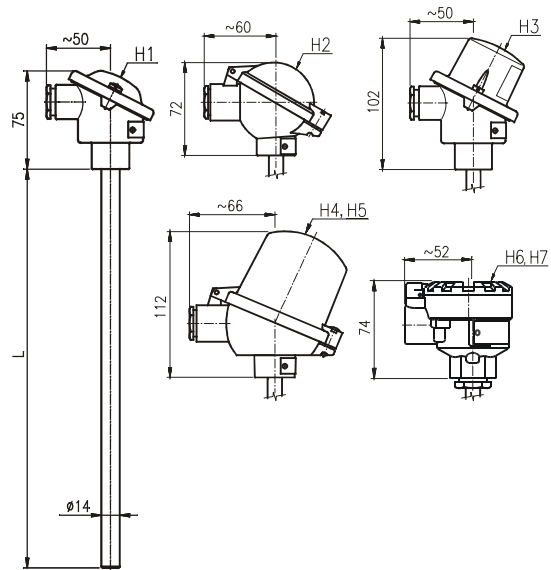


# T1504

## Straight Thermocouple Temperature Sensors without/with Transmitters 4 to 20 mA

- Thermocouple "J", "K"
- Measuring range -200 to +800 °C ("J"), -200 to +1100 °C ("K")
- Diameter of mineral insulated measuring insert stem  $\varnothing$  6 mm
- Accuracy class 1, 2 according to EN 60584-2
- Head form B according to DIN
- Protective tube material: stainless steel DIN 1.4541, DIN 1.4841
- Selectable protective tube length
- Mounting temperature sensor by means of Fixing Shift Pipe Union or Flange
- Housing IP 54, IP 65, IP 68
- Optional headmounted programmable transmitter with output 4 to 20 mA, including circuit isolation version and II 1G EEx ia IIC T4 ... T6 (ATEX) version
- Explosion proof II 2GD EEx d IIC T1 ... T6  $\Delta$ T5 °C (ATEX)



### Application

Straight resistance temperature sensors T1504 are designed for remote measuring of temperature in furnaces, incinerating plants in non-hazardous or in hazardous locations with potentially explosive atmosphere of gases or dusts. Sensors in EExd version can be situated in Zone 1 (21) and Zone 2 (22) according to EN 60079-10. They can be supplied with or without 4 to 20 mA headmounted transmitter or terminal board for connection wire.

### Description

A single or dual thermocouple type "J" or type "K" which is placed in the measuring insert stem and connected to a terminal board inside the head. 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. With a version with a transmitter the thermoelectric voltage is converted to a unified linear current signal of 4 to 20 mA. The thermometer should be mounted into furnace and the like by a fixing shift pipe union or by a flange.

### Technical Specifications

#### Thermocouple:

J, K, accuracy class 1, 2 according to EN 60584-2

#### Measuring Range:

standard version -200 to +800 °C (thermocouple J)  
 standard version -200 to +1100 °C (thermocouple K)  
 EEx d version -40 to +450 °C

**Output signal:** linearized 4 to 20 mA <sup>1)</sup>

**Materials:** Head - Aluminium alloy (H1, H2, H3, H4, H5, H6)  
 - Stainless steel DIN 1.4312 (H7)

Protective tube - Stainless steel DIN 1.4541  
 - High temperature steel

**Housing:** IP 54, IP 65, IP 68 (according to head)

#### Operation conditions

##### Maximal Temperature of Head:

100 °C (without transmitter)  
 80 °C (with transmitter PT-031 and P3301)  
 85 °C (with transmitter P5102, P5201 and P5310)

##### Ambient temperature for EExd version (Code ED):

-40 to +65 °C

<sup>1)</sup> ... Only for sensor with transmitter

# Straight Thermocouple Temperature Sensors T1504

## Ambiente temperature for EExd version (Code ED):

Customers have to assure installation of temperature sensors to do not increase of maximal surface temperature and temperature of armature influenced by outside temperature (measured medium, sun heating, etc.) defined by EN 50014 (for gases) and EN 50281 (for dusts). Customers have to calculate plus 5 °C (self heating of maximal operating energy output,  $P_{\text{imax}}=1 \text{ W}$ ) for defining of ambient temperature. Maximal ambient temperature for electrical device of explosion group II for explosive atmosphere of gases, steams and foges see Table 1.

Maximal ambient temperature for electrical device of explosion group II for explosive atmosphere of dusts is lower value of:

- ignition temperature of dust in layer decreased of 75 °C,
- 2/3 of ignition temperature of dust in turbulent state

Table 1

Temperature Class	Max. Ambient Temperature	Max. Temperature of Measured Medium
T1	450 °C	445 °C
T2	300 °C	295 °C
T3	200 °C	195 °C
T4	135 °C	130 °C
T5	100 °C	95 °C
T6	85 °C	80 °C

## Other specifications

### EMC (Electromagnetic Compatibility):

According to EN 61326-1:98 / A1:99

### Explosion proof (Code ED):

⊕ II 2GD EEx d IIC T1 ... T6 ΔT5°C

only for head H6, H7

Maximal permissible operating properties:

$I_{\text{imax}}$ : 30 mA

$P_{\text{imax}}$ : 1 W

## CAUTION!

It is possible to use for EExd version other cable gland with connection thread M20x1.5 and with approving ⊕ II 2G EEx d IIC for explosion proof version and for ambient temperature -40 to +65 °C.

