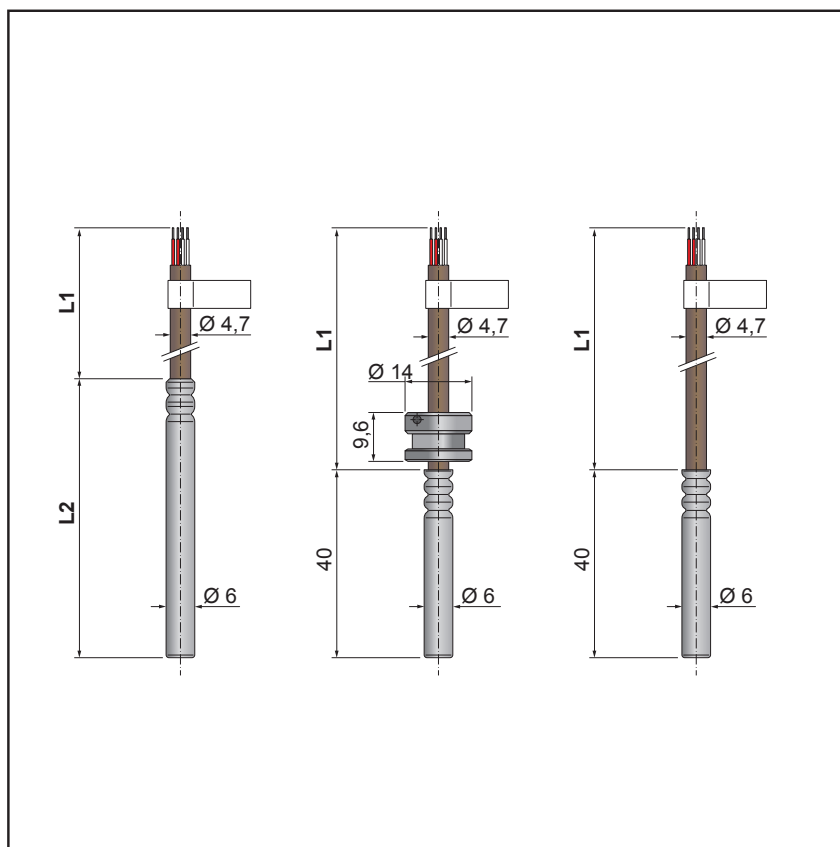


MANUAL

T1027

Cable Resistance Temperature Sensors



- Measuring resistor 1x / 2x Pt100, Pt1000 according to EN 60751
- Measuring resistor 1x Ni1000 according to DIN 43760
- Measuring range -40 to +180 °C (sensors Pt)
-50 to +150 °C (sensors Ni)
- Accuracy class A, B according to EN 60751
- Stem material stainless steel 1.4541, brass
- Selectable thermowell sensor PN 63
- Housing IP 67

Contents

1. General instructions and information	3
1.1 Symbols used.....	3
1.2 Safety warnings and cautions.....	3
1.3 Scope of delivery.....	3
1.4 Description of the delivery and packing.....	3
1.5 Storage.....	3
1.6 Installation and commissioning.....	3
1.7 Spare parts.....	3
1.8 Repairs.....	3
1.9 Warranty.....	3
2. End of service and disposal	3
2.1 End of service.....	3
2.2 Disposal.....	3
3. Product description	4
3.1 Application.....	4
3.2 Description.....	4
3.3 Dimensional drawings.....	4
4. Installation, operation and maintenance	5
4.1 Installation and commissioning.....	5
4.2 Operation and maintenance.....	5
5. Product specifications	5
5.1 Technical specifications.....	5
5.2 Metrological parameters.....	6
6. Ordering information	6
6.1 Ordering table.....	6

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

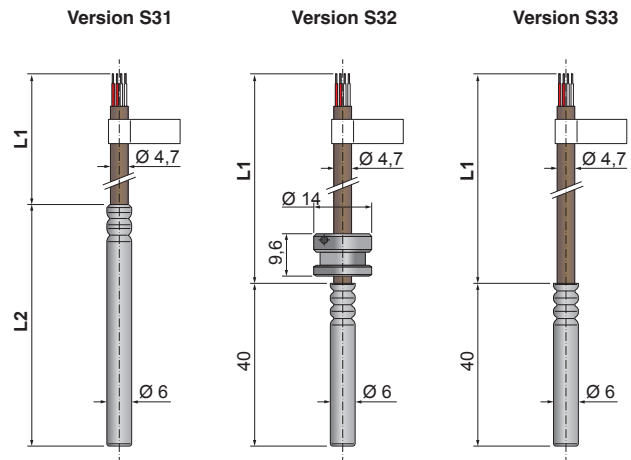


The products do not contain any environmentally hazardous parts. When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations.

