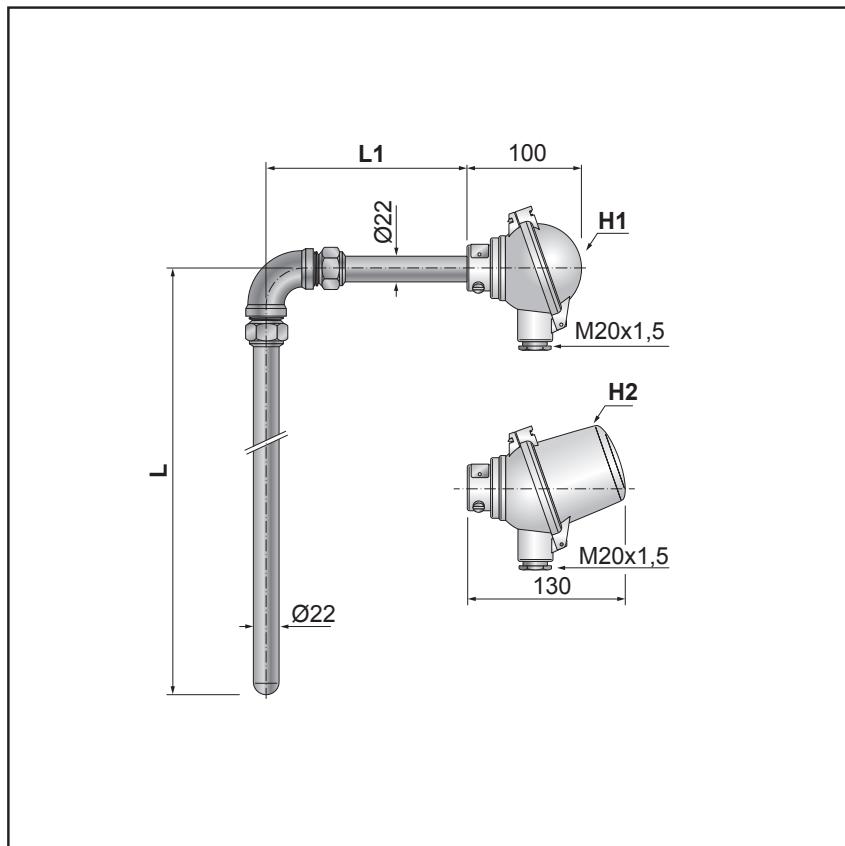


# MANUAL

## T1506

### Angle-type Thermocouple Temperature Sensors



- Thermocouple 1x / 2x "J", "K"
- Measuring range -40 to +800 °C ("J"),  
-40 to +1200 °C ("K")
- Accuracy class 2 according to EN 60584-1
- Head form A according to DIN
- Protective tube material steel 1.4845,  
1.4762, Kanthal AF
- Selectable protective tube length
- Mounting of temperature sensor by  
fixing shift pipe union
- Housing IP 53
- Optional headmounted transmitter with  
output 4 to 20 mA, HART, Profibus, Fieldbus,  
including version with galvanic isolation  
and intrinsically safe version

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## 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. When used with headmounted transmitter, observe also the requirements according to transmitter 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 products shall be stored at temperatures from 5 °C 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.

### 1.10 Lifetime

Lifetime of the product cannot be exactly determined, it depends on the operational conditions.

## 2. End of service and disposal

### 2.1 End of service

Before removing and ending of service of the thermocouple 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. The head is than opened, connecting wires of the sensor are disconnected (cut off) and sensor is dismantled.

In case of ending service of the sensor with the transmitter, previous paragraph should be observed after power supply is switched off.

### 2.2 Disposal

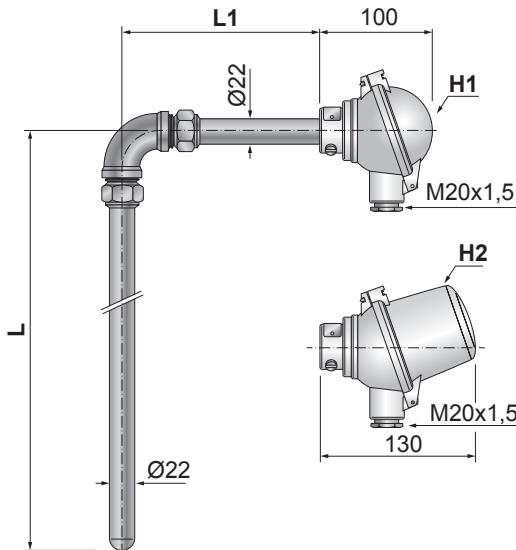
When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations.