It is due to lock cable against possible rotation and displacement for using with cable glands (KME1, KME2).

**ATTENTION! Temperature sensors in EExd version (code ED) have not to be removed in operation, cover of head and cable gland keep tight when circuit alive!**

**Any construction changes of EExd version are prohibited and can be cause of explode!**

Information and attention of EExd head

FTZÚ 03ATEX0297

⊕ II 2GD EExd IIC T1 ... T6 ΔT5°C

(-40°C ≤ Ta ≤ +65°C)

KEEP TIGHT WHEN CIRCUIT ALIVE!

## Weight:

a) without transmitters with head H1:

Nominal lenght L: 250 ... 0.69 kg  
 310 ... 0.80 kg  
 400 ... 0.98 kg  
 500 ... 1.17 kg  
 710 ... 1.57 kg  
 1000 ... 2.14 kg  
 1400 ... 2.91 kg  
 2000 ... 4.08 kg

b) with head H2 plus 0.04 kg

H3 plus 0.05 kg

H4, H5 plus 0.20 kg

H6 plus 0.16 kg

H7 plus 0.70 kg

c) with transmitter PT-031 plus 0.02 kg

with transmitter P5102 plus 0.04 kg

with transmitter P5201 plus 0.05 kg

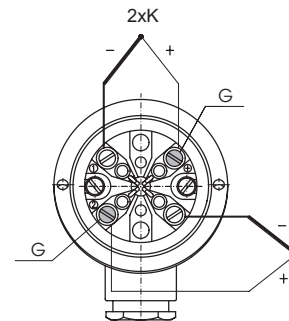
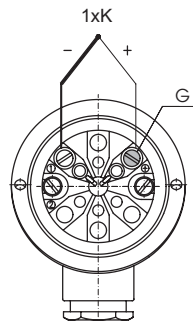
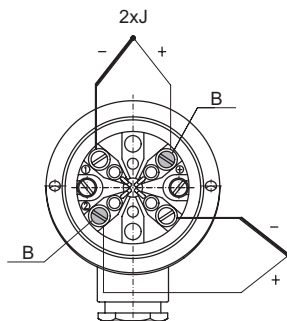
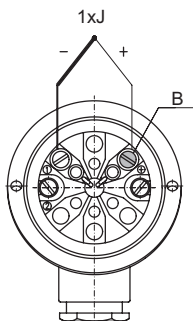
with transmitter P3301 plus 0.04 kg

with transmitter P5310 plus 0.04 kg

## Electrical Connections

B - black

G - green



# Straight Thermocouple Temperature Sensors T1504

Type	Description
◦ T1504-6 →	<b>Straight Thermocouple Temperature Sensors</b>
<b>Code</b>	<b>Thermocouple</b> <span style="float:right"><b>Measuring range</b></span>
◦ 21	1x"J" (Fe-CuNi), Insulated <span style="float:right">-200 to +800 °C</span>
61 →	2x"J" (Fe-CuNi), Insulated, Isolated Junctions <span style="float:right">-200 to +800 °C</span>
◦ 22	1x"K" (NiCr-NiAl), Insulated <span style="float:right">-200 to +1100 °C</span>
62	2x"K" (NiCr-NiAl), Insulated, Isolated Junctions <span style="float:right">-200 to +1100 °C</span>
<b>Code</b>	<b>Accuracy Class according to EN 60584-2</b>
6	1
◦ 7 →	2
<b>Code</b>	<b>Nominal Length L [mm]</b>
◦ 125 →	250
◦ 131	310
◦ 140	400
◦ 150	500
◦ 171	710
◦ 210	1000
◦ 214	1400
220	2000
999	Other
<b>Code</b>	<b>Protection Tube - Outside Diameter x Wall Thickness [mm]</b> <span style="float:right"><b>Material</b></span>
◦ O3 →	∅ 14x2.5 (standard for "J") <span style="float:right">Stainless Steel DIN 1.4541 (up to 800 °C)</span>
◦ O4	∅ 14x2.5 (standard for "K") <span style="float:right">Stainless Steel DIN 1.4845 (up to 1100 °C)</span>
O9	Other
<b>Code</b>	<b>Head</b>
◦ H1	Al Alloy, Cable Outlet M20x1.5, Housing IP 54, with Terminal Board
◦ H2	Al Alloy, Cable Outlet M20x1.5, Housing IP 65, with Terminal Board
◦ H3 →	Al Alloy, with High Cap for Mounting of Transmitter ∅ 44 mm into Cap, Cable Outlet M20x1.5, Housing IP 54, with Terminal Board
◦ H4	Al Alloy, with High Cap for Mounting of Transmitter up to ∅ 62 mm and High 50 mm, Span of Mounting Bolts 33 mm, Cable Outlet M20x1.5, Housing IP 65, with Terminal Board
◦ H5	Al Alloy, with High Cap for Mounting of Transmitter up to ∅ 62 mm and High 50 mm, Span of Mounting Bolts 33 mm, Cable Outlet M20x1.5, Housing IP 65, with Terminal Board, Outside and Inside Ground Clamp
H6 <sup>1</sup>	Al Alloy, for Transmitters ∅ 44 mm with Mounting on Bulb Flange, Thread for Cable Outlet M20x1.5, Outside and Inside Ground Clamp, without Cable Outlet, without Terminal Board, Housing IP 68
H7 <sup>1</sup>	Stainless Steel, for Transmitters ∅ 44 mm with Mounting on Bulb Flange, Thread for Cable Outlet M20x1.5, Outside and Inside Ground Clamp, without Cable Outlet, without Terminal Board, Housing IP 68
H9	Other
S1 <sup>1</sup>	Terminal Board for Connection Wire (for Heads H6, H7)
	<b>OPTIONAL ACCESSORIES</b>
<b>Code</b>	<b>Explosion proof</b>
ED	Explosion proof II 2GD EEx d IIC T1 - T6, Measuring Range -50 to +450 °C (only with code H6, H7)
<b>Code</b>	<b>Fixing Flanges</b>
◦ P1	Fixing Shift Flange UP 01 with Counterflange (See Data Sheet No. 126)
◦ P2 →	Fixing Shift Pipe Union UPS 14 M27 (See Data Sheet No. 126)
<b>Code</b>	<b>Spray Protection Tube</b> <span style="float:right"><b>T<sub>max</sub> (with Spray)</b></span>
X1	Polyamide PA 11 <span style="float:right">100 °C (Depend on Measurement Medium)</span>
X2	E-CTFE "Halar" <span style="float:right">170 °C (Depend on Measurement Medium)</span>
X4	ETFE "Hyflon" <span style="float:right">130 °C (Depend on Measurement Medium)</span>
X8	Corundum Spray for Intense Abrasive Medium
X9	Other
<b>Code</b>	<b>Calibration</b>
◦ KTE3	Sensor Calibration in Three Customer's Given Temperature Points (0 to +1100 °C)
KTE9	Other
<b>Code</b>	<b>Transmitters for Headmounting</b>
• P5310	Programmable Transmitter P5310 with LHP Communication, Base Accuracy up to 0.1 % from Set Range (See Data Sheet No. 824)
• PT-031	Programmable Transmitter for Thermoelectric Sensors PT-031, Base Accuracy 0.15 % from Input Range (See Data Sheet No. 471)
• P5102	Programmable Transmitter P5102 H10, Base Accuracy to 0.07 % from Set Range (See Data Sheet No. 451)
◦ P5102EEx	Intrinsically Safe Programmable Transmitter P5102 H10EEx, Base Accuracy to 0.07 % from Set Range (See Data Sheet No. 451)
• P5201 →	Universal Programmable Transmitter P5201 H10 with Circuit Isolation, Base Accuracy to 0.05 % from Set Range (See Data Sheet No. 288)
◦ P5201EEx	Intrinsically Safe Universal Programmable Transmitter P5201 H10EEx with Circuit Isolation, Base Accuracy to 0.05 % from Set Range (See Data Sheet No. 288)
• P3301	Universal Programmable Transmitter P3301 SMART with Circuit Isolation, Base Accuracy to 0.065 % from Set Range HART Communication Interface (See Data Sheet No. 507)
<b>Code</b>	<b>Other</b>
• KM1	Cable Outlet, Nickel Silver, IP 68, Diameter of Cable 5 to 10 mm (for Heads H6, H7)
• KME1	Cable Outlet EExd, Nickel Silver, IP 68, for fixed assembly Cable with Diameter 4 to 8.5 mm (for Heads H6, H7)
• KME2	Cable Outlet EExd, Nickel Silver, IP 68, for fixed assembly Cable with Diameter 6 to 12 mm (for Heads H6, H7)
KM9	Other Outlet
• PK1	Lock anti pull-up cable for EExd Cable Outlet KME1
• PK2	Lock anti pull-up cable for EExd Cable Outlet KME2

**Example of Order: T1504-6 61 7 125 O3 H3 P2 P5201 H10 C2 RL 0 °C RH 350 °C EHL**

• ... Ex Stock Version      ° ... Marked Version can be Dispatched up to 10 Working Days

<sup>1</sup> ... Temperature transmitter is mounted directly on flange of measuring insert in lieu of ceramic terminal block when temperature sensor is supplied with head H6 or H7.