3. Product description

T1027 Cable Resistance Temperature Sensors

- Measuring resistor 1x / 2x Pt100, Pt1000 according to EN 60751
- Measuring resistor 1x Ni1000 according to DIN 43760
- Measuring range -40 to +180 °C (sensors Pt) -50 to +150 °C (sensors Ni)
- Accuracy class A, B according to EN 60751
- Stem material stainless steel 1.4541, brass
- Selectable thermowell sensor PN 63
- Housing IP 67



3.1 Application

Cable resistance temperature sensors T1027 have firmly connected connection wires in a form of cable. They are designed for remote measuring of temperature of liquid and gaseous media.

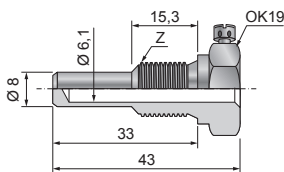
3.2 Description

Resistance sensor is made of one or two measuring resistors, embedded in a metal stem of measuring insert and connected to connection wires. There is used defined resistance change according to temperature change. Measuring inserts are inserted into thermowells, where they are fixed by a sealing fitting or by aluminum ring. Thermowells are mounted to a pipe by a shift pipe union into a straight or an oblique welded on piece etc.

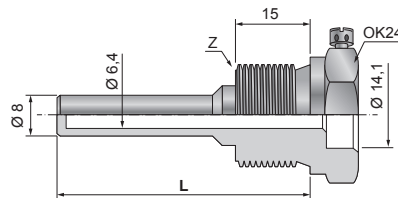
3.3 Dimensional drawings

Thermowells - stainless steel 1.4541 for PN 63

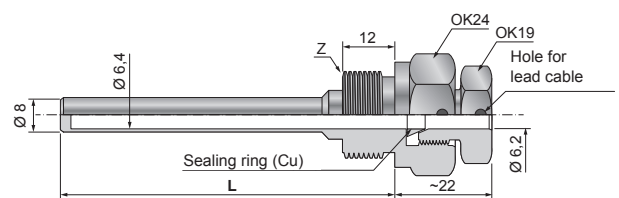
Version A for code S31, S33



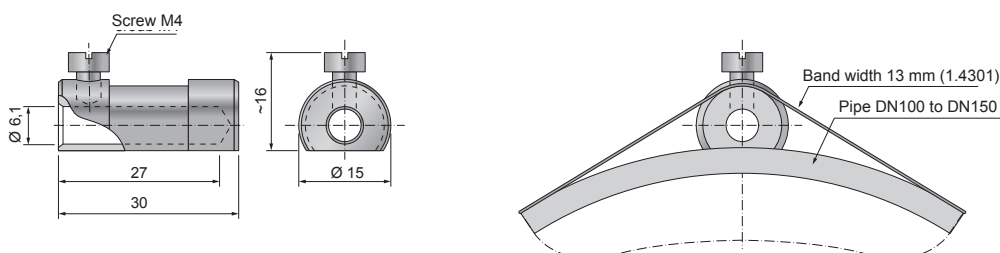
Version B for code S32



Version C for code S31



Brass sleeve



4. Installation, operation and maintenance

4.1 Installation and commissioning

4.1.1 General

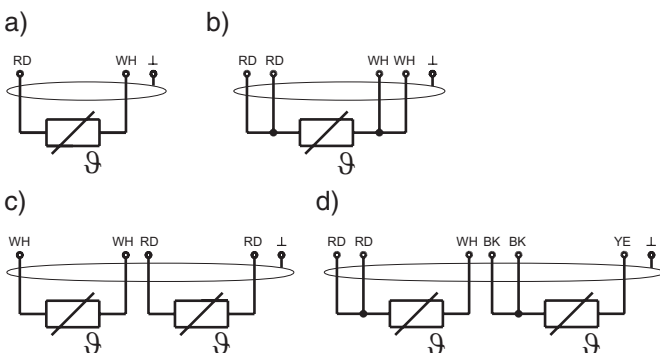
Sensors shall be fixed by screwing inside of the welded on piece of pipe or technological equipment. Thermowells of the sensors shall be fixed by corresponding connecting pipe union into direct or oblique welded on piece into pipe etc. When installing the sensor with brass sleeve into thermowell type A, sensor is inserted to the bottom of the thermowell and it is secured by a screw on the side of the thermowell. Connection thread of stainless steel version shall be treated against galling and for easy mounting and dismantling especially during installation to stainless steel fitting). When installing the sensor into thermowell type B, Teflon distance tube (included in the delivery) is slipped over the sensor cable between a brass sleeve and seal ring. Sensor is inserted to the bottom of the thermowell and secured by a screw on the side of the thermowell. Side screw is screwed to a groove of she sealing ring. When installing the sensor with stainless steel housing into thermowell type C, sensor is inserted to the bottom of the thermowell and it is 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. When the sensor is used in environment with increased interference level, it is recommended to connect the shield wire according to usual engineering practice. Shielding is not electrically connected to the stem.

