

EPIC[®] SENSORS

Temperature sensor products and services



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EPIC® SENSORS PRODUCTION PROGRAM

Lapp Automaatio has manufactured temperature sensors for nearly 30 years. We have extensive experience in producing temperature sensors for power plants, Ex-areas, the oil and gas, pulp & paper, machine building, and hygienic industries.

We manufacture vibration-proof resistance and thermocouple sensing elements which are mineral insulated. Our standard product line consists of 25 basic structures, which can be altered according to customer specifications. In addition to the wide standard product range, we also provide individual, customer specific solutions. The principles of our services are high quality sensors, fast deliveries, cost-effectiveness and low risk for the customer.

Our own manufacturing guarantees short delivery times also for application specific special sensors, for example our range of ATEX and IECEx certified sensors for potentially explosive areas. All demanding precision welding is performed with laser welding equipment at our production facilities in Finland.

PRODUCED EPIC® SENSORS TEMPERATURE SENSORS

- Pt 100 (2xPt100, 3xPt100)
- Pt1000
- Thermocouples
- Thermowells
- Flanged thermowells
- Pt100 with silicon well
- Cable probes
- Bayonet probes
- Ceramic sensors
- Coated thermowells
- Multi-point temperature sensors
- Ex-approved sensors
- Bearing temperature sensors
- Temperature sensors with magnet
- Immersible temperature sensors
- Customer specific solutions
- Materials used are stainless, acid-proof, and heat-resistant steel, titanium, Hastelloy and polyamids, among others.

OUR APPROVALS AND CERTIFICATES

- DNV ISO9001:2015 and ISO14001:2015 Management system certificates
- EESF 18 ATEX Q 006 product quality assurance notification
- IECEx FI/EESF/QAR18.0004 quality assessment report
- ATEX product certificates for all Ex d, Ex e, and Ex i sensors
- IECEx product certificates for specific Ex d, Ex e, and Ex i sensors
- RU-T-Metrological - Russian metrological certificate for TC sensors
- RU-W-Metrological - Russian metrological certificate for RTD sensors
- EAC Russian certificate (Ex)
- Ex e Korean KCs certificate for thermocouple T-M 303 sensors
- Ex e Korean KCs certificate for Pt100 W-M 303 sensors
- Ex e Korean KCs certificate for Pt 100 bayonet sensors
- Ex e Korean KCs certificate for Pt 100 cable sensors.

5-YEAR WARRANTY

We rely on the craftsmanship and quality of our sensor manufacturing and want this to be beneficial to our customers in planning and maintaining their temperature measuring systems. That is why we grant a five year product warranty for EPIC® SENSORS temperature sensors.



ENERGY AND PULP & PAPER INDUSTRIES

The long tradition of Finnish pulp & paper plants with their self-contained power production, has taught us to deal with extreme materials, temperatures and scale of machinery.

Even in the changing environment, this vast knowledge can be adapted to renewable energy applications and advanced, smart production automation.

OIL, GAS, AND PETROCHEMICAL INDUSTRIES

We have a long history in delivering and manufacturing temperature measurement solutions for oil refineries, bio-diesel plants and the petrochemical industry.

We have delivered temperature instrumentation solutions for:

- Columns
- Trace heating
- Reactor temperature measurements (inside reactors, single point, multi-point and surface)
- Furnaces
- Pipelines
- Laboratories
- Oil tanks
- Ethylene plants
- Underground oil reservoirs
- Bio-diesel manufacturing and pyrolysis processes
- Flare temperature measurement.

HYGIENIC INDUSTRY

EPIC® SENSORS temperature sensors can be used in areas where strict hygiene is required and extreme cleaning processes are used.

Our range of temperature sensors include many products designed specifically for hygienic applications.

The temperature sensors can be customized for all kinds of cleaning processes.

Hygienic solutions are used in the food & beverage, pharmaceutical, and medical equipment industries, and clean room solutions, for example.

MACHINE BUILDING INDUSTRY

We have a wide variety of solutions for the machine building applications.

When measuring temperature in machine building, it is essential to take into account vibration, thermal stability and screening. We have developed sensor variations, which specially suit the machine building designs; confined installation spaces, easy assembly and cost effective solutions.

We have accumulated experience in electric motor stators, different energy chain applications, circuit boards, gear oil & bearing, and transformer measurements, to name a few.

We design and manufacture temperature measurement sensors, no matter how big or small the application.

SENSORS FOR EX-AREAS

EPIC® SENSORS temperature sensors are also manufactured for different kind of potentially explosive areas and zones.

We have implemented temperature measurement applications related to potentially explosive areas for more than ten years. The risk of explosion can be caused by flammable liquids, gases or dust. Temperature measurements have been made for a variety of devices and applications used in Ex-areas. For example:

- Pipes/tanks
- Trace heating control
- Electrical equipment and components
- Gearboxes
- Pumps and pump/motor combinations.

Solutions can be executed according to the application requirements, with the following protection types:

- Flameproof enclosure Ex db ATEX-certified
- Increased safety Ex e ATEX- / IECEx-certified
- Dust protection by housing Ex tb ATEX- / IECEx-certified
- Intrinsic safety Ex i ATEX- / IECEx-certified.

EPIC® SENSORS PT100 TEMPERATURE SENSORS

- The measurement is based on resistance principle
- The measurement element material is platinum and the resistance value is 100 ohm at 0 °C temperature
- Platinum has a positive resistance temperature factor so the resistance increases with rising temperature
- Resistance variation is according to IEC 60751
- Long term stability is the main advantage compared to other temperature measuring methods. Change of measurement value is smaller than 0,2 Ω / 0 °C
- One sensor structure can include several Pt100 resistances: 1, 2 or 3 × Pt100 (the most common is 1 × Pt-100)
- For different measuring circuits the resistance element can be produced in different versions: 2-, 3- or 4-wire connection, most accurate version is 4-wire connection
- Standard version of the industrial Pt100 sensor is vibration proof, additionally it can be produced as an extra vibration proof version for extreme conditions.



VIBRATION PROOF RESISTANCE SENSING ELEMENTS, SHEATH CONSTRUCTION

- Standard sheath material AISI 316L
- Length according to specification
- Diameter 1.6...8 mm
- As Pt100 probes (1x Pt100, 2x Pt100, other norms on request)
- 2-, 3- and 4-wire connection + compensation loop
- Precision classes: Class A, B, 1/3 DIN and 1/10 DIN.

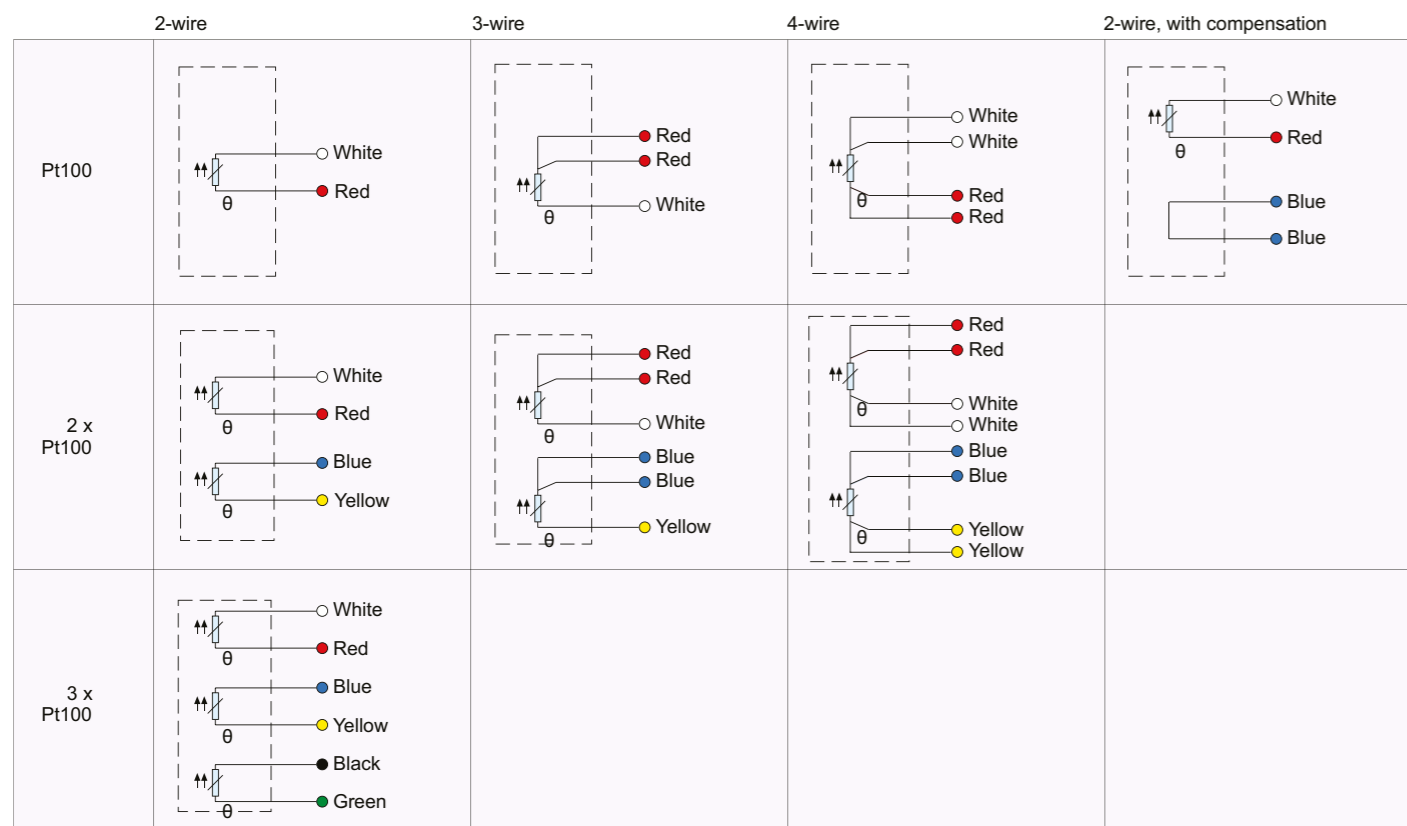
CABLE PROBES

- Diameter and length according to specification (AISI 316)
- Various cable options
- As thermocouples
- As Pt100 probes (1xPt100, 2xPt100, other norms on request)
- 2-, 3- and 4-wire connection (Pt100)
- Precision classes: Class A, B, 1/3 DIN, 1/10 DIN (Pt100) and Class 1 (TC)
- Various coupling options.

BAYONET PROBES

- Diameter 6 and 8mm (AISI 316)
- Various cable options
- As thermocouples
- As Pt100 probes (1xPt100, 2xPt100, other norms on request)
- 2-, 3- and 4-wire connection (Pt100)
- Precision classes: Class A, B, 1/3 DIN, 1/10 DIN (Pt100) and Class 1 (TC)
- Various coupling options.

PT100 CONNECTIONS



EXAMPLES OF PRECISION CLASSES FOR, WIRE WOUND RESISTORS AND THIN FILM RESISTORS

For wire wound resistors		For film resistors		Tolerance value
Tolerance class	Temperature range of validity °C	Tolerance class	Temperature range of validity °C	
W 0.1	-100 to +350	F 0.1	0 to +150	$\pm (0.1 + 0.0017 t)$
W 0.15	-100 to +450	F 0.15	-30 to +300	$\pm (0.15 + 0.002 t)$
W 0.3	-196 to +660	F 0.3	-50 to +300	$\pm (0.3 + 0.005 t)$
W 0.6	-196 to +660	F 0.6	-50 to +600	$\pm (0.6 + 0.001 t)$

a | t | = modulus of temperature in °C without regard to sign.

EPIC® SENSORS Pt100 sensors are usually manufactured with wire wound resistors of tolerance class A. Other classes and resistor types on request.

TOLERANCE CLASSES FOR PT100 THERMOMETERS ACCORDING TO STANDARD IEC 60751

Tolerance class	Temperature range of validity °C		Tolerance value
	Wire wound resistors	Film resistors	
AA	-50 to +250	0 to +150	$\pm (0.1 + 0.0017 t)$
A	-100 to +450	-30 to +300	$\pm (0.15 + 0.002 t)$
B	-196 to +600	-50 to +500	$\pm (0.3 + 0.005 t)$
C	-196 to +600	-50 to +600	$\pm (0.6 + 0.001 t)$

a | t | = modulus of temperature in °C without regard to sign.

If the required precision exceeds the values given in precision class A, then class AA will be used or the fractions will be based on class B, for instance:

$$\begin{matrix} 1/3 & 1/10 & \text{DIN} \\ \downarrow & \downarrow & \\ \pm 0.3/3 & \pm 0.3/10 & 0^\circ\text{C} \end{matrix}$$

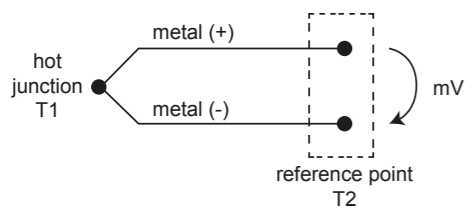
The fractional values are not valid for the total measurement range, only at point 0 °C.

