SensyTemp TSC400
Industrial thermometer
—

**Measurement made easy**

For plug-in connection
For screw-in connection
For surface measurement

—

**Areas of application**

- Universal application in general process engineering, tank and piping construction, mechanical and plant engineering

—

**Electrical connections**

- With compression fitting and fixed screw-in connection
- With weld-on plate for permanent surface measurement
- With molded part for tension clip mounting

—

**Benefits**

- Fastest possible measuring results through direct contact of the mineral insulated cable with the medium
- Widest application ranges through optimum sheath materials
- Subsequent installation possible by surface mounting
- Optimal usage due to a combination of mechanical and electrical interfaces
- Global approvals for explosion protection up to Zone 0
Overview of temperature sensors

**Type TSC420, with direct electrical connection**

Dimensions in mm (in)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TSC420</th>
</tr>
</thead>
<tbody>
<tr>
<td>U = Installation length</td>
<td>100 (3.94)</td>
</tr>
<tr>
<td>N = Nominal length</td>
<td>26 (1.02)</td>
</tr>
<tr>
<td>ØA = Diameter of the mineral insulated cable</td>
<td>6 (0.24)</td>
</tr>
</tbody>
</table>

Electrical connection

- Single and double thermocouples
- Single Pt100 / 2-, 3-, or 4-wire
- Double Pt100 / 2-, 3-, or 4-wire
- Double Pt100 / 2- or 3-wire

Design

- Bendable mineral insulated cable with sealing sleeve
- Open cable ends, standard 100 mm (3.94 in) or customer-specific
- Form F connecting head
- Plug, socket

**Type TSC430, with connection cable**

Dimensions in mm (in)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TSC430</th>
</tr>
</thead>
<tbody>
<tr>
<td>U = Installation length</td>
<td>43 (1.69)</td>
</tr>
<tr>
<td>N = Nominal length</td>
<td>8 (0.31)</td>
</tr>
<tr>
<td>KL = Cable length</td>
<td>50 (1.97)</td>
</tr>
<tr>
<td>ØA = Diameter of the mineral insulated cable</td>
<td></td>
</tr>
</tbody>
</table>

Electrical connection

- Single and double thermocouples
- Single Pt100 / 2-, 3-, or 4-wire
- Double Pt100 / 2-, 3-, or 4-wire
- Double Pt100 / 2- or 3-wire

Design

- Bendable mineral insulated cable with sealing sleeve and optional anti-kink spring
- Open cable ends
- Plug, socket
... Overview of temperature sensors

Selectable process connections

- Without process connection
- With fixed connection (please specify nominal length 'N' and installation length 'U')
- With movable connection (please specify nominal length 'N' only)
- With weld-on plate 25 x 25 x 3 mm (0.98 x 0.98 x 0.12 in) or 35 x 25 x 3 mm (1.38 x 0.98 x 0.12 in) for surface measurement
- With molded part for tension clip mounting
- Temperature sensor for use with or without thermowell

Installation instructions

The usual way of ensuring that thermal measurements are accurate is to comply with the minimum installation length of the temperature sensor. Ideally, in the case of pipelines, the sensor on a thermometer should be located in the center of the pipe. If this is not possible, both in the case of pipes and containers, a minimum installation length of 10- to 15-times the temperature sensor diameter is assumed to be sufficient.

Insufficient nominal diameter

In the case of pipelines with very small nominal diameters, installation inside an elbow pipe is recommended. The temperature sensor tip is set in opposition to the flow direction of the measuring medium. Also installing the temperature sensor with an adapter at an acute angle against the flow direction can also distort measurement results.

Figure 1: Recommended installation

Figure 2: Installation with small nominal diameter
Specification

Resistance thermometer

The use of a mineral insulated cable and special sensors, including their installation, makes the vibration resistance of all SensyTemp TSC400 industrial thermometers very high. The peak-to-peak acceleration values of 30 m/sec² (3 g) for frequencies between 10 and 500 Hz (already defined in accordance with standard IEC 60751 for increased requirements) are exceeded by all industrial thermometers. The optimally suitable combination of measuring range, diameter, accuracy, and vibration resistance can be taken from the following tables.

Thin film resistor (TF) – Base design

<table>
<thead>
<tr>
<th>Class</th>
<th>Meas. range</th>
<th>Vibration resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>-50 to 400 °C (−58 to 752 °F)</td>
<td>100 m/sec² (10 g) at 10 to 500 Hz</td>
</tr>
<tr>
<td>A</td>
<td>-30 to 300 °C (−22 to 572 °F)</td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>0 to 100 °C (32 to 212 °F)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Single sensor</th>
<th>Double sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-W</td>
<td>3-W</td>
</tr>
<tr>
<td>3.0 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>3.0 mm, class A</td>
<td>●</td>
</tr>
<tr>
<td>4.5 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>4.5 mm, class A</td>
<td>●</td>
</tr>
<tr>
<td>6.0 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>6.0 mm, class A</td>
<td>●</td>
</tr>
<tr>
<td>6.0 mm, class AA</td>
<td>●</td>
</tr>
</tbody>
</table>

Wire wound resistor (WW) – extended measuring range

<table>
<thead>
<tr>
<th>Meas. range</th>
<th>Vibration resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class B -196 to 600 °C (−320.8 to 1112 °F)</td>
<td>100 m/sec² (10 g) at 10 to 500 Hz</td>
</tr>
<tr>
<td>Class A, single WW -100 to 450 °C (−148 to 842 °F)</td>
<td></td>
</tr>
<tr>
<td>Class A, double WW 0 to 250 °C (32 to 482 °F)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Single sensor</th>
<th>Double sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-W</td>
<td>3-W</td>
</tr>
<tr>
<td>3.0 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>3.0 mm, class A</td>
<td>●</td>
</tr>
<tr>
<td>4.5 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>4.5 mm, class A</td>
<td>●</td>
</tr>
<tr>
<td>6.0 mm, class B</td>
<td>●</td>
</tr>
<tr>
<td>6.0 mm, class A</td>
<td>●</td>
</tr>
</tbody>
</table>

Accuracy classes of measurement resistors in accordance with IEC 60751

Both thin film resistors and wire wound resistors in accordance with IEC 60751 can be used across the entire range of application (also with increased accuracy class AA or class A). Subsequently, only the accuracy class of the temperature range used can remain valid.

Example: A sensor of class AA is used at 290 °C (554 °F). After this albeit brief application, class A applies for this sensor.

