hz |
| Immersion tube     | Stainless steel 1.4571 (AISI 316Ti)                                                          |                          |                                                                                                                                                                                            |
| Case               | Stainless steel 1.4301 (AISI 304)                                                            |                          |                                                                                                                                                                                            |
| Bezel ring         | Stainless steel 1.4301 (AISI 304)                                                            |                          |                                                                                                                                                                                            |
| Window             | Instrument glass                                                                             |                          |                                                                                                                                                                                            |
| Window gasket      | Elastomer (silicone)                                                                         |                          |                                                                                                                                                                                            |
| Dial               | Aluminium, white                                                                             |                          |                                                                                                                                                                                            |
| Pointer            | Aluminium, black, adjustable                                                                 |                          |                                                                                                                                                                                            |

## Options

|                                                              |                |                                                                                                   |                |            |
|--------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------|----------------|------------|
| ATEX II2GDc<br>(Only with window laminated safety glass)     | Code 0078      | <b>Additional ordering codes for specific process connections</b>                                 |                |            |
| Stainless steel housing 1.4404 (316L)                        | Code 0110      |                                                                                                   | <b>Sliding</b> | <b>Fix</b> |
| Dampening grease                                             | Code 0581      | G¼" male                                                                                          | 9550           | 9551       |
| Laminated safety glass                                       | Code 0751      | ¼" - 18 NPT male                                                                                  | 9560           | 9561       |
| Acrylic glass (PMMA or Plexiglass) <sup>(1)</sup>            | Code 0752      | ¾" - 14 NPT male                                                                                  | 9562           | 9563       |
| Window polycarbonate                                         | Code 0753      | 1" - 11.5 NPT male                                                                                | 9564           | 9565       |
| Customer specific immersion length <sup>(2)</sup>            | Code 9003_xxxx | M18 x 1.5 male                                                                                    | 9574           | 9575       |
| Oil filling (silicone oil window gasket EPDM) <sup>(3)</sup> | Code 0776      | M27 x 2.0 male                                                                                    | 9576           | 9577       |
| Red mark                                                     | Code 9700      | M20 x 1.5 female                                                                                  | 9584           | -          |
| Specific temperature range                                   | Code 9704      | M24 x 1.5 female                                                                                  | 9586           | -          |
| Customer logo on dial                                        | Code 9710      | To be used with ordering code = 0 for specific connection<br>Example: TBHI 100 204.162.12T / 9550 |                |            |
| Specific technical data on dial                              | Code 9711      | <b>To be ordered separately</b>                                                                   |                |            |

<sup>(1)</sup> The case must not be constantly heated over 75 °C.

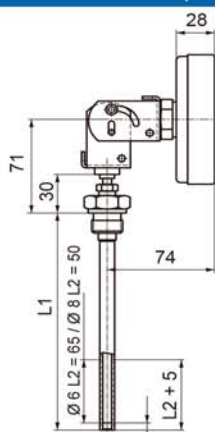
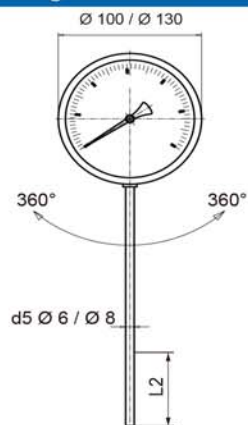
<sup>(2)</sup> xxxx = L1 in mm

<sup>(3)</sup> Only available with fluid temperature ranges between -30 °C (-20 °F) and +250 °C (480 °F).

|                                    |          |
|------------------------------------|----------|
| Material certificate 3.1 EN 10204  | 90001132 |
| Calibration certificate (3 points) | 90001188 |



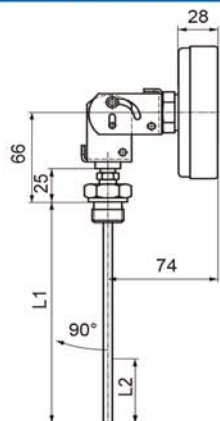
**Drawing - Immersion tube center back, every angle without connection (dimensions in mm)**



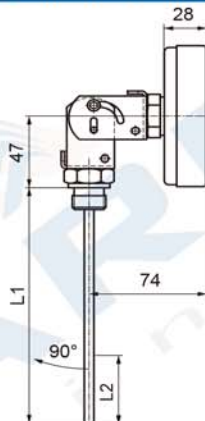
Mounted in a thermowell

| NS                    | Weight (kg) |
|-----------------------|-------------|
| 100                   | 0.450       |
| 130                   | 0.570       |
| <b>Add per 100 mm</b> |             |
| Ø 6 mm                | 0.007       |
| Ø 8 mm                | 0.017       |

**Drawing - Immersion tube center back, every angle with connection (dimensions in mm)**

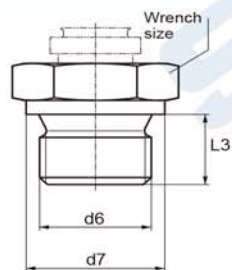


With sliding connection

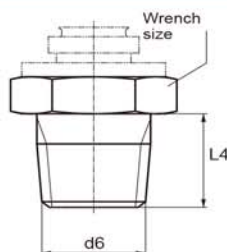


With fix connection

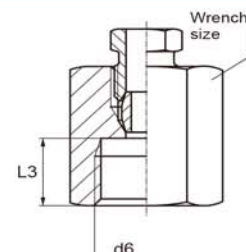
**Drawings - connections**



Cylindrical screw threads



Conical screw threads



Sliding screw connection female

| d6                 | d7 | L3 | L4 | Wrench size | Weight (kg) |       |
|--------------------|----|----|----|-------------|-------------|-------|
|                    |    |    |    |             | sliding     | fix   |
| G½", male          | 26 | 15 | -  | 27          | 0.095       | 0.090 |
| G¾", male          | 32 | 16 | -  | 32          | 0.150       | 0.140 |
| G1", male          | 39 | 19 | -  | 41          | 0.210       | 0.240 |
| M20 x 1.5, male    | 27 | 14 | -  | 27          | 0.090       | 0.090 |
| M24 x 1.5, male    | 27 | 15 | -  | 27          | 0.110       | 0.110 |
| ½" - 14 NPT", male | -  | -  | 20 | 27          | 0.095       | 0.100 |





Temperature ranges

| Code              | Range<br>°C |
|-------------------|-------------|
| 52T               | -20 ... 40  |
| 54T               | -20 ... 60  |
| 84T               | -20 ... 100 |
| 55T               | -30 ... 170 |
| 51T               | -30 ... 70  |
| 68T <sup>1)</sup> | -70 ... 50  |
| 11T               | 0 ... 60    |
| 27T               | 0 ... 80    |
| 12T               | 0 ... 100   |
| 20T               | 0 ... 120   |
| 13T               | 0 ... 160   |
| 22T               | 0 ... 200   |
| 14T               | 0 ... 250   |
| 23T <sup>1)</sup> | 0 ... 300   |
| 15T <sup>1)</sup> | 0 ... 400   |
| 25T <sup>1)</sup> | 0 ... 500   |
| 16T <sup>1)</sup> | 0 ... 600   |
| 30T <sup>1)</sup> | 100 ... 500 |

| Code              | Range<br>°F  |
|-------------------|--------------|
| 68U <sup>1)</sup> | -100 ... 120 |
| 09U <sup>1)</sup> | -50 ... 120  |
| 08U <sup>1)</sup> | -40 ... 160  |
| 54U               | 0 ... 140    |
| 02U               | 0 ... 200    |
| 03U               | 0 ... 250    |
| 04U               | 0 ... 300    |
| 05U               | 0 ... 400    |
| 06U               | 0 ... 500    |
| 11U               | 30 ... 140   |
| 20U               | 30 ... 250   |
| 13U               | 30 ... 320   |
| 22U               | 30 ... 400   |
| 23U <sup>1)</sup> | 30 ... 580   |
| 15U <sup>1)</sup> | 30 ... 750   |
| 28U <sup>1)</sup> | 100 ... 800  |
| 29U <sup>1)</sup> | 200 ... 1000 |

| Code              | Range (double scale)<br>°C / °F |
|-------------------|---------------------------------|
| 51V               | -30 ... 70 / -40 ... 160        |
| 68V <sup>1)</sup> | -70 ... 50 / -100 ... 100       |
| 55V               | -30 ... 170 / 0 ... 350         |
| 11V               | 0 ... 60 / 30 ... 140           |
| 20V               | 0 ... 120 / 30 ... 250          |
| 13V               | 0 ... 160 / 30 ... 320          |
| 14V               | 0 ... 250 / 30 ... 500          |
| 15V <sup>1)</sup> | 0 ... 400 / 30 ... 750          |
| 16V <sup>1)</sup> | 0 ... 600 / 100 ... 1100        |

<sup>1)</sup>Not available with silicone filling (option 0776 )

Ordering example with options

|                                                              | TBHI | 100 | - | 2 | 1 | 4 | . | 1 | 4 | 0 | . | 12T | / | 9003 | - | 0130 | - | 0078 |
|--------------------------------------------------------------|------|-----|---|---|---|---|---|---|---|---|---|-----|---|------|---|------|---|------|
| All stainless steel bimetal thermometer                      | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Nominal size 100 mm                                          | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Case material stainless steel 1.4301 (AISI 304)              | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Without connection (direct mounting)                         | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Immersion tube outlet: Center back, every angle              | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Indication EN 13190 (standard)                               | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Immersion tube Ø 6 mm, stainless steel 1.4571 (AISI 316 Ti)  | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Immersion tube customer specific length                      | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Temperature range: 0 ... 100 °C                              | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Option: Customer specific immersion length                   | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Option: Immersion length L1 = 130 mm                         | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Option: ATEX Version with window laminated safety glass only | ←    |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |



## Ordering details TBHI

| Model                                                            | TBHI |   |   | - | 2 |  |  | . | 1 |  | . | xxx | / |
|------------------------------------------------------------------|------|---|---|---|---|--|--|---|---|--|---|-----|---|
| All stainless steel Industrial Bimetal Thermometer               | TBHI |   |   |   |   |  |  |   |   |  |   |     |   |
| <b>Nominal size</b>                                              |      |   |   |   |   |  |  |   |   |  |   |     |   |
| 100 mm                                                           |      | 1 | 0 | 0 |   |  |  |   |   |  |   |     |   |
| 130 mm                                                           |      | 1 | 3 | 0 |   |  |  |   |   |  |   |     |   |
| <b>Case</b>                                                      |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Stainless steel 1.4301 (AISI 304)                                |      |   |   |   | 2 |  |  |   |   |  |   |     |   |
| <b>Connection</b>                                                |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Without connection (direct mounting)                             |      |   |   |   |   |  |  |   | 1 |  |   |     |   |
| With sliding connection:                                         |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Sliding screw connection M20 x 1.5, male <sup>(2)</sup>          |      |   |   |   |   |  |  |   | 2 |  |   |     |   |
| Sliding screw connection M24 x 1.5, male <sup>(2)</sup>          |      |   |   |   |   |  |  |   | 3 |  |   |     |   |
| Sliding screw connection G½", male <sup>(2)</sup>                |      |   |   |   |   |  |  |   | 5 |  |   |     |   |
| Sliding screw connection ½"-14 NPT, male <sup>(3)</sup>          |      |   |   |   |   |  |  |   | 6 |  |   |     |   |
| Sliding screw connection G¾", male <sup>(2)</sup>                |      |   |   |   |   |  |  |   | 7 |  |   |     |   |
| Sliding screw connection G1", male <sup>(2)</sup>                |      |   |   |   |   |  |  |   | 8 |  |   |     |   |
| Sliding screw connection G½", female                             |      |   |   |   |   |  |  |   | 9 |  |   |     |   |
| Sliding screw connection G¾", female                             |      |   |   |   |   |  |  |   | A |  |   |     |   |
| Sliding screw connection G1", female                             |      |   |   |   |   |  |  |   | B |  |   |     |   |
| With fix connection:                                             |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Fix screw connection G½", male <sup>(4)</sup>                    |      |   |   |   |   |  |  |   | C |  |   |     |   |
| Fix screw connection G¾", male <sup>(4)</sup>                    |      |   |   |   |   |  |  |   | D |  |   |     |   |
| Fix screw connection G1", male <sup>(4)</sup>                    |      |   |   |   |   |  |  |   | E |  |   |     |   |
| Fix screw connection M20 x 1.5, male <sup>(4)</sup>              |      |   |   |   |   |  |  |   | S |  |   |     |   |
| Fix screw connection M24 x 1.5, male <sup>(4)</sup>              |      |   |   |   |   |  |  |   | T |  |   |     |   |
| Fix screw connection ½"-14 NPT, male <sup>(5)</sup>              |      |   |   |   |   |  |  |   | Q |  |   |     |   |
| Specific connection (additional code needed, see page 1)         |      |   |   |   |   |  |  |   | 0 |  |   |     |   |
| <b>Immersion tube outlet</b>                                     |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Center back, every angle                                         |      |   |   |   |   |  |  |   | 4 |  |   |     |   |
| <b>Indication</b>                                                |      |   |   |   |   |  |  |   |   |  |   |     |   |
| EN 13190 (Standard)                                              |      |   |   |   |   |  |  |   | 1 |  |   |     |   |
| <b>Immersion tube / diameter / material</b>                      |      |   |   |   |   |  |  |   |   |  |   |     |   |
| Ø 6 mm, stainless steel 1.4571 (AISI 316 Ti)                     |      |   |   |   |   |  |  |   |   |  |   | 4   |   |
| Ø 8 mm, stainless steel 1.4571 (AISI 316 Ti)                     |      |   |   |   |   |  |  |   |   |  |   | 6   |   |
| <b>Immersion tube / installed length L1</b>                      |      |   |   |   |   |  |  |   |   |  |   |     |   |
| 60 mm <sup>(1)</sup>                                             |      |   |   |   |   |  |  |   |   |  |   | 1   |   |
| 100 mm                                                           |      |   |   |   |   |  |  |   |   |  |   | 2   |   |
| 160 mm                                                           |      |   |   |   |   |  |  |   |   |  |   | 4   |   |
| 250 mm                                                           |      |   |   |   |   |  |  |   |   |  |   | 6   |   |
| 400 mm                                                           |      |   |   |   |   |  |  |   |   |  |   | 7   |   |
| 600 mm                                                           |      |   |   |   |   |  |  |   |   |  |   | 8   |   |
| 1000 mm                                                          |      |   |   |   |   |  |  |   |   |  |   | 9   |   |
| Customer specific length (use option 9003_xxxx, xxxx = L1 in mm) |      |   |   |   |   |  |  |   |   |  |   | 0   |   |
| <b>Unit of measurement / Temperature ranges <sup>(6)</sup></b>   |      |   |   |   |   |  |  |   |   |  |   |     |   |
| °C                                                               |      |   |   |   |   |  |  |   |   |  |   | xxT |   |
| °F                                                               |      |   |   |   |   |  |  |   |   |  |   | xxU |   |
| °C / °F (double scale)                                           |      |   |   |   |   |  |  |   |   |  |   | xxV |   |
| <b>Options to be added behind the / (see example page 3)</b>     |      |   |   |   |   |  |  |   |   |  |   |     | / |

<sup>(1)</sup> L1 < 100 mm: only for immersion tube Ø 8 mm and only for temperature ≤ 250 °C. The case must not be heated over 110 °C.