THERMOCOUPLES

EPIC® SENSORS thermocouple sensor produces an mV measuring signal, which is proportional to temperature depending on which TC type is used.

MEASURING PRINCIPLE

When two wires of different metals or metal alloys (thermo wires) are joined together in one end (hot junction), a thermocouple is formed. The free ends of those wires form a reference point. If there is a temperature difference between hot junction T1 and reference point T2, a thermal electromotive force (voltage) is created in the thermocouple, the level of this voltage is proportional only to temperature difference T1-T2 and to materials, which the thermocouple is formed of (Seebeck effect).



For that reason it is important to have the reference point as stable as possible, when it is moved to a location of standard temperature (reference temperature) using extension wire or insulated thermo wire.

COLD JUNCTION COMPENSATION (CJC)

A temperature transmitter or measuring system needs information from the reference point (cold junction) temperature T2. Variations in the reference point temperature are compensated with CJC measuring (Cold Junction Compensation). The temperature transmitters' CJC measurement can be done by internal measurement or with a resistance sensor (RTD) installed on the connector. If the reference point is far from the transmitter, a separate temperature measurement is required to measure and compensate the temperature at that point.

VIBRATION-PROOF THERMOCOUPLES, SHEATH CONSTRUCTION

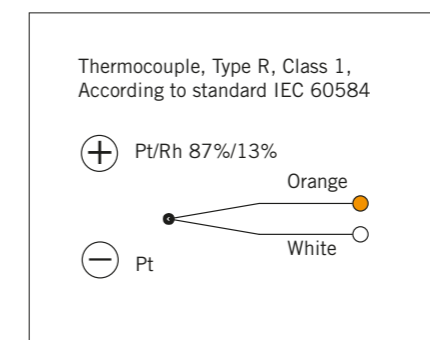
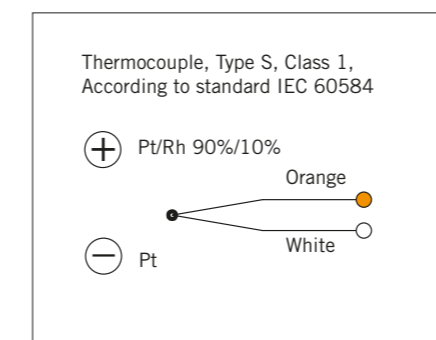
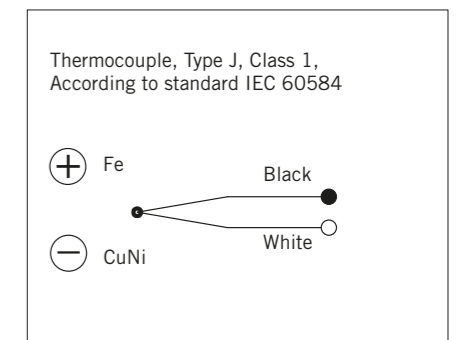
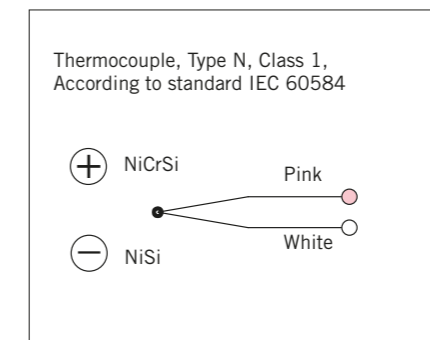
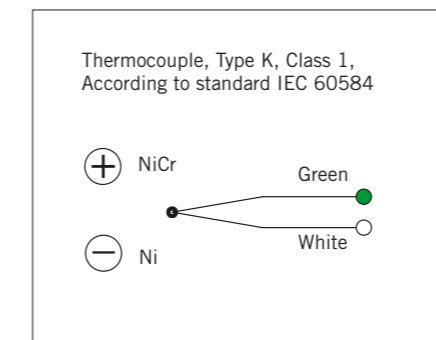
- Diameter 0.5...8 mm
- Standard sheath material Inconel 600 or AISI 316
- Precision class 1
- Length according to specification.

TEMPERATURE RANGES AND TOLERANCES OF THERMOCOUPLE TYPES

Type	Accuracy class	Temperature range °C	Constant value °C	Tolerances allowed
T	1	-40...+350	± 0.5	± 0.004 [t]
	2	-40...+350	± 1.0	± 0.0075 [t]
	3	-200...+40	± 1.0	± 0.015 [t]
E	1	-40...+800	± 1.5	± 0.004 [t]
	2	-40...+900	± 2.5	± 0.0075 [t]
	3	-200...+40	± 2.5	± 0.015 [t]
J	1	-40...+750	± 1.5	± 0.004 [t]
	2	-40...+750	± 2.5	± 0.0075 [t]
K and N	1	-40...+1000	± 1.5	± 0.004 [t]
	2	-40...+1200	± 2.5	± 0.0075 [t]
	3	-200...+40	± 2.5	± 0.015 [t]
R and S	1	0...+1600	± 1.0	± [1+(t-1100) × 0.003] °C
	2	0...+1600	± 1.5	± 0.0025 [t]
L*		-200...+400 +400...+900		± 3.0 °C ± 0.75 %

* Type L is defined in standard DIN 43710, all other types in standard IEC 60584.

THERMO ELEMENT CONNECTIONS



1 Threaded temperature sensor without neck pipe
T-B-ØK / W-B-ØK



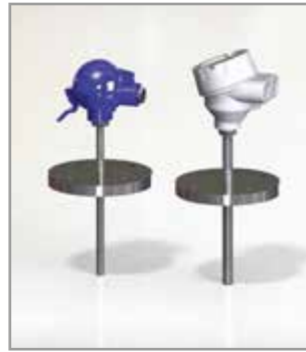
page 12-13

2 Threaded temperature sensor with neck pipe and thermowell
T-B-Ø / W-B-Ø



page 14-15

3 Flanged temperature sensor
T-F / W-F



page 16-17

4 Weldable temperature sensor
T-D / W-D



page 18-19

5 Threaded temperature sensor with neck pipe and sensing element
T-H-12 / W-H-12



page 20-21

6 Indoor/outdoor resistance temperature sensor
W-K-F / W-M-F



page 22-23

7 Mineral insulated element
T-M-Ø / W-M-Ø



page 24-25

8 Immersible temperature sensor
T-A-Ø / W-A-Ø or
T-A-Ø-U / W-A-Ø-U



page 26-27

9 Immersible thermocouple sensor
T-K / T-AK / T-AKK



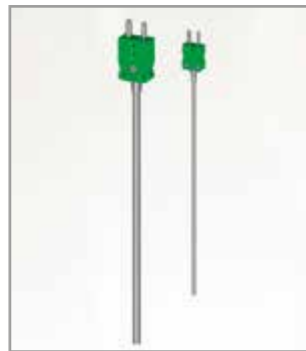
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10 Mineral insulated thermocouple or resistance sensor with cable
T-M-303 / W-M-303 or
T-M-302 / W-M-302



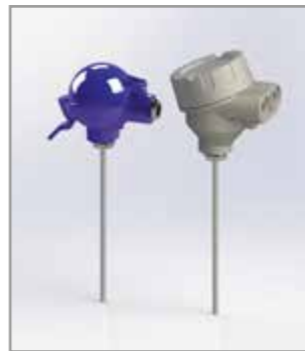
page 30-31

11 Mineral insulated thermocouple insert with connector
T-M-313 or T-M-314



page 32-33

12 Mineral insulated insert with connection head
T-M-N / W-M-N



page 34-35

13 Acid proof temperature sensor for hygienic installation
W-E-6-HST-S /
W-E-6-HST-CLAMP



page 36-37

14 Pipe surface temperature sensor
T-RO / W-RO



page 38-39

15 Surface temperature sensor
T-M-P / W-M-P or T-P / W-P



page 40-41

16 Temperature sensor with cable
T-CABLE / W-CABLE



page 42-43

17 Bayonet temperature sensor
T-BAJO / W-BAJO



page 44-45

18 Magnetic temperature sensor
T-MAGN / W-MAGN



page 46-47

19 Temperature sensor for food industry
T-106 / W-106



page 48-49

20 Bearing temperature sensor
T-BTD / W-BTD



page 50-51

21 Multi-point temperature sensor
T-MP / W-MP or T-MPT / W-MPT



page 52-53

22 Threaded temperature sensor with cable
T-SCREW / W-SCREW



page 54-55

23 Trace heating sensor
TW-M-TRACE or 2x W-M-TRACE



page 56-57

24 Silicone patch sensor
T-SIL-PATCH / W-SIL-PATCH or
2xT-SIL-PATCH / 2xW-SIL-PATCH



page 58-59

25 Mineral insulated temperature sensor for multipoint measurement
nxT-MP-303



page 60-61

26 Autoclave temperature sensor with cable
W-63 or 2xW-63



page 62-63

27 Compact resistance temperature sensor with transmitter
W-5802



page 64-65

EPIC® SENSORS T-B-ØK / W-B-ØK

Threaded temperature sensor without neck pipe

Features

- according to DIN 43772 form 2
- temperature range -40...+250 °C
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- AISI 316L as standard delivery material, other materials on request
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- 3D step models available on request.

Typical applications

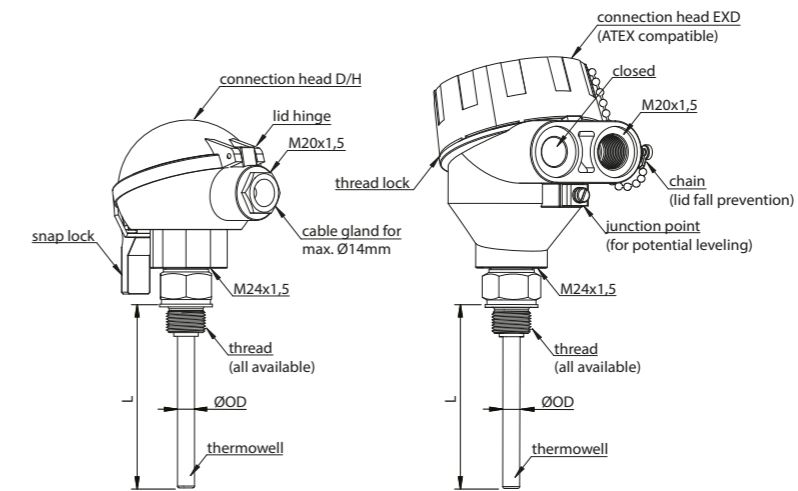
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, maximum temperature +250 °C, temporarily +300 °C, other materials on request
Thread	G, R, metric and NPT threads as standard delivery, other threads on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-40...+250 °C
Temperature range thermocouple	-40...+250 °C
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

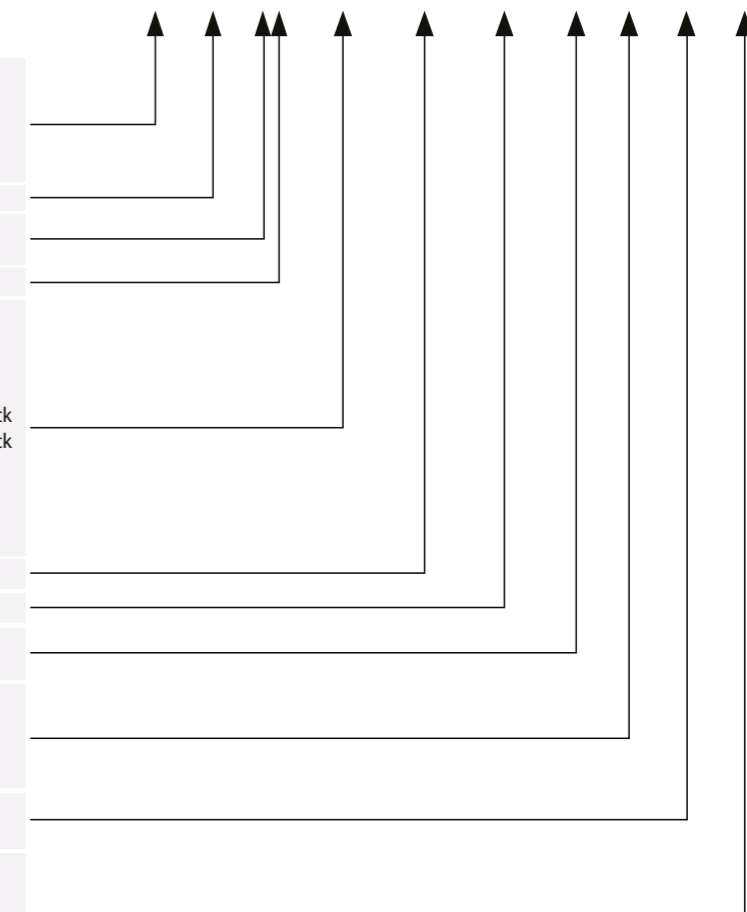
Drawing



Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
B	= threaded sensor type (constant in code)
6, 9, 11	= thermowell outer diameter (ØOD) [mm], other diameters on request
K	= no cooling neck (constant in code)
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX compatible connection head
HST	= acid proof connection head
N	= connection head N
100	= length, L [mm]
G½"	= thread size (all available, also NPT)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — B — 9K — D/H — 100 — G½" — 4 — A — TR — X



Installation examples



EPIC® SENSORS T-B-Ø / W-B-Ø

Threaded temperature sensor with neck pipe and thermowell

Features

- according to DIN 43772 form 2G
- temperature range -200...+1200 °C
- neck pipe for heat source clearance
- Pt100 or thermocouple as sensing element
- thermowell material according to the application
- Pt100 accuracy class A as a standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- neck pipe length 145 mm as standard delivery, other lengths on request
- 3D step models available on request.