### 3. Product description

## T1506

### Angle-type Thermocouple Temperature Sensors

- Thermocouple 1x / 2x "J", "K"
- Measuring range -40 to +800 °C ("J"), -40 to +1200 °C ("K")
- Accuracy class 2 according to EN 60584-1
- Head form A according to DIN
- Protective tube material steel 1.4845, 1.4762, Kanthal AF
- Selectable protective tube length
- Mounting of temperature sensor by fixing shift pipe union
- Housing IP 53
- Optional headmounted transmitter with output 4 to 20 mA, HART, Profibus, Fieldbus, including version with galvanic isolation and intrinsically safe version



### 3.1 Application

Angle-type thermocouple temperature sensors T1506 are designed for remote measuring of temperature in furnaces, baths etc. The sensors can be supplied with transmitter of output signal from 4 to 20 mA, HART, Profibus, Fieldbus embedded into the lid of sensor head (code H2).

### 3.2 Description

A single or dual thermocouple type "J" or type "K" which is placed in the protective tube of silicon carbide and connected to a terminal block inside the head type A. There is made use of rise of thermoelectric voltage. Its size depends on a temperature difference between a measuring junction and a cold junction of the thermocouple. At sensors with transmitter is output thermocouple signal further transformed to linearized unified current signal 4 to 20 mA, optionally to HART, Profibus, Fieldbus output. The thermometer should be mounted by a fixing shift pipe union.

### 4. Installation, operation and maintenance

#### 4.1 Installation and commissioning

##### 4.1.1 General

 Mounting position of the sensors is optional, with cable gland facing down, if possible. Vertical position with the head up is deemed to be basic position.

The device may be installed only by qualified personnel.

The thermometer should be mounted by a fixing shift pipe union.

Thermocouple temperature sensors without installed transmitter are connected to the decoding devices using extension or compensation cable wires with cross section 0.5 to 1.5 mm<sup>2</sup>.

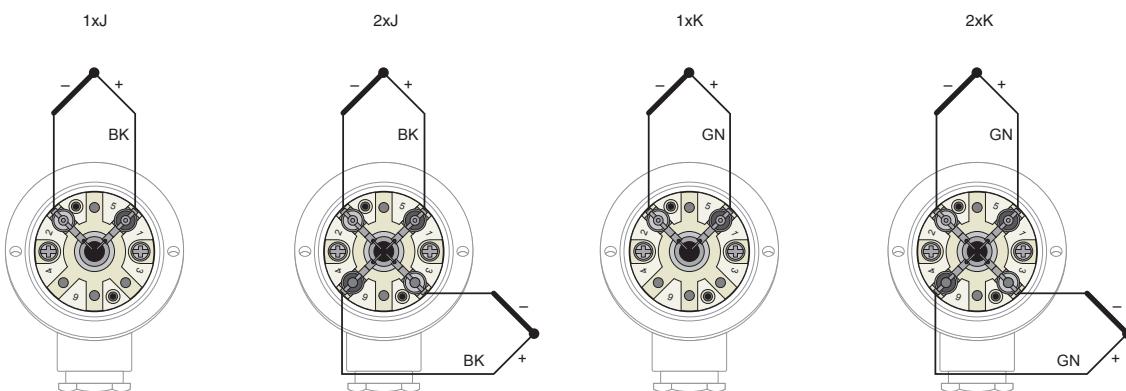
Connection terminal is accessible after removal of the head cover. Drawing of the connection terminals and wiring are shown on the scheme of electrical connection. The sensor outlet shall be carefully sealed after connection of the wires.

##### 4.1.2 Commissioning

Thermocouple temperature sensor without transmitter in the head is ready for operation after connection of compensation (extension) wires between the sensor terminals and terminals of the associated apparatus (transmitter, thermostat of comparator connections, devices with internal compensation, etc.) and after mounting head cover.

Thermocouple temperature sensor with transmitter in the head (installed in the head cover) is ready for operation if terminals of the measuring insert and transmitter are connected by the attached compensation (extension) wires and after connection of copper connection wires between the transmitter terminals and terminals of the associated apparatus and after mounting head cover.

#### 4.1.3 Electrical connection



BK - black  
GN - green

#### 4.2 Operation and maintenance

The product does not need any operation and 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 difference from the expected metrological parameters, it is necessary to replace the sensor.

### 5. Product specifications

#### 5.1 Technical specifications

##### Thermocouple:

"J" (Fe-CuNi) accuracy class 2 acc. to EN 60584-1  
"K" (NiCr-NiAl) accuracy class 2 acc. to EN 60584-1

##### Measuring range:

-40 to +800 °C ("J")  
-40 to +1200 °C ("K")

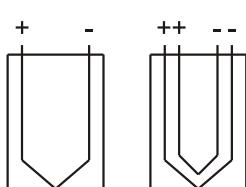
##### Output signal:

without transmitter voltage  
with transmitter linearized 4 to 20 mA

##### Dielectric strength:

500 V eff

##### Version of measuring end



single insulated  
double insulated separated

##### Materials:

head - aluminium alloy  
protective tubes  
- heat-resisting steel 1.4845 (AISI 310)  
- heat-resisting steel 1.4762 (AISI 446)  
- Kanthal AF (1.4767)

##### Housing (according to EN 60529):

IP 53

#### 5.2 Operation conditions

##### Maximal temperature of the head:

150 °C (without transmitter)  
85 °C (with transmitter P5310, P5311 a 5335)

#### 5.3 Metrological parameters

Temperature sensors CeraTEMP® 80 can be supplied:

- as sensors with calibration,
- as sensors without calibration.

Tolerance limits of accuracy classes are listed EN 60584-1. The initial tolerance is related to the initial calibration of the sensor. 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. Sensors with the transmitter can be also with calibration including transmitter with current output signal 4 to 20 mA.

#### 5.4 Supplementary parameters

##### 5.4.1 Version with transmitters

Sensors with transmitters may be completed with transmitters in heads with output 1x/2x 4 to 20 mA, HART, Profibus, Fiedbus. This version is usable only for heads with high head cover (order code H4), where the transmitter (diameter 44 to 64 mm) is placed inside the sensor head cover.



Using the transmitter in sensor head is possible if temperature of sensor head in place of application does not exceed max. allowed ambient temperature of transmitter. This temperature is typically 80 °C or 85 °C according to used transmitter.

**Applicable transmitters**

For range of transmitter see category optional accessories in transmitters for head mounting and the catalogue transmitters. For application in explosion hazard environment, transmitters with individual approval have to be selected.



For application with headmounted transmitter, observe also the requirements according to transmitter manual.

**6. Tests, certificates, standards and marking****6.1 Standards**

General:

EN 60584-1

Electromagnetic compatibility:

EN 61326-1

**6.2 Marking and type tag information****Marking on temperature sensors head:**

Standard version - aluminium tag (example):

|   |  |
|---|--|
| T1506-6 22 7 150 O3 H1  | number type (version number)                       |
| -   | - incomplete marking                               |
| 1xK/2   | number of sensors, sensor material, accuracy class |
| -40 ..1100 °C   | temperature range                                  |
| 11030371  | serial number                                      |
| IP 53   | housing  |
| Czech Republic  | country of origin                                  |
|  | logo JSP, s.r.o.                                   |
| <a href="http://www.jsp.cz">www.jsp.cz</a>  | website address                                    |

**7. Ordering information****7.1 Ordering table**

| Type  | Description  |                     |                        |
|---|--|---------------------|------------------------|
| T1506-6   | Angle-type thermocouple temperature sensor   |                     |                        |
| <b>Code</b>   | <b>Thermocouple</b>  |                     | <b>Measuring range</b> |
| 21  | 1x"J" (Fe-CuNi), insulated   |                     | -40 to +800 °C         |
| 61  | 2x"J" (Fe-CuNi), insulated, isolated junctions   |                     | -40 to +800 °C         |
| 22  | 1x"K" (NiCr-Ni), insulated   |                     | -40 to +1200 °C        |
| 62  | 2x"K" (NiCr-Ni), insulated, isolated junctions   |                     | -40 to +1200 °C        |
| <b>Code</b>   | <b>Accuracy class according to EN 60584-1</b>  |                     |                        |
| 7   | 2  |                     |                        |
| <b>Code</b>   | <b>Nominal length L [mm]</b>   | <b>L1 [mm]</b>      |                        |
| 150   | 500  | 400                 |                        |
| 165   | 630  | 500                 |                        |
| 166   | 630  | 600                 |                        |
| 180   | 800  | 600                 |                        |
| <b>Code</b>   | <b>Protective tube</b>   | <b>Material</b>     |                        |
| O1  | Ø 22x2   | 1.4845 / 1.4845     | +1100 °C               |
| O3  | Ø 22x2   | 1.4762 / 1.4762     | +1100 °C               |
| O5  | Ø 22x1.3   | Kanthal AF / 1.4845 | +1200 °C               |
| <b>Code</b>   | <b>Head</b>  |                     |                        |
| H1  | Al alloy, terminal board, cable outlet 4 to 12.5 mm, IP 53   |                     |                        |
| H2  | Al alloy, cap for transmitter Ø 62 mm, terminal board, cable outlet 4 to 12.5 mm, IP 53  |                     |                        |
| <b>Code</b>   | <b>OPTIONAL ACCESSORIES</b>  |                     |                        |
| <b>Calibration in customer defined points, including certificate of calibration</b> |  |                     |                        |
| KTE32AB   | Thermocouple temperature sensor calibration in three points in range -40 to +1100 °C   |                     |                        |
| KTE42AB   | Thermocouple temperature sensor calibration in four points in range -40 to +1100 °C  |                     |                        |
| KTE52AB   | Thermocouple temperature sensor calibration in five points in range -40 to +1100 °C  |                     |                        |
| KTE32B  | Thermocouple temperature sensor calibration in three points in range +400 to +1200 °C  |                     |                        |
| KTE42B  | Thermocouple temperature sensor calibration in four points in range +400 to +1200 °C   |                     |                        |
| KTE52B  | Thermocouple temperature sensor calibration in five points in range +400 to +1200 °C   |                     |                        |
| KTE9  | Other  |                     |                        |
| <b>Code</b>   | <b>Fixing shift pipe unions</b>  |                     |                        |
| UPS22M33  | Fixing shift pipe union for diameter 22 mm, connecting thread M33x2 (see data sheet No. 0126)  |                     |                        |
| P9  | Other  |                     |                        |
| <b>Code</b>   | <b>Transmitters for headmounting</b>   |                     |                        |
| P5310 H10   | Transmitter with LHP protocol (see data sheet No. 0824)  |                     |                        |
| P5310EN2 H10  | Transmitter with LHP protocol, (Ex) II 3G Ex nA IIC T4 Gc (see data sheet No. 0824)  |                     |                        |
| P5311 H10   | Transmitter with LHP protocol with galvanic isolation (see data sheet No. 0824)  |                     |                        |
| P5311EN2 H10  | Transmitter with LHP protocol with galvanic isolation, (Ex) II 3G Ex nA IIC T4 Gc (see data sheet No. 0824)  |                     |                        |
| P5311EI1 H10  | Transmitter with LHP protocol with galvanic isolation, (Ex) II 1G Ex ia IIC T4-T6 Ga, (Ex) II 1D Ex ia IIIC T106°C Da (see data sheet No. 0824)          |                     |                        |
| P5315 H10   | Precision transmitter with LHP protocol with galvanic isolation (see data sheet No. 2098)  |                     |                        |
| P5315EN2 H10  | Precision transmitter with LHP protocol with galvanic isolation, (Ex) II 3G Ex nA [ic] IIC T4 Gc (see data sheet No. 2098)                               |                     |                        |
| P5320 H10   | Precision transmitter with HART protocol with galvanic isolation (see data sheet No. 0825)   |                     |                        |
| P5320EN2 H10  | Precision transmitter with HART protocol with galvanic isolation, (Ex) II 3G Ex nA [ic] IIC T4 Gc (see data sheet No. 0825)                              |                     |                        |
| P5320EI1 H10  | Precision transmitter with HART protocol with galvanic isolation, (Ex) II 1G Ex ia IIC T4-T6 Ga, (Ex) II 1D Ex ia IIIC Tx°C Da (see data sheet No. 0825) |                     |                        |

Example of order: T1506-6 21 7 150 O1 H2 P1 KTE32AB (-40, 400, 700 °C)



**JSP Industrial Controls**

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