## Application

- Measuring range: -40 .. +800°C
- Fine chemical industry
- Light energy industry
- Blast furnaces, regenerating air heaters
- General industrial services

## Features

- Stainless Steel AISI321 / 1.4541 or AISI316L / 1.4404, AISI316Ti / 1.4571 upon request
- Spring-loaded measuring insert provides ideal contact with the thermowell
- Temperature transmitter can be installed in the sensor head
- Gas-tight process connection (compression fitting)
- Optionally the head can be installed with a local temperature display (see models TWR01H, DANWdie-LED)

The sensor consists of a replaceable insert, a welded protective tube (thermowell) and an aluminium connection head where a programmable temperature transmitter with a 4-20 mA output signal can be installed.

The measuring insert is a replaceable element of the complete sensor, which significantly reduces the time and cost of maintenance of measuring instruments on site.

Thanks to the spring-loaded fastening of the measuring insert it is perfectly pressed against the bottom of the protective tube, which reduces the time of reaction to temperature changes, increases accuracy of measurement and reduces natural vibrations, thus mechanical and electrical damages can be avoided.

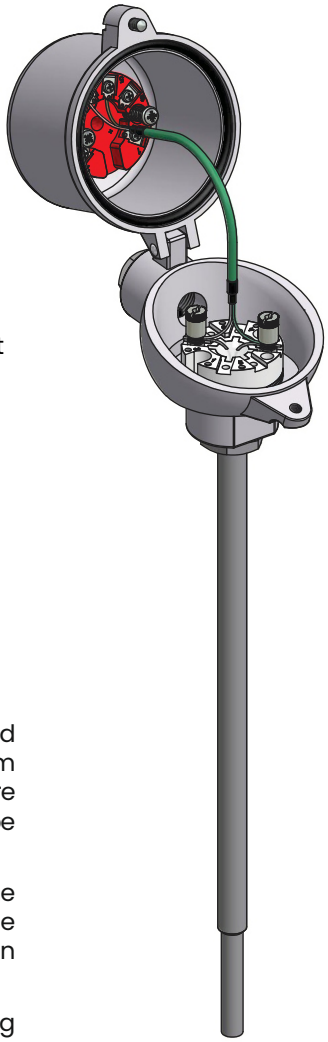
Length of the thermowell, connection head, shape and material of the sheath can be selected depending on the requirements of the application.

## Temperature Transmitter (Option)

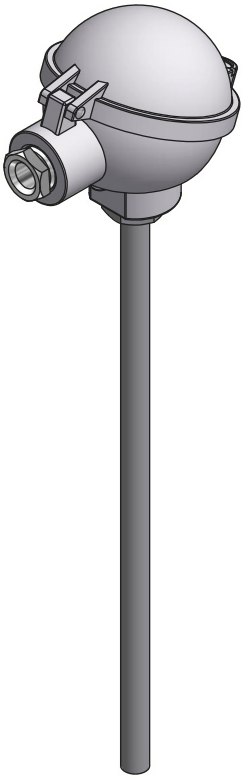
Transmitter is mounted inside the connection head of the sensor. There are two ways of installation: directly on the measuring insert or in the higher cap of the head.

The advantage of the second solution is that replacing the standard insert with a terminal block is easy without having to dismantle the transmitter, which significantly shortens the time and lowers the cost of sensor maintenance and protects the connection cables.

Mounting two transmitters is possible upon customer's request.



Sensor with connection head DANW. Thermowell with reduced tip.



Sensor with connection head NA

## ATEX, EAC Ex versions

Intrinsically safe and Flameproof designs are available for applications in hazardous areas. These models are provided with certificate for „intrinsically safe" and „flameproof" type of protection according to Directive 2014/34/UE (ATEX) and EAC Ex TR-CU 012/2011 (Eurasian Economic Union).

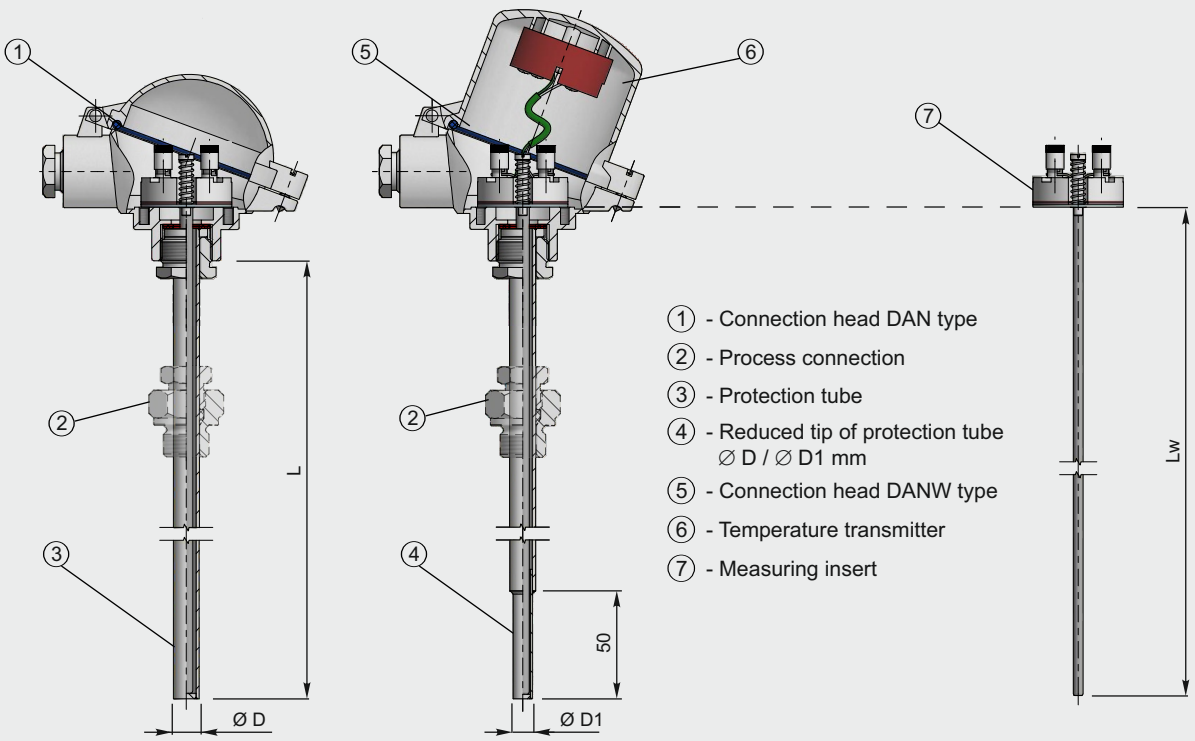
| | |
|---|---|
| Intrinsically safe (Exi) | data sheet XI-TT..P |
| Flameproof (Exd) | data sheet XD-TT..P |

## Other versions

This data sheet contains only a small portion of our program of supplying thermocouple thermometer with a replaceable measuring insert.

Other versions can be supplied upon customer's request.

## Designs




## Basic values of thermocouples type J, K, N according to PN-EN 60584 / IEC 584

| Temperature | | °C | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
|---|---|---|---|---|---|---|---|---|---|
| Nominal value | Type J | mV | 5.27 | 10.78 | 16.33 | 21.85 | 27.39 | 33.10 | 39.13 |
| | Type K | mV | 4.10 | 8.14 | 12.21 | 16.40 | 20.64 | 24.91 | 29.13 |
| | Type N | mV | 2.77 | 5.91 | 9.34 | 12.97 | 16.75 | 20.61 | 24.53 |
| Tolerance | Class 1 | °C | ±1.5 | ±1.5 | ±1.5 | ±1.6 | ±2.0 | ±2.4 | ±2.8 |
| | Class 2 | °C | ±2.5 | ±2.5 | ±2.5 | ±3.0 | ±3.7 | ±4.5 | ±5.2 |

## Compression fittings

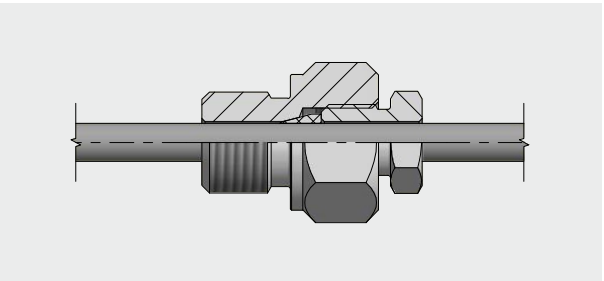
Allows simple adaptation to the required insertion length at the installation point.

Material: stainless steel

Sealing ring material: stainless steel or PTFE

Sealing rings of stainless steel can be adjusted once, after unscrewing, sliding along the sheath is no longer possible. Max. temperature at process connection 500 °C

Sealing rings of PTFE can be adjusted several times, after unscrewing, repeated sliding along the sheath is still possible. Max. temperature at process connection 150 °C



More detailed information are available in the „Compression fittings UG" data sheet

## Standard lenghts

| Length L | Measuring insert length Lw |
|---|---|
| 500 mm | 525 mm |
| 710 mm | 735 mm |
| 1000 mm | 1025 mm |
| 1400 mm | 1425 mm |
| 2000 mm | 2025 mm |

## Tolerance

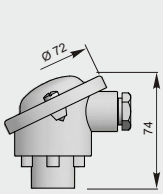
The PN-EN 60584 Standard defines the formulas for calculating acceptable measure tolerance. More information available in the general thermocouple thermometer sheet.

Type K ( NiCr-Ni ), Type N ( NiCrSi-NiSi )

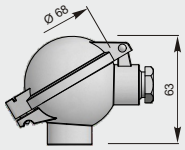
| Class | Temperature range | Tolerance |
|---|---|---|
| 1 | -40 °C .. +375 °C | ± 1.5 °C |
| | +375 °C .. +1000 °C | ± 0.0040 x \| t \| |
| 2 | -40 °C .. +333 °C | ± 2.5 °C |
| | +333 °C .. +1200 °C | ± 0.0075 x \| t \| |

## Connection heads

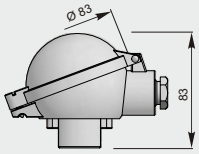
This sensor can be fitted with one of the following connection heads. For more information about the connection heads see section "Accessories".



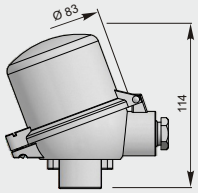
Type B (aluminum)



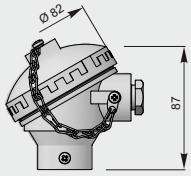
Type NA (aluminum)



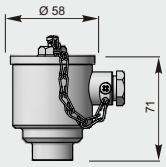
Type DAN (aluminum)



Typ DANW (aluminum)



Type KNE (aluminum)



Type BEG (stainless steel)

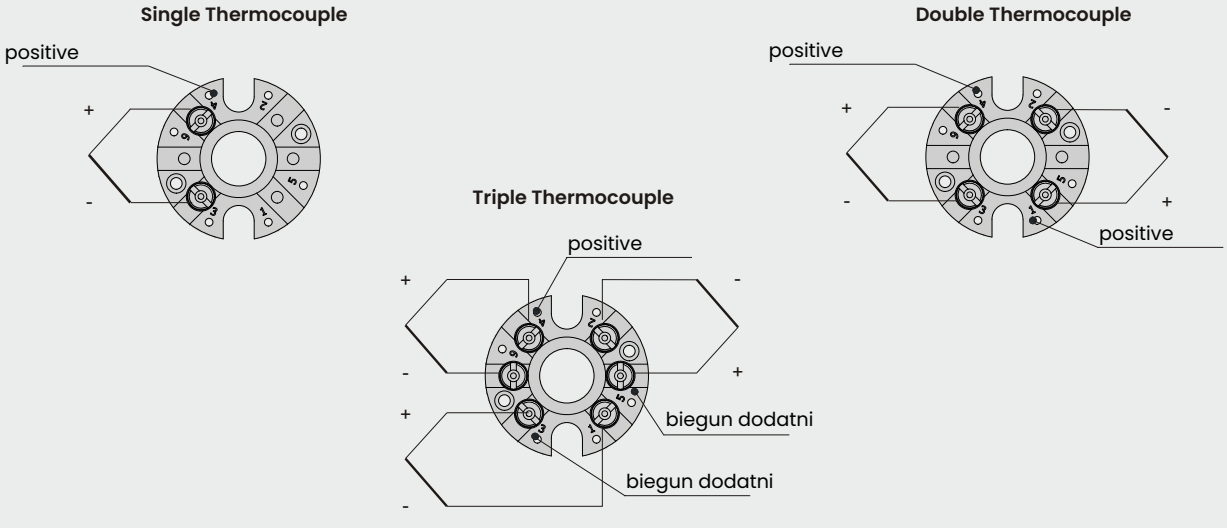
## Connection head DANWdie with local LED display

The display is mounted in connection head cover with glass window which allows preview of measuring temperature. 4 digits with a height of 9.5 milimeter ensure clear reading of values.

Programming of measure range can be performed via three buttons placed on the back of display panel.

Mounted temperature transmitter 4..20mAon measuring insert is necessary for proper use. It also works with temperature transmitters with HART® protocol.


## Electrical connection on ceramic block



## Ordering code

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| | TT | | P1 | - | - | - | - | - | - | - | - | |

**Version**

| | |
|---|---|
| | Single thermocouple |
| AP | Single thermocouple, with 4..20 mA temperature transmitter |
| APW | Single thermocouple, 4..20 mA temperature transmitter and local LED display* |
| 2 | Double thermocouple |
| 3 | Triple thermocouple |

* only with connection head DANWdie

**Thermocouple type**

| | |
|---|---|
| J | Type J ( Fe-CuNi ) |
| K | Type K ( NiCr-Ni ) |
| xxx | other, please specify |

**Closing method of connection head**

| | |
|---|---|
| 1 | closing by screw |
| 3 | closing by clamp |

**Connection head**

| | | | | |
|---|---|---|---|---|
| NA | Type NA | Aluminium | Cable gland: M20x1.5 | IP65 |
| DAN | Type DAN | Aluminium | Cable gland: M20x1.5 | IP65 |
| DANW | Type DANW | Aluminium | Cable gland: M20x1.5 | IP65 |
| B | Type B | Aluminium | Cable gland: M20x1.5 | IP65 |
| BEG | Type BEG | Stal kwasoodporna | Cable gland: M20x1.5 | IP65 |
| xxx | other, please specify | | | |

**Length L [mm]**

| | |
|---|---|
| 500 | 500 mm |
| 710 | 710 mm |
| 1000 | 1000 mm |
| xxx | other, please specify |

**Thermowell diameter [mm]**

| | |
|---|---|
| 12 | Ø 12 mm |
| 15 | Ø 15 mm |
| 12/9 | Ø 12 mm with reduced tip to Ø 9 mm |
| xxx | other, please specify |

**Thermowell material**

| | |
|---|---|
| | Stainless steel 1.4541 ( AISI321 ) |
| 1.4404 | Stainless steel 1.4404 ( AISI316L ) |
| xxx | other, please specify |

**Measuring junction**

| | |
|---|---|
| SO | Junction isolated |
| SP | Junction grounded |
| SOB | Junctions isolated ( double and triple thermocouples ) |

**Tolerance**

| | |
|---|---|
| 1 | Class 1 according to PN-EN 60584-2 |
| 2 | Class 2 according to PN-EN 60584-2 |

**Measuring range of temperature transmitter**

| | |
|---|---|
| 0..100 | input signal for 4..20mA: 0..100°C |
| xxx | other, please specify |

**Type of temperature transmitter**

| | |
|---|---|
| PR5334A3B | Output signal 4..20 mA |
| PR5335A | Output signal 4..20 mA, with HART® protocol |
| PR5350A | Output signal Profibus® PA / Foundation Fieldbus |
| xxx | other, please specify |

## Example

Temperature sensor TTKP11-DAN-500-15-SO-1
( sensor 1xK, connection head type DAN closed by screw, length L=500mm, thermowell material 1.4541, diameter Ø15 mm, junction isolated, class 1 ).

Temperature sensor APWTTKP11-DANWdie-500-12-1.4404-SO-1-0..100°C-PR5335A
( sensor 1xK with 4..20mA transmitter, connection head type DANWdie, closed by screw, length L=500mm, thermowell material 1.4404, diameter Ø12, junction isolated, class 1, temperature transmitter PR5335A ).