Thin film resistor (TF), built-in

<table>
<thead>
<tr>
<th>Class</th>
<th>Accuracy formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>$\Delta t = (0.30 + 0.0050[t])$</td>
</tr>
<tr>
<td>A</td>
<td>$\Delta t = (0.15 + 0.0020[t])$</td>
</tr>
<tr>
<td>AA</td>
<td>$\Delta t = (0.10 + 0.0017[t])$</td>
</tr>
</tbody>
</table>

Wire wound resistor (WW), built-in

<table>
<thead>
<tr>
<th>Class</th>
<th>Accuracy formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>$\Delta t = (0.30 + 0.0050[t])$</td>
</tr>
<tr>
<td>A</td>
<td>$\Delta t = (0.15 + 0.0020[t])$</td>
</tr>
</tbody>
</table>
... Specification

Measuring errors with two-wire circuits

The electric resistance of the copper inner conductor of the mineral insulated cable affects the measured value for two-wire circuits and must be taken into consideration. Electric resistance depends on the diameter and length of the industrial thermometer.

If the error cannot be compensated metrologically, the following reference values shall apply:

<table>
<thead>
<tr>
<th>Industrial thermometer diameter</th>
<th>Electric resistance / measured error</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 mm (0.12 in)</td>
<td>0.281 Ω/m / 0.7 °C/m</td>
</tr>
<tr>
<td>6.0 mm (0.24 in)</td>
<td>0.1 Ω/m / 0.25 °C/m</td>
</tr>
</tbody>
</table>

It is for this reason that ABB supplies three-wire / four-wire circuit temperature sensors as standard.

Length data for the temperature sensor tip

The following table shows the minimum immersion length, the temperature-sensitive length and the non-flexible length at the tip of the temperature sensor.

<table>
<thead>
<tr>
<th>Design</th>
<th>Basic design</th>
<th>Extended measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum immersion length</td>
<td>70 mm (2.8 in)</td>
<td>70 mm (2.8 in)</td>
</tr>
<tr>
<td>Temperature-sensitive length</td>
<td>7 mm (0.3 in)</td>
<td>50 mm (1.9 in)</td>
</tr>
<tr>
<td>Non-flexible length</td>
<td>30 mm (1.2 in)</td>
<td>60 mm (2.4 in)</td>
</tr>
</tbody>
</table>

Figure 3: Graphical representation of accuracy classes
**Thermocouples**

The accuracy classes of the thermocouples are in accordance with the IEC 60584 international standard. ABB also supplies in accordance with ANSI MC96.1 upon request. Since the values of both standards differ only very slightly at low temperatures (up to approx. 300 °C), ABB recommends using thermocouples conforming to international standard IEC 60584. The tolerance specifications are presented in the table ‘Accuracy classes in accordance with IEC 60584’

**Version**

Vibration-resistant up to 600 m/sec² (60 g)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Class</th>
<th>Temperature range</th>
<th>Maximum measuring error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 mm, class 2</td>
<td>2</td>
<td>−40 to 333 °C (-40 to 631.4 °F)</td>
<td>± 2.5 °C (± 4.5 °F)</td>
</tr>
<tr>
<td>3.0 mm, class 2</td>
<td>1</td>
<td>−40 to 375 °C (-40 to 707 °F)</td>
<td>± 1.5 °C (± 2.7 °F)</td>
</tr>
<tr>
<td>4.5 mm, class 1</td>
<td>2</td>
<td>−40 to 333 °C (-40 to 631.4 °F)</td>
<td>± 2.5 °C (± 4.5 °F)</td>
</tr>
<tr>
<td>4.5 mm, class 1</td>
<td>1</td>
<td>−40 to 375 °C (-40 to 707 °F)</td>
<td>± 1.5 °C (± 2.7 °F)</td>
</tr>
<tr>
<td>6.0 mm, class 2</td>
<td>2</td>
<td>−40 to 333 °C (-40 to 631.4 °F)</td>
<td>± 2.5 °C (± 4.5 °F)</td>
</tr>
<tr>
<td>6.0 mm, class 1</td>
<td>1</td>
<td>−40 to 375 °C (-40 to 707 °F)</td>
<td>± 1.5 °C (± 2.7 °F)</td>
</tr>
</tbody>
</table>

**Note**

Industrial thermometers with a diameter of 8 mm (0.31 in) are made up of a mineral insulated cable with a diameter of 6.0 mm (0.24 in) and a sleeve pressed onto the temperature sensor tip.
### Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>Class (CL)</th>
<th>Temperature range</th>
<th>Maximum measuring error</th>
</tr>
</thead>
<tbody>
<tr>
<td>K (NiCr-Ni)</td>
<td>Standard</td>
<td>0 to 293 °C (32 to 559.4 °F)</td>
<td>± 2.2 °C (± 3.96 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>293 to 1250 °C (559.4 to 2282 °F)</td>
<td>±0.0075 x t</td>
</tr>
<tr>
<td></td>
<td>Special</td>
<td>0 to 275 °C (32 to 527 °F)</td>
<td>± 1.1 °C (± 1.98 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>275 to 1250 °C (527 to 2282 °F)</td>
<td>±0.004 x t</td>
</tr>
<tr>
<td>N (NiCrSi-NiSi)</td>
<td>Standard</td>
<td>0 to 293 °C (32 to 559.4 °F)</td>
<td>± 2.2 °C (± 3.96 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>293 to 1250 °C (559.4 to 2282 °F)</td>
<td>±0.0075 x t</td>
</tr>
<tr>
<td></td>
<td>Special</td>
<td>0 to 275 °C (32 to 527 °F)</td>
<td>± 1.1 °C (± 1.98 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>275 to 1250 °C (527 to 2282 °F)</td>
<td>±0.004 x t</td>
</tr>
<tr>
<td>J (Fe-CuNi)</td>
<td>Standard</td>
<td>0 to 293 °C (32 to 559.4 °F)</td>
<td>± 2.2 °C (± 3.96 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>293 to 750 °C (559.4 to 1382 °F)</td>
<td>±0.0075 x t</td>
</tr>
<tr>
<td></td>
<td>Special</td>
<td>0 to 275 °C (32 to 527 °F)</td>
<td>± 1.1 °C (± 1.98 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>275 to 750 °C (527 to 1382 °F)</td>
<td>±0.004 x t</td>
</tr>
</tbody>
</table>

**Figure 4**: Graphical representation of accuracy classes using type K and N in accordance with IEC 60584 as examples. See tables for other types.

**Length data for the temperature sensor tip**

The following table shows the temperature-sensitive length, the minimum immersion length, and the non-flexible length at the tip of the temperature sensor.

<table>
<thead>
<tr>
<th>Basic design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum immersion</td>
<td>70 mm (2.8 in)</td>
</tr>
<tr>
<td>Temperature-sensitive</td>
<td>7 mm (0.3 in)</td>
</tr>
<tr>
<td>Non-flexible length</td>
<td>30 mm (1.2 in)</td>
</tr>
</tbody>
</table>
Resistance thermometers and thermocouples

Insulation resistance of measuring inset
The insulation resistance is measured between the outer sheath and measuring loop. If there are two measuring loops, the insulation resistance between both measuring loops is also measured.
Thanks to a special process used during manufacturing, ABB measuring insets can boast outstanding insulation values even at high temperatures.

Insulation resistance $R_{\text{iso}}$ ≥ 500 MΩ with an ambient temperature range from 15 to 35 °C (59 to 95 °F)

Air humidity < 80 %

Permissible ambient temperature at the closure of the mineral insulated cable

<table>
<thead>
<tr>
<th>Design</th>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>−40 to 120 °C (−40 to 248 °F)</td>
</tr>
<tr>
<td>Optional</td>
<td>−56 to 200 °C (−68.8 to 392 °F)</td>
</tr>
</tbody>
</table>

In type TSC430, the temperature limits of the connection cables used should also be considered. See Connection cable for the resistance thermometer on page 14 and Connection cables for thermocouples on page 16.

Response times in accordance with IEC 60751 and IEC 60584

<table>
<thead>
<tr>
<th>Ø Temperature sensor</th>
<th>Water 0.4 m/s</th>
<th>Air 3 m/s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t_{0.5}$</td>
<td>$t_{0.9}$</td>
</tr>
<tr>
<td>Resistance thermometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 mm (0.12 in)</td>
<td>1.5</td>
<td>4.5</td>
</tr>
<tr>
<td>4.5 mm (0.18 in)</td>
<td>2.5</td>
<td>6.3</td>
</tr>
<tr>
<td>6.0 mm (0.24 in)</td>
<td>4.0</td>
<td>9.7</td>
</tr>
<tr>
<td>Thermocouples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 mm (0.06 in)</td>
<td>0.7</td>
<td>1.8</td>
</tr>
<tr>
<td>3.0 mm (0.12 in)</td>
<td>0.8</td>
<td>2.1</td>
</tr>
<tr>
<td>4.5 mm (0.18 in)</td>
<td>1.8</td>
<td>5.4</td>
</tr>
<tr>
<td>6.0 mm (0.24 in)</td>
<td>3.0</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Maximum permissible operating temperature
Depending on the sensor type and material selected, the lower temperature value in each case applies.

<table>
<thead>
<tr>
<th>Sensor types</th>
<th>Maximum operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin film resistor (TF)</td>
<td>400 °C (752 °F)</td>
</tr>
<tr>
<td>Wire wound resistor (WW)</td>
<td>600 °C (1112 °F)</td>
</tr>
<tr>
<td>Type K and N thermocouples</td>
<td>1200 °C (2192 °F)</td>
</tr>
<tr>
<td>Type J thermocouples</td>
<td>750 °C (1382 °F)</td>
</tr>
<tr>
<td>Type E thermocouples</td>
<td>900 °C (1652 °F)</td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th></th>
<th>Maximum operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel 1.4404 (ASTM 316L)</td>
<td>800 °C (1472 °F)</td>
</tr>
<tr>
<td>Stainless steel 1.4571 (ASTM 316Ti)</td>
<td>800 °C (1472 °F)</td>
</tr>
<tr>
<td>NiCr alloy 2.4816 (Inconel 600)</td>
<td>1100 °C (2012 °F)</td>
</tr>
</tbody>
</table>

The maximum operating temperatures and pressures specified are maximum values and do not take into consideration process-related stress.
The effects of viscosity, flow rate, pressure, and temperature in the process usually cause these values to drop.

Transport temperature / Storage temperature
−20 to 70 °C (−4 to 158 °F)
Process connections

Process connections – screwed connections

<table>
<thead>
<tr>
<th>Design</th>
<th>Material</th>
<th>Thread</th>
<th>Mineral insulated cable [Ø mm (in)]</th>
<th>Length of engaged thread (TL) [mm (in)]</th>
<th>Compression fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed connection</td>
<td>Stainless steel</td>
<td>M8 x 1</td>
<td>3.0 (0.12)</td>
<td>6.5 (0.26)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G¼ A</td>
<td>3.0 / 4.5 / 6.0</td>
<td>12.0 (0.47)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G½ A</td>
<td>(0.12 / 0.18 / 0.24)</td>
<td>14.0 (0.55)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¼ in NPT</td>
<td></td>
<td>5.08 (0.20)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ in NPT</td>
<td></td>
<td>8.12 (0.32)</td>
<td>–</td>
</tr>
<tr>
<td>Sliding connection</td>
<td>Stainless steel</td>
<td>M8 x 1</td>
<td>3.0 (0.12)</td>
<td>6.5 (0.26)</td>
<td>PTFE or VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G¼ A</td>
<td>3.0 / 4.5 / 6.0</td>
<td>12.0 (0.47)</td>
<td>PTFE or VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G½ A</td>
<td>(0.12 / 0.18 / 0.24)</td>
<td>14.0 (0.55)</td>
<td>PTFE or VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¼ in NPT</td>
<td></td>
<td>5.08 (0.20)</td>
<td>PTFE or VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ in NPT</td>
<td></td>
<td>8.12 (0.32)</td>
<td>PTFE or VA</td>
</tr>
</tbody>
</table>

Note

In the version with fixed connection, the link between the connection and the mineral insulated cable is established using hard-soldering. The process connections for mineral insulated cables with a diameter of 6 mm (0.24 in) and 8 mm (0.31 in) are identical.
Process connections for surface thermometers

Molded part for clip mounting
All dimensions in mm (in)

Figure 5: Molded part for clamp collars up to 500 mm (19.68 in), other versions available on request

1 Industrial thermometer  2 Material: Stainless steel 1.4571 (ASTM 316Ti)

Figure 6: Weld-on plate for resistance thermometer, all dimensions in mm (in)
... Process connections

1  Industrial thermometer

2  Material: NiCr alloy 2.4816 (Inconel 600)

Figure 7: Weld-on plate for thermocouples, all dimensions in mm (in)
## Electrical connections

<table>
<thead>
<tr>
<th>Lemo plug size 1S</th>
<th>Lemo socket size 1S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions in mm (in)</strong></td>
<td><strong>Dimensions in mm (in)</strong></td>
</tr>
<tr>
<td>Ø 12 (0.47)</td>
<td>Ø 12 (0.47)</td>
</tr>
<tr>
<td>42.5 (1.67)</td>
<td>40.5 (1.59)</td>
</tr>
<tr>
<td>max. Ø 0.2</td>
<td>max. Ø 0.2</td>
</tr>
</tbody>
</table>

**Type**  
FFA  
PCA

**Chassis**  
Nickel-plated brass, gold-plated brass contacts, PEEK isolator, maximum 6 contacts  
Aluminum epoxide coating, loose cover,

**IP rating**  
IP 54  
IP 65

**Maximum ambient temperature**  
200 °C (392 °F)  
120 °C (248 °F)

## Thermocouple – standard plug  
Thermocouple – standard socket

<table>
<thead>
<tr>
<th><strong>Dimensions in mm (in)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>16 (0.63)</td>
</tr>
</tbody>
</table>

**Type**  
Standard

**Material**  
Plastic

**Maximum ambient temperature**  
200 °C (392 °F)

## Form F connecting head

<table>
<thead>
<tr>
<th><strong>Dimensions in mm (in)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>35 (1.38)</td>
</tr>
</tbody>
</table>

**Chassis**  
Aluminum epoxide coating, loose cover,

**IP rating**  
IP 65

**Maximum ambient temperature**  
120 °C (248 °F)

### Functions of the connection head
- Housing of a coupler connector
- Protection of the terminal compartment against environmental influence

### Ambient temperature

The ambient temperature on the Form F connection head can be between -40 and 120 °C (-40 to 248 °F). The most commonly used cable gland is suited for a temperature range of -20 to 100 °C (-4 to 212 °F). For temperatures outside this range, an appropriate cable gland can be installed.
… Electrical connections

Connection cable for the resistance thermometer

Note
The specified outside diameters of the connection cable are batch-dependent and should be treated as guideline values. The color coding of the wires for the resistance thermometer is in accordance with IEC 60751. See also ‘Electrical connections’ in the operating instruction OI/TSC400.

Figure 8: PFA cable

<table>
<thead>
<tr>
<th>Design</th>
<th>Design</th>
<th>Sensor design</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFA cable TFT – coding T2</td>
<td>General: Stranded wire, wire material: solid copper</td>
<td>1 x Pt100 / 2-w. – coding P1</td>
</tr>
<tr>
<td></td>
<td>Temperature resistance of the insulation: −200 to 200 °C (−328 to 392 °F)</td>
<td>1 x Pt100 / 3-w. – coding P2</td>
</tr>
<tr>
<td></td>
<td>Up to 4 wires: Outside diameter: approx. 4.8 mm (0.19 in), conductor cross-section: 0.75 mm²</td>
<td>1 x Pt100 / 4-w. – coding P3</td>
</tr>
<tr>
<td></td>
<td>From 6 wires: Outside diameter: approx. 5.5 mm (0.22 in), conductor cross-section: 0.22 mm²</td>
<td>2 x Pt100 / 2-w. – coding P4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x Pt100 / 3-w. – coding P5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x Pt100 / 4-w. – coding P6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>Design</th>
<th>Sensor design</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFA cable TFTV – coding T3</td>
<td>General: Stranded wire, wire material: solid copper</td>
<td>1 x Pt100 / 2-w. – coding P1</td>
</tr>
<tr>
<td></td>
<td>Temperature resistance of the insulation: −200 to 200 °C (−328 to 392 °F)</td>
<td>1 x Pt100 / 3-w. – coding P2</td>
</tr>
<tr>
<td></td>
<td>Up to 4 wires: Outside diameter: approx. 4.0 mm (0.16 in), conductor cross-section: 0.22 mm²</td>
<td>1 x Pt100 / 4-w. – coding P3</td>
</tr>
<tr>
<td></td>
<td>From 6 wires: Outside diameter: approx. 5.5 mm (0.22 in), conductor cross-section: 0.22 mm²</td>
<td>2 x Pt100 / 2-w. – coding P4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x Pt100 / 3-w. – coding P5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x Pt100 / 4-w. – coding P6</td>
</tr>
</tbody>
</table>
PVC cable JJ – coding P2

1. PVC wire insulation (J)
2. Film with wire mesh (F)
3. PVC sheath (J)

PVC cable JFJ – coding P3

1. PVC cable JJ – coding P2
2. PVC cable JFJ – coding P3

<table>
<thead>
<tr>
<th>Design</th>
<th>Design details</th>
<th>Sensor design</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC cable JJ – coding P2</td>
<td>Outside diameter approx. 5.5 mm (0.22 in)</td>
<td>1 x Pt100 / 2-w. – coding P1</td>
</tr>
<tr>
<td></td>
<td>Conductor cross-section: 0.22 mm², Wire material: copper strand</td>
<td>1 x Pt100 / 3-w. – coding P2</td>
</tr>
<tr>
<td></td>
<td>Temperature resistance of the insulation: −20 to 105 °C (−4 to 221 °F)</td>
<td>1 x Pt100 / 4-w. – coding P3</td>
</tr>
<tr>
<td>PVC cable JFJ – coding P3</td>
<td>Outside diameter approx. 5.5 mm (0.22 in)</td>
<td>2 x Pt100 / 2-w. – coding P4</td>
</tr>
<tr>
<td></td>
<td>Conductor cross-section: 0.50 mm², Wire material: copper strand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temperature resistance of the insulation: −10 to 105 °C (14 to 221 °F)</td>
<td></td>
</tr>
</tbody>
</table>
... Electrical connections

Connection cables for thermocouples

**Note**
The specified outside diameters of the connection cable are batch-dependent and should be treated as guideline values.

<table>
<thead>
<tr>
<th>Type</th>
<th>Class of upper/lower deviation</th>
<th>Application temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class 1</td>
<td>Class 2</td>
</tr>
<tr>
<td>JX</td>
<td>± 85 μV (± 1.5 °C (34.7 °F))</td>
<td>–</td>
</tr>
<tr>
<td>EX</td>
<td>± 120 μV (± 1.5 °C (34.7 °F))</td>
<td>–</td>
</tr>
<tr>
<td>NX</td>
<td>± 60 μV (± 1.5 °C (34.7 °F))</td>
<td>–</td>
</tr>
<tr>
<td>KCA</td>
<td>–</td>
<td>± 100 μV (± 2.5 °C (36.5 °F))</td>
</tr>
</tbody>
</table>

1 PVC wire insulation, overmolded (J)
2 Plastic-laminated aluminum foil shield (F)
3 PVC sheath (J)
4 Silicone rubber wire insulation, overmolded (SL)
5 Silicone rubber sheath (SL)
6 Glass filament mesh (GL)

Figure 10: PVC and silicone cable

<table>
<thead>
<tr>
<th>Design</th>
<th>Design</th>
<th>Sensor design</th>
<th></th>
</tr>
</thead>
</table>
| PVC cable JFJ – coding P3 | General:
Stranded wire, conductor cross-section: 0.22 mm², Temperature resistance of the insulation: –10 to 105 °C (14 to 221 °F) |
Type JX:
Outside diameter up to 4 wires approx. 5.8 mm (0.23 in) |
Type KCA:
Outside diameter up to 4 wires approx. 5.0 mm (0.20 in) |
|              | 1 x JX – coding J1                  | 2 x JX – coding J2 |
| Silicone cable SLSLGL – coding S3 | Stranded wire, conductor cross-section: 0.22 mm², Temperature resistance of the insulation: –200 to 200 °C (–328 to 392 °F) |
Outside diameter up to 2 wires approx. 4.7 mm (0.19 in) |
Outside diameter up to 4 wires approx. 5.5 mm (0.22 in) |
|              | 1 x KCA – coding K1                 | 2 x KCA – coding K2 |
Figure 11: PFA cable

<table>
<thead>
<tr>
<th>Design</th>
<th>PFA cable T/CUT – coding T2</th>
<th>PFA cable T/SLV – coding T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFA cable T/CUT – coding T2</td>
<td>Stranded wire, conductor cross-section: 0.22 mm²</td>
<td>General:</td>
</tr>
<tr>
<td></td>
<td>Temperature resistance of the insulation: -200 to 200 °C (-328 to 392 °F)</td>
<td>With single thermocouple: parallel wire</td>
</tr>
<tr>
<td></td>
<td>Outside diameter approx. 3.0 mm (0.12 in)</td>
<td>With double thermocouple: stranded wire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conductor cross-section: 0.22 mm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temperature resistance of the insulation: -200 to 200 °C (-328 to 392 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type JX:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter with 2 wires (oval conductor): approx. 3.3 mm x 2.0 mm (0.13 x 0.08 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter up to 4 wires approx. 3.7 mm (0.15 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type KCA:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter with 2 wires (oval conductor): approx. 3.3 mm x 2.0 mm (0.13 x 0.08 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter up to 4 wires approx. 3.7 mm (0.15 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type NX:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter up to 4 wires approx. 3.5 mm (0.14 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type EX:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outside diameter up to 4 wires approx. 3.4 mm (0.13 in)</td>
</tr>
</tbody>
</table>

1 x NY – coding N1
1 x JX – coding J1
2 x JX – coding J2
1 x KCA – coding K1
2 x KCA – coding K2
1 x NX – coding N1
2 x NX – coding N2
1 x EX – coding E1
2 x EX – coding E2

1. PFA wire insulation, overmolded (T)
2. Tinned mesh (CU)
3. PFA sheath, overmolded (T)
4. Glass filament mesh (GL)
5. Mesh made of stainless steel (V)
Use in potentially explosive atmospheres

Intrinsic safety type of protection approvals (Ex i)

The SensyTemp TSC400 temperature sensors are equipped with the following approvals. ATEX approvals are valid throughout the EU and in Switzerland, IECEx approvals are recognized internationally.

The device has the following approvals (examination certificates):
- ATEX Ex i, PTB 01 ATEX 2200 X
- IECEx Ex i, IECEx PTB 11.0111 X

A list of applied standards including the output data with which the device is in conformity can be found in the (EC type) examination certificate.

Additional approvals available for the TSC400 temperature sensor are available on request.

Industrial thermometers that conform to the requirements of both the type examination certificate for ATEX ‘Ex i’ and NAMUR-specification NE24, are available on request.

Electrical data

All of the values listed below are valid assuming that an additional transmitter has been connected.

The following electric values must not be up-scaled:

- **U_i** (input voltage)  
  - 30 V  
  - 25 V  
  - 20 V

- **l_i** (input current)  
  - 101 mA  
  - 158 mA  
  - 309 mA

- **P_i** (internal power) = max. 0.5 W
- **L_i** (internal inductance) = 15 μH/m
- **C_i** (internal capacitance) = 280 pF/m

**Note**

For the internal power **P_i** of the sensor and the output power **P_o** of the connected transmitter, the following must apply: **P_i** ≥ **P_o**

Likewise the following must apply: **U_i** ≥ **U_o** and **l_i** ≥ **l_o**

The output values of a connected transmitter, both when mounting in the connection head and when mounting in the field, must not up-scale these electric values. The output values of ABB temperature transmitters (TTx300 and TTx200) are below these maximum values.

<table>
<thead>
<tr>
<th>Transmitter type</th>
<th><strong>P_o</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>TTx00</td>
<td>≤ 38 mW</td>
</tr>
</tbody>
</table>

The type examination certificates for the corresponding transmitters contain all further information necessary to verify intrinsic safety (**U_o**, **I_o**, **P_o**, **L_o**, **C_o** etc.).

**Note**

Temperature sensors for use in Zone 0 may only contain an intrinsically safe circuit and may only be connected to declared intrinsically safe circuits with type of protection ‘Ex ia’.

Temperature data

**Thermal resistance**

The thermal resistances for mineral insulated cables are listed in the following table. The values are specified under ‘gas with a flow velocity of 0 m/s’ conditions.

<table>
<thead>
<tr>
<th>Diameter of the mineral insulated cable</th>
<th><strong>R_{th}</strong></th>
<th><strong>Δ</strong>t = 200 K/W x 0.038 W = 7.6 K</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6 mm (0.24 in)</td>
<td>200 K/W</td>
<td>84 K/W</td>
</tr>
<tr>
<td>≥ 6 mm (0.24 in)</td>
<td>30 K/W</td>
<td>30 K/W</td>
</tr>
</tbody>
</table>

**K/W** = kelvin per watt

The output power **P_o** with ABB transmitters

Resistance thermometer 200 K/W 84 K/W
Thermocouple 30 K/W 30 K/W
Temperature rise in the event of a fault

In the event of a fault, the temperature sensors will exhibit a temperature rise $\Delta t$ as appropriate for the applied power. This temperature rise $\Delta t$ must be taken into account when determining the maximum process temperature for each temperature class.

**Note**

In the event of a fault (short-circuit), the dynamic short-circuit current that occurs in the measurement circuit for a matter of milliseconds is not relevant with regard to temperature rise.

The temperature rise $\Delta t$ can be calculated using the following formula:

$$\Delta t = R_{th} \times P_o \left[ K / W \times W \right]$$

Where:
- $\Delta t$: Temperature rise
- $R_{th}$: Thermal resistance
- $P_o$: Output power of an additional connected transmitter

**Example:**

Resistance thermometer diameter 3 mm (0.12 in):

$R_{th} = 200 \, K/W$

Temperature transmitter TTxx00 $P_o = 38 \, mW$, see also [Output power Po with ABB transmitters](#) on page 18.

$$\Delta t = 200 \, K/W \times 0.038 \, W = 7.6 \, K$$

Therefore, at transmitter output power $P_o = 38 \, mW$, the temperature rise in the event of a fault is approximately 8 K. This results in the following maximum possible process temperatures $T_{medium}$, as shown in Table Maximum process temperature $T_{medium}$ in Zone 0 and Zone 1 on page 19.

**Table:**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>$-5 , K$</th>
<th>$-10 , K$</th>
<th>$T_{medium}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 (450 °C (842 °F))</td>
<td>—</td>
<td>440 °C (824 °F)</td>
<td>432 °C (809.6 °F)</td>
</tr>
<tr>
<td>T2 (300 °C (572 °F))</td>
<td>—</td>
<td>290 °C (554 °F)</td>
<td>282 °C (539.6 °F)</td>
</tr>
<tr>
<td>T3 (200 °C (392 °F))</td>
<td>195 °C (383 °F)</td>
<td>—</td>
<td>187 °C (368.6 °F)</td>
</tr>
<tr>
<td>T4 (135 °C (275 °F))</td>
<td>130 °C (266 °F)</td>
<td>—</td>
<td>122 °C (251.6 °F)</td>
</tr>
<tr>
<td>T5 (100 °C (212 °F))</td>
<td>95 °C (203 °F)</td>
<td>—</td>
<td>87 °C (188.6 °F)</td>
</tr>
<tr>
<td>T6 (85 °C (185 °F))</td>
<td>80 °C (176 °F)</td>
<td>—</td>
<td>72 °C (161.6 °F)</td>
</tr>
</tbody>
</table>

**For a higher output power $P_o$ as 38 mW in case of failure, but also for a generally higher output power of a connected transmitter as 38 mW, the temperature increase $\Delta t$ must be recalculated.**
Tests and certificates

In order to increase the safety and accuracy of the process, ABB offers various mechanical and electrical tests. The results are confirmed with certificates in accordance with EN 10204.

Certificates
- Declaration of compliance 2.1 for order conformity
- Inspection certificate 3.1 for the following tests:
  - Material certificate for the MI-Cable
  - Visual, dimensional and function checks of the temperature sensor
  - Reference measurement for temperature sensor

For measurements requiring extremely high accuracy, ABB offers a calibration of the temperature sensor in its own DAkkS-calibration laboratory. With a DAkkS-calibration, a separate calibration certificate is provided for each temperature sensor.

To obtain meaningful measurement results, the following minimum lengths of the mineral insulated cable should be adhered to:

<table>
<thead>
<tr>
<th>Temperature range</th>
<th>Recommended minimum lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>For very low temperatures below</td>
<td>300 mm</td>
</tr>
<tr>
<td>−70 °C (−94 °F)</td>
<td>(11.81 in)</td>
</tr>
<tr>
<td>For low to medium temperatures</td>
<td>100 to 150 mm</td>
</tr>
<tr>
<td></td>
<td>(3.94 to 5.91 in)</td>
</tr>
<tr>
<td>For temperatures above 500 °C</td>
<td>300 to 400 mm (11.81 to 15.75 in)</td>
</tr>
<tr>
<td>(932 °F)</td>
<td></td>
</tr>
</tbody>
</table>

Greater lengths allow additional measurement methods and simplify the measuring process. If you require any further information, please contact your local ABB partner.

In case of a reference measurements and DAkkS-calibration, the individual sensor characteristic of the temperature sensor can also be calculated and a suitable transmitter can be accordingly programmed using a freestyle characteristic. The measuring accuracy of the temperature sensor can be considerably improved by adjusting the transmitter to the sensor characteristics. To this end, the measurement must be conducted with at least three temperatures.
**Ordering Information**

**NOTE**
Order codes cannot be combined at will. Your ABB partner will be happy to answer any questions you might have regarding installation feasibility. All documentation, declarations of conformity, and certificates are available in ABB's download area.

---

**SensyTemp TSC420**

<table>
<thead>
<tr>
<th>Base model</th>
<th>TSC420</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC420 Screw-in thermometer with direct electrical connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explosion Protection Certification**

- Without explosion protection: Y0
- Intrinsic Safety ATEX II 1 G Ex ia IIC T6...T1 Ga, Zone 0: A1
- Intrinsic Safety ATEX II 2 G Ex ib IIC T6...T1 Gb, Zone 1: A2
- Intrinsic Safety IECEx la IIC T6...T1 Ga, Zone 0: H1
- NEPSI Intrinsic Safety type of protection: Ex ia IIC T6 Ga: S1

**Mounting Type**

- Without fitting: F0
- Fixed connection: F1
- Compression fitting, clamp ring material PTFE: F2
- Compression fitting, clamp ring material stainless steel: F3
- Weld-on pad 25 mm x 25 mm x 3 mm (for Thermocouple): W2
- Weld-on pad 35 mm x 25 mm x 3 mm (for Pt100): W3
- Clamping adapter (please define clip separately): C1
- Others: Z9

**Sensor Type and Wiring**

- 1 x Pt100, two-wire circuit: P1
- 1 x Pt100, three-wire circuit: P2
- 1 x Pt100, four-wire circuit: P3
- 2 x Pt100, two-wire circuit: P4
- 2 x Pt100, three-wire circuit: P5
- 2 x Pt100, four-wire circuit: P6
- 1 x Type K (NiCr-NiAl): K1
- 2 x Type K (NiCr-NiAl): K2
- 1 x Type J (Fe-CuNi): J1
- 2 x Type J (Fe-CuNi): J2
- 1 x Type N (NiCrSi-NiSi): N1
- 2 x Type N (NiCrSi-NiSi): N2
- 1 x Type E (NiCr-CuNi): E1
- 2 x Type E (NiCr-CuNi): E2
- Others: Z9
## Ordering Information

<table>
<thead>
<tr>
<th>SensyTemp TSC420</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor / Accuracy Class</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Accuracy Class B, IEC 60751, Range −196 to 600 °C (−321 to 1112 °F)</td>
<td>B2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Double, Accuracy Class A, IEC 60751, Range 0 to 250 °C (32 to 482 °F)</td>
<td>D2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Accuracy Class A, IEC 60751, Range −100 to 450 °C (−148 to 842 °F)</td>
<td>D1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class B, IEC 60751, Range −50 to 400 °C (−58 to 752 °F)</td>
<td>S5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class A, IEC 60751, Range −30 to 300 °C (−22 to 572 °F)</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class AA, IEC 60751, Range 0 to 100 °C (32 to 212 °F)</td>
<td>S3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple, Accuracy Class 2, IEC 60584</td>
<td>T2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple, Accuracy Class 1, IEC 60584</td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mineral Insulated Cable Diameter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 mm</td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 mm</td>
<td>D3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5 mm</td>
<td>C5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 mm</td>
<td>D6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 mm, tip with sleeve 8.0 mm</td>
<td>H8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mineral Insulated Cable Material</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel 316Ti (1.4571)</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel 316L (1.4404)</td>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inconel Alloy 600 (2.4816)</td>
<td>J1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process Connection Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>Y0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread M8 x 1</td>
<td>M1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread G ¼ A</td>
<td>G1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread G ½ A</td>
<td>G2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tapered thread ¼ in. NPT</td>
<td>N1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tapered thread ½ in. NPT</td>
<td>N2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SensyTemp TSC420</td>
<td>XX</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical Connection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head type F / aluminium</td>
<td>C7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open wires, length 100 mm (4 in.), standard length</td>
<td>C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open wires, customer specific length</td>
<td>C8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple-plug, size: standard</td>
<td>C3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple-socket, size: standard</td>
<td>C4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemo-plug, size: 1S</td>
<td>C5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemo-socket, size: 1S</td>
<td>C6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length Unit of Measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millimeter (mm)</td>
<td>U1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inches (in.)</td>
<td>U3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SensyTemp TSC420</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certificates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, material monitoring for wetted parts</td>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>Declaration of compliance according EN 10204-2.1, with the order</td>
<td>C4</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, visual, dimensional and functional test</td>
<td>C6</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, single RTD</td>
<td>CD</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, double RTD</td>
<td>CE</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, single thermocouple</td>
<td>CF</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, double thermocouple</td>
<td>CG</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, single RTD, separate calibration certificate per thermometer</td>
<td>CH</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, double RTD, separate calibration certificate per thermometer</td>
<td>C3</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, single thermocouple, separate calibration certificate per thermometer</td>
<td>CK</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, double thermocouple, separate calibration certificate per thermometer</td>
<td>CL</td>
<td></td>
</tr>
</tbody>
</table>

| **Number of Calibration Test Points** | |
| 1 point | P1 |
| 2 points | P2 |
| 3 points | P3 |
| 4 points | P4 |
| 5 points | P5 |
### Ordering Information

<table>
<thead>
<tr>
<th>SenSyTemp TSC420</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperatures for Sensor Calibration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C (32 °F)</td>
<td>V1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 100 °C (212 °F)</td>
<td>V2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 400 °C (752 °F)</td>
<td>V3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C and 100 °C (32 °F and 212 °F)</td>
<td>V4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C and 400 °C (32 °F and 752 °F)</td>
<td>V5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C, 100 °C and 200 °C (32 °F, 212 °F and 392 °F)</td>
<td>V7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C, 200 °C and 400 °C (32 °F, 392 °F and 752 °F)</td>
<td>V8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: Customer specific temperatures</td>
<td>V6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C (32 °F)</td>
<td>D1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 100 °C (212 °F)</td>
<td>D2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 400 °C (752 °F)</td>
<td>D3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C and 100 °C (32 °F and 212 °F)</td>
<td>D4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C and 400 °C (32 °F and 752 °F)</td>
<td>D5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C, 100 °C and 200 °C (32 °F, 212 °F and 392 °F)</td>
<td>D7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C, 200 °C and 400 °C (32 °F, 392 °F and 752 °F)</td>
<td>D8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: Customer specific temperatures</td>
<td>D6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pipe Clamp</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 20 mm up to 40 mm</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 40 mm up to 60 mm</td>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 60 mm up to 80 mm</td>
<td>S3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 80 mm up to 100 mm</td>
<td>S4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 100 mm up to 120 mm</td>
<td>S5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 120 mm up to 140 mm</td>
<td>S6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 140 mm up to 160 mm</td>
<td>S7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 160 mm up to 180 mm</td>
<td>S8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 180 mm up to 200 mm</td>
<td>S9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter more than 200 mm</td>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Options</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot junction grounded</td>
<td>J1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral insulated cable sealed, up to 200 °C (392 °F)</td>
<td>J6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Documentation Language</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>German</td>
<td>M1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>M5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)</td>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional TAG Plate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel plate with TAG no., lasered</td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SensyTemp TSC430

<table>
<thead>
<tr>
<th>Base model</th>
<th>TSC430</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC430 Sheated cable thermometer with connection cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explosion Protection Certification**

- Without explosion protection: Y0
- Intrinsic Safety ATEX II 1 G Ex ia IIC T6...T1 Ga, Zone 0: A1
- Intrinsic Safety ATEX II 2 G Ex ib IIC T6...T1 Gb, Zone 1: A2
- Intrinsic Safety IECEx ia IIC T6...T1 Ga, Zone 0: H1
- NEPSI Intrinsic Safety type of protection: Ex ia IIC T6 Ga: S1

**Mounting Type**

- Without fitting: F0
- Fixed connection: F1
- Compression fitting, clamp ring material PTFE: F2
- Compression fitting, clamp ring material stainless steel: F3
- Weld-on pad 25 mm x 25 mm x 3 mm (for Thermocouple): W2
- Weld-on pad 35 mm x 25 mm x 3 mm (for Pt100): W3
- Clamping adapter (please define clip separately): C1
- Others: Z9

**Sensor Type and Wiring**

- 1 x Pt100, 2-wire: P1
- 1 x Pt100, 3-wire: P2
- 1 x Pt100, 4-wire: P3
- 2 x Pt100, 2-wire: P4
- 2 x Pt100, 3-wire: P5
- 2 x Pt100, 4-wire: P6
- 1 x Type K (NiCr-NiAl): K1
- 2 x Type K (NiCr-NiAl): K2
- 1 x Type J (Fe-CuNi): J1
- 2 x Type J (Fe-CuNi): J2
- 1 x Type N (NiCrSi-NiSi): N1
- 2 x Type N (NiCrSi-NiSi): N2
- 1 x Type E (NiCr-CuNi): E1
- 2 x Type E (NiCr-CuNi): E2
- Others: Z9
### Ordering Information

<table>
<thead>
<tr>
<th>Main ordering information SensyTemp TSC430</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor / Accuracy Class</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Accuracy Class B, IEC 60751, Range -196 to 600 °C (-321 to 1112 °F)</td>
<td>B2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Double, Accuracy Class A, IEC 60751, Range 0 to 250 °C (32 to 482 °F)</td>
<td>D2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Wound, Accuracy Class A, IEC 60751, Range -100 to 450 °C (-148 to 842 °F)</td>
<td>D1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class B, IEC 60751, Range -50 to 400 °C (-58 to 752 °F)</td>
<td>S5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class A, IEC 60751, Range -30 to 300 °C (-22 to 572 °F)</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Film, Accuracy Class AA, IEC 60751, Range 0 to 100 °C (32 to 212 °F)</td>
<td>S3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple, Accuracy Class 2, IEC 60584</td>
<td>T2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple, Accuracy Class 1, IEC 60584</td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mineral Insulated Cable Diameter</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 mm</td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 mm</td>
<td>D3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5 mm</td>
<td>C5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 mm</td>
<td>D6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 mm, tip with sleeve 8.0 mm</td>
<td>H8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mineral Insulated Cable Material</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel 316Ti (1.4571)</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel 316L (1.4404)</td>
<td>S2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inconel Alloy 600 (2.4816)</td>
<td>J1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Connection Type</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Without</td>
<td>Y0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread M8 x 1</td>
<td>M1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread G 1/4 A</td>
<td>G1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel thread G 1/2 A</td>
<td>G2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tapered thread 1/4 in. NPT</td>
<td>N1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tapered thread 1/2 in. NPT</td>
<td>N2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Connection</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Open wires</td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple-plug, size: standard</td>
<td>C3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple-socket, size: standard</td>
<td>C4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemo-plug, size: 1S</td>
<td>C5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemo-socket, size: 1S</td>
<td>C6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Main ordering information SensyTemp TSC430

<table>
<thead>
<tr>
<th>Connection Cable Type</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3 (PVC / PVC), up to 105 °C (221 °F)</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>JFJ (PVC/Alu Foil with additional tinned wire 0.50 mm/PVC), up to 105 °C (221 °F)</td>
<td>P3</td>
<td></td>
</tr>
<tr>
<td>SLSLGL (silicone / silicone / glas fibre) up to 200°C (392 °F)</td>
<td>S3</td>
<td></td>
</tr>
<tr>
<td>TFT (PFA / Alu Foil / PFA), up to 200 °C (392 °F)</td>
<td>T2</td>
<td></td>
</tr>
<tr>
<td>TFTV (PFA / Alu Foil / PFA / SST wire braid), up to 200 °C (392 °F)</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>TGLV (PFA / Glas fibre / SST wire braid), up to 200 °C (392 °F)</td>
<td>T4</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Z9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length Unit of Measure</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Millimeter (mm)</td>
<td>U1</td>
<td></td>
</tr>
<tr>
<td>Inches (in.)</td>
<td>U3</td>
<td></td>
</tr>
</tbody>
</table>

# Additional ordering information

<table>
<thead>
<tr>
<th>SenSyTemp TSC430</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, material monitoring for wetted parts</td>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>Declaration of compliance according EN 10204-2.1, with the order</td>
<td>C4</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, visual, dimensional and functional test</td>
<td>C6</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, single RTD</td>
<td>CD</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, double RTD</td>
<td>CE</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, single thermocouple</td>
<td>CF</td>
<td></td>
</tr>
<tr>
<td>Inspection certificate according EN 10204-3.1, sensor calibration, double thermocouple</td>
<td>CG</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, single RTD, calibration certificate per thermometer</td>
<td>CH</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, double RTD, calibration certificate per thermometer</td>
<td>C3</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, single thermocouple, calibration certificate per thermometer</td>
<td>CK</td>
<td></td>
</tr>
<tr>
<td>DAkkS sensor calibration, double thermocouple, calibration certificate per thermometer</td>
<td>CL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Calibration Test Points</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
<th>4 points</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>P2</td>
<td>P3</td>
<td>P4</td>
<td>P5</td>
<td></td>
</tr>
</tbody>
</table>
… Ordering Information

<table>
<thead>
<tr>
<th>SensyTemp TSC430</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperatures for Sensor Calibration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C (32 °F)</td>
<td>V1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 100 °C (212 °F)</td>
<td>V2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 400 °C (752 °F)</td>
<td>V3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C and 100 °C (32 °F and 212 °F)</td>
<td>V4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C and 400 °C (32 °F and 752 °F)</td>
<td>V5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C, 100 °C and 200 °C (32 °F, 212 °F and 392 °F)</td>
<td>V7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: 0 °C, 200 °C and 400 °C (32 °F, 392 °F and 752 °F)</td>
<td>V8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard calibration: Customer specific temperatures</td>
<td>V6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C (32 °F)</td>
<td>D1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 100 °C (212 °F)</td>
<td>D2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 400 °C (752 °F)</td>
<td>D3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C and 100 °C (32 °F and 212 °F)</td>
<td>D4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C and 400 °C (32 °F and 752 °F)</td>
<td>D5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C, 100 °C and 200 °C (32 °F, 212 °F and 392 °F)</td>
<td>D7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: 0 °C, 200 °C and 400 °C (32 °F, 392 °F and 752 °F)</td>
<td>D8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAkkS calibration: customer specific temperatures</td>
<td>D6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pipe Clamp</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td>S0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 20 mm up to 40 mm</td>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 40 mm up to 60 mm</td>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 60 mm up to 80 mm</td>
<td>S3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 80 mm up to 100 mm</td>
<td>S4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 100 mm up to 120 mm</td>
<td>S5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 120 mm up to 140 mm</td>
<td>S6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 140 mm up to 160 mm</td>
<td>S7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 160 mm up to 180 mm</td>
<td>S8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter 180 mm up to 200 mm</td>
<td>S9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping diameter more than 200 mm</td>
<td>SZ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Options</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot junction grounded</td>
<td>J1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral insulated cable, sealed, up to 200 °C (392 °F)</td>
<td>J6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-kink spring for connecting cable</td>
<td>J8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Documentation Language</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>German</td>
<td>M1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>M5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)</td>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional TAG Plate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel plate with TAG no.</td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC400 Commissioning Instruction, German</td>
<td>3KXT121400R4403</td>
</tr>
<tr>
<td>TSC400 Commissioning Instruction, English</td>
<td>3KXT121400R4401</td>
</tr>
<tr>
<td>TSC400 Commissioning Instruction, Language package Western Europe / Scandinavia</td>
<td>3KXT121400R4493</td>
</tr>
<tr>
<td>TSC400 Commissioning Instruction, Language package Eastern Europe</td>
<td>3KXT121400R4494</td>
</tr>
</tbody>
</table>
Trademarks

Inconel is a registered trademark of Special Metals Corporation
- Measurement made easy
- For plug-in connection
- For screw-in connection
- For surface measurement

Areas of application
- Universal application in general process engineering, tank and piping construction, mechanical and plant engineering

Electrical connections
- With compression fitting and fixed screw-in connection
- With weld-on plate for permanent surface measurement
- With molded part for tension clip mounting

Benefits
- Fastest possible measuring results through direct contact of the mineral insulated cable with the medium
- Widest application ranges through optimum sheath materials
- Subsequent installation possible by surface mounting
- Optimal usage due to a combination of mechanical and electrical interfaces
- Global approvals for explosion protection up to Zone 0
ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/temperature

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

Copyright© 2021 ABB
All rights reserved