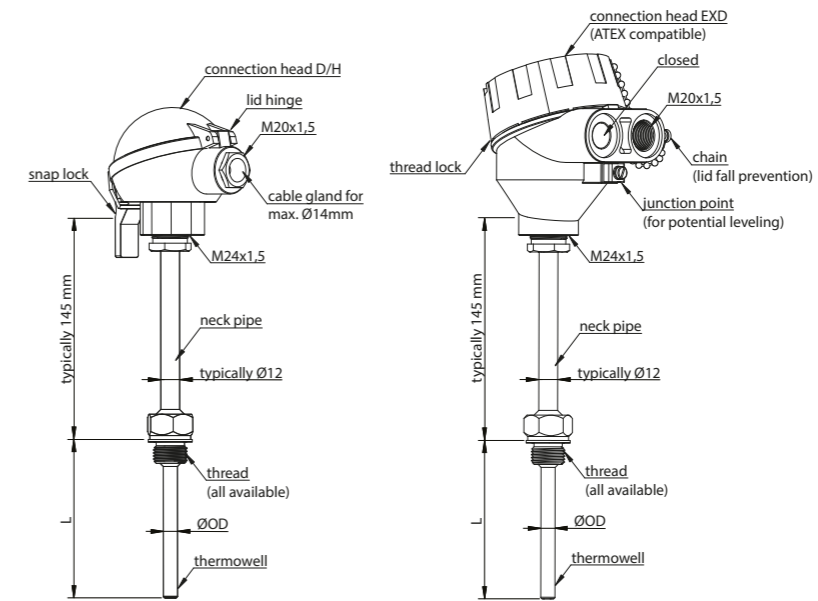
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, Other materials on request
Thread	G, R, metric and NPT threads as standard delivery, other threads on request
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C
Temperature range thermocouple	-200...+1200 °C depending on thermocouple type and cooling neck length Neck pipe length = 250 mm → maximum temperature +750 °C Neck pipe length = 300 mm → maximum temperature +1000 °C Neck pipe length = 350 mm → maximum temperature +1200 °C
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

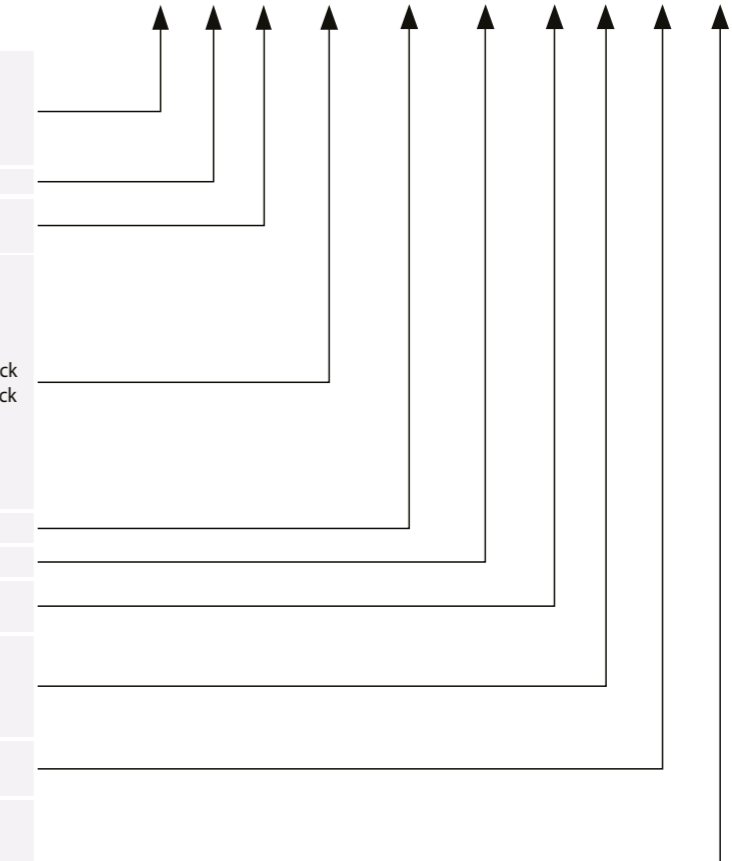
Drawing



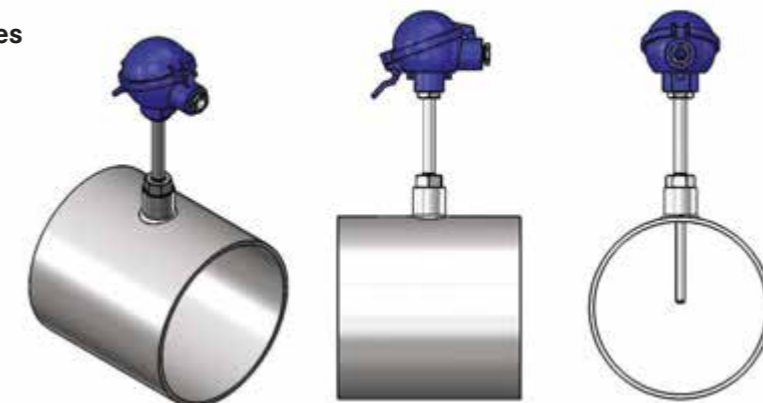
Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
B	= threaded sensor type (constant in code)
6, 9, 11	= thermowell outer diameter (ØOD) [mm] other diameters on request
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX-compatible connection head
HST	= acid proof connection head
N	= connection head N
100	= length, L [mm]
G½"	= thread size (all available, also NPT)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — B — 9 — D/H — 100 — G½" — 4 — A — TR — X



Installation examples



EPIC® SENSORS T-F / W-F

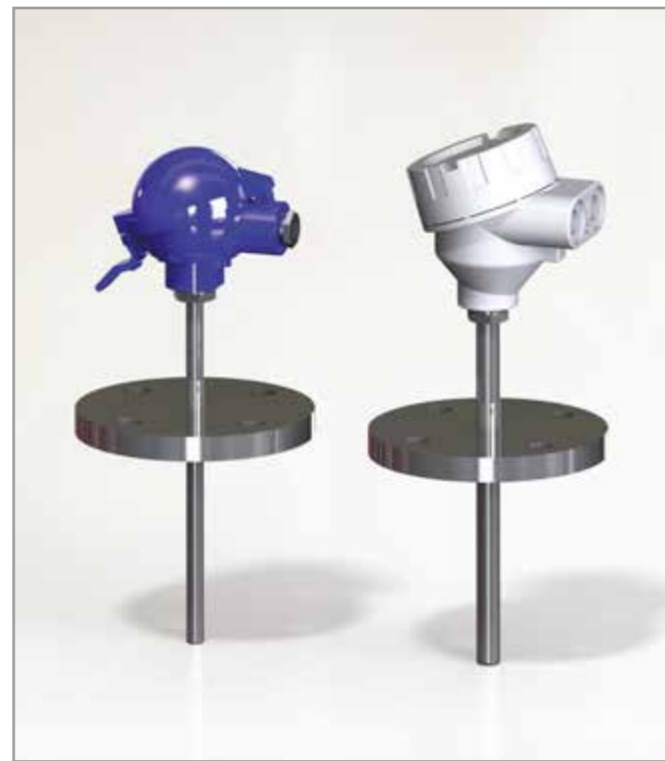
Flanged temperature sensor

Features

- according to DIN 43772 form 2F
- temperature range -200...+1200 °C
- neck pipe for heat source clearance
- AISI 316L as standard delivery material, other materials on request
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- flange size and type according to customer application
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- typical neck pipe length 145 mm, other lengths on request
- 3D step models available on request.

Typical applications

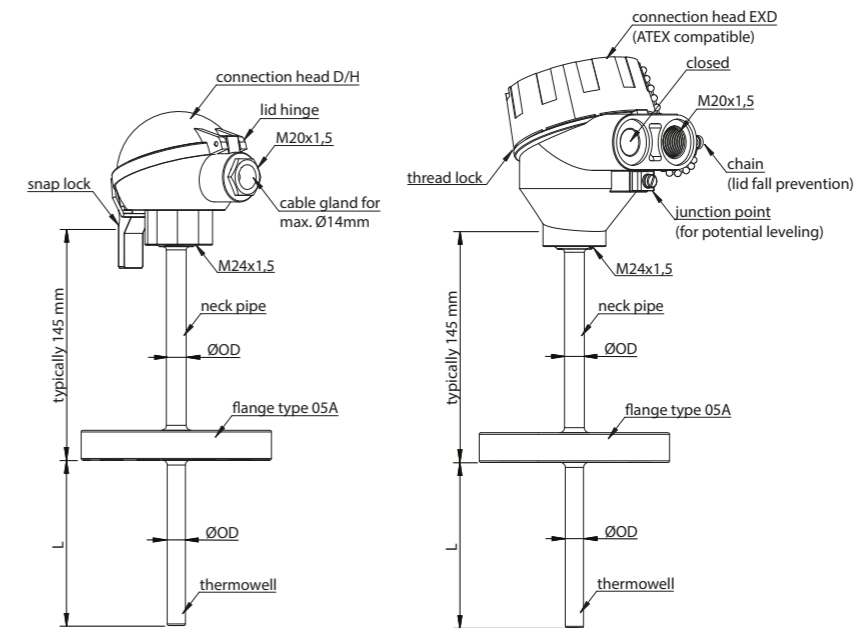
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Thermowell materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, Other materials on request
Flange	Flat face DIN EN 1092 -1, type 05A, other flange types on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type and cooling neck length Neck pipe length = 250 mm → temp. max. +750 °C Neck pipe length = 300 mm → temp. max. +1000 °C Neck pipe length = 350 mm → temp. max. +1200 °C
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing

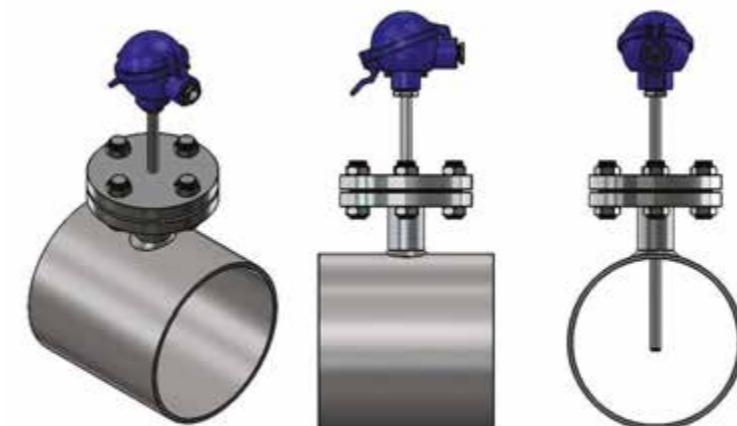


Product code key

Example code: W — F — 11 — D/H — 100 — DN50/PN40 — 4 — A — TR — X

- W = Pt100 resistance thermometer
- 2xW = 2 x Pt100 resistance thermometer
- T = thermocouple
- 2xT = 2 x thermocouple
- F = sensor with flange (constant in code)
- 11, 15, 22 = thermowell outer diameter (ØOD) [mm] (other diameters on request)
- B = connection head B
- D/H = connection head with snap lock
- D/H/D = connection head with snap lock and double barrel (2x cable gland)
- D/W/H = high cover connection head with snap lock
- D/W/H/D = high cover connection head with snap lock and double barrel (2x cable gland)
- EXD = ATEX-compatible connection head
- HST = acid proof connection head
- N = connection head N
- 100 = length, L [mm]
- DN25/PN40 = flange size / flange thickness (only typical stocked values listed)
- DN50/PN40 = flange size / flange thickness (only typical stocked values listed)
- DN80/PN40 = flange size / flange thickness (all flange sizes available)
- 4,3,2 = Pt100 wire count
- K,N,J = thermocouple type
- A,B = Pt100 accuracy class, (class A as standard delivery)
- 1,2,3 = thermocouple accuracy class, (class 1 as standard delivery)
- TR = wires for transmitter connection
- CB = with ceramic terminal block
- EXI = Ex i certified sensor
- X = additional details on the text line

Installation examples



EPIC® SENSORS T-D / W-D

Weldable temperature sensor

Features

- according to DIN 43772 form 4
- temperature range -200...+1200 °C
- neck pipe for heat source clearance
- with weldable thermowell
- AISI 316L as standard delivery material, other materials on request
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- neck pipe length 165 mm as standard delivery, other lengths on request
- 3D step models available on request.