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



- a) 1x Pt100, Pt1000, Ni1000, two-wire
- b) 1x Pt100, Pt1000, Ni1000, four-wire
- c) 2x Pt100, Pt1000, two-wire
- d) 2x Pt100, Pt1000, three-wire

RD - red, WH - white, BK - black, YE - yellow, ⊥ - shielding

Note: Shielding is not electrically connected to the stem.

4.2 Operation and maintenance

Sensors do not need any maintenance.

It is recommended to check the mounting of the sensors 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 difference from the expected metrological parameters, it is necessary to replace the sensor.

5. Product specifications

5.1 Technical specifications

Measuring resistor:

1xPt100, 1xPt1000, 1xNi1000
 accuracy class A, B according to EN 60751,
 two-wire inside wiring (cable 2x0.50 mm²),
 four-wire inside wiring (cable 4x0.22 mm²),
 2xPt100, 2xPt1000
 accuracy class B according to EN 60751,
 two-wire inside wiring (cable 4x0.22 mm²),
 accuracy class A, B according to EN 60751,
 three-wire inside wiring (cable 6x0.22 mm²)

Measuring range:

-40 to +180 °C (sensor Pt)
 -50 to +150 °C (sensor Ni)

Measuring current:

Pt100	0.3 to 1 mA
Pt1000	0.1 to 0.3 mA
Ni1000	up to 0.8 mA

Dielectric strength: 500 V eff

Electrical insulation resistance:

min. 100 MOhm according to EN 60751,
 at temperature (25 ±10)°C
 max. 80 % relative humidity

Used materials:

thermowell
 - stainless steel 1.4541 (AISI 321)
 stem
 - brass
 - stainless steel 1.4541 (AISI 321)
 inside wiring - Cu
 protective metal tube
 - stainless steel AISI 410

Connecting wires resistance R₃ for two-wire connection:

- cable 4x0.22 mm² ... 0.17 Ohm/m (two cores)
 - cable 2x0,50 mm² ... 0.08 Ohm/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. Ordering information

6.1 Ordering table

Type	Description	
• T1027-2	Cable resistance temperature sensor	
Code	Temperature sensor	Measuring range
• 01	1xPt100, four-wire inside wiring	-40 to +180 °C
◦ 03	1xPt1000, four-wire inside wiring	-40 to +180 °C
◦ 21	1xPt100, two-wire inside wiring	-40 to +180 °C
◦ 23	1xPt1000, two-wire inside wiring	-40 to +180 °C
◦ 04	2xPt100, two-wire inside wiring	-40 to +180 °C
◦ 06	2xPt1000, two-wire inside wiring	-40 to +180 °C
◦ 54	2xPt100, three-wire inside wiring	-40 to +180 °C
◦ 56	2xPt1000, three-wire inside wiring	-40 to +180 °C
◦ 33	1xNi1000 (W100 = 1,6180), two-wire inside wiring	-50 to +150 °C
13	1xNi1000 (W100 = 1,6180), four-wire inside wiring	-50 to +150 °C
99	Other	
Code	Accuracy class according to EN 60751 (Pt and Ni sensors)	
• 1	B	
◦ 2	A (only for sensors with four-wire or three-wire inside wiring)	
Code	Nominal length L2 [mm]	
• 104	40 (not for code S31)	
◦ 111	111 (not for code S32 and S33)	
◦ 112	126 (not for code S32 and S33)	
114	146 (not for code S32 and S33)	
117	176 (not for code S32 and S33)	
123	236 (not for code S32 and S33)	
999	Other	
Code	Stem - outer diameter of stem [mm]	Stem coat material
◦ S31	∅ 6 (for nominal lengths L2 = 111, 126, 146, 176 and 236 mm)	1.4541
• S32	∅ 6 (for nominal length L2 = 40 mm) + seal ring	brass
◦ S33	∅ 6 (for nominal length L2 = 40 mm)	brass
Code	Cable - nominal length L1 [mm]	
• K216	1600	
◦ K220	2000	
• K225	2500	
• K240	4000	
• K260	6000	
◦ K280	8000	
◦ K310	10000	
◦ K312	12000	
◦ K314	14000	
◦ K316	16000	
◦ K318	18000	
◦ K320	20000	
K999	Other	
Code	Outer insulation / shield / inner insulation	Ambient temperature of cable
• 01	Silicone isolation / copper braiding / FEP	-50 to +180 °C
Code	Cable termination	
• 00	Flying leads	
Code	OPTIONAL ACCESSORIES	
	Cable protection	
D070 (...)	Protective steel conduit with outer diameter 7 mm, material SS410 (specify in brackets the length of conduit in mm) (only for code 31)	
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	
KTE9	Other	