<sup>(2)</sup> Form 2 according to EN 13190

<sup>(3)</sup> Form 6 according to EN 13190

<sup>(4)</sup> Form 3 according to EN 13190

<sup>(5)</sup> Form 7 according to EN 13190

<sup>(6)</sup> Available standard temperature ranges, see tables on page 3. For ranges not listed, please contact Baumer.







## Main Features

- For corrosive gasses and liquids
- Class 1 and 2 according to EN 13190
- Wetted parts Stainless steel
- Option : case material 1.4404 (316L) for aggressive atmosphere

## Applications

- Food & Beverage
- Oil & Gas / Chemical
- Water & Waste water
- Energy
- Machinery

## Technical Data

|                    |                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------|
| Nominal size       | 80, 100, 130, 160 mm                                                                         |
| Temperature ranges | -70 ... 600 °C / -100 ... 1100 °F                                                            |
| Accuracy           | According to EN 13190<br>up to 250 °C: class 1<br>above 250 °C: class 2 (class 1 on request) |
| Protection rating  | IP 67 (EN 60529)                                                                             |
| Immersion tube     | Stainless steel 1.4571 (AISI 316Ti)                                                          |
| Case               | Stainless steel 1.4301 (AISI 304)                                                            |
| Bezel ring         | Stainless steel 1.4301 (AISI 304)                                                            |
| Window             | Instrument glass                                                                             |
| Window gasket      | Elastomer                                                                                    |

|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| Dial                     | Aluminium, white                                                       |
| Pointer                  | Aluminium, black, adjustable                                           |
| Minimum immersion length | Immersion tube Ø 6 mm: L2 ≥ 65 mm<br>Immersion tube Ø 8 mm: L2 ≥ 50 mm |
| Temperature limit        | ranges ≤ 400 °C: 135 % F.S.<br>ranges > 400 °C: 100 % F.S.             |
| ATEX                     | Ex II2GDc<br>(with option 0078)                                        |

## Options

|                                                          |                |
|----------------------------------------------------------|----------------|
| ATEX II2GDc<br>(Only with window laminated safety glass) | Code 0078      |
| Stainless steel housing 1.4404 (316L) <sup>(1)</sup>     | Code 0110      |
| Dampening grease                                         | Code 0581      |
| Zero adjustment by knob on the backside <sup>(2)</sup>   | Code 0727      |
| Laminated safety glass                                   | Code 0751      |
| Acrylic glass (PMMA or Plexiglass) <sup>(3)</sup>        | Code 0752      |
| Window polycarbonate <sup>(4)</sup>                      | Code 0753      |
| Silicon free, label marking                              | Code 0793      |
| Silicon free, marking on dial                            | Code 0794      |
| Customer specific immersion length <sup>(5)</sup>        | Code 9003_xxxx |
| Red mark                                                 | Code 9700      |
| Specific temperature range                               | Code 9704      |
| Customer logo on dial                                    | Code 9710      |
| Specific technical data on dial                          | Code 9711      |

| Additional ordering codes for specific process connections | Sliding | Fix  |
|------------------------------------------------------------|---------|------|
| G1/4" male                                                 | 9550    | 9551 |
| 1/4" - 18 NPT male                                         | 9560    | 9561 |
| 3/4" - 14 NPT male                                         | 9562    | 9563 |
| 1" - 11.5 NPT male                                         | 9564    | 9565 |
| M18 x 1.5 male                                             | 9574    | 9575 |
| M27 x 2.0 male                                             | 9576    | 9577 |
| M20 x 1.5 female                                           | 9584    | -    |
| M24 x 1.5 female                                           | 9586    | -    |

To be used with ordering code = 0 for specific connection  
Example: TBI 100 204.162.12T / **9550**

## To be ordered separately

|                                    |          |
|------------------------------------|----------|
| Material certificate 3.1 EN 10204  | 90001132 |
| Calibration certificate (3 points) | 90001188 |

<sup>(1)</sup> Only NS 100 and NS 130.

<sup>(2)</sup> Only center back and every angle.

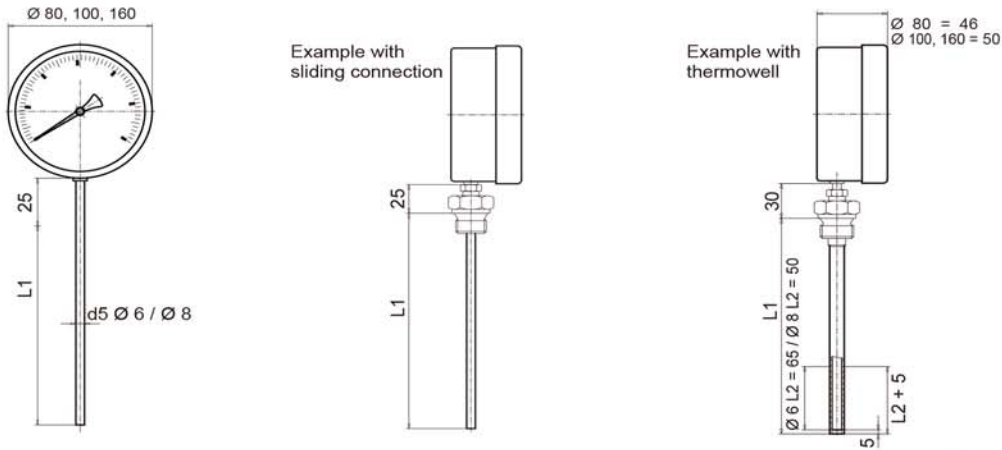
<sup>(3)</sup> The case must not be constantly heated over 75 °C.

<sup>(4)</sup> Only center back and every angle, not for NS 160.

<sup>(5)</sup> xxxx = L1 in mm.

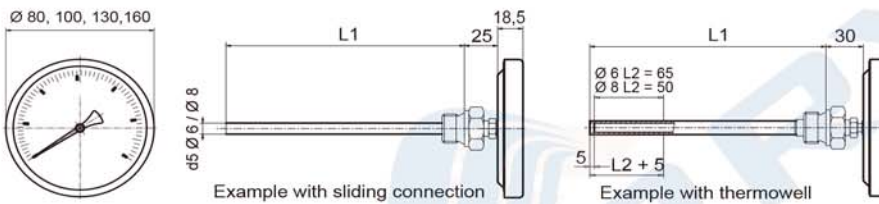


**Drawing - Immersion tube bottom (dimensions in mm)**



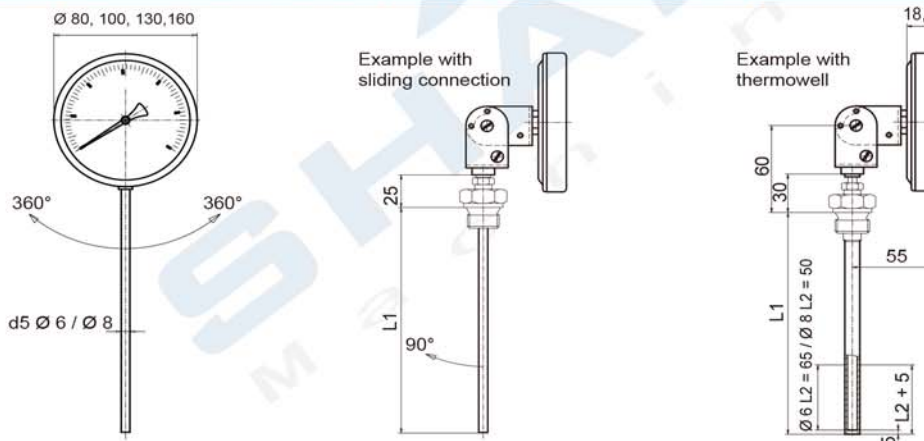
| NS                    | Weight (kg) |
|-----------------------|-------------|
| 80                    | 0.250       |
| 100                   | 0.300       |
| 160                   | 0.700       |
| <b>Add per 100 mm</b> |             |
| Ø 6 mm                | 0.007       |
| Ø 8 mm                | 0.017       |

**Drawing - Immersion tube center back (dimensions in mm)**



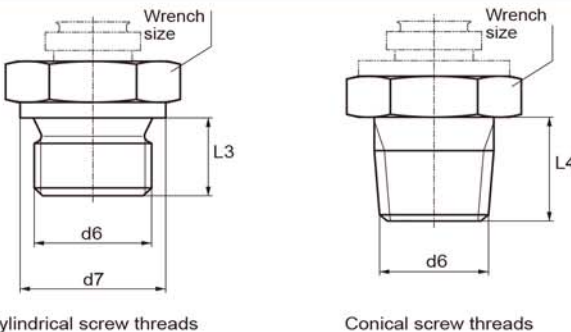
| NS                    | Weight (kg) |
|-----------------------|-------------|
| 80                    | 0.110       |
| 100                   | 0.160       |
| 130                   | 0.300       |
| 160                   | 0.450       |
| <b>Add per 100 mm</b> |             |
| Ø 6 mm                | 0.007       |
| Ø 8 mm                | 0.017       |

**Drawing - Immersion tube center back, every angle (dimensions in mm)**



| NS                    | Weight (kg) |
|-----------------------|-------------|
| 80                    | 0.300       |
| 100                   | 0.350       |
| 130                   | 0.470       |
| 160                   | 0.610       |
| <b>Add per 100 mm</b> |             |
| Ø 6 mm                | 0.007       |
| Ø 8 mm                | 0.017       |

**Drawings - connections**



| d6                 | d7 | L3 | L4 | Wrench size | Weight (kg) |       |
|--------------------|----|----|----|-------------|-------------|-------|
|                    |    |    |    |             | sliding     | fix   |
| G½", male          | 26 | 15 | -  | 27          | 0.095       | 0.090 |
| G¾", male          | 32 | 16 | -  | 32          | 0.150       | 0.140 |
| G1", male          | 39 | 19 | -  | 41          | 0.210       | 0.240 |
| M20 x 1.5, male    | 27 | 14 | -  | 27          | 0.090       | 0.090 |
| M24 x 1.5, male    | 27 | 15 | -  | 27          | 0.110       | 0.110 |
| ½" - 14 NPT", male | -  | -  | 20 | 27          | 0.095       | 0.100 |





## Temperature ranges

| Code              | Range<br>°C |
|-------------------|-------------|
| 53T <sup>1)</sup> | -10 ... 30  |
| 52T               | -20 ... 40  |
| 54T               | -20 ... 60  |
| 84T               | -20 ... 100 |
| 55T               | -30 ... 170 |
| 51T               | -30 ... 70  |
| 68T               | -70 ... 50  |
| 10T <sup>1)</sup> | 0 ... 40    |
| 11T               | 0 ... 60    |
| 27T               | 0 ... 80    |
| 12T               | 0 ... 100   |
| 20T               | 0 ... 120   |
| 13T               | 0 ... 160   |
| 22T               | 0 ... 200   |
| 14T               | 0 ... 250   |
| 23T               | 0 ... 300   |
| 15T               | 0 ... 400   |
| 25T               | 0 ... 500   |
| 16T               | 0 ... 600   |
| 30T               | 100 ... 500 |

| Code | Range<br>°F  |
|------|--------------|
| 68U  | -100 ... 120 |
| 09U  | -50 ... 120  |
| 08U  | -40 ... 160  |
| 54U  | 0 ... 140    |
| 02U  | 0 ... 200    |
| 03U  | 0 ... 250    |
| 04U  | 0 ... 300    |
| 05U  | 0 ... 400    |
| 06U  | 0 ... 500    |
| 11U  | 30 ... 140   |
| 20U  | 30 ... 250   |
| 13U  | 30 ... 320   |
| 22U  | 30 ... 400   |
| 23U  | 30 ... 580   |
| 15U  | 30 ... 750   |
| 28U  | 100 ... 800  |
| 29U  | 200 ... 1000 |

| Code | Range (double scale)<br>°C / °F |
|------|---------------------------------|
| 51V  | -30 ... 70 / -40 ... 160        |
| 68V  | -70 ... 50 / -100 ... 100       |
| 55V  | -30 ... 170 / 0 ... 350         |
| 11V  | 0 ... 60 / 30 ... 140           |
| 20V  | 0 ... 120 / 30 ... 250          |
| 13V  | 0 ... 160 / 30 ... 320          |
| 14V  | 0 ... 250 / 30 ... 500          |
| 15V  | 0 ... 400 / 30 ... 750          |
| 16V  | 0 ... 600 / 100 ... 1100        |

<sup>1)</sup> Only center back version, NS 80 and NS 100, max. immersion length 160 mm

## Ordering example with options

|                                                              | TBI | 100 | - | 2 | 1 | 1 | . | 1 | 4 | 0 | . | 12T | / | 9003 | - | 0130 | - | 0078 |
|--------------------------------------------------------------|-----|-----|---|---|---|---|---|---|---|---|---|-----|---|------|---|------|---|------|
| All stainless steel bimetal thermometer                      | ←   |     |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Nominal size 100 mm                                          |     | ←   |   |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Case material stainless steel 1.4301 (AISI 304)              |     |     | ← |   |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Without connection (direct mounting)                         |     |     |   | ← |   |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Immersion tube outlet: Bottom                                |     |     |   |   | ← |   |   |   |   |   |   |     |   |      |   |      |   |      |
| Indication EN 13190 (standard)                               |     |     |   |   |   | ← |   |   |   |   |   |     |   |      |   |      |   |      |
| Immersion tube Ø 6 mm, stainless steel 1.4571 (AISI 316 Ti)  |     |     |   |   |   |   | ← |   |   |   |   |     |   |      |   |      |   |      |
| Immersion length (L1) customer specific                      |     |     |   |   |   |   |   | ← |   |   |   |     |   |      |   |      |   |      |
| Temperature range: 0 ... 100 °C                              |     |     |   |   |   |   |   |   | ← |   |   |     |   |      |   |      |   |      |
| Option: Customer specific immersion length                   |     |     |   |   |   |   |   |   |   | ← |   |     |   |      |   |      |   |      |
| Option: Immersion length L1 = 130 mm                         |     |     |   |   |   |   |   |   |   |   | ← |     |   |      |   |      |   |      |
| Option: ATEX Version with window laminated safety glass only |     |     |   |   |   |   |   |   |   |   |   |     | ← |      |   |      |   |      |





**Ordering details TBI**

|                                                                  |  |  |  |  |  |  |  |  |  | TBI |   |   |   | - | 2 |  |  | . | 1 |  |  | . | xxx | / |
|------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|-----|---|---|---|---|---|--|--|---|---|--|--|---|-----|---|
| <b>Model</b>                                                     |  |  |  |  |  |  |  |  |  | TBI |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| All stainless steel Industrial Bimetal Thermometer               |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Nominal size</b>                                              |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 80 mm                                                            |  |  |  |  |  |  |  |  |  |     | 0 | 8 | 0 |   |   |  |  |   |   |  |  |   |     |   |
| 100 mm                                                           |  |  |  |  |  |  |  |  |  |     | 1 | 0 | 0 |   |   |  |  |   |   |  |  |   |     |   |
| 130 mm                                                           |  |  |  |  |  |  |  |  |  |     | 1 | 3 | 0 |   |   |  |  |   |   |  |  |   |     |   |
| 160 mm                                                           |  |  |  |  |  |  |  |  |  |     | 1 | 6 | 0 |   |   |  |  |   |   |  |  |   |     |   |
| <b>Case</b>                                                      |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Stainless steel 1.4301 (AISI 304)                                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Connection</b>                                                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Without connection (direct mounting)</b>                      |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>With sliding connection:</b>                                  |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection M20 x 1.5, male <sup>(3)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection M24 x 1.5, male <sup>(3)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G½", male <sup>(3)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection ½"-14 NPT, male <sup>(4)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G¾", male <sup>(3)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G1", male <sup>(3)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G¾", female                             |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G¾", female                             |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Sliding screw connection G1", female                             |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>With fix connection: <sup>(1)</sup></b>                       |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection G½", male <sup>(1) (5)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection G¾", male <sup>(1) (5)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection G1", male <sup>(1) (5)</sup>                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection M20 x 1.5, male <sup>(1) (5)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection M24 x 1.5, male <sup>(1) (5)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Fix screw connection ½"-14 NPT, male <sup>(1) (6)</sup>          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Specific connection (additional code needed, see page 1)</b>  |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Immersion tube outlet</b>                                     |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Bottom                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Center back                                                      |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Center back, every angle                                         |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Indication</b>                                                |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| EN 13190 (Standard)                                              |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Immersion tube / diameter / material</b>                      |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Ø 6 mm, stainless steel 1.4571 (AISI 316 Ti)                     |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Ø 8 mm, stainless steel 1.4571 (AISI 316 Ti)                     |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Immersion tube / installed length L1</b>                      |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 60 mm <sup>(2)</sup>                                             |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 100 mm                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 160 mm                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 250 mm                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 400 mm                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 600 mm                                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| 1000 mm                                                          |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| Customer specific length (use option 9003_xxxx, xxxx = L1 in mm) |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Unit of measurement / Temperature ranges <sup>(7)</sup></b>   |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| °C                                                               |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| °F                                                               |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| °C / °F (double scale)                                           |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |
| <b>Options to be added behind the / (see example page 3)</b>     |  |  |  |  |  |  |  |  |  |     |   |   |   |   |   |  |  |   |   |  |  |   |     |   |

- (1) TBI with fix connection: only available for the every angle version of TBI  
 (2) L1 < 100 mm: only for immersion tube Ø 8 mm and only for temperature ≤ 250 °C. The case must not be heated over 110 °C.  
 (3) Form 2 according to EN 13190  
 (4) Form 6 according to EN 13190  
 (5) Form 3 according to EN 13190  
 (6) Form 7 according to EN 13190  
 (7) Available standard temperature ranges, see tables on page 3. For ranges not listed, please contact Baumer.





## Main features

- Sensor in stainless steel, AISI 316L
- FlexHousing, Ø80 mm, stainless steel
- Wall or pipe mounted

## Applications

- Room temperature measurement
- Outdoor
- In cold stores
- ATEX applications



## Technical specifications

|                                 |                                                       |
|---------------------------------|-------------------------------------------------------|
| Housing material                | FlexHousing, Ø80 mm<br>Stainless steel, AISI 304      |
| El. connection                  | M16 cable gland<br>M12 5-pin or M12 8-pin             |
| Material                        | Plastic<br>Stainless steel, AISI 303                  |
| Sensor tube dimensions          | Fixed sensor Ø6 x 100 mm<br>Cable sensor Ø5.8 x 60 mm |
| Material                        | Stainless steel, AISI 316L (1.4404)                   |
| Cable material for cable sensor | High flexible silicone, grey                          |

## Sensor element, Pt100 - DIN/EN/IEC 60751

|                       |                                                 |
|-----------------------|-------------------------------------------------|
| Pt100 1/1 DIN class B | $\pm (0.3 + 0.005xt) ^\circ\text{C}$            |
| Pt100 1/3 DIN class B | $\pm 1/3 \times (0.3 + 0.005xt) ^\circ\text{C}$ |
| Pt100 1/6 DIN class B | $\pm 1/6 \times (0.3 + 0.005xt) ^\circ\text{C}$ |
| Pt100 1/1 DIN class A | $\pm (0.15 + 0.002xt) ^\circ\text{C}$           |

|                |           |
|----------------|-----------|
| Single element | 1 x Pt100 |
|----------------|-----------|

## Output

|                                |                              |
|--------------------------------|------------------------------|
| Resistance, ceramic terminal   | Pt100 signal, 2, 3 or 4 wire |
| Analogue, built in transmitter | 4...20 mA, 4...20 mA HART    |

|                |                  |
|----------------|------------------|
| Single element | 1 x Pt100        |
| Connection     | 2-wire or 4-wire |

## Environment

|                                                             |                                              |
|-------------------------------------------------------------|----------------------------------------------|
| Media temperature and ambient temperature (air temperature) | -40 ... 85°C<br>-30...80°C with DFON display |
| Protection class                                            | IP67                                         |
| Humidity                                                    | < 98% RH, condensing                         |

## Display, DFON

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Type            | Graphically LCD                                                                               |
| Front glass     | Polycarbonate                                                                                 |
| Display modes   | 8 modes, programmable, e.g. value, bar graph, analogue, tank illustration, visual data logger |
| Background      | White, green, red, programmable                                                               |
| Measuring range | -9999 ... 99999                                                                               |
| Digit height    | Max. 22 mm                                                                                    |
| Accuracy        | 0.1% @ ambient -10 ... 70°C                                                                   |
| Voltage drop    | 4V ... 6.5V                                                                                   |
| Output          | 2 configurables relay output, 60 Vp, 75 mA                                                    |
| Programming     | Touch screen or FlexProgrammer 9701                                                           |

Further information can be found in separate data sheet for DFON, D21.09

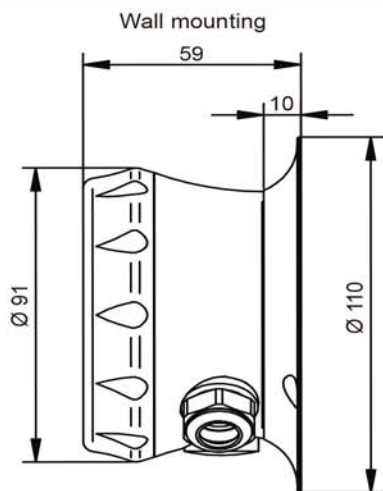
## Comply to / Approvals

|           |                                                             |
|-----------|-------------------------------------------------------------|
| Comply to | EMC directive 2004/108/CE in accordance with EN61326-1/2013 |
|-----------|-------------------------------------------------------------|





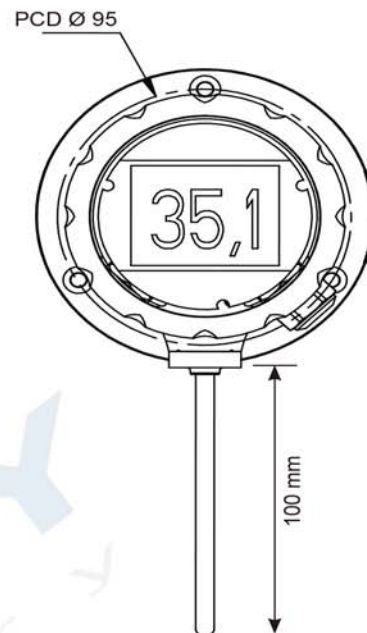
Technical Data



Cable sensor



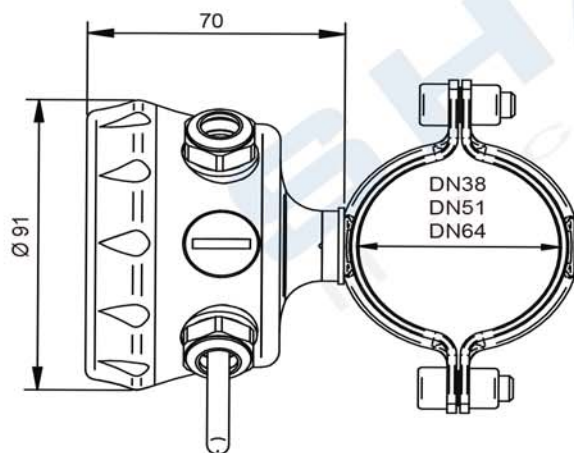
Fixed sensor



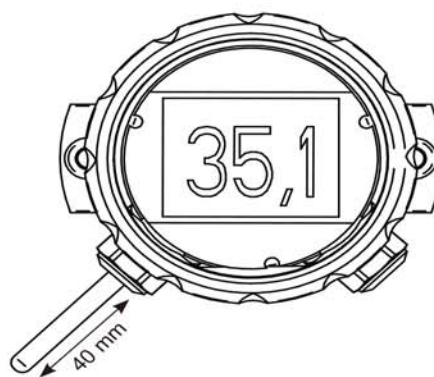
Available with cable between sensor and housing in free selectable length



Pipe mounting



Cable sensor



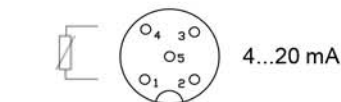
Available with cable between sensor and housing in free selectable length





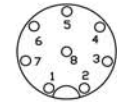
## Electrical connections

### M12, 5 wire

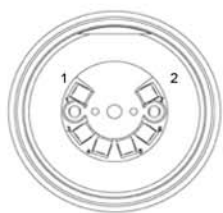


|     |         |   |                     |
|-----|---------|---|---------------------|
| RTD | Single  | 1 | + supply, 4...20 mA |
| 1+2 | Pt100-1 | 2 | Common for relays   |
| 3+4 | Pt100-1 | 3 | - supply, 4...20 mA |
| 5   | N.C.    | 4 | Relay 2             |
|     |         | 5 | Relay 1             |

### M12, 8 wire



|   |                     |
|---|---------------------|
| 1 | N.C.                |
| 2 | + supply, 4...20 mA |
| 3 | Relay 2             |
| 4 | Relay 2             |
| 5 | Relay 1             |
| 6 | Relay 1             |
| 7 | - supply, 4...20 mA |
| 8 | N.C.                |



### Cable gland

#### Transmitter

|   |                             |
|---|-----------------------------|
| 1 | +24VDC / - 4...20mA         |
| 2 | - 24VDC / +4...20mA         |
| 1 | Red clip (FlexProgrammer)   |
| 2 | Black clip (FlexProgrammer) |

#### Display

|       |                             |
|-------|-----------------------------|
| 1     | + 4...20 mA                 |
| 2     | - 4...20 mA                 |
| 3     | Relay 2                     |
| 4     | Relay 2                     |
| 5     | Relay 1                     |
| 6     | Relay 1                     |
| Com 1 | Red clip (FlexProgrammer)   |
| Com 2 | Black clip (FlexProgrammer) |



## Temperature transmitters

### Transmitter, type FlexTop 2202 - Standard

|                                                                |                          |
|----------------------------------------------------------------|--------------------------|
| Input                                                          | Pt100                    |
| Output                                                         | 4...20 mA                |
| Accuracy                                                       |                          |
| Input                                                          | <0.25°C                  |
| Output                                                         | <0.1% signal span (16mA) |
| Range                                                          | -200...850°C             |
| Minimum span                                                   | 25°C                     |
| Supply                                                         | 8...35 VDC               |
| Programmability                                                | By FlexProgrammer 9701   |
| For further information please see data sheet for FlexTop 2202 |                          |

### Transmitter, type FlexTop 2211 - Performance

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | 4...20 mA                  |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Output                                                         | <0.1% signal span (16mA)   |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 8...35 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
| For further information please see data sheet for FlexTop 2211 |                            |

### Transmitter, type FlexTop 2221 - performance, HART®

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | 4...20 mA / HART           |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Output                                                         | <0.1% signal span (16mA)   |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 8...35 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
|                                                                | By HART terminal/modem     |
| For further information please see data sheet for FlexTop 2221 |                            |



## Temperature transmitters - ATEX specifications

### Transmitter, type FlexTop 2202 - ATEX

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G                                                                         |
| Supply               | 8...28 VDC                                                                                          |
| Internal inductivity | $L_i \leq 10 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 10 \text{ nF}$                                                                            |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 28 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.7$                             |

### Transmitter, type FlexTop 2211 - ATEX

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G                                                                         |
| Supply               | 6.5...30 VDC                                                                                        |
| Internal inductivity | $L_i \leq 1.5 \mu\text{H}$                                                                          |
| Internal capacity    | $C_i \leq 5 \text{ nF}$                                                                             |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.7$                             |

### Transmitter, type FlexTop 2221 - ATEX

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G                                                                         |
| Supply               | 8...30 VDC                                                                                          |
| Internal inductivity | $L_i \leq 15 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 5 \text{ nF}$                                                                             |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.7$                             |

### Ex-data for FlexTop with nA approval

|                      |                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------|
| Approval             | Ex nA IIC T4/T5, ATEX II 3G                                                                    |
| Voltage supply range |                                                                                                |
| 2202, 2221:          | $U_i$ : 8...30 VDC                                                                             |
| 2211:                | $U_i$ : 6.5...30 VDC<br>$I_i$ : $< 100 \text{ mA}$                                             |
| Temperature class    | T4: $-20 < T_{\text{amb}} < 70^\circ\text{C}$<br>T5: $-20 < T_{\text{amb}} < 60^\circ\text{C}$ |

## DFON display - ATEX specifications

### ATEX Gas ia

|                       |                                                                                                             |
|-----------------------|-------------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 0/1 |  II 1 G, Ex ia IIC T5 Ga |
| Voltage drop          | $U_{\text{Disp}}$ 4.5 ... 6.5 VDC                                                                           |
| Temperature class     | T1...T5 Zone 0 $-20 \dots 60^\circ\text{C}$<br>Zone 1/2 $-40 \dots 65^\circ\text{C}$                        |
| Internal inductivity  | $L_i$ $< 10 \mu\text{H}$                                                                                    |
| Internal capacity     | $C_i$ $< 15 \text{ nF}$                                                                                     |
| Barrier data          | $U_i$ $< 30 \text{ VDC}$<br>$I_i$ $< 0.1 \text{ A}$<br>$P_i$ $< 0.75 \text{ W}$                             |

### ATEX Gas nA

|                      |                                                                                                           |
|----------------------|-----------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 2  |  II 3 G, Ex nA II T5 |
| Voltage drop         | $U_{\text{Disp}}$ 4.5 ... 6.5 VDC                                                                         |
| Temperature class    | T1...T5 $-30 < T_{\text{amb}} < 65^\circ\text{C}$                                                         |
| Internal inductivity | $L_i$ $< 10 \mu\text{H}$                                                                                  |
| Internal capacity    | $C_i$ $< 15 \text{ nF}$                                                                                   |
| Maximum voltage      | $U_{\text{max}}$ $< 35 \text{ VDC}$                                                                       |
| Maximum current      | $I_{\text{max}}$ $< 0.1 \text{ A}$                                                                        |



## Ordering details

### Model

CombiTemp™ TRF5 temperature room sensor

TFR5

### Housing material

FlexHousing Ø80 mm, Stainless steel, AISI 304, wall mount, cable sensor  
FlexHousing Ø80 mm, Stainless steel, AISI 304, pipe mount DN38, cable sensor  
FlexHousing Ø80 mm, stainless steel, AISI 304, pipe mount DN51, cable sensor  
FlexHousing Ø80 mm, stainless steel, AISI 304, pipe mount DN65, cable sensor  
FlexHousing Ø80 mm, stainless steel, AISI 304, wall mount, fixed sensor

A  
B  
C  
D  
E

### Electrical connection (output)

M12, 5 pins  
M12, 8 pins  
Cable gland, M16  
Cable gland, M20

1  
3  
5  
B

### Material el. connection

Plastic  
AISI 303

1  
3

### Display

Without display  
With display No relays activated  
With display With activated relays

1  
2  
4

### Transmitter /socket

Flying leads  
Ceramic socket Pt100  
Transmitter 2202 4-20 mA ±0.25 °C  
Transmitter 2211 4-20 mA ±0.10 °C  
Transmitter 2221 4-20 mA/HART® ±0.10 °C

0  
1  
2  
3  
4

### Safety

Standard  
Ex ia IIC T4/T5 1G (Gas)  
Ex nA II T4/T5 3G (Gas)  
Ex ia II 1 G Eex ia IIC, Zone 0, Pt100 output only

0  
1  
3  
9

### Configuration

No configuration  
Configuration of Range  
Configuration of Range + Display

0  
1  
2

### Sensor element (DIN/EN/IEC 60751)

None (open cable gland)  
1x Pt100 Class 1/1 B  
1x Pt100 Class 1/3 B  
1x Pt100 Class 1/6 B  
1x Pt100 Class 1/1 A

0  
1  
5  
7  
A

### Cable length

None  
Cable length between housing and sensor in cm (0100 = 1 meter)

0000  
XXXX







## Main characteristics (20 °C)

|                              |                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------|
| Standard process temperature | -50 ... 250 °C                                                                    |
| Accuracy                     | Pt100 output as to DIN/EN/IEC 60751<br>Transmitter output<br><±0.1 °C / <±0.25 °C |
| Connections                  | Hygienic                                                                          |

## Technical specification

|                          |                                                                 |
|--------------------------|-----------------------------------------------------------------|
| Measuring principle      | Resistance Temperature Detector (RTD)                           |
| Measuring ranges         | -50...250 °C                                                    |
| Immersion tube, diameter | Ø6 mm, Ø8 mm                                                    |
| Immersion tube, length   | Min. 20 mm - Max. 3000 mm                                       |
| Immersion tube, tip      | Normal response - Ø6/Ø8 mm<br>Fast response - Ø6/Ø4 or Ø8/Ø4 mm |
| Process connections      | See page 4                                                      |

## Environment

|                            |                                                                                                        |
|----------------------------|--------------------------------------------------------------------------------------------------------|
| Temperature, Ambient       | -40...160 °C                                                                                           |
| - w. transmitter           | -40...85 °C                                                                                            |
| - w. display               | -30...80 °C                                                                                            |
| Protection rating, IEC 529 | IP67 / IP69K, depending on electrical connection                                                       |
| Humidity, IEC 68-2-38      | 98%, condensing                                                                                        |
| Vibration IEC60068-2-6     | DNV high vibration strain, class B<br>1.6 mm, 2...25 Hz<br>IEC60068-2-6, test FC<br>25...100 Hz, 4.0 g |

## Material

|                    |                                           |
|--------------------|-------------------------------------------|
| Process connection | S.S. 14404, AISI 316L                     |
| Housing            | S.S. 14301, AISI 304                      |
| Sealing            | To be ordered separately see table page 4 |

## Main features

- Pt100 sensor element, 2- or 4-wire
- Built in graphical display, CombiView™ DFON optional
- Head mounted 4...20 mA transmitter, FlexTop type 22xx
- HART®, PA
- ATEX
- 3-A, FDA
- Programmable by touch screen
- Easy and full programmable with FlexProgrammer 9701

## Applications

- Food and beverage
- Pharmaceutical
- Water treatment
- General process industry

## Approvals

|              |                                                                                                            |
|--------------|------------------------------------------------------------------------------------------------------------|
| Apply to     | EMC directive 2004/108/CE in accordance with EN 61000-6-2, EN 61000-6-3<br>Pressure directive 97/23/CE FDA |
| Certificates | 3-A                                                                                                        |

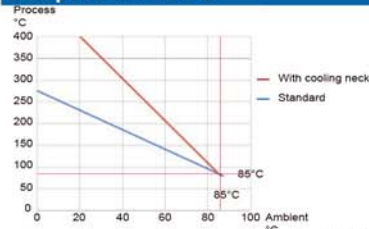
## Sensor element and electrical specification

|               |                                                                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor type   | RTD type Pt100 (acc. to DIN/EN/IEC 60751)<br>Single or Double<br>2-wire or 4-wire                                                                                     |
| Accuracy      | Class 1/1 B ±(0,3 + (0,005 x T)) °C<br>Class 1/3 B ±1/3 x (0,3 + (0,005 x T)) °C<br>Class 1/6 B ±1/6 x (0,3 + (0,005 x T)) °C<br>Class 1/1 A ±(0,15 + (0,002 x T)) °C |
| Analog output | 4-20 mA, 4-20mA+HART®, Profibus®<br>See separate data sheet, series 22xx                                                                                              |

## Time constant, τ 0,5

| Medium   | Liquid     | Air     | Air     |
|----------|------------|---------|---------|
| Velocity | 0,4 m/sec. | 0 m/sec | 3 m/sec |
| Ø 6mm    | <6,1       | <138    | <27,2   |
| Ø 6/4mm  | <1,5       | <136    | <21,4   |
| Ø 8mm    | <7,6       | <201    | <47,7   |
| Ø 8/4mm  | <1,5       | <181    | <33,6   |

## Temperature curve



## Technical Data

### Transmitter, type FlexTop 2202 - Standard

|                                                                |                          |
|----------------------------------------------------------------|--------------------------|
| Input                                                          | Pt100                    |
| Output                                                         | 4...20 mA                |
| Accuracy                                                       |                          |
| Input                                                          | <0.25°C                  |
| Output                                                         | <0.1% signal span (16mA) |
| Range                                                          | -200...850°C             |
| Minimum span                                                   | 25°C                     |
| Supply                                                         | 8...35 VDC               |
| Programmability                                                | By FlexProgrammer 9701   |
| For further information please see data sheet for FlexTop 2202 |                          |

### Transmitter, type FlexTop 2211 - Performance

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | 4...20 mA                  |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Output                                                         | <0.1% signal span (16mA)   |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 8...35 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
| For further information please see data sheet for FlexTop 2211 |                            |

### Display DFON

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| Type            | Graphically LCD                                                           |
| Front glass     | Polycarbonate                                                             |
| Display modes   | 8 modes, programmable, e.g. value, bar graph, analogue, tank illustration |
| Background      | White, green, red - programmable                                          |
| Measuring range | -9999...9999                                                              |
| Digit height    | Max. 22 mm                                                                |
| Accuracy        | 0,1% @ ambient -10...70 °C                                                |
| Voltage drop    | 4V...6.5 V                                                                |
| Output          | 2 configurable relay output, 60 Vp, 75 mA                                 |
| Programming     | Touch screen or FlexProgrammer 9701                                       |

Further information can be found in separate data sheet for DFON, D21.09.

### Transmitter, type FlexTop 2221 - Performance, HART®

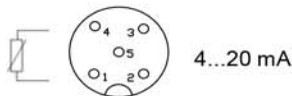
|                                                                |                                                  |
|----------------------------------------------------------------|--------------------------------------------------|
| Input                                                          | Pt100 / Pt1000 (universal)                       |
| Output                                                         | 4...20 mA / HART                                 |
| Accuracy                                                       |                                                  |
| Input                                                          | <0.1°C                                           |
| Output                                                         | <0.1% signal span (16mA)                         |
| Range                                                          | -200...850°C                                     |
| Minimum span                                                   | 25°C                                             |
| Supply                                                         | 8...35 VDC                                       |
| Programmability                                                | By FlexProgrammer 9701<br>By HART terminal/modem |
| For further information please see data sheet for FlexTop 2221 |                                                  |

### Transmitter, type FlexTop 2231 - Performance, Profibus®

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | Profibus A                 |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 9...32 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
| For further information please see data sheet for FlexTop 2231 |                            |

## Electrical connections

### M12, 5-wire

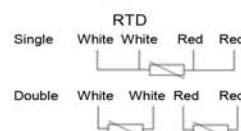
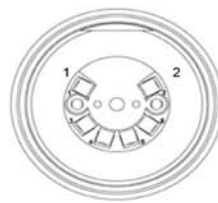


| RTD | Single    | Double |
|-----|-----------|--------|
| 1+2 | Pt100-1   |        |
| 3+4 | Pt100-1   |        |
| 1   | Pt100 - 1 |        |
| 2   | Pt100 - 1 |        |
| 3   | Pt100 - 2 |        |
| 4   | Pt100 - 2 |        |
| 5   | N.C.      | N.C.   |

### M12, 8-wire



|   |                     |
|---|---------------------|
| 1 | N.C.                |
| 2 | + supply, 4...20 mA |
| 3 | Relay 2             |
| 4 | Relay 2             |
| 5 | Relay 1             |
| 6 | Relay 1             |
| 7 | - supply, 4...20 mA |
| 8 | N.C.                |



### Cable gland

| Transmitter |                             |
|-------------|-----------------------------|
| 1           | +24VDC / - 4...20mA         |
| 2           | - 24VDC / +4...20mA         |
| 1           | Red clip (FlexProgrammer)   |
| 2           | Black clip (FlexProgrammer) |

| Display |                             |
|---------|-----------------------------|
| 1       | N.C.                        |
| 2       | N.C.                        |
| 3       | Relay 2                     |
| 4       | Relay 2                     |
| 5       | Relay 1                     |
| 6       | Relay 1                     |
| Com 1   | Red clip (FlexProgrammer)   |
| Com 2   | Black clip (FlexProgrammer) |





**ATEX data for temperature transmitters and displays**

**Transmitter, type FlexTop 2202 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 8...28 VDC                                                                                          |
| Internal inductivity | $L_i \leq 10 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 10 \text{ nF}$                                                                            |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 28 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.75 \text{ W}$                  |

**Transmitter, type FlexTop 2211 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 6.5...30 VDC                                                                                        |
| Internal inductivity | $L_i \leq 15 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 5 \text{ nF}$                                                                             |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.75 \text{ W}$                  |

**Display DFON - ATEX**

**ATEX Gas ia and for ATEX Dust ia**

|                                          |                                                                                                                                                                                                                                 |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 0/1<br>Dust Zone 20/21 |  II 1 G, Ex ia IIC T5 Ga<br> II 1 D, Ex ia IIIC T100°C Da |
| Voltage drop                             | $U_{\text{Disp}} \quad 4.5 \dots 6.5 \text{ VDC}$                                                                                                                                                                               |
| Temperature class                        | $L_i \leq 15 \mu\text{H}$<br>$C_i \leq 5 \text{ nF}$                                                                                                                                                                            |
| Temperature class                        | T1...T5 Zone 0 and 20<br>$-20 \dots 60^\circ\text{C}$<br>Zone 1/2 and 21/22<br>$-40 \dots 65^\circ\text{C}$                                                                                                                     |
| Internal inductivity                     | $L_i < 10 \mu\text{H}$                                                                                                                                                                                                          |
| Internal capacity                        | $C_i < 15 \text{ nF}$                                                                                                                                                                                                           |
| Barrier data                             | $U_i < 30 \text{ VDC}$<br>$I_i < 0.1 \text{ A}$<br>$P_i < 0.75 \text{ W}$                                                                                                                                                       |

**ATEX Gas nA**

|                      |                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 2  |  II 3 G, Ex nA II T5 |
| Voltage drop         | $U_{\text{Disp}} \quad 4.5 \dots 6.5 \text{ VDC}$                                                       |
| Temperature class    | T1...T5 $-30 < T_{\text{amb}} < 65^\circ\text{C}$                                                       |
| Internal inductivity | $L_i < 10 \mu\text{H}$                                                                                  |
| Internal capacity    | $C_i < 15 \text{ nF}$                                                                                   |
| Maximum voltage      | $U_{\text{max}} < 35 \text{ VDC}$                                                                       |
| Maximum current      | $U_{\text{max}} < 0.1 \text{ A}$                                                                        |

**Transmitter, type FlexTop 2221 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 8...30 VDC (Ex nA : 12...30 VDC)                                                                    |
| Internal inductivity | $L_i \leq 15 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 5 \text{ nF}$                                                                             |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{ VDC}$<br>$I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.75 \text{ W}$                  |

**Transmitter, type FlexTop 2231 - ATEX**

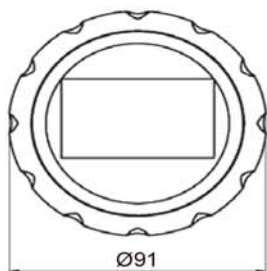
|                                |                                                                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Approval                       | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                                                                   |
| Internal inductivity           | $L_i \leq 10 \mu\text{H}$                                                                                                                |
| Internal capacity              | $C_i \leq 2 \text{ nF}$                                                                                                                  |
| Temperature class              | T1...T4: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T5: $-40 < T_{\text{amb}} < 60^\circ\text{C}$                                      |
| Coupler/link<br>FISCO approved | $U_i \leq 17.5 \text{ VDC}$ $I_i \leq 0.275 \text{ A}$<br>$P_i \leq 0.75 \text{ W}$ $C_i \leq 2 \text{ nF}$<br>$L_i \leq 10 \mu\text{H}$ |
| Barrier data                   | $U_i \leq 20 \text{ VDC}$ $I_i \leq 0.1 \text{ A}$<br>$P_i \leq 0.75 \text{ W}$ $C_i \leq 2 \text{ nF}$<br>$L_i \leq 10 \mu\text{H}$     |



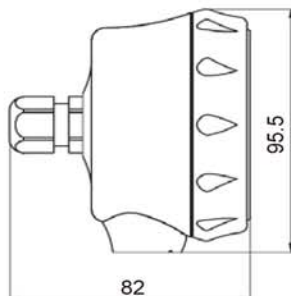


**Dimensions (mm)**

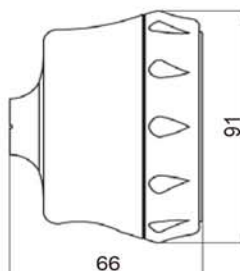
Ø80 mm housing front view



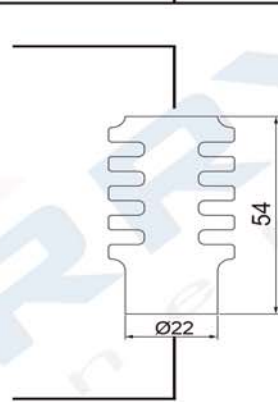
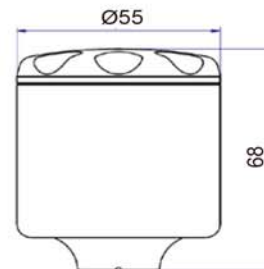
Ø80 mm housing bottom connection



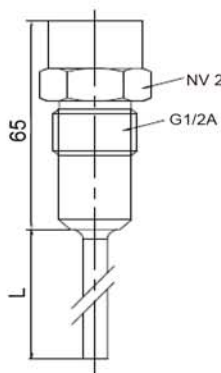
Ø80 mm housing rear connection



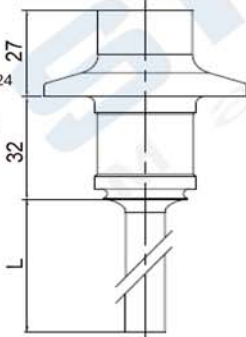
Ø55 mm housing



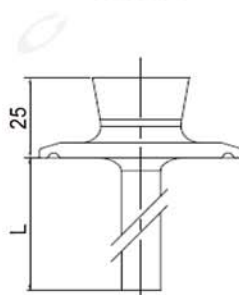
G $\frac{1}{2}$ A Hygiene  
Code 51



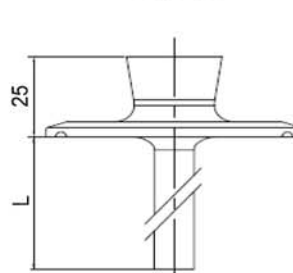
3-A DN 38  
Code 60



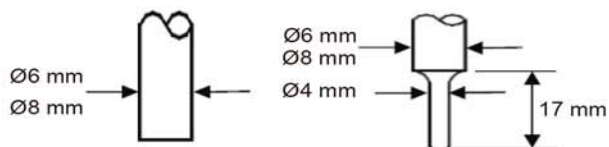
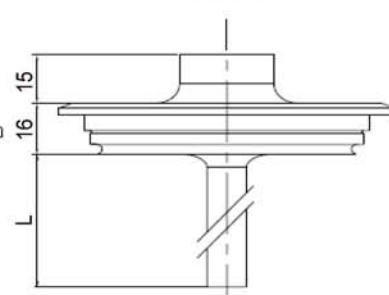
ISO 2852 DN 38  
Code 65



ISO 2852 DN 51  
Code 66



Variline® type N  
Code 70



**Accessories – seals**

| Seal type | Code | Material | Approvals | Item Number |
|-----------|------|----------|-----------|-------------|
| O-ring    | 60   | EPDM     | 3-A FDA   | 8126982     |
| -         | 70   | EPDM     | 3-A FDA   | 8126979     |
| Gasket    | 65   | EPDM     | 3-A FDA   | 8126980     |
| -         | 66   | EPDM     | 3-A FDA   | 8126981     |

Seal is to be purchased separately.  
For other types and materials please see data sheet for accessories.



## Ordering details

### Model

CombiTemp™

TFRH

### Housing material

ø 80 mm, Stainless steel, AISI 304 Bottom

5

ø 80 mm, Stainless steel, AISI 304 Rear

6

Field housing Ø55, stainless steel, AISI 304

7

### Electrical connection

M12, 5 pins

1

M12, 8 pins

3

Cable gland, M16

5

Cable gland, M20

B

### Material el. connection

Plastic

1

AISI 304

3

### Display

Without display, Ø55 housing

0

Without display

1

With display No relays activated

2

With display With activated relays

4

### Transmitter / socket

Flying leads

0

Ceramic socket Pt100

1

Transmitter 2202 4-20 mA ±0,25 °C (Accuracy class)

2

Transmitter 2211 4-20 mA ±0,10 °C (Accuracy class)

3

Transmitter 2221 4-20 mA / HART® ±0,10 °C (Accuracy class)

4

Transmitter 2231 Profibus® ±0,10 °C (Accuracy class)

5

### Safety

Standard

0

Ex ia IIC T4/T5 1G (Gas)

1

Ex nA II T4/T5 3G (Gas)

3

Ex ia II 1 G Eex ia IIC, Zone 0, simple apparatus

9

### Configuration

No configuration

0

Configuration of Range

1

Configuration of Range + Display

2

Configuration of Range + Display incl. 2 relays

3

### Sensor element (DIN/EN/IEC 60751)

None (for cable sensor)

0

1x Pt100 Class 1/1 B

1

2x Pt100 Class 1/1 B

2

1x Pt100 Class 1/3 B

5

2x Pt100 Class 1/3 B

6

1x Pt100 Class 1/6 B

7

2x Pt100 Class 1/6 B

8

1x Pt100 Class 1/1 A

A

2x Pt100 Class 1/1 A

B

### Sensor insert type

Sensor tube with embedded sensor element 2-wire

1

Sensor tube with embedded sensor element 4-wire

2

Cable sensor Pt100 Class 1/1 B (1xPt100 only, for ø 8 mm only)

A

Cable sensor Pt100 Class 1/3 B (1xPt100 only, for ø 8 mm only)

B

Cable sensor Pt100 Class 1/6 B (1xPt100 only, for ø 8 mm only)

C

Cable sensor Pt100 Class 1/1 A (1xPt100 only, for ø 8 mm only)

D

### Cooling neck

None

0

Cooling neck

4

### Process connection

G½ hygienic

51

3-A DN38

Hygienic connection 3-A

60

DN25/DN38 Clamp

ISO 2852, 1" - 1½"

3-A

65

DN51 Clamp

ISO 2852, 2"

3-A

66

Variline® type N

Gea Tuchenhausen

70

### Seal

Without (to be ordered separately)

0

### Sensor diameter

ø 6 mm AISI 316

1

ø 8 mm AISI 316

2

### Sensor tip

Standard Normal response

1

Fast Fast response ø 4 mm tip Max sensor length : 300 mm

2

### Approvals

None

0

EAC (TR CU 020/2011)

B

### Sensor tube length

Length in mm (min. 20 mm)

x x x x

If the product wanted is not available from above list please inquire.

**SHARRY Machinery (Shanghai) Co.,Ltd.**  
13761943624

Web: [www.sharry-sh.com](http://www.sharry-sh.com)

Tel: +86-21-64881886  
[www.xierui-sh.com](http://www.xierui-sh.com)



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## Main characteristics (20 °C)

|                              |                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------|
| Standard process temperature | -50 ... 400 °C                                                                                      |
| Accuracy                     | Pt100 output as to DIN/EN/IEC 60751<br>Transmitter output<br>$\leq \pm 0.1$ °C / $\leq \pm 0.25$ °C |
| Connections                  | Threaded                                                                                            |

## Technical specification

|                          |                                                                 |
|--------------------------|-----------------------------------------------------------------|
| Measuring principle      | Resistance Temperature Detector (RTD)                           |
| Measuring ranges         | -50...400 °C                                                    |
| Immersion tube, diameter | Ø6 mm, Ø8 mm                                                    |
| Immersion tube, length   | Min. 20 mm - Max. 3000 mm                                       |
| Immersion tube, tip      | Normal response - Ø6/Ø8 mm<br>Fast response - Ø6/Ø4 or Ø8/Ø4 mm |
| Process connections      | See page 4                                                      |

## Environment

|                            |                                                  |
|----------------------------|--------------------------------------------------|
| Temperature, Ambient       | -40...160 °C                                     |
| - w. transmitter           | -40...85 °C                                      |
| - w. display               | -30...80 °C                                      |
| Protection rating, IEC 529 | IP67 / IP69K, depending on electrical connection |

|                       |                                                                                                        |
|-----------------------|--------------------------------------------------------------------------------------------------------|
| Humidity, IEC 68-2-38 | 98%, condensing                                                                                        |
| Vibrations            | DNV high vibration strain, class B<br>1.6 mm, 2...25 Hz<br>IEC60068-2-6, test FC<br>25...100 Hz, 4.0 g |

## Material

|                    |                      |
|--------------------|----------------------|
| Process connection | SS 1.4404, AISI 316L |
| Housing            | SS 1.4301, AISI 304  |
| Sealing            | See ordering table   |

## Approvals

|          |                                                                                                             |
|----------|-------------------------------------------------------------------------------------------------------------|
| Apply to | EMC directive 2004/108/CE<br>in accordance with<br>EN61000-6-2, EN 61000-6-3<br>Pressure directive 97/23/CE |
|----------|-------------------------------------------------------------------------------------------------------------|

## Main features

- Pt100 sensor element, 2- or 4-wire
- HART®, PA
- Built in graphical display, CombiView™ DFON optional
- Head mounted 4...20 mA transmitter, FlexTop type 22xx
- ATEX
- Programmable by touch screen
- Easy and full programmable with FlexProgrammer 9701

## Applications

- Oil and Gas
- Chemical
- Energy
- General Process Industrie

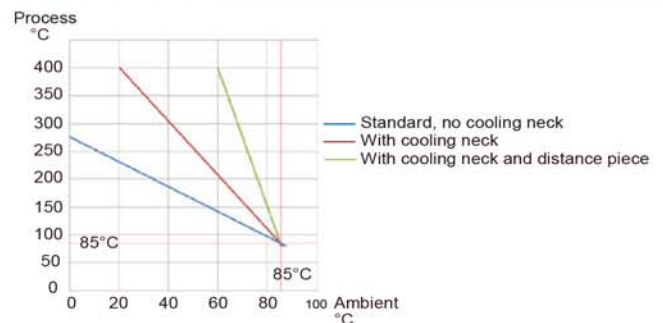
## Sensor element and electrical specification

|               |                                                                                                                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor type   | RTD type Pt100 (acc. to DIN/EN/IEC 60751)<br>Single or Double<br>2-wire or 4-wire                                                                                                                                     |
| Accuracy      | Class 1/1 B $\pm(0.3 + (0.005 \times T))$ °C<br>Class 1/3 B $\pm 1/3 \times (0.3 + (0.005 \times T))$ °C<br>Class 1/6 B $\pm 1/6 \times (0.3 + (0.005 \times T))$ °C<br>Class 1/1 A $\pm(0.15 + (0.002 \times T))$ °C |
| Analog output | 4-20 mA, 4-20mA+HART®, Profibus®<br>See separate data sheet, series 22xx                                                                                                                                              |

## Time constant, $\tau$ 0,5

|          | Medium     | Liquid   | Air      | Air      |
|----------|------------|----------|----------|----------|
| Velocity | 0,4 m/sec. | 0 m/sec. | 0 m/sec. | 3 m/sec. |
| Ø 6 mm   | <6,1       | <138     | <27,2    |          |
| Ø 6/4 mm | <1,5       | <136     | <21,4    |          |
| Ø 8 mm   | <7,6       | <201     | <47,7    |          |
| Ø 8/4 mm | <1,5       | <181     | <33,6    |          |

## Temperature curve



## Technical Data

### Transmitter, type FlexTop 2202 - Standard

|                                                                |                          |
|----------------------------------------------------------------|--------------------------|
| Input                                                          | Pt100                    |
| Output                                                         | 4...20 mA                |
| Accuracy                                                       |                          |
| Input                                                          | <0.25°C                  |
| Output                                                         | <0.1% signal span (16mA) |
| Range                                                          | -200...850°C             |
| Minimum span                                                   | 25°C                     |
| Supply                                                         | 8...35 VDC               |
| Programmability                                                | By FlexProgrammer 9701   |
| For further information please see data sheet for FlexTop 2202 |                          |

### Transmitter, type FlexTop 2211 - Performance

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | 4...20 mA                  |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Output                                                         | <0.1% signal span (16mA)   |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 8...35 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
| For further information please see data sheet for FlexTop 2211 |                            |

### Display DFON

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| Type            | Graphically LCD                                                           |
| Front glass     | Polycarbonate                                                             |
| Display modes   | 8 modes, programmable, e.g. value, bar graph, analogue, tank illustration |
| Background      | White, green, red - programmable                                          |
| Measuring range | -9999...99999                                                             |
| Digit height    | Max. 22 mm                                                                |
| Accuracy        | 0,1% @ ambient -10...70 °C                                                |
| Voltage drop    | 4V...6.5 V                                                                |
| Output          | 2 configurable relay output, 60 Vp, 75 mA                                 |
| Programming     | Touch screen or FlexProgrammer 9701                                       |

Further information can be found in separate data sheet for DFON, D21.09.

### Transmitter, type FlexTop 2221 - Standard

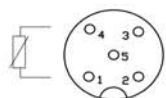
|                                                                |                                                  |
|----------------------------------------------------------------|--------------------------------------------------|
| Input                                                          | Pt100 / Pt1000 (universal)                       |
| Output                                                         | 4...20 mA / HART                                 |
| Accuracy                                                       |                                                  |
| Input                                                          | <0.1°C                                           |
| Output                                                         | <0.1% signal span (16mA)                         |
| Range                                                          | -200...850°C                                     |
| Minimum span                                                   | 25°C                                             |
| Supply                                                         | 8...35 VDC                                       |
| Programmability                                                | By FlexProgrammer 9701<br>By HART terminal/modem |
| For further information please see data sheet for FlexTop 2221 |                                                  |

### Transmitter, type FlexTop 2231 - Performance

|                                                                |                            |
|----------------------------------------------------------------|----------------------------|
| Input                                                          | Pt100 / Pt1000 (universal) |
| Output                                                         | Profibus A                 |
| Accuracy                                                       |                            |
| Input                                                          | <0.1°C                     |
| Range                                                          | -200...850°C               |
| Minimum span                                                   | 25°C                       |
| Supply                                                         | 9...32 VDC                 |
| Programmability                                                | By FlexProgrammer 9701     |
| For further information please see data sheet for FlexTop 2231 |                            |

## Electrical connections

### M12, 5-wire



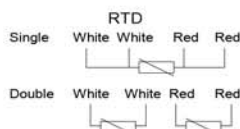
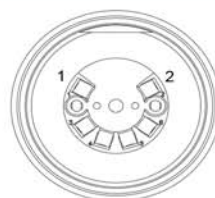
4...20 mA

| RTD | Single  | Double    | 1 | + supply, 4...20 mA |
|-----|---------|-----------|---|---------------------|
| 1+2 | Pt100-1 |           | 2 | Common for relays   |
| 3+4 | Pt100-1 |           | 3 | - supply, 4...20 mA |
| 1   |         | Pt100 - 1 | 4 | Relay 2             |
| 2   |         | Pt100 - 1 | 5 | Relay 1             |
| 3   |         | Pt100 - 2 |   |                     |
| 4   |         | Pt100 - 2 |   |                     |
| 5   | N.C.    | N.C.      |   |                     |

### M12, 8-wire



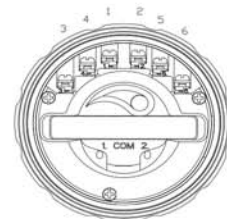
|   |                     |
|---|---------------------|
| 1 | N.C.                |
| 2 | + supply, 4...20 mA |
| 3 | Relay 2             |
| 4 | Relay 2             |
| 5 | Relay 1             |
| 6 | Relay 1             |
| 7 | - supply, 4...20 mA |
| 8 | N.C.                |



### Cable gland

| Transmitter |                             |
|-------------|-----------------------------|
| 1           | +24VDC / - 4...20mA         |
| 2           | - 24VDC / +4...20mA         |
| 1           | Red clip (FlexProgrammer)   |
| 2           | Black clip (FlexProgrammer) |

| Display |                             |
|---------|-----------------------------|
| 1       | + 4...20 mA                 |
| 2       | - 4...20 mA                 |
| 3       | Relay 2                     |
| 4       | Relay 2                     |
| 5       | Relay 1                     |
| 6       | Relay 1                     |
| Com 1   | Red clip (FlexProgrammer)   |
| Com 2   | Black clip (FlexProgrammer) |





**ATEX data for temperature transmitters and displays**

**Transmitter, type FlexTop 2202 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 8...28 VDC                                                                                          |
| Internal inductivity | $L_i \leq 10 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 10 \text{nF}$                                                                             |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 28 \text{VDC}$<br>$I_i \leq 0.1 \text{A}$<br>$P_i \leq 0.75 \text{W}$                     |

**Transmitter, type FlexTop 2211 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 6.5...30 VDC                                                                                        |
| Internal inductivity | $L_i \leq 1.5 \mu\text{H}$                                                                          |
| Internal capacity    | $C_i \leq 5 \text{nF}$                                                                              |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{VDC}$<br>$I_i \leq 0.1 \text{A}$<br>$P_i \leq 0.75 \text{W}$                     |

**Display DFON - ATEX**

**ATEX Gas ia and for ATEX Dust ia**

|                                          |                                                                                                                                                                                                                                 |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 0/1<br>Dust Zone 20/21 |  II 1 G, Ex ia IIC T5 Ga<br> II 1 D, Ex ia IIIC T100°C Da |
| Voltage drop                             | $U_{\text{Disp}} \quad 4.5 \dots 6.5 \text{VDC}$                                                                                                                                                                                |
| Temperature class                        | $L_i \leq 1.5 \mu\text{H}$<br>$C_i \leq 5 \text{nF}$                                                                                                                                                                            |
| Temperature class                        | T1...T5 Zone 0 and 20<br>$-20 \dots 60^\circ\text{C}$<br>Zone 1/2 and 21/22<br>$-40 \dots 65^\circ\text{C}$                                                                                                                     |
| Internal inductivity                     | $L_i < 10 \mu\text{H}$                                                                                                                                                                                                          |
| Internal capacity                        | $C_i < 15 \text{nF}$                                                                                                                                                                                                            |
| Barrier data                             | $U_i < 30 \text{VDC}$<br>$I_i < 0.1 \text{A}$<br>$P_i < 0.75 \text{W}$                                                                                                                                                          |

**ATEX Gas nA**

|                      |                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------|
| Approval Gas Zone 2  |  II 3 G, Ex nA II T5 |
| Voltage drop         | $U_{\text{Disp}} \quad 4.5 \dots 6.5 \text{VDC}$                                                        |
| Temperature class    | T1...T5 $-30 < T_{\text{amb}} < 65^\circ\text{C}$                                                       |
| Internal inductivity | $L_i < 10 \mu\text{H}$                                                                                  |
| Internal capacity    | $C_i < 15 \text{nF}$                                                                                    |
| Maximum voltage      | $U_{\text{max}} < 35 \text{VDC}$                                                                        |
| Maximum current      | $U_{\text{max}} < 35 \text{VDC}$                                                                        |

**Transmitter, type FlexTop 2221 - ATEX**

|                      |                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------|
| Approval             | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                              |
| Supply               | 8...30 VDC (Ex nA : 12...30 VDC)                                                                    |
| Internal inductivity | $L_i \leq 15 \mu\text{H}$                                                                           |
| Internal capacity    | $C_i \leq 5 \text{nF}$                                                                              |
| Temperature class    | T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T6: $-40 < T_{\text{amb}} < 50^\circ\text{C}$ |
| Barrier data         | $U_i \leq 30 \text{VDC}$<br>$I_i \leq 0.1 \text{A}$<br>$P_i \leq 0.75 \text{W}$                     |

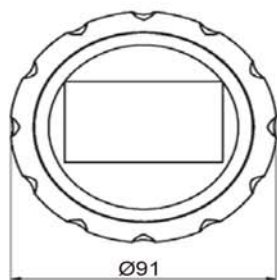
**Transmitter, type FlexTop 2231 - ATEX**

|                                |                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Approval                       | Ex ia IIC T5/T6, ATEX II 1G<br>Ex nA II T5, ATEX II 3G                                                                               |
| Internal inductivity           | $L_i \leq 10 \mu\text{H}$                                                                                                            |
| Internal capacity              | $C_i \leq 2 \text{nF}$                                                                                                               |
| Temperature class              | T1...T4: $-40 < T_{\text{amb}} < 85^\circ\text{C}$<br>T5: $-40 < T_{\text{amb}} < 60^\circ\text{C}$                                  |
| Coupler/link<br>FISCO approved | $U_i \leq 17.5 \text{VDC}$ $I_i \leq 0.275 \text{A}$<br>$P_i \leq 0.75 \text{W}$ $C_i \leq 2 \text{nF}$<br>$L_i \leq 10 \mu\text{H}$ |
| Barrier data                   | $U_i \leq 20 \text{VDC}$ $I_i \leq 0.1 \text{A}$<br>$P_i \leq 0.75 \text{W}$ $C_i \leq 2 \text{nF}$<br>$L_i \leq 10 \mu\text{H}$     |

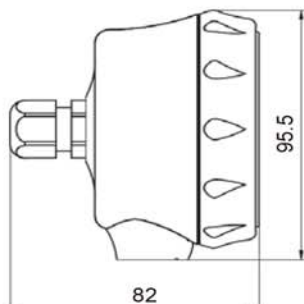


Dimensions (mm)

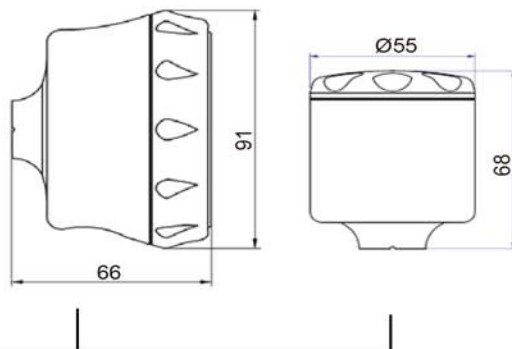
Ø80 mm housing front view



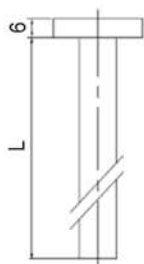
Ø80 mm housing bottom connection



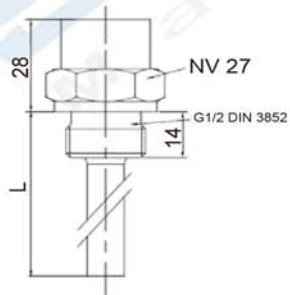
Ø80 mm housing rear connection



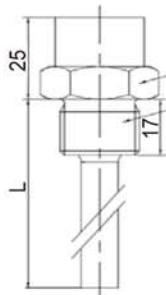
Tube without connection  
Code 10



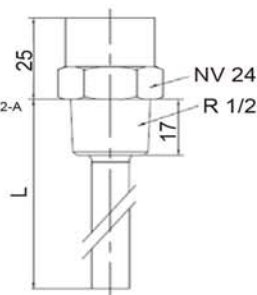
G $\frac{1}{2}$ A DIN 3852-E  
Code 11



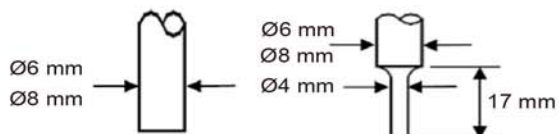
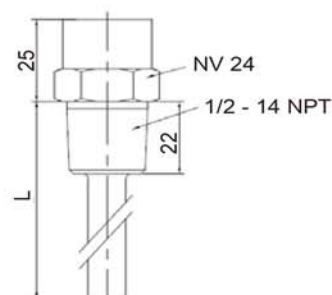
G $\frac{1}{2}$ A DIN 3852-A  
Code 12



R $\frac{1}{2}$   
Code 13



$\frac{1}{2}$ " NPT  
Code 30





## Ordering details

### Model

CombiTemp™

TFRN

### Housing material

Ø80 mm, Stainless steel, AISI 304 Bottom 5  
Ø80 mm, Stainless steel, AISI 304 Rear 6  
Field housing Ø55, stainless steel, AISI 304 7

### Electrical connection

M12, 5 pins 1  
M12, 8 pins 3  
Cable gland, M16 5  
Cable gland, M20 B

### Material el. connection

Plastic 1  
AISI 304 3

### Display

Without display, Ø55 housing 0  
Without display 1  
With display No relays activated 2  
With display With activated relays 4

### Transmitter / socket

Flying leads 0  
Ceramic socket Pt100 1  
Transmitter 2202 4-20 mA ±0.25 °C (Accuracy class) 2  
Transmitter 2211 4-20 mA ±0.10 °C (Accuracy class) 3  
Transmitter 2221 4-20 mA/HART® ±0.10 °C (Accuracy class) 4  
Transmitter 2231 Profibus® ±0.10 °C (Accuracy class) 5

### Safety

Standard 0  
Ex ia IIC T4/T5 1G (Gas) 1  
Ex nA II T4/T5 3G (Gas) 3  
Ex ia II 1 G Eex ia IIC, Zone 0, simple apparatus 9

### Configuration

No configuration 0  
Configuration of Range 1  
Configuration of Range + Display 2  
Configuration of Range + Display incl. 2 relays 3

### Sensor element (DIN/EN/IEC 60751)

None (for cable sensor) 0  
1x Pt100 Class 1/1 B 1  
2x Pt100 Class 1/1 B 2  
1x Pt100 Class 1/3 B 5  
2x Pt100 Class 1/3 B 6  
1x Pt100 Class 1/6 B 7  
2x Pt100 Class 1/6 B 8  
1x Pt100 Class 1/1 A A  
2x Pt100 Class 1/1 A B  
1x Pt100 Class 1/1 B, < 600°C C

### Sensor insert type

Sensor tube with embedded sensor element 2-wire 1  
Sensor tube with embedded sensor element 4-wire 2  
Cable sensor Pt100 Class 1/1 B (1xPt100 only, for ø 8 mm only) A  
Cable sensor Pt100 Class 1/3 B (1xPt100 only, for ø 8 mm only) B  
Cable sensor Pt100 Class 1/6 B (1xPt100 only, for ø 8 mm only) C  
Cable sensor Pt100 Class 1/1 A (1xPt100 only, for ø 8 mm only) D

### Cooling neck

None 0  
Cooling neck 4  
Cooling neck + 1 spacer 5  
Cooling neck + 2 spacers 6

### Process connection

Tube without connection 10  
G½ Male DIN 3852 form E 11  
G½ Male DIN 3852 form A 12  
R½ Male ISO 7/1 13  
½"-14 NPT Male ANSI/ASME B1.20.1 30

### Seal

No seal 0  
Seal NBR For G½ DIN 3852 - E 1  
Seal EPDM For G½ DIN 3852 - E 2  
Seal FKM (Viton®) For G½ DIN 3852 - E 3

### Sensor diameter

No sensor 0  
ø 6 mm AISI 316 1  
ø 8 mm AISI 316 2

### Sensor tip

No sensor 0  
Standard Normal response 1  
Fast Fast response ø 4 mm tip Max sensor length : 300 mm 2

### Approvals

None 0  
DNV marine approval 3  
EAC (TR CU 020/2011) B

### Sensor tube length

Length in mm (min. 20 mm)





## Main Features

- For corrosive gasses and liquids
- Class 1 according to EN 13190
- Capillary 0.5 to 30 m
- Wetted parts and case material stainless steel
- Option : case material 1.4404 (316L) for aggressive atmosphere

## Applications

- Food & Beverage
- Oil & Gas / Chemical
- Laboratory & Medical
- Energy

## Technical Data

|                    |                                                       |
|--------------------|-------------------------------------------------------|
| Nominal size       | 63, 80, 100, 160, 250 mm                              |
| Temperature ranges | -200 ... 800 °C                                       |
| Accuracy           | Class 1 (according to EN 13190)                       |
| Protection rating  | IP 65 (EN 60529)                                      |
| Immersion tube     | Stainless steel 1.4541 (AISI 321)                     |
| Capillary          | Stainless steel 1.4541 (AISI 321)<br>max. length 30 m |
| Bezel ring         | Stainless steel 1.4301 (AISI 304)                     |
| Window             | Instrument glass                                      |
| Movement           | Brass                                                 |

|                   |                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------|
| Window gasket     | Elastomer                                                                               |
| Dial              | Aluminium, white                                                                        |
| Pointer           | Aluminium, black                                                                        |
| Accessories       | Sliding connections and thermowells, see data-sheets: B51.01 (AGF/AGW) and T6.215 (Ø 8) |
| Temperature limit | 130 % F.S.                                                                              |
| ATEX              | Ex II2GDc<br>(with option 0078)                                                         |

## Options

|                                                            |           |                                                   |                |
|------------------------------------------------------------|-----------|---------------------------------------------------|----------------|
| Index pointer under window, adjustable knob removable      | Code 0053 | Oil filling (silicon oil)                         | Code 0776      |
| Polycarbonat window with max pointer with removable button | Code 0060 | Screws secured with loctite                       | Code 0799      |
| ATEX II2GDc<br>(Only with window laminated safety glass)   | Code 0078 | Accuracy +/- 0.6 % F.S.                           | Code 0840      |
| Stainless steel housing 1.4404 (316L) <sup>(1)</sup>       | Code 0110 | Customer specific immersion length <sup>(3)</sup> | Code 9003_XXXX |
| Movement stainless steel                                   | Code 0651 | Red mark                                          | Code 9700      |
| Process connections (see table on page 4/5)                | Code 73xx | Green mark                                        | Code 9701      |
| Laminated safety glass                                     | Code 0751 | Stainless steel tag plate and wire                | Code 9941      |
| Acrylic window (PMMA or Plexiglass) <sup>(2)</sup>         | Code 0752 |                                                   |                |

<sup>(1)</sup> Only NS 63, NS 100 and NS 160.

<sup>(2)</sup> The case must not be constantly heated over 75 °C.

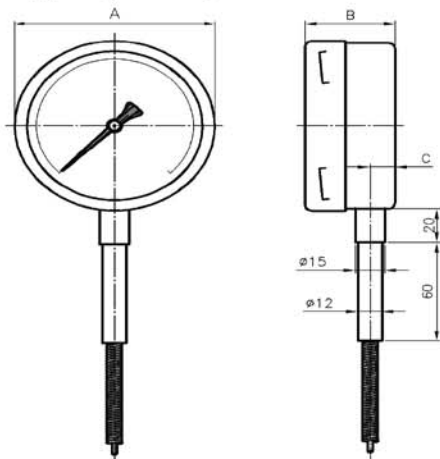
<sup>(3)</sup> XXXX = L in mm.





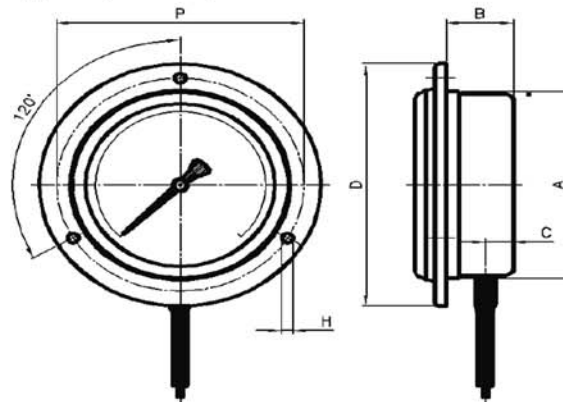
## Dimensions in mm

**Type D (Code 11)**



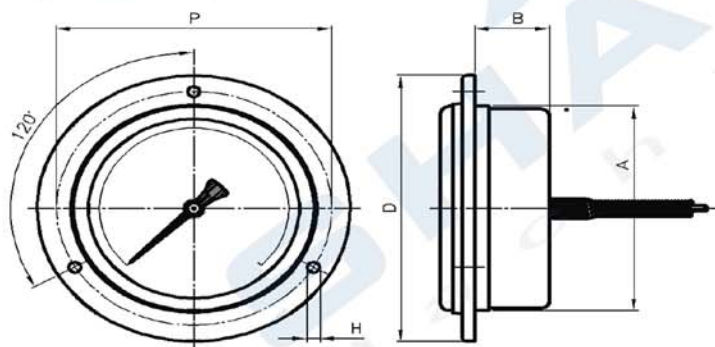
| Dimensions | Diameter |    |     |     |     |
|------------|----------|----|-----|-----|-----|
|            | 63       | 80 | 100 | 160 | 250 |
| A          | 65       | 83 | 101 | 161 | 252 |
| B          | 38       | 37 | 45  | 45  | 55  |
| C          | 13       | 13 | 13  | 13  | 13  |

**Type C (Code 21)**



| Dimensions | Diameter |     |     |     |     |
|------------|----------|-----|-----|-----|-----|
|            | 63       | 80  | 100 | 160 | 250 |
| A          | 65       | 83  | 101 | 161 | 252 |
| B          | 33       | 29  | 31  | 32  | 45  |
| C          | 13       | 13  | 13  | 13  | 13  |
| D          | 86       | 110 | 132 | 196 | 285 |
| H          | 3.5      | 4   | 5.5 | 6   | 6   |
| P          | 75       | 95  | 116 | 178 | 270 |

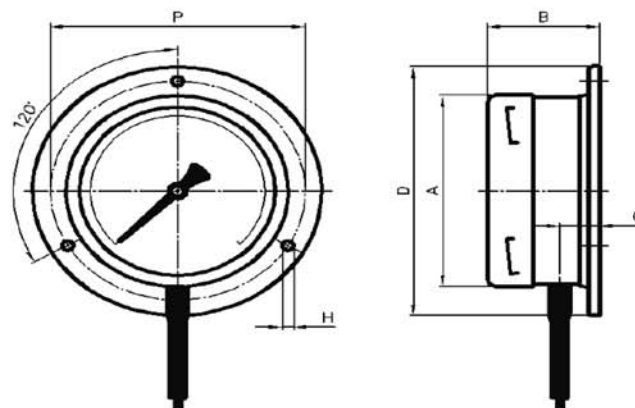
**Type B (Code 22)**



| Dimensions | Diameter |     |     |     |     |
|------------|----------|-----|-----|-----|-----|
|            | 63       | 80  | 100 | 160 | 250 |
| A          | 65       | 83  | 101 | 161 | 252 |
| B          | 33       | 29  | 31  | 32  | 45  |
| D          | 86       | 110 | 132 | 196 | 285 |
| H          | 3.5      | 4   | 5.5 | 6   | 6   |
| P          | 75       | 95  | 116 | 178 | 270 |

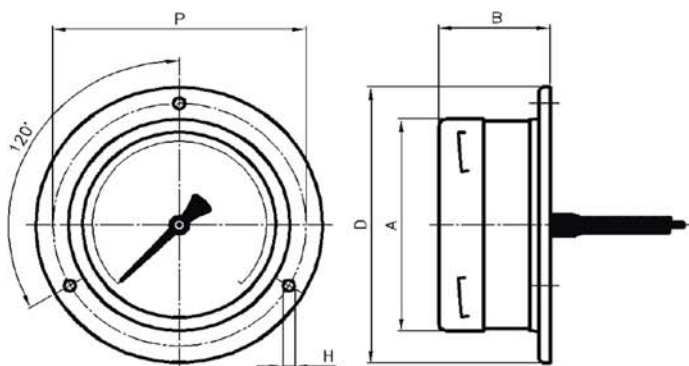
| Dimensions | Diameter |     |     |     |     |
|------------|----------|-----|-----|-----|-----|
|            | 63       | 80  | 100 | 160 | 250 |
| A          | 65       | 83  | 101 | 161 | 252 |
| B          | 41       | 40  | 51  | 51  | 57  |
| C          | 13       | 13  | 13  | 13  | 13  |
| D          | 86       | 110 | 132 | 196 | 285 |
| H          | 3.5      | 4   | 5.5 | 6   | 6   |
| P          | 75       | 95  | 116 | 178 | 270 |

**Type A (Code 31)**



## Dimensions in mm

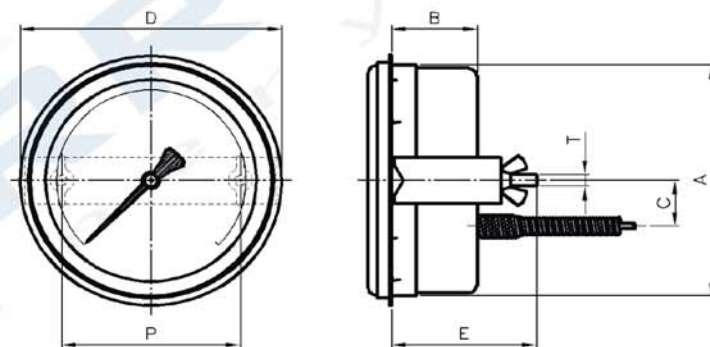
### Type E (Code 32)



| Dimensions | Diameter |     |     |     |     |
|------------|----------|-----|-----|-----|-----|
|            | 63       | 80  | 100 | 160 | 250 |
| A          | 65       | 83  | 101 | 161 | 252 |
| B          | 41       | 40  | 51  | 51  | 57  |
| D          | 86       | 110 | 132 | 196 | 285 |
| H          | 3.5      | 4   | 5.5 | 6   | 6   |
| P          | 75       | 95  | 116 | 178 | 270 |

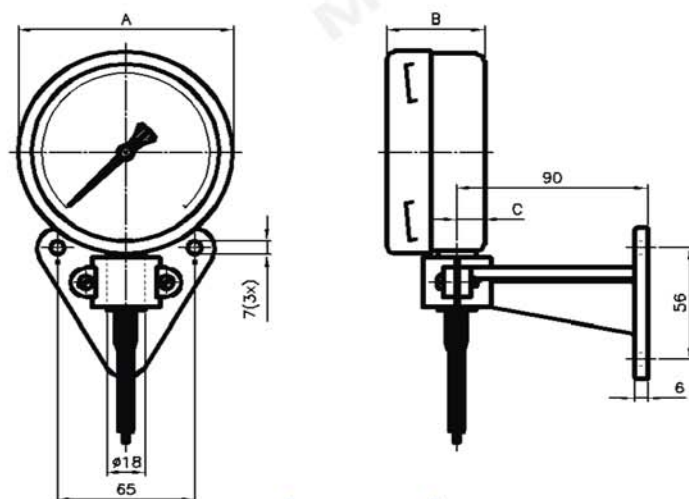
### Type G (Code 53)

| Dimensions | Diameter |    |     |     |     |
|------------|----------|----|-----|-----|-----|
|            | 63       | 80 | 100 | 160 | 250 |
| A          | 65       | 83 | 101 | 161 | 252 |
| B          | 30       | 35 | 35  | 25  | 45  |
| C          | 20       | 25 | 20  | 20  | 0   |
| D          | 70       | 85 | 112 | 180 | 270 |
| E          | 50       | 55 | 60  | 60  | 70  |
| P          | 33       | 59 | 75  | 139 | +   |
| T          | M5       | M5 | M5  | M5  | M5  |



For version 250 mm 3 clamps staggered over 120°

### Type D (Code 61)

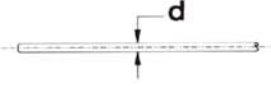
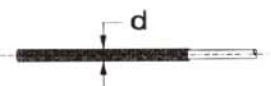
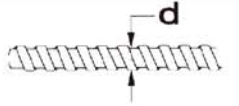
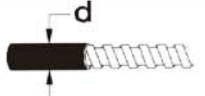


| Dimensions | Diameter |    |     |     |     |
|------------|----------|----|-----|-----|-----|
|            | 63       | 80 | 100 | 160 | 250 |
| A          | 65       | 83 | 101 | 161 | 252 |
| B          | 38       | 37 | 45  | 45  | 55  |
| C          | 13       | 13 | 13  | 13  | 13  |

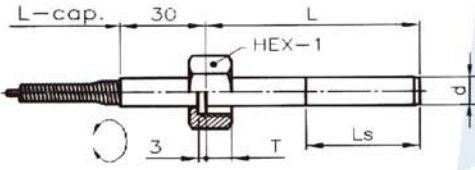
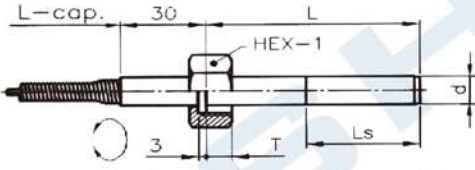
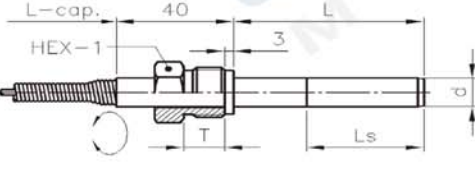
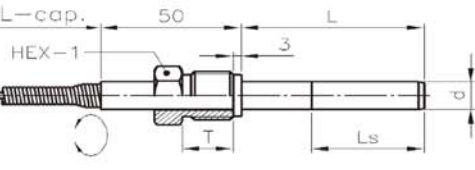




### Types of capillary

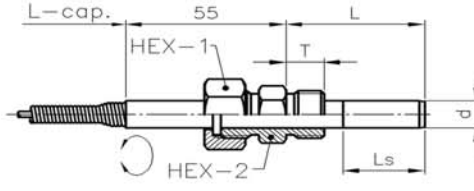
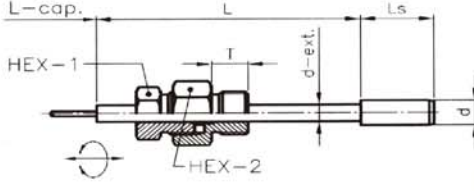
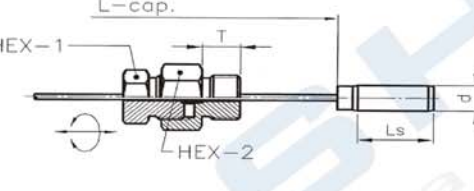
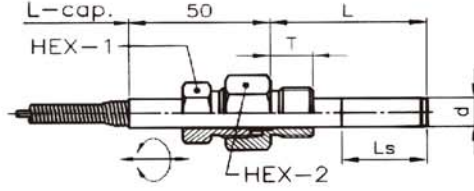
| Type                                                                                      | Code | Models                                                                             | Ø d in mm | Tmin in °C | Tmax in °C |
|-------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|-----------|------------|------------|
| Stainless steel 1.4541 (321) without protection                                           | 6    |  | 2         | - 250      | + 800      |
| Stainless steel 1.4541 (321) with PVC coating                                             | 7    |  | 4         | - 60       | + 120      |
| Stainless steel 1.4541 (321) with stainless steel protection 1.4301 (304)                 | B    |  | 6         | - 260      | + 800      |
| Stainless steel 1.4541 (321) with stainless steel protection 1.4301 (304) and PVC coating | C    |  | 7.5       | - 60       | + 120      |

### Process connections

| Models                                                                                                              | Code | Connection | HEX-1 | HEX-2 | T  | Immersion tube (mm) |
|---------------------------------------------------------------------------------------------------------------------|------|------------|-------|-------|----|---------------------|
| <br>Coupling nut (standard)       | 731A | G½         | 22    | -     | 7  | Ø 6 to 8            |
|                                                                                                                     | 731B | G¾         | 27    | -     | 9  | Ø 6 to 11           |
|                                                                                                                     | 731C | G½         | 27    | -     | 9  | Ø 6 to 15           |
|                                                                                                                     | 731D | G¾         | 32    | -     | 9  | Ø 6 to 20           |
|                                                                                                                     | 731E | G1         | 41    | -     | 13 | Ø 6 to 20           |
|                                                                                                                     | 731P | M18 x 1.5  | 27    | -     | 8  | Ø 6 to 12           |
|                                                                                                                     | 731Q | M20 x 1.5  | 27    | -     | 9  | Ø 6 to 14           |
|                                                                                                                     | 731R | M24 x 1.5  | 32    | -     | 9  | Ø 6 to 18           |
| <br>Coupling nut (long model)    | 732C | G½         | 27    | -     | 14 | Ø 6 to 15           |
|                                                                                                                     | 732D | G¾         | 32    | -     | 16 | Ø 6 to 20           |
|                                                                                                                     | 732E | G1         | 41    | -     | 18 | Ø 6 to 20           |
| <br>Rotating nipple (standard)   | 733A | G½         | 17    | -     | 12 | Ø 6 to 8            |
|                                                                                                                     | 733B | G¾         | 22    | -     | 12 | Ø 6 to 11           |
|                                                                                                                     | 733C | G½         | 22    | -     | 14 | Ø 6 to 15           |
|                                                                                                                     | 733D | G¾         | 30    | -     | 16 | Ø 6 to 20           |
|                                                                                                                     | 733E | G1         | 36    | -     | 18 | Ø 6 to 20           |
|                                                                                                                     | 733P | M18 x 1.5  | 22    | -     | 12 | Ø 6 to 12           |
|                                                                                                                     | 733Q | M20 x 1.5  | 22    | -     | 14 | Ø 6 to 14           |
|                                                                                                                     | 733R | M24 x 1.5  | 27    | -     | 14 | Ø 6 to 18           |
| <br>Rotating nipple (long model) | 734C | G½         | 22    | -     | 20 | Ø 6 to 15           |
|                                                                                                                     | 734D | G¾         | 30    | -     | 20 | Ø 6 to 20           |
|                                                                                                                     | 734E | G1         | 36    | -     | 25 | Ø 6 to 20           |



## Process connections

| Models                                                                                                                            | Code | Connection        | HEX-1 | HEX-2 | T  | Immersion tube (mm) |
|-----------------------------------------------------------------------------------------------------------------------------------|------|-------------------|-------|-------|----|---------------------|
|  <p>Coupling nut + double nipple</p>             | 735A | G $\frac{1}{4}$   | 27    | 22    | 12 | Ø 6 to 8            |
|                                                                                                                                   | 735B | G $\frac{1}{4}$   | 27    | 22    | 12 | Ø 6 to 11           |
|                                                                                                                                   | 735C | G $\frac{1}{2}$   | 27    | 22    | 14 | Ø 6 to 15           |
|                                                                                                                                   | 735D | G $\frac{3}{4}$   | 27    | 27    | 16 | Ø 6 to 20           |
|                                                                                                                                   | 735E | G1                | 27    | 36    | 18 | Ø 6 to 20           |
|                                                                                                                                   | 735H | $\frac{1}{4}$ NPT | 27    | 22    | 14 | Ø 6 to 8            |
|                                                                                                                                   | 735J | $\frac{1}{2}$ NPT | 27    | 22    | 20 | Ø 6 to 15           |
|                                                                                                                                   | 735K | $\frac{3}{4}$ NPT | 27    | 27    | 20 | Ø 6 to 20           |
|                                                                                                                                   | 735L | 1" NPT            | 27    | 36    | 25 | Ø 6 to 20           |
|                                                                                                                                   | 735P | M18 x 1.5         | 27    | 22    | 12 | Ø 6 to 12           |
|                                                                                                                                   | 735Q | M20 x 1.5         | 27    | 22    | 14 | Ø 6 to 14           |
|                                                                                                                                   | 735R | M24 x 1.5         | 27    | 27    | 14 | Ø 6 to 18           |
|  <p>Sliding connection on the extension tube</p> | 736A | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 11           |
|                                                                                                                                   | 736B | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 14           |
|                                                                                                                                   | 736C | G $\frac{1}{2}$   | 22    | 27    | 14 | Ø 6 to 18           |
|                                                                                                                                   | 736D | G $\frac{3}{4}$   | 22    | 32    | 16 | Ø 6 to 23           |
|                                                                                                                                   | 736E | G1                | 22    | 36    | 18 | Ø 6 to 30           |
|                                                                                                                                   | 736H | $\frac{1}{4}$ NPT | 22    | 27    | 14 | Ø 6 to 13           |
|                                                                                                                                   | 736J | $\frac{1}{2}$ NPT | 22    | 27    | 20 | Ø 6 to 20           |
|                                                                                                                                   | 736K | $\frac{3}{4}$ NPT | 22    | 27    | 20 | Ø 6 to 25           |
|                                                                                                                                   | 736L | 1" NPT            | 22    | 36    | 25 | Ø 6 to 32           |
|                                                                                                                                   | 736P | M18 x 1.5         | 22    | 27    | 12 | Ø 6 to 16           |
|                                                                                                                                   | 736Q | M20 x 1.5         | 22    | 27    | 14 | Ø 6 to 18           |
|                                                                                                                                   | 736R | M24 x 1.5         | 22    | 27    | 14 | Ø 6 to 22           |
|  <p>Sliding connection on the capillary</p>    | 737A | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 11           |
|                                                                                                                                   | 737B | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 14           |
|                                                                                                                                   | 737C | G $\frac{1}{2}$   | 22    | 27    | 14 | Ø 6 to 18           |
|                                                                                                                                   | 737D | G $\frac{3}{4}$   | 22    | 32    | 16 | Ø 6 to 23           |
|                                                                                                                                   | 737E | G1                | 22    | 36    | 18 | Ø 6 to 30           |
|                                                                                                                                   | 737H | $\frac{1}{4}$ NPT | 22    | 27    | 14 | Ø 6 to 13           |
|                                                                                                                                   | 737J | $\frac{1}{2}$ NPT | 22    | 27    | 20 | Ø 6 to 20           |
|                                                                                                                                   | 737K | $\frac{3}{4}$ NPT | 22    | 27    | 20 | Ø 6 to 25           |
|                                                                                                                                   | 737L | 1" NPT            | 22    | 36    | 25 | Ø 6 to 32           |
|                                                                                                                                   | 737P | M18 x 1.5         | 22    | 27    | 12 | Ø 6 to 16           |
|                                                                                                                                   | 737Q | M20 x 1.5         | 22    | 27    | 14 | Ø 6 to 18           |
|                                                                                                                                   | 737R | M24 x 1.5         | 22    | 27    | 14 | Ø 6 to 22           |
|  <p>Sliding connection on the stem</p>         | 738A | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 8            |
|                                                                                                                                   | 738B | G $\frac{1}{4}$   | 22    | 27    | 12 | Ø 6 to 11           |
|                                                                                                                                   | 738C | G $\frac{1}{2}$   | 22    | 27    | 14 | Ø 6 to 15           |
|                                                                                                                                   | 738D | G $\frac{3}{4}$   | 22    | 32    | 16 | Ø 6 to 20           |
|                                                                                                                                   | 738E | G1                | 22    | 36    | 18 | Ø 6 to 20           |
|                                                                                                                                   | 738H | $\frac{1}{4}$ NPT | 22    | 27    | 14 | Ø 6 to 8            |
|                                                                                                                                   | 738J | $\frac{1}{2}$ NPT | 22    | 27    | 20 | Ø 6 to 15           |
|                                                                                                                                   | 738K | $\frac{3}{4}$ NPT | 22    | 27    | 20 | Ø 6 to 20           |
|                                                                                                                                   | 738L | 1" NPT            | 22    | 36    | 25 | Ø 6 to 20           |
|                                                                                                                                   | 738P | M18 x 1.5         | 22    | 27    | 12 | Ø 6 to 12           |
|                                                                                                                                   | 738Q | M20 x 1.5         | 22    | 27    | 14 | Ø 6 to 14           |
|                                                                                                                                   | 738R | M24 x 1.5         | 22    | 27    | 14 | Ø 6 to 18           |





### Temperature ranges

| Code | Range<br>°C |
|------|-------------|
| 69T  | -200 ... 50 |
| 77T  | -120 ... 40 |
| 76T  | -100 ... 50 |
| 74T  | -80 ... 40  |
| 68T  | -70 ... 50  |
| 50T  | -60 ... 40  |
| 65T  | -40 ... 40  |
| 55T  | -30 ... 170 |
| 51T  | -30 ... 70  |
| 61T  | -30 ... 30  |
| 84T  | -20 ... 100 |
| 54T  | -20 ... 60  |
| 52T  | -20 ... 40  |
| 11T  | 0 ... 60    |
| 27T  | 0 ... 80    |

| Code | Range<br>°C |
|------|-------------|
| 12T  | 0 ... 100   |
| 20T  | 0 ... 120   |
| 13T  | 0 ... 160   |
| 22T  | 0 ... 200   |
| 14T  | 0 ... 250   |
| 23T  | 0 ... 300   |
| 15T  | 0 ... 400   |
| 25T  | 0 ... 500   |
| 16T  | 0 ... 600   |
| 82T  | 0 ... 800   |
| 30T  | 100 ... 500 |

| Code | Range<br>°F  |
|------|--------------|
| 68U  | -100 ... 120 |
| 09U  | -50 ... 120  |
| 08U  | -40 ... 160  |
| 02U  | 0 ... 200    |
| 03U  | 0 ... 250    |
| 04U  | 0 ... 300    |
| 05U  | 0 ... 400    |
| 06U  | 0 ... 500    |
| 20U  | 30 ... 250   |
| 13U  | 30 ... 320   |
| 22U  | 30 ... 400   |
| 23U  | 30 ... 580   |
| 15U  | 30 ... 750   |
| 28U  | 100 ... 800  |
| 29U  | 200 ... 1000 |

| Code | Range (double scale)<br>°C / °F |
|------|---------------------------------|
| 51V  | -30 ... 70 / -40 ... 160        |
| 68V  | -70 ... 50 / -100 ... 100       |
| 55V  | -30 ... 170 / 0 ... 350         |
| 11V  | 0 ... 60 / 30 ... 140           |
| 20V  | 0 ... 120 / 30 ... 250          |
| 13V  | 0 ... 160 / 30 ... 320          |
| 14V  | 0 ... 250 / 30 ... 500          |
| 15V  | 0 ... 400 / 30 ... 750          |
| 16V  | 0 ... 600 / 100 ... 1100        |

### Minimum immersion length Ls (mm)

| Diameter of the Immersion tube (mm) |     |     |      |      |      |      |      |
|-------------------------------------|-----|-----|------|------|------|------|------|
| Ø 6                                 | Ø 8 | Ø 9 | Ø 10 | Ø 11 | Ø 12 | Ø 14 | Ø 16 |
| 70                                  | 35  | 30  | 25   | 20   | 18   | 15   | 13   |
| 120                                 | 60  | 45  | 35   | 30   | 25   | 20   | 17   |
| 190                                 | 90  | 60  | 55   | 45   | 35   | 30   | 25   |
| -                                   | 135 | 100 | 80   | 65   | 55   | 40   | 30   |
| -                                   | 170 | 130 | 100  | 80   | 65   | 50   | 40   |
| -                                   | -   | 190 | 150  | 120  | 95   | 70   | 55   |
| Length of sensitive part Ls (mm)    |     |     |      |      |      |      |      |

| Capillary length (m)       |     |      |      |      |
|----------------------------|-----|------|------|------|
| ≤ 2                        | ≤ 5 | ≤ 10 | ≤ 20 | ≤ 30 |
| 80                         | 100 | 120  | n.a. | n.a. |
| 60                         | 80  | 80   | 100  | 120  |
| -                          | -   | -    | 80   | 100  |
| -                          | 60  | -    | -    | -    |
| -                          | -   | 60   | -    | -    |
| -                          | -   | -    | 60   | 60   |
| Min. temperature span (°C) |     |      |      |      |

#### How to use this table:

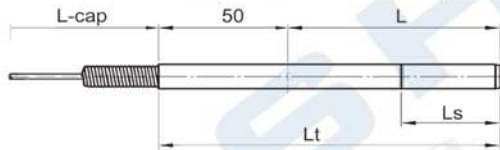
1. Select in the right table the first column, which covers your capillary length.
2. Move down in this column to the first value, which is not higher than your temperature span.
3. Move horizontal to the left table into the column with your selected immersion tube diameter.
4. Read the minimum length of the sensitive part of the immersion tube for your selection.

If this is too long, choose a larger diameter, a larger range or a shorter capillary.

#### Example:

4 m capillary, -20 ... 40 °C (span = 60 °C),  
Immersion tube Ø 10 mm:  
Minimum length of the sensitive part: Ls ≥ 80 mm

Standard version with plain immersion tube (without process connection)



### Ordering example with options

|                                                                                                       | TSF | 100 | - | 2 | 61 | . | 1 | B | 0 | . | 20T | . | 30 | / | 738C | - | 9003 | - | 0210 |
|-------------------------------------------------------------------------------------------------------|-----|-----|---|---|----|---|---|---|---|---|-----|---|----|---|------|---|------|---|------|
| Gas filled thermometer with capillary                                                                 | TSF | 100 | - | 2 | 61 | . | 1 | B | 0 | . | 20T | . | 30 | / | 738C | - | 9003 | - | 0210 |
| Nominal size 100 mm                                                                                   |     | 100 |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Case material stainless steel 1.4301 (AISI 304)                                                       |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Support console for wall mounting, capillary outlet bottom                                            |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Immersion tube diameter 8 mm                                                                          |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Type of capillary stainless steel 1.4541 with stainless steel protection 1.4301 Ø 6 mm (up to 800 °C) |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Immersion length (L) customer specific                                                                |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Temperature range: 0 ... 120 °C                                                                       |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Length of capillary: 3 m                                                                              |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Option: Adjustable connection sliding on stem G½                                                      |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Option: Customer specific immersion length                                                            |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |
| Option: Customer specific immersion length L = 210 mm                                                 |     |     |   |   |    |   |   |   |   |   |     |   |    |   |      |   |      |   |      |



### Ordering details TSF

|                                                                                              |  | TSF   |  |  |  | - | 2 | xx | . |  |  | . | xxx | . | xx | / |
|----------------------------------------------------------------------------------------------|--|-------|--|--|--|---|---|----|---|--|--|---|-----|---|----|---|
| <b>Model</b>                                                                                 |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Gas filled thermometer with capillary                                                        |  | TSF   |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Nominal size</b>                                                                          |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 63 mm                                                                                        |  | 0 6 3 |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 80 mm                                                                                        |  | 0 8 0 |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 100 mm                                                                                       |  | 1 0 0 |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 160 mm                                                                                       |  | 1 6 0 |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 250 mm                                                                                       |  | 2 5 0 |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
|                                                                                              |  | -     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Case</b>                                                                                  |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Stainless steel 1.4301 (AISI 304)                                                            |  | 2     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Type of mounting</b>                                                                      |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Direct mounting, capillary outlet bottom                                                     |  | 11    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Front flange for panel mounting, capillary outlet bottom                                     |  | 21    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Front flange for panel mounting, capillary outlet center back                                |  | 22    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Rear flange for wall mounting, capillary outlet bottom                                       |  | 31    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Rear flange for wall mounting, capillary outlet center back                                  |  | 32    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| U-clamp for panel mounting, capillary outlet lower back                                      |  | 53    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Support console for wall mounting, capillary outlet bottom                                   |  | 61    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Immersion tube diameter</b>                                                               |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 6 mm                                                                                         |  | 4     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 8 mm                                                                                         |  | 1     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 9 mm                                                                                         |  | A     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 10 mm                                                                                        |  | B     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 11 mm                                                                                        |  | 2     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 12 mm                                                                                        |  | C     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 14 mm                                                                                        |  | 7     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 16 mm                                                                                        |  | D     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Type of capillary</b>                                                                     |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Stainless steel 1.4541 without protection, Ø 2.0 mm (up to 800 °C)                           |  | 6     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Stainless steel 1.4541 with PVC, Ø 4.0 mm (up to 120 °C)                                     |  | 7     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Stainless steel 1.4541 with stainless steel protection 1.4301, Ø 6.0 mm (up to 800 °C)       |  | B     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Stainless steel 1.4541 with stainless steel protection 1.4301 + PVC, Ø 7.5 mm (up to 120 °C) |  | C     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Immersion tube / installed length L</b>                                                   |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 100 mm                                                                                       |  | 2     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 160 mm                                                                                       |  | 4     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 250 mm                                                                                       |  | 6     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 400 mm                                                                                       |  | 7     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 600 mm                                                                                       |  | 8     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 1000 mm                                                                                      |  | 9     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| Customer specific length (use option 9003_xxxx, xxxx = L in mm)                              |  | 0     |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Unit of measurement / Temperature ranges</b>                                              |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| °C                                                                                           |  | xxT   |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| °F                                                                                           |  | xxU   |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| °C / °F (double scale)                                                                       |  | xxV   |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| <b>Length of capillary</b>                                                                   |  |       |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 0.5 m                                                                                        |  | 05    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 1 m                                                                                          |  | 10    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 3 m                                                                                          |  | 30    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 4.5 m                                                                                        |  | 45    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 6 m                                                                                          |  | 60    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 9 m                                                                                          |  | 90    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 12 m                                                                                         |  | A2    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 15 m                                                                                         |  | A5    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 20 m                                                                                         |  | B0    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 25 m                                                                                         |  | B5    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |
| 30 m                                                                                         |  | C0    |  |  |  |   |   |    |   |  |  |   |     |   |    |   |

Options to be added behind the / (see example page 6)