Typical applications

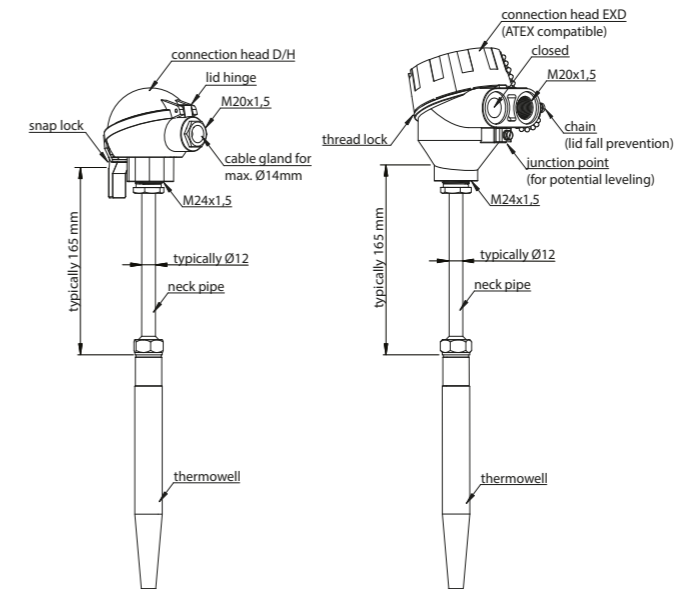
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, max. temperature +550 °C, temporarily +600 °C 13CrMo44 / 1.7335, max. temperature +550 °C 10CrMo910 / 1.7380, max. temperature +580 °C 16Mo3 / 1.5415, max. temperature +480 °C Other materials available on request, for example: AISI S31803 / 1.4462, SMO254 / 1.4547, AISI304L / 1.4307, TiGr2 / 3.7035, etc.
Thermowell types	D1, D2, D3, D4, D5, D6 with M18x1,5 thread or D1/S, D2/S, D4/S, D5/S with M14x1,5 thread According to standard DIN 43772 form 4, other thermowell types on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C
Temperature range thermocouple	-200...+1200 °C depending on thermoelement, thermowell material and cooling neck length Neck pipe length = 250 mm → temp. max. +750 °C Neck pipe length = 300 mm → temp. max. +1000 °C Neck pipe length = 350 mm → temp. max. +1200 °C
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

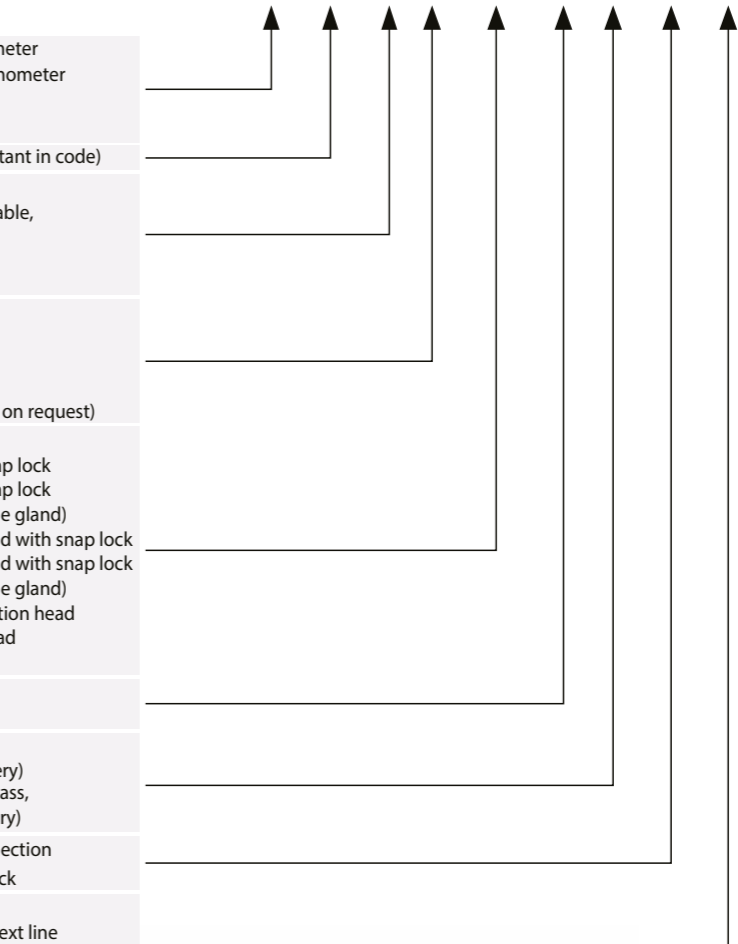
Drawing



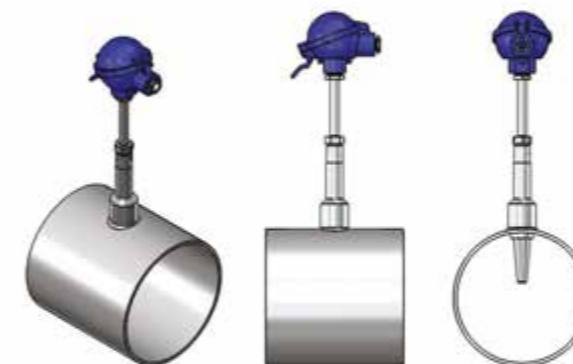
Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
D	= welded thermowell (constant in code)
D1, D2, D3, D4, D5, D6, D1/S, D2/S, D4/S, D5/S	= thermowell size (separate datasheet available, welded thermowells)
K	= AISI 316L / EN1.4404
L	= 13CrMo44 / EN1.7335
M	= 10CrMo910 / EN1.7380
O	= 16Mo3 / EN1.5415 (other materials available on request)
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover onnection head with snap lock
D/W/H/D	= high cover onnection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX-compatible connection head
HST	= acid proof connection head
N	= connection head N
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — D — D1 / K — D/H — 4 — A — TR — X



Installation examples



EPIC® SENSORS T-H-12 / W-H-12

Threaded temperature sensor with neck pipe and sensing element

Features

- temperature range -200...+1200 °C
- neck pipe for heat source clearance
- thread attachable to thermowell or process
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- standard delivery length for sensor element is 315, 375 or 435mm, other lengths available on request
- neck pipe length 165 mm as standard delivery, other lengths on request
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- 3D step models available on request.



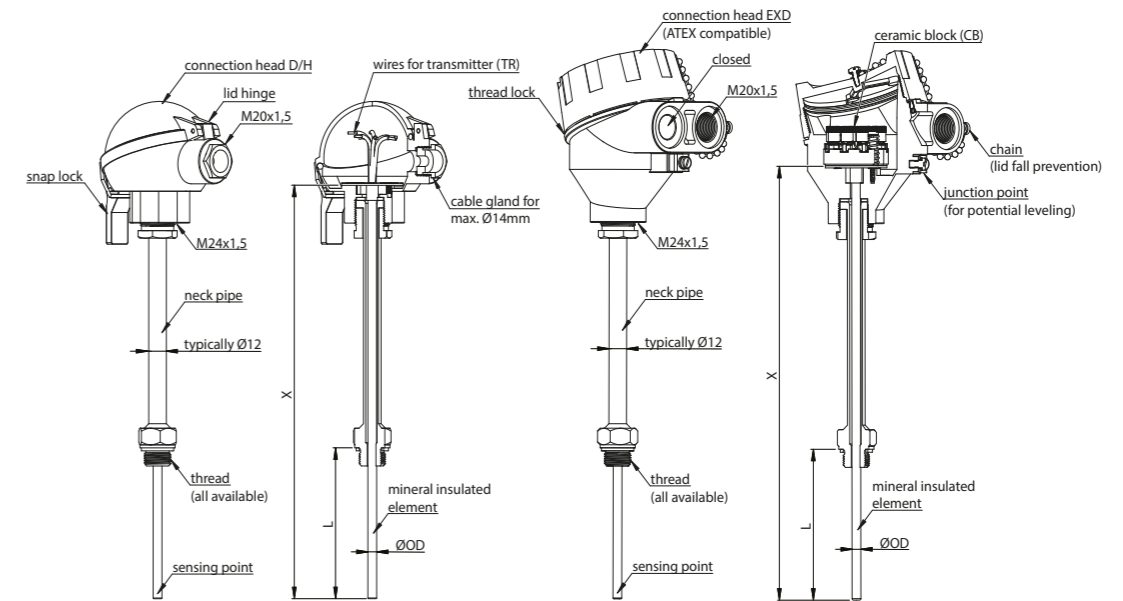
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Thread	M14x1.5 or M18x1.5 thread as standard delivery, other threads on request
Internal sensor element diameter	3, 6 or 8 mm
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.5 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C
Temperature range thermocouple	-200...+1200 °C depending on thermocouple type, thermowell materials and cooling neck length Neck pipe length = 250 mm → temp. max. +750 °C Neck pipe length = 300 mm → temp. max. +1000 °C Neck pipe length = 350 mm → temp. max. +1200 °C
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

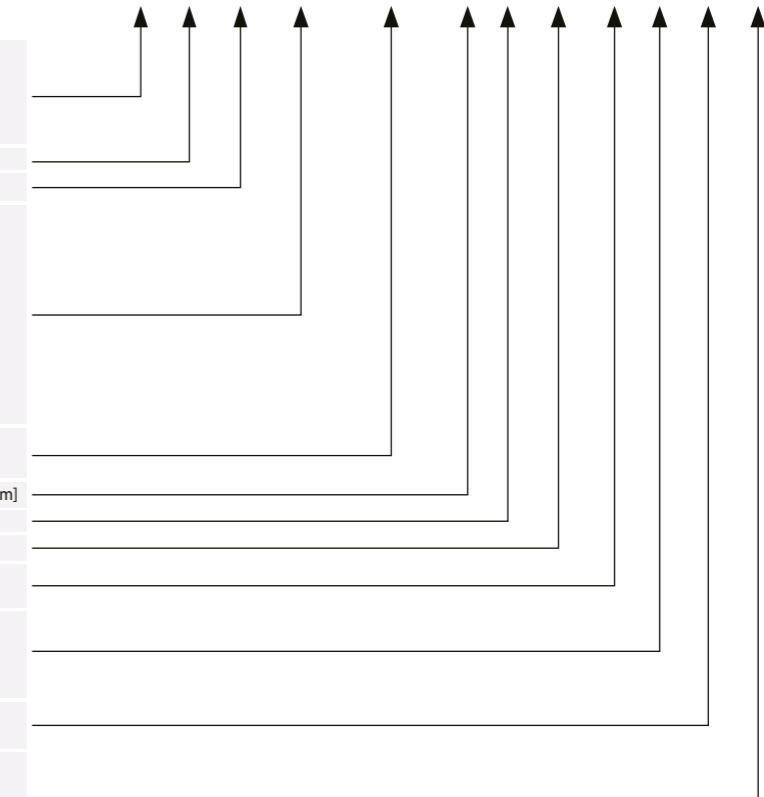
Drawing



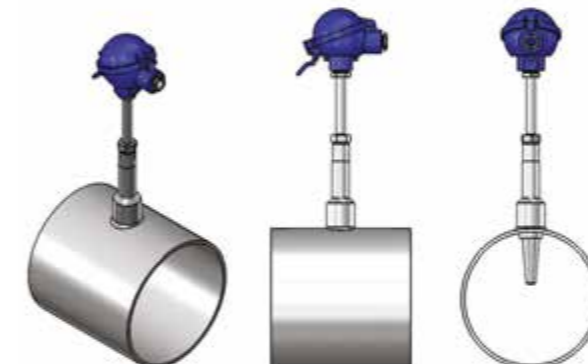
Product code key

Example code: W — H — 12 — D/H — M18x1,5 — 6 / 375 / 200 — 4 — A — TR — X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
H	= sensor with cooling neck (constant in code)
12	= external diameter of neck pipe [mm]
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX-compatible connection head
HST	= acid proof connection head
N	= connection head N
M18x1,5	= thread size (all available: M14x1.5, M18x1.5, M20x1.5, G1/2", R1/2", NPT1/2")
3, 6, 8	= outer diameter of sensor element (ØOD) [mm]
375	= length of the sensor element, X [mm]
200	= immersion length, L [mm]
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line



Installation examples



EPIC® SENSORS W-K-F / W-M-F

Indoor/outdoor resistance temperature sensor

Features

- temperature range -40...+80 °C
- Pt100 as sensing element
- Pt100 accuracy class A as standard delivery
- fast response time
- can be supplied with mA transmitter
- available with plastic or metal housing
- tailored solutions according to customer specific needs
- thermocouple versions available on request
- ATEX and IECEx compatible Ex db and Ex i versions available.
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

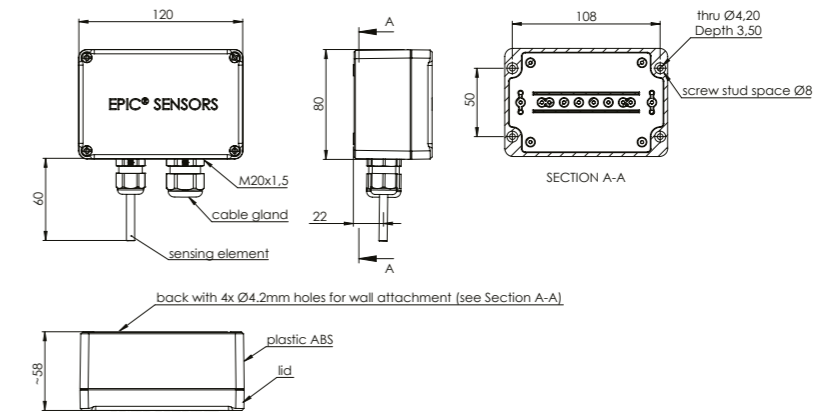


Technical data

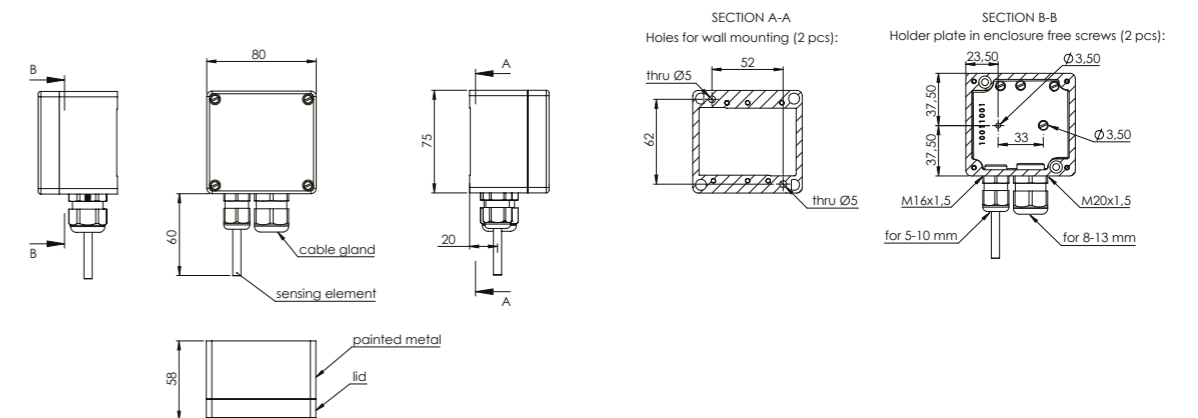
Enclosure	Plastic enclosure dimensions 120x80x58 mm (W x H x D), Metal enclosure dimensions 80x75x58 mm (W x H x D) Other enclosures on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Temperature range Pt100	-40...+80 °C, other measurement ranges on request
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing

Plastic enclosure



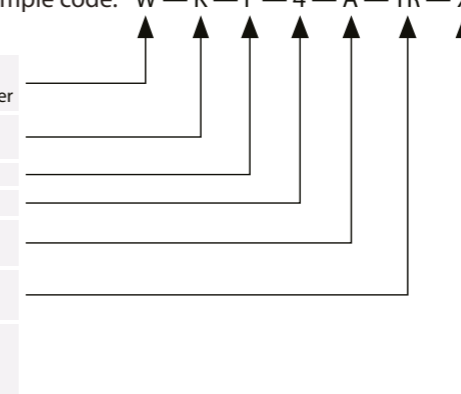
Metal enclosure



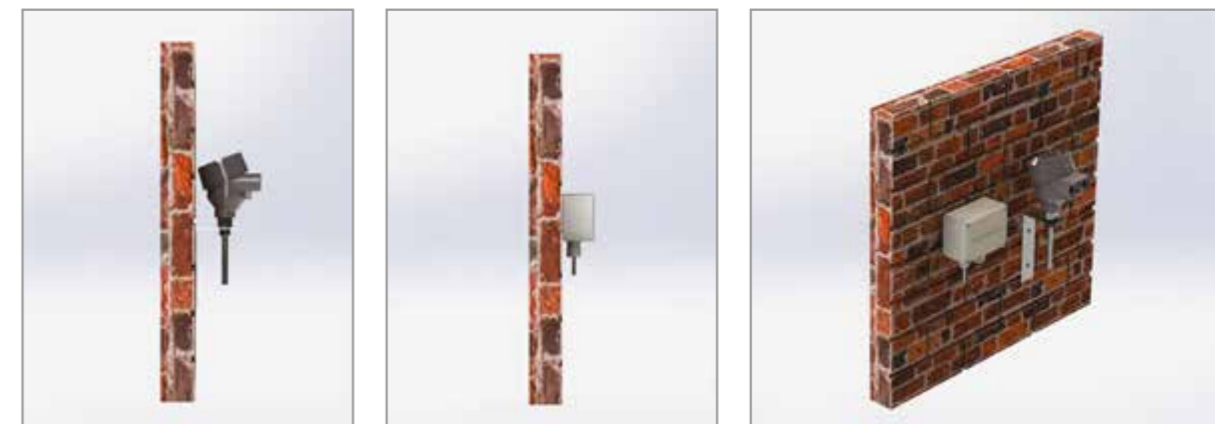
Product code key

Example code: W - K - F - 4 - A - TR - X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
K	= plastic enclosure
M	= metallic enclosure
F	= sensor type (constant in code)
4,3,2	= Pt100 wire count
A, B	= Pt100 accuracy class (class A as standard delivery)
TR	= wires for transmitter connection
CB	= with connection terminal block
EXI	= Ex i certified sensor type, only with metallic enclosure
X	= additional details on text line
Ex d -versions: contact our sales.	



Installation examples



EPIC® SENSORS T-M-Ø / W-M-Ø

Mineral insulated element

Features

- similar to DIN 43762
- temperature range -200...+1200 °C
- Pt100 or thermocouple as sensing element
- AISI 316L or INCONEL 600 as standard delivery material, other materials on request
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- bendable
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Special applications

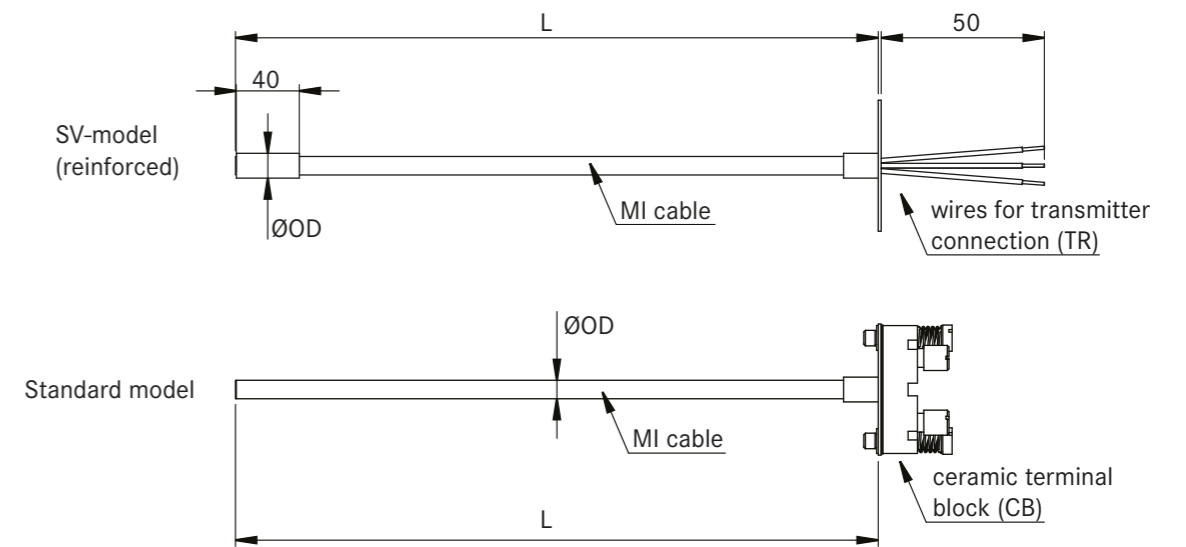
- for very high temperature solutions we can offer special thermocouple inserts with ceramic tubing and platinum wiring up to +1600 °C
- for this type of insert please contact our sales.



Technical data

Materials	AISI 316L, max. temperature +550 °C, temporarily +600 °C INCONEL 600, max. temperature +1100 °C, temporarily +1200 °C Other materials on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C, depending on sensor housing materials
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type and sensor housing materials
Approvals	ATEX, IECEx, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

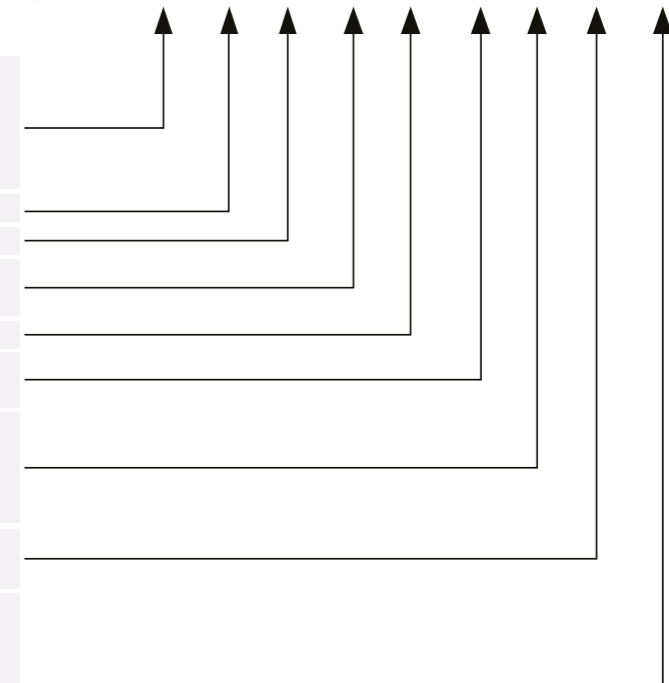
Drawing



Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
M	= mineral insulated sensor (constant in code)
3, 6, 8	= outer diameter of MI cable (ØOD) [mm]
empty	= even thickness (as standard delivery)
SV	= thick wall in measure end
315	= length, L [mm]
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXD	= special version with specific dimensions, used only with EXD enclosure
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — M — 6 — / 315 — 4 — A — TR — X



W-M-6/315-3-A-CB

Pt100 resistance thermometer for 3 wire measurement, Pt100 with accuracy class A, mineral insulated element with diameter 6 mm and length 315 mm, ceramic block for cable connection.

T-M-8-SV/1500-K-1-TR

Thermocouple type K with accuracy class 1, mineral insulated element with diameter 8 mm and length 1500 mm, reinforced structure, wire ends for connecting 2 wire mA transmitter.

EPIC® SENSORS T-A-Ø / W-A-Ø or T-A-Ø-U / W-A-Ø-U

Immersible temperature sensor

Features

- according to DIN 43772 form 1
- temperature range -200...+1200 °C
- AISI 316L/EN1.4044 or heat-resistant steel AISI 446-1/EN1.4749 as typical material, other materials on request
- available with solid tip
- 200 mm as typical length for the solid tip
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- internal sensor element replaceable on the fly
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- 3D step models available on request.



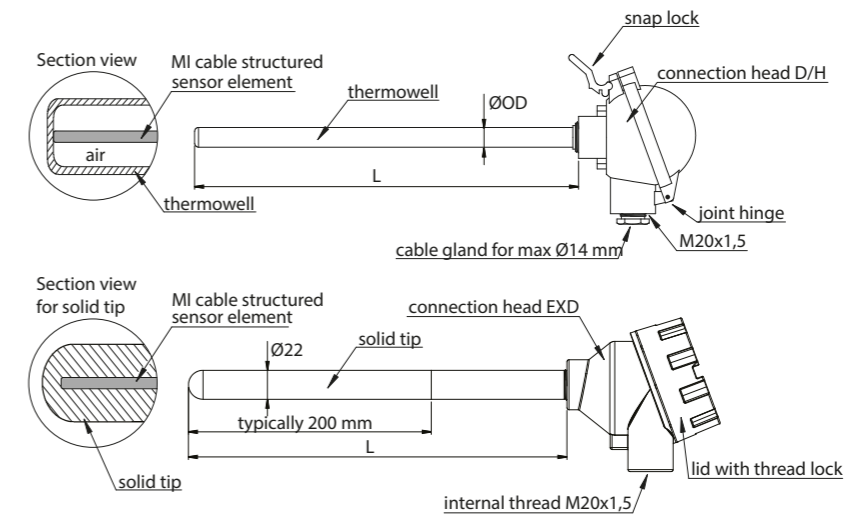
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Thermowell material	AISI 316L/EN1.4044 max. temperature +550 °C, temporarily +600 °C, AISI 446-1/EN1.4749 max. temperature +1100 °C, temporarily +1200 °C Other materials on request
Thermowell tip material	AISI 316L/EN1.4044 max. temperature +550 °C, temporarily +600 °C AISI 446-1/EN1.4749 max. temperature +1100 °C, temporarily +1200 °C Other materials on request
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	-200...+550 °C, depending on housing and thermowell materials
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type and thermowell materials
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing



Product code key

Example code: T — A — 22 — D/H — U / 1000 / 1.4749 — K — 1 — TR — X

W	= Pt100 resistance thermometer	↑
2xW	= 2 x Pt100 resistance thermometer	↑
T	= thermocouple	↑
2xT	= 2 x thermocouple	↑
A	= immersible sensor type (constant in code)	↑
10, 22	= outer diameter of sensor element (ØOD) [mm] (other diameters available on request)	↑
B	= connection head B	↑
D/H	= connection head with snap lock	↑
D/H/D	= connection head with snap lock and double barrel (2x cable gland)	↑
D/W/H	= high cover connection head with snap lock	↑
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)	↑
EXD	= ATEX-compatible connection head	↑
HST	= acid proof connection head	↑
N	= connection head N	↑
empty	= without solid tip	↑
U	= with solid tip (tip length typically 200 mm)	↑
1000	= length, L [mm]	↑
1.4404, 1.4749	= thermowell or tip material, (other materials on request)	↑
4,3,2	= Pt100 wire count	↑
K,N,J	= thermocouple type	↑
A,B	= Pt100 accuracy class, (class A as standard delivery)	↑
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)	↑
TR	= wires for transmitter connection	↑
CB	= with ceramic terminal block	↑
EXI	= Ex i certified sensor	↑
X	= additional details on the text line	↑

W-A-22-EXD-500/1.4404-4-A-CB

Pt100 resistance thermometer for 4 wire measurement, Pt100 with accuracy class A, immersible sensor type, 22 mm diameter for sensor element, ATEX compatible housing, without solid tip, sensor length 500 mm, materials AISI316L/EN1.4404, with ceramic block for cable connection.

Installation examples



EPIC® SENSORS T-K / T-AK / T-AKK

Immersible thermocouple sensor

Features

- similar to DIN 43733
- temperature range -200...+1600 °C
- thermocouple as sensing element
- thermocouple accuracy class 1 as standard delivery
- ceramic thermowell with C610 or C799 as typical material, other materials on request
- ceramic C610 and C799 are gas-tight materials
- typical neckpipe materials AISI304/316L
- thermo-cement filling in between neckpipe and ceramic
- installation recommendation with weldable flange, adjustable flange or with gas tight compression fitting
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.



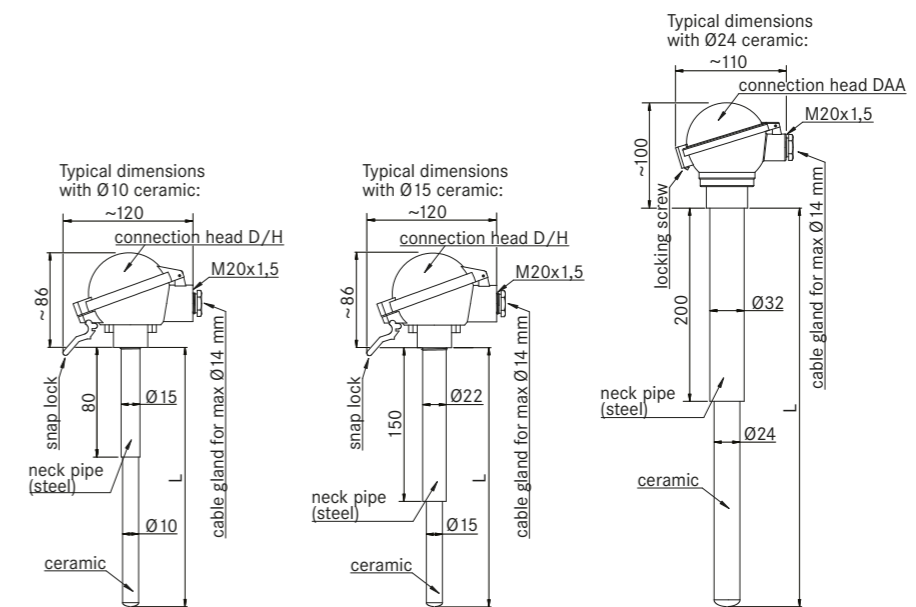
Typical applications

- very high temperature applications
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Thermowell material	Ceramic C610 max. temperature +1500 °C, gas-tight, medium to good thermal shock resistance Ceramic C799 max. temperature +1600 °C, gas-tight, medium thermal shock resistance Other materials on request
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...+375 °C ±1.5 °C, +375...+750 °C +/- 0.004 x t Type K and N tolerance class 1 = -40...+375 °C ±1.5 °C, +375...1000 °C ±0.004 x t Type R and S tolerance class 1 = 0...+1100 °C ±1 °C, 1100...1600 °C ±[1+0.003(t-1100)] °C
Temperature range	-200...+1700 °C, depending on thermocouple type, thermowell material and neck pipe length
Approvals	ATEX, IECEx, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing

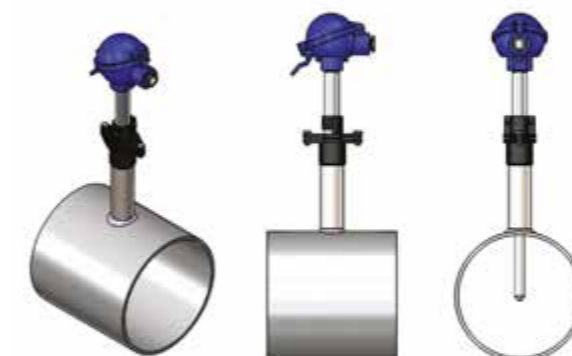


Product code key

Example code: T — AK — 24 — D/H — 1000 — S / 0.5 — 1 — CB — X

T	= thermocouple	↑
2xT	= 2 x thermocouple	↑
K	= gastight ceramic well	↑
AK	= flame proof outer tube, internal well gastight	↑
AKK	= gastight ceramic inner and outer tube	↑
10	= gastight ceramic C799, Ø10 mm	↑
15	= gastight ceramic C799, Ø15 mm	↑
24	= flameproof ceramic outer tube C610, Ø24 mm and gas tight internal ceramic tube C799, Ø15 mm (only with DAA enclosure) (special versions with Ø24 can be customized)	↑
B	= connection head B	↑
D/H	= connection head with snap lock	↑
D/H/D	= connection head with snap lock and double barrel (2x cable gland)	↑
D/W/H	= high cover connection head with snap lock	↑
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)	↑
HST	= acid-proof connection head	↑
N	= connection head N	↑
DAA	= connection head DAA (only with Ø24 ceramic)	↑
1000	= immersion length [mm]	↑
J, K, N, S, R, B	= thermocouple type	↑
0.5	= platinum sensor wire diameter (0.5 mm diameter as standard delivery)	↑
1,2,3	= thermocouple accuracy class (class 1 as standard delivery)	↑
TR	= wires for transmitter connection	↑
CB	= with ceramic terminal block	↑
EXI	= Ex i certified sensor	↑
X	= additional details on the text line	↑

Installation examples



EPIC® SENSORS T-M-303 / W-M-303 or T-M-302 / W-M-302

Mineral insulated thermocouple or resistance sensor with cable

Features

- according to DIN 43721
- temperature range -200...+1200 °C
- Pt100 or thermocouple as sensing element
- AISI 316L or INCONEL 600 as standard delivery material, other materials on request
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- bendable
- vibration proof
- ATEX and IECEx compatible Ex e and Ex i versions available
- 3D step models available on request.



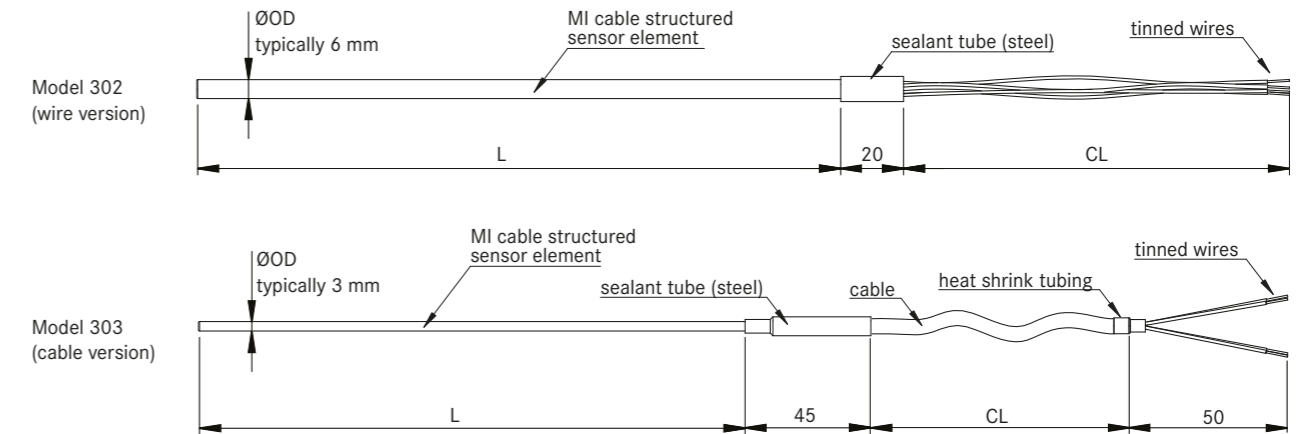
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, max. temperature +550 °C, temporarily +600 °C, INCONEL 600, max. temperature +1100 °C, temporarily +1200 °C Other materials on request (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Wire materials	FEP wire insulation/no jacket, max. +205 °C
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	-200...+550 °C, depending on sensor element and cable material (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type and other sensor materials (Note. maximum safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Approvals	ATEX, IECEx, EAC Ex, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

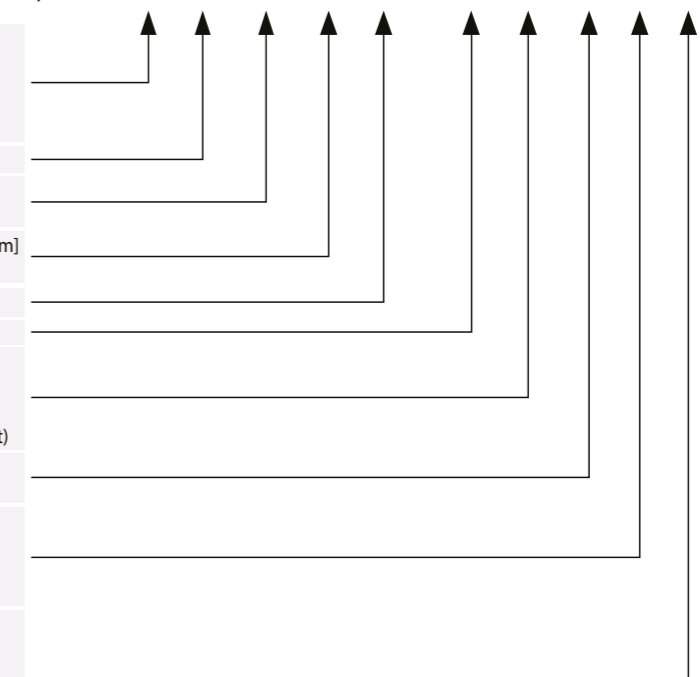
Drawing



Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
M	= mineral insulated sensor (constant in code)
302	= sensor with wires
303	= sensor with cable
1.5, 3, 4.5, 6	= outer diameter of sensor element (ØOD) [mm] (other diameters on request)
1000	= MI cable length, L [mm]
3000	= cable or wire length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EX	= Ex e certified sensor
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: T — M — 303 — 3 / 1000 — 3000 / SIL — K — 1 — X



Installation examples



EPIC® SENSORS T-M-313 or T-M-314

Mineral insulated thermocouple insert with connector

Features

- according to DIN 43721
- temperature range -200...+1200 °C
- thermocouple as sensing element
- thermocouple accuracy class 1 as standard delivery
- available with standard STD or mini-plug
- AISI 316L and INCONEL 600 as standard materials, other materials on request
- MI cable structured sensor element
- bendable
- vibration proof
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.



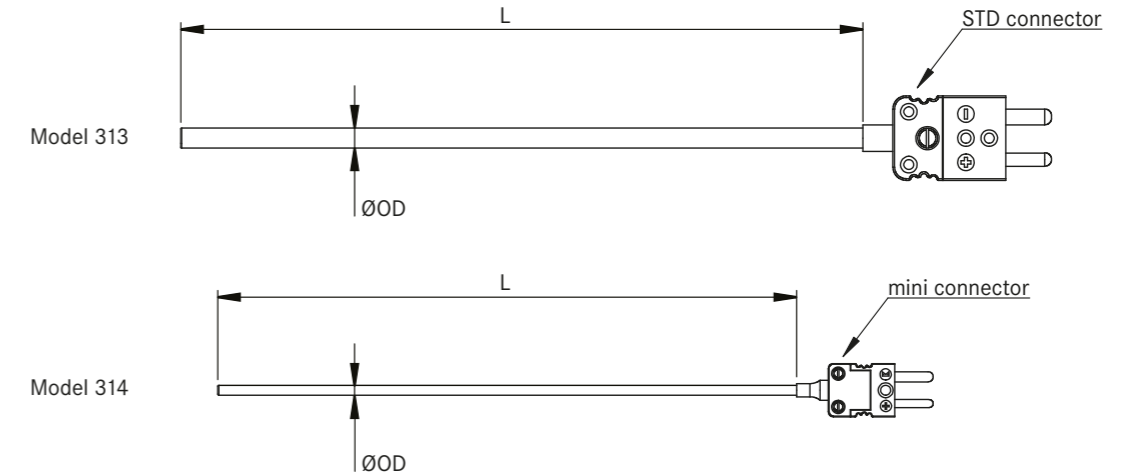
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, INCONEL 600, maximum temperature +1100 °C, temporarily +1200 °C Other materials on request
Connectors	Construction "313" = connector with round pins, STD Construction "314" = connector with flat pins, mini (Note: maximum safe temperature for connector +180 °C, unless other wise specified)
Diameter	0.5 / 1.0 / 1.5 / 2.0 / 3.0 / 4.5 / 6.0 mm (Note: mini connector up to 4.5 mm element diameter)
Color	According to EN 60584
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ±1.5 °C, 375...750 °C ±0.004 x t Type K and N tolerance class 1 = -40...375 °C ±1.5 °C, 375...1000 °C ±0.004 x t
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type and sensor element material
Approvals	ATEX, IECEx, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

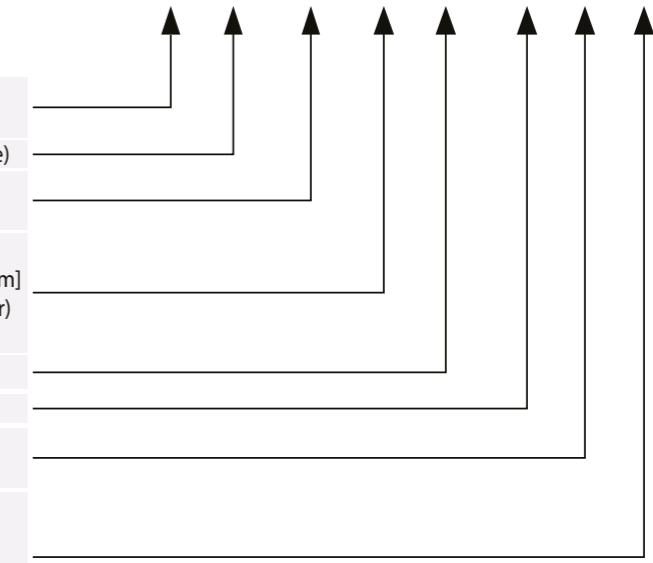
Drawing



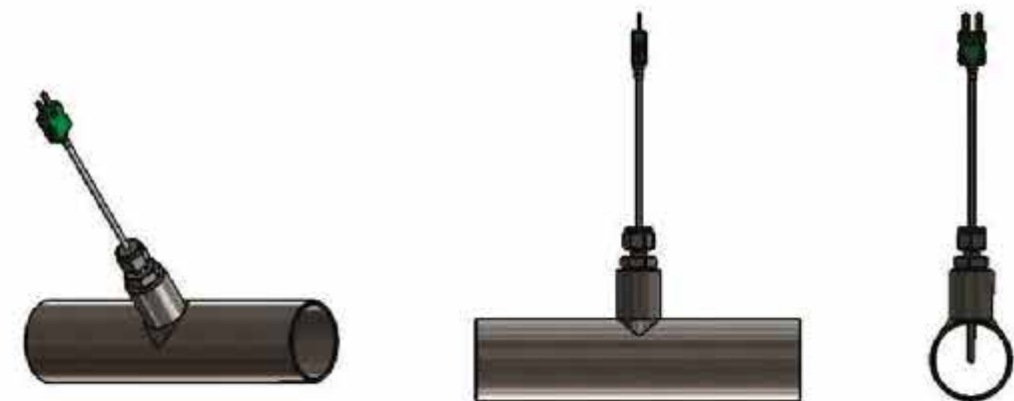
Product code key

T	= thermocouple
2xT	= 2 x thermocouple
M	= MI cable structured sensor (constant in code)
313	= with STD connector
314	= with mini connector
0.5, 1, 1.5, 2, 3, 4.5, 6	= outer diameter of sensor element (ØOD) [mm] (Note: mini connector up to 4.5mm diameter) (other diameters on request)
1000	= MI cable length, L [mm]
K,N,J	= thermocouple type
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: T — M — 313 — 3 / 1000 — K — 1 — X



Installation examples



EPIC® SENSORS T-M-N / W-M-N

Mineral insulated insert with connection head

Features

- according to DIN 43721
- temperature range -200...+1200 °C
- AISI 316L or INCONEL 600 as standard delivery material, other materials on request
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor element
- bendable
- vibration proof
- typically used with compression fitting
- adjustable immersion length can be achieved
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex db and Ex i versions available
- 3D step models available on request.



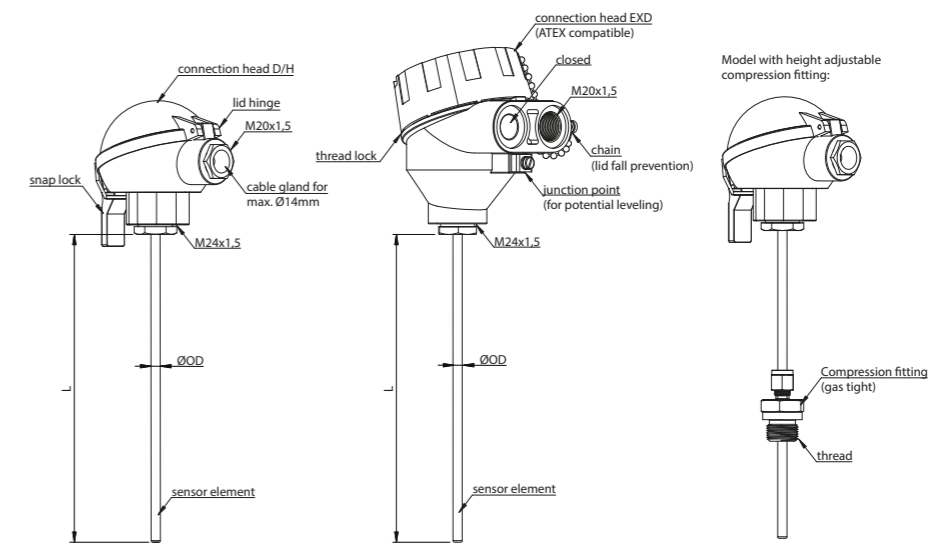
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, INCONEL 600, maximum temperature +1100 °C, temporarily +1200 °C Other materials on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+550 °C, depending on sensor element material and length
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type, sensor element material and length
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

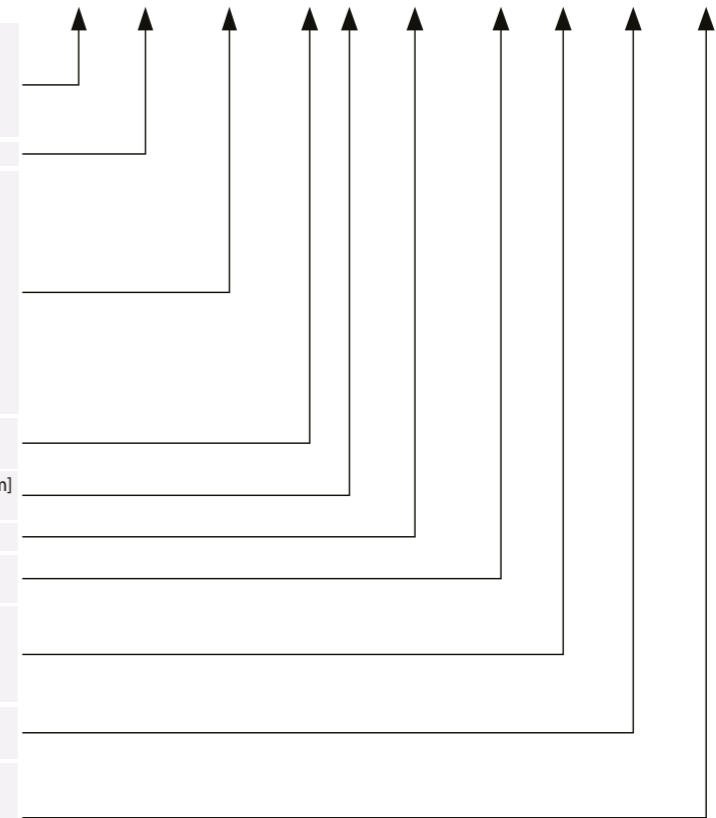
Drawing



Product code key

Example code: T — M — D/H — L / 6 / 1000 — K — 1 — CB — X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
M	= mineral insulated sensor (constant in code)
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX-compatible connection head
HST	= acid proof connection head
N	= connection head N
empty	= no compression fitting
L	= with height adjustable compression fitting
6, 8	= outer diameter of sensor element (ØOD) [mm] (other diameters on request)
1000	= length, L [mm]
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line



T-M-D/W/H-6/5000-N-1-TR

Thermocouple, mineral insulated sensor type with connection head D/W/H, no thread between the sensor element and connection head, no compression fitting in the sensor element, the sensor element's diameter is 6 mm and length 5000 mm, thermocouple type N with accuracy class 1, connection head suitable for mA current transmitter housing.

Installation examples



EPIC® SENSORS W-E-6-HST-S / W-E-6-HST-CLAMP

Acid proof temperature sensor for hygienic installation

Features

- temperature range -200...+550 °C
- shaped for hygienic installations
- neck pipe for heat source clearance
- all parts made of acid proof steel
- Pt100 as sensing element
- Pt100 accuracy class A as standard delivery
- mounting by weldable ball flange or with tri-clamp fitting
- thermowell material according to the application
- MI cable structured inner element
- inner element replaceable on the fly
- vibration proof
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

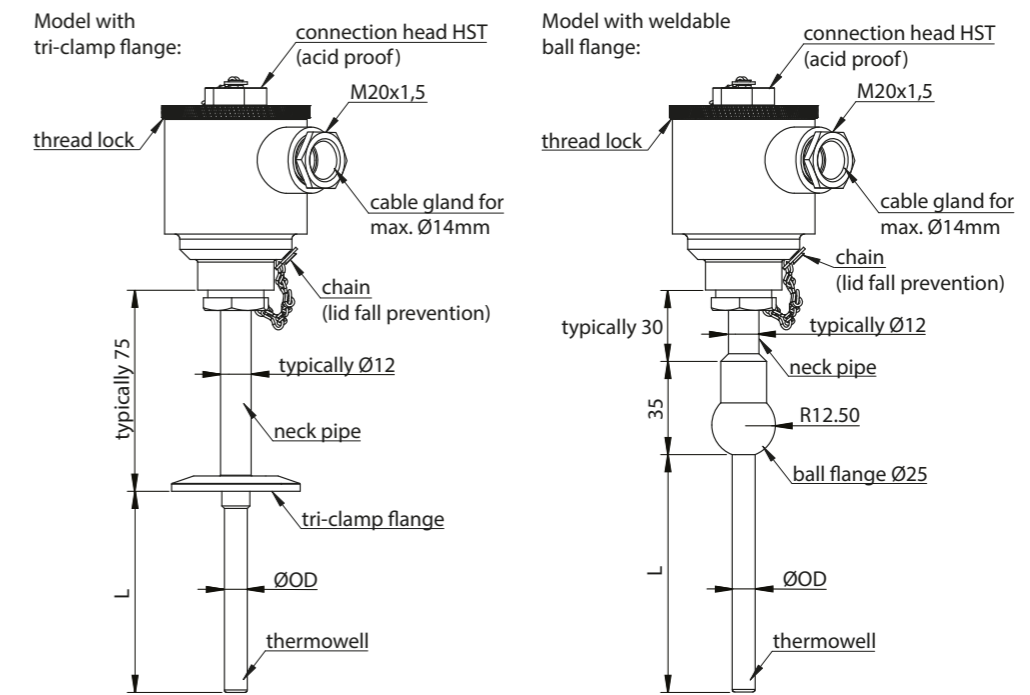
- food industry
- pharmaceutical industry
- chemical industry
- process industry
- energy and power plant technology
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316 L, max. temperature +550 °C, temporarily +600 °C, other materials on request
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Temperature range Pt100	-200...+550 °C, depending on materials and neck pipe length
Approvals	ATEX, IECEx, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request



Drawing



Product code key

Example code: W — E — 6 — HST — S — 500 — 4 — A — TR — X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
E	= sensor for food processing industry (constant in code)
6, 9, 11	= outer diameter of thermowell (ØOD) [mm] (other diameters on request)
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
HST	= acid proof connection head
N	= connection head N
S	= with weldable ball flange Ø25 mm
CLAMP/51	= tri-clamp flange with diameter Ø51 mm (all sizes available)
500	= immersion length, L [mm]
4,3,2	= Pt100 wire count
A,B	= Pt100 accuracy class, (class A as standard delivery)
TR	= wires for transmitter connection
CB	= with ceramic terminal block
EXI	= Ex i certified sensor
X	= additional details on the text line

Installation examples



EPIC® SENSORS T-RO / W-RO

Pipe surface temperature sensor

Features

- temperature range -200...+550 °C
- fitting for pipes or other cylindrical shapes
- on request, the fitting can be welded on the sensor element at the factory
- sensor without welded fitting will meet the ATEX, IECEx and EAC Ex (Ex e) requirements
- fitting can be supplied as separate item
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- AISI 316L as standard delivery material, other materials on request
- MI cable structured sensor element
- bendable
- vibration proof
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

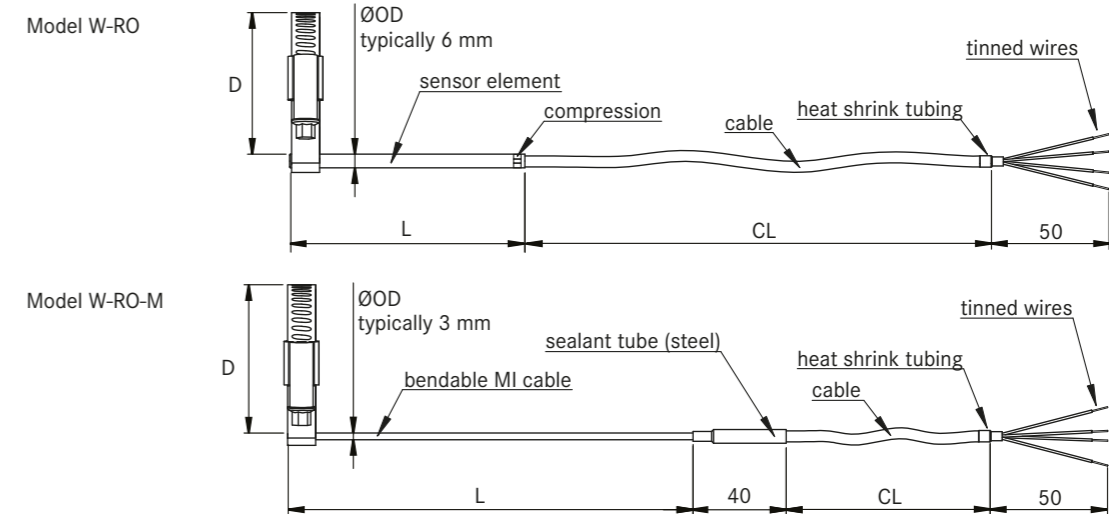
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, max. temperature +550 °C, temporarily +600 °C, other materials on request (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Fittings available for pipe sizes	0... 1000 mm, other sizes on request
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max.+205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	Model W-RO: -200...+350 °C, depending on materials and sensor element length, Model W-RO-M: -200...+550 °C, depending on materials and MI element length. (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Temperature range thermocouple	Model T-RO: -200...+350 °C, depending on thermocouple type, materials and sensor element length, Model T-RO-M: -200...+550 °C, depending on thermocouple type, materials and MI element length. (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Approvals	ATEX, IECEx and EAC Ex (Ex e) with remarks (see features), METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV



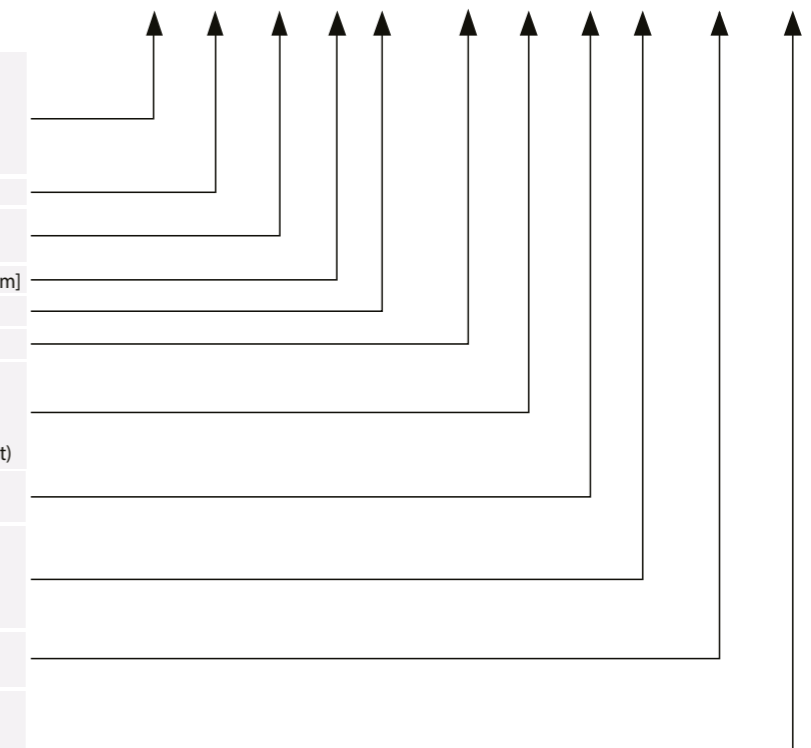
Drawing



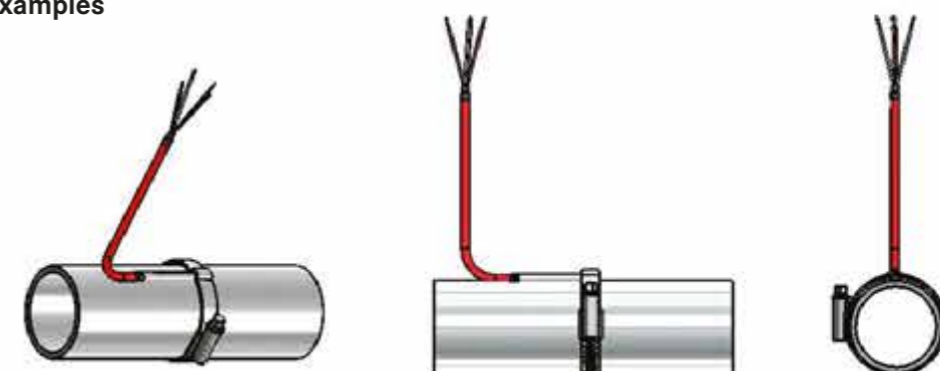
Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
RO	= sensor with pipe fitting (constant in code)
empty	= non-bendable sensor element
M	= bendable MI cable as sensor element
3, 6, 8	= outer diameter of sensor element (ØOD) [mm]
500	= immersion length, L [mm]
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS,	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
D=25	= inner diameter of pipe fitting [mm] (= external diameter of process pipe)
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — RO — M — 3 / 500 — 5000 / SIL — 4 — A — D=25 — X



Installation examples



EPIC® SENSORS T-M-P / W-M-P or T-P / W-P

Surface temperature sensor

Features

- temperature range -200...+550 °C
- fitting for plane surfaces
- fitting can be welded to sensor element at factory
- sensors with without a welded fitting, meet the ATEX, IECEx and EAC Ex (Ex e) requirements
- fitting can be supplied as separate item
- installation typically with welding, bolt or steel ties
- Pt100 or thermocouple as sensing element
- AISI 316L as standard delivery material, other materials on request
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured
- bendable sensor element
- vibration proof
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

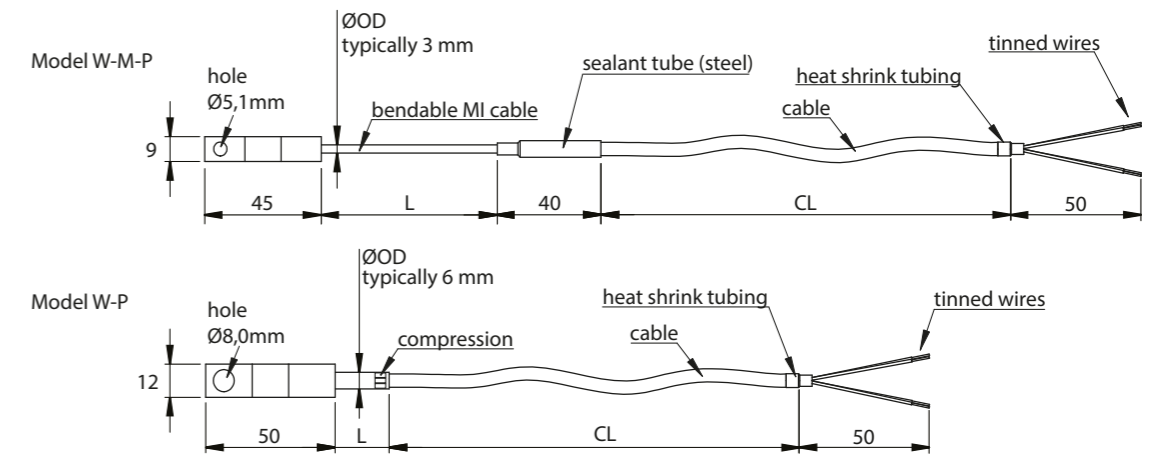
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, other materials on request (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Dimensions	5x9x45 (WxHxL) (hole Ø5.1 mm), 12x12x50 (WxHxL) (hole Ø8.0 mm), other dimensions on request
Tolerances Pt100 (IEC 60751)	A tolerance ±0.5 + 0.002 x t, operating temperature -100...+450 °C B tolerance ±0.3 + 0.005 x t, operating temperature -196...+600 °C B 1/3 DIN, tolerance ±1/3 x (0.3 + 0.005 x t), operating temperature -196...+600 °C B 1/10 DIN, tolerance ±1/10 x (0.3 + 0.005 x t), operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ±1.5 °C, 375...750 °C ±0.004 x t Type K and N tolerance class 1 = -40...375 °C ±1.5 °C, 375...1000 °C ±0.004 x t
Temperature range Pt100	Model W-P: -200...+350 °C, depending on materials and sensor element length, Model W-M-P: -200...+500 °C, depending on materials and MI element length. (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Temperature range thermocouple	Model T-P: -200...+350 °C, depending on thermocouple type, materials and sensor element length, Model T-M-P: -200...+550 °C, depending on thermocouple type, materials and MI element length. (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Approvals	ATEX, IECEx and EAC Ex (Ex e) with remarks (see features), METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Drawing



Product code key

Example code: W — M — P — 5x9x45 — 3 / 500 — 5000 / SIL — 4 — A — X

W	= Pt100 resistance thermometer	↑
2xW	= 2 x Pt100 resistance thermometer	↑
T	= thermocouple	↑
2xT	= 2 x thermocouple	↑
empty	= non-bendable sensor element	↑
M	= bendable MI cable as sensor element	↑
P	= surface temperature sensor (constant in code)	↑
5x9x45	= dimensions of the tip piece	↑
12x12x50	(Note: 5x9x45 tip only with 3 mm element)	↑
3, 6	= outer diameter of sensor element (ØOD) [mm]	↑
500	= length of sensor element, L [mm]	↑
5000	= cable length, CL [mm]	↑
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable materials (for more information, look technical data on first page of the datasheet)	↑
4,3,2	= Pt100 wire count	↑
K,N,J	= thermocouple type	↑
A,B	= Pt100 accuracy class, (class A as standard delivery)	↑
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)	↑
EXI	= Ex i certified sensor	↑
X	= additional details on the text line	↑

W-M-P-5x9x45-3/50-15000/GGD-4-A

Pt 100 resistance thermometer for 4-wire measurement, surface temperature sensor with bendable MI-structure, sensor element with diameter of Ø3 mm, tip piece dimensions 5x9x45 mm, delivered with 15 meter glass silk cable, maximum temperature +350°C.

Installation examples

Steel collar installation



Welded



Screw



EPIC® SENSORS T-CABLE / W-CABLE