• ... Ex stock version

◦ ... Marked version can be dispatched up to 5 working days (with calibration up to two weeks)

Code	Thermowell
• J01	Thermowell, version A, length L=33 mm, stainless steel 1.4541, PN 63, G1/4" thread (for code S33 and S31)
◦ J02	Thermowell, version A, length L=33 mm, stainless steel 1.4541, PN 63, M12x1.5 thread (for code S33 and S31)
• J03	Thermowell, version B, length L=54 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S32)
• J04	Thermowell, version B, length L=100 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S32)
◦ J05	Thermowell, version B, length L=160 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S32)
◦ J06	Thermowell, version B, length L=54 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S32)
◦ J07	Thermowell, version B, length L=100 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S32)
◦ J08	Thermowell, version B, length L=160 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S32)
◦ J11	Thermowell, version C, length L=100 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S31)
◦ J12	Thermowell, version C, length L=150 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S31)
◦ J13	Thermowell, version C, length L=85 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S31)
◦ J14	Thermowell, version C, length L=120 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S31)
◦ J15	Thermowell, version C, length L=210 mm, stainless steel 1.4541, PN 63, G1/2" thread (for code S31)
◦ J16	Thermowell, version C, length L=100 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S31)
◦ J17	Thermowell, version C, length L=150 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S31)
◦ J18	Thermowell, version C, length L=85 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S31)
◦ J19	Thermowell, version C, length L=120 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S31)
◦ J20	Thermowell, version C, length L=210 mm, stainless steel 1.4541, PN 63, M20x1.5 thread (for code S31)
J99	Other
Code	Welded on pieces
• N01	Straight welded on piece G1/4", L=22 mm, carbon steel
• N02	Straight welded on piece M12x1.5, L=22 mm, carbon steel
• N03	Straight welded on piece G1/2", L=20 mm, carbon steel
• N04	Straight welded on piece M20x1.5, L=20 mm, carbon steel
• N05	Oblique welded on piece G1/4", L=19 mm, carbon steel
• N06	Oblique welded on piece M12x1.5, L=19 mm, carbon steel
• N07	Oblique welded on piece G1/2", L=26 mm, carbon steel
• N08	Oblique welded on piece M20x1.5, L=26 mm, carbon steel
◦ N11	Straight welded on piece G1/2", L=70 mm, carbon steel
◦ N12	Oblique welded on piece G1/2", L=70 mm, carbon steel
N99	Other
Code	Sleeve, mounting band and machine
• PP1	Sleeve for stem diameter 6 mm, material brass, with mounting band and machine, material stainless steel 1.4301, use up to 400 °C, for attaching a pipe up to 60 mm
• PP2	Sleeve for stem diameter 6 mm, material brass, with mounting band and machine, material stainless steel 1.4301, use up to 400 °C, for attaching a pipe from 60 to 90 mm
• PP3	Sleeve for stem diameter 6 mm, material brass, with mounting band and machine, material stainless steel 1.4301, use up to 400 °C, for attaching a pipe from 90 to 140 mm
• PP4	Sleeve for stem diameter 6 mm, material brass, with mounting band and machine, material stainless steel 1.4301, use up to 400 °C, for attaching a pipe from 140 to 220 mm
Example of order: T1027-2 01 1 111 S31 K216 01 00 D070(1400) KTE31A (-40, 50, 150 °C)	

Type	OPTIONAL ACCESSORIES		
	Description		
• P	Fixing shift pipe union for sheath temperature sensor		
Code	Version	T _{max}	P _{max}
• S ¹⁾	With stainless steel cutting ring, pipe union of stainless steel material	600 °C / 0.1 MPa	4 MPa / 100 °C
• T ²⁾	With PTFE sealing ring, pipe union of stainless steel material	200 °C / 0.1 MPa	0.6 MPa / 100 °C
Code	Connection thread Z		
• M02	M12x1.5		
• M03	M16x1.5		
• M04	M20x1.5		
• G02	G1/4"		
• G03	G3/8"		
• G04	G1/2"		
N02	1/4" NPT		
N03	3/8" NPT		
N04	1/2" NPT		
Code	Outer diameter of stem sensor		
• D60	6 mm		
Example of order: PS M04 D60			

- ... Ex stock version ° ... Marked version can be dispatched up to 5 working days
- ¹⁾ ... Adjustable nominal length only for first time of mounting.
- ²⁾ ... Always adjustable nominal length.



JSP Industrial Controls

JSP, s.r.o. | Raisova 547, 506 01 Jičín, Czech Republic
+420 493 760 811 | export@jsp.cz | www.jsp.cz

Your Supplier: