MANUAL

T1026

Cable Resistance Temperature Sensors for Cryogenic Temperatures

- Measuring resistor 1x / 2x Pt100.
- Measuring range -200 až +180 °C.
- Accuracy class A, B according to EN 60751.
- High resistance to temperature shock.
- Stainless steel design.
- Selectable length of immersion.
- Selectable diameter of stem.
- Selectable size of connection thread.
- Selectable length of extension cable.
- Housing IP 67.

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Content

1. General instructions and information

1.1 Symbols used

Symbol of warning; for safe use it is necessary to proceed according to the instructions

This product does not belong to public waste and it is subjected to separate collection

1.2 Safety warnings and cautions

The equipment may be installed only by a qualified personnel who are familiar with national and international laws, directives, standards and with the instructions manual. The equipment shall be supplied from a safe voltage source that meets all requirements of the standard EN 61010-1 and must be-installed in compliance with national requirements and standards providing safety.

The instrument may not be used for other purposes than as specified in this instruction manual. For elimination of a risk of injury from electric shock or fire, the maximum operational parameters of the instrument may not be exceeded.

1.3 Scope of delivery

With the product is delivered:

- Manual for installation, operation and maintenance,
- Certificate of calibration (only with calibrated sensors).

1.4 Description of the delivery and packing

The product is packaged in a protective cover and provided with an identification label with a mark of the output control.

The product must not be exposed to direct rain, vibrations and shocks during transport.

1.5 Storage

The product shall be stored at temperatures from 5 to 35 °C and maximum relative humidity 80 % in the rooms with elimination of condensation of water vapours on the products. The stored products shall not be exposed to any shocks, vibrations and effects of harmful vapours and gases.

1.6 Installation and commissioning

During installation, commissioning, operation and maintenance follow the instructions in chapter 4.

1.7 Spare parts

Any of the compact parts of the product can be also ordered as a spare part if there are not required special procedures or technological operations for the exchange.

1.8 Repairs

Products are repaired by the manufacturer. The products for repair should be sent in a packing that guarantees damping of shocks and vibrations and protects against damage during transport.

1.9 Warranty

Products are covered by a warranty for a period of 24 months from the delivery date on the delivery note. The manufacturer guarantees technical and operational parameters of the products within scope of the applicable documentation. Warranty period is specified with individual items and begins from the day of takeover of the goods by the purchaser or delivery to the carrier. Any claims concerning to defects of the goods together can be filed in writing with the manufacturer within the warranty period and the claimed product shall be presented. The claiming party shall give identification of the product, number of the delivery note and description of the fault or defect.

The manufacturer is not responsible for any defects caused by improper storage, incorrect connection, damages caused by external effects, in particular by effects of factors with excessive values, unqualified installation, improper operation or common wearing.

2. End of service and disposal

2.1 End of service

Before removing and ending of service of the sensor is at first necessary to switch the control loop to manual operation, or take other appropriate action to prevent potential harm associated with the end of sensor operation. Connected power supply is switched off and connecting wires of the sensor are disconnected (cut off).

2.2 Disposal

The products do not contain any environmentally hazardous parts. When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations.

3. Product description

T1026
Cable Resistance Temperature Sensors for Cryogenic Temperatures

- Measuring resistor 1x / 2x Pt100.
- Measuring range -200 až +180 °C.
- Accuracy class A, B according to EN 60751.
- High resistance to temperature shock.
- Stainless steel design.
- Selectable length of immersion.
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- Selectable length of extension cable.
- Housing IP 67.

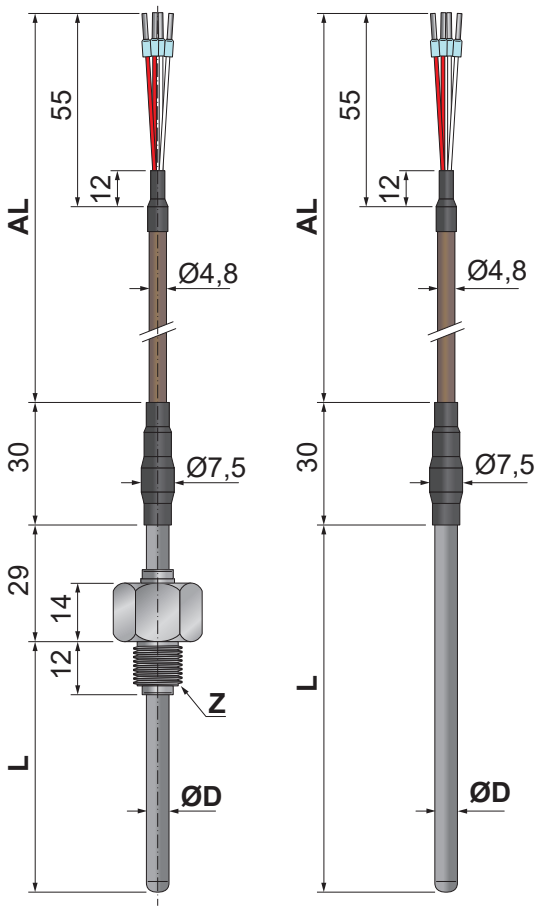
3.1 Application

Cable resistance temperature sensors T1026 with firmly connected connection wires are designed for measuring in areas with cryogenic temperatures. Construction of the sensors allows measuring in areas with repeated abrupt temperature changes in the range -200 to +180 °C.

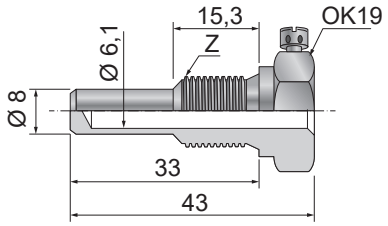
3.2 Description

Sensor is made of one or two measuring resistors Pt100 embedded in the ceramic housing and metal protective tube. Sensor terminals are firmly connected to the extension wires with cooper wires and FEP insulation, cooper screen and outer silicone insulation. Version without welded connecting pipe union is mounted to the technology by fixing shift pipe union or into protective thermowell. Version with welded connecting pipe union on the protective tube of the sensor is screwed into welded on piece or into inner thread in the technology.

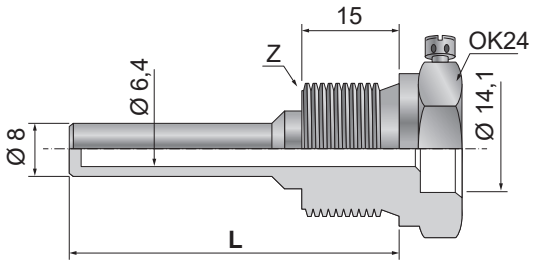
3.3 Dimensional drawings



Thermowells, stainless steel 1.4541 for PN 63

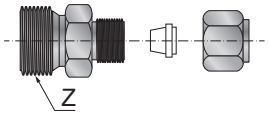


version A for code S60 M00

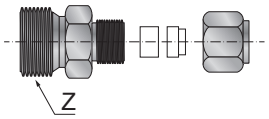


version C for code S60 M00

Fixing shift pipe union



version PS



version PT

4. Installation, operation and maintenance

4.1 Installation and commissioning

4.1.1 General

Sensor shall be fixed by screwing inside of the welded-on piece of pipe or technological equipment. Thermowells of the sensors shall be fixed by corresponding connecting pipe union into direct or oblique welded-on piece into pipe etc. When installing the sensor into thermowell type A, sensor is inserted to the bottom of the thermowell and secured by a screw on the side of the thermowell (connection thread shall be treated against galling and for easy mounting and dismounting especially to stainless steel fitting). When installing the sensor with stainless steel housing into thermowell type C, sensor is inserted to the bottom of the thermowell and secured by screwing cap nut with safety copper ring. All versions of the thermowells allow sealing against unauthorized manipulation. Sealing is performed by authorized worker during commissioning.

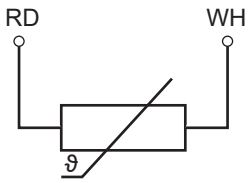
Sensors are connected to the evaluating device by connecting copper wire (cable). In case of two-wire sensor is needed to count with internal resistance of the cable. The value of the internal resistance per meter is listed on the type plate.

4.1.2 Commissioning

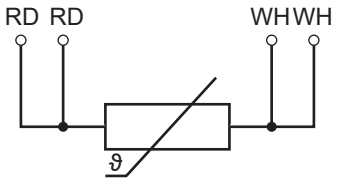
Sensor is ready for operation after connection of connection wires between the sensor terminals and terminals of the associated apparatus.

4.1.3 Electrical connection

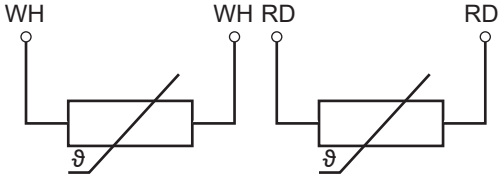
Description: RD - red, WH - white



1x Pt100, two-wire



1x Pt100, four-wire



2x Pt100, two-wire

4.2 Operation and maintenance

The product does not need any maintenance.

It is recommended to check the mounting of the sensor at preselected intervals.

To ensure metrological parameters of the sensors, periodic checks of calibration parameters must be performed. Period of calibrations is set by the user and it is based on operating conditions and internal metrology regulations. Manufacturer's recommended period is 12 months. If there is during the calibration found calibration difference from the expected metrological parameters, it is necessary to replace the sensor.

5. Product specifications

5.1 Technical specifications

Measuring resistor:
1x Pt100 accuracy class A, B according to EN 60751,
four-wire inside wiring (cable 4x 0,22 mm²)
two-wire inside wiring (cable 2x 0,50 mm²)
2x Pt100 accuracy class B according to EN 60751,
two-wire inside wiring (cable 4x 0,22 mm²)

Measuring range:
-200 to +180 °C (in accuracy class B)

Measuring current:

recommended	0,3 to 1 mA
maximal	3 mA

Dielectric strenght:
500 Vef

Electrical insulation resistance:
min. 100 MΩ according to EN 60751,
at temperature (25 ±10)°C
max. 80 % relative humidity

Used materials:
thermowell, pipe union – stainless steel 1.4541 (AISI 321)
inside wiring – Cu
core insulation – PFA
cable insulation – silikon

Connecting wires resistance R3 for two-wire connection:
cable 4x 0,22 mm² ... 0,17 Ω/m (two cores)
cable 2x 0,50 mm² ... 0,08 Ω/m (two cores)

Housing:
IP 67

5.2 Metrological parameters

Temperature sensors can be supplied:
as sensors with calibration,
as sensors without calibration.

Tolerance limits of accuracy classes are listed in EN 60751. The initial tolerance is related to the initial calibration of the sensor. Drift of the sensor meets the requirements of EN 60751, Sec. 6.5.3. To ensure accuracy of measurement, it is necessary to calibrate sensors periodically according to the operating parameters. Sensors can be supplied with calibration at several temperature points, according to customer requirements.

6. Tests, certifications, standards and labeling

6.1 Standards and government regulations (European directives)

Electromagnetic compatibility:
EN IEC 61326-1:2022

RoHS:
2011/65/EU

6.2 Labeling and tag data

T1026 06 1 S60 L250 M12 AL6000 I1 00
... type number (ordering code)

1xPT100/B/4
... number of sensors, sensor material, basic resistance value, accuracy class, inside wiring version

-200 až 180 °C ... measuring range

3333333 ... serial number

IP67 ... housing

JSP, s.r.o. ... manufacturer adress
Raisova 547
50601 Jičín
Czech Republic

logo and website of JSP, s.r.o.

CE ... mark of conformity

7. Ordering

7.1 Ordering table

Cable resistance temperature sensor for cryogenic temperatures — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

Temperature sensor — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

1. code	Description	Inside wiring
04	1× Pt100, 2-wire	Cu / 0,56 mm²
06	1× Pt100, 4-wire	Cu / 0,22 mm²
08	2× Pt100, 2-wire	Cu / 0,22 mm²

Accuracy class — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

2. code	Accuracy class according to EN 60751	
1	B in range -200 to +180 °C	
2	A in range -30 to +180 °C	only for 4-wire. and in range -30 to +180 °C

Stem — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

3. code	Outer diameter of stem D	Stem material
S40	4 mm	1.4401
S50	5 mm	1.4541
S60	6 mm	1.4541

Nominal length L — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

4. code	Immersion length L	for version with thread
L065	65 mm	
L100	100 mm	
L160	160 mm	
L250	250 mm	
L___	other – length in mm must be added to the code	
4. code	**Immersion length L**	**for version without thread – code M00**
L095	95 mm	
L130	130 mm	
L190	190 mm	
L280	280 mm	
L___	other – length in mm must be added to the code	

Proccess connection — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

5. code	Thread Z	Thread length L2	
M00	without connecting pipe union	–	not for stem diameter 4 and 5 mm
M10	M10 outer	7,5 mm	
G14	G1/4" outer	12 mm	
M12	M12 outer	12 mm	
P20	diameter 20 mm, height 7 mm (for cap nut)		

Extension cable – length — **T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧**

6. code	Length AL
AL1000	1000 mm
AL1600	1600 mm
AL2500	2500 mm

6. code	Length AL
AL4000	4000 mm
AL6000	6000 mm
AL____	other – length in mm must be added to the code (in 100mm steps)

Extension cable – insulation — T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

7. code	Outer insulation / shield / inner insulation
I1	silikon / Cu braid / teflon FEP

Extension cable – termination — T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

8. code	Description
01	nsulated pressing tube according to DIN 46228

Optional accessories — T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ...

Code	Calibration in customer defined points, including certificate of calibration
KTE31A	Resistance temperature sensor calibration in three points in range -40 to +180 °C
KTE41A	Resistance temperature sensor calibration in four points in range -40 to +180 °C
KTE51A	Resistance temperature sensor calibration in five points in range -40 to +180 °C
KTE31B	Resistance temperature sensor calibration in three points in range (-196 °C; -75 to +180 °C)
KTE41B	Resistance temperature sensor calibration in four points in range (-196 °C; -75 to +180 °C)
KTE51B	Resistance temperature sensor calibration in five points in range (-196 °C; -75 to +180 °C)
Code	**Thermowell (only for S60 M00)**
J01	version A, length L=33 mm, material stainless steel 1.4541, PN 63, thread G1/4"
J02	version A, length L=33 mm, material stainless steel 1.4541, PN 63, thread M12x1,5
J11	version C, length L=100 mm, material stainless steel 1.4541, PN 63, thread G1/2"
J12	version C, length L=150 mm, material stainless steel 1.4541, PN 63, thread G1/2"
J13	version C, length L=85 mm, material stainless steel 1.4541, PN 63, thread G1/2"
J14	version C, length L=120 mm, material stainless steel 1.4541, PN 63, thread G1/2"
J15	version C, length L=210 mm, material stainless steel 1.4541, PN 63, thread G1/2"
J16	version C, length L=100 mm, material stainless steel 1.4541, PN 63, thread M20x1,5
J17	version C, length L=150 mm, material stainless steel 1.4541, PN 63, thread M20x1,5
J18	version C, length L=85 mm, material stainless steel 1.4541, PN 63, thread M20x1,5
J19	version C, length L=120 mm, material stainless steel 1.4541, PN 63, thread M20x1,5
J20	version C, length L=210 mm, material stainless steel 1.4541, PN 63, thread M20x1,5

Example of order:

T1026 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

↓

T1026 06 1 S50 L065 G14 AL6000 I1 00
KTE31A (-40, 0, 20 °C)

Fixing shift pipe union for sheath temperature sensor P① ② ③

Version P① ② ③

1. code	Description	T_{MAX}	p_{MAX}
S	With stainless steel cutting ring, pipe union of stainless steel material	600 °C / 0,1 MPa	4 MPa / 100 °C
T	With PTFE sealing ring, pipe union of stainless steel material	200 °C / 0,1 MPa	0,6 MPa / 100 °C

*1 – Adjustable nominal length only for first time of mounting. *2 – Always adjustable nominal length.

Connection thread Z P① ② ③

2. code	Description	
M02	M12×1,5	only for sensors with outer diameter of stem 3 to 6 mm (not for version PB)
M03	M16×1,5	only for sensors with outer diameter of stem 3 to 6 mm
M04	M20×1,5	only for sensors with outer diameter of stem 3 to 6 mm
G02	G1/4"	only for sensors with outer diameter of stem 3 to 6 mm
G03	G3/8"	only for sensors with outer diameter of stem 3 to 6 mm
G04	G1/2"	only for sensors with outer diameter of stem 3 to 6 mm
N02	1/4" NPT	only for sensors with outer diameter of stem 3 to 6 mm
N03	3/8" NPT	only for sensors with outer diameter of stem 3 to 6 mm
N04	1/2" NPT	only for sensors with outer diameter of stem 3 to 6 mm

Outer diameter of sensor stem P① ② ③

3. code	Description
D60	6 mm

Example of order:

P① ② ③ → PS M04 D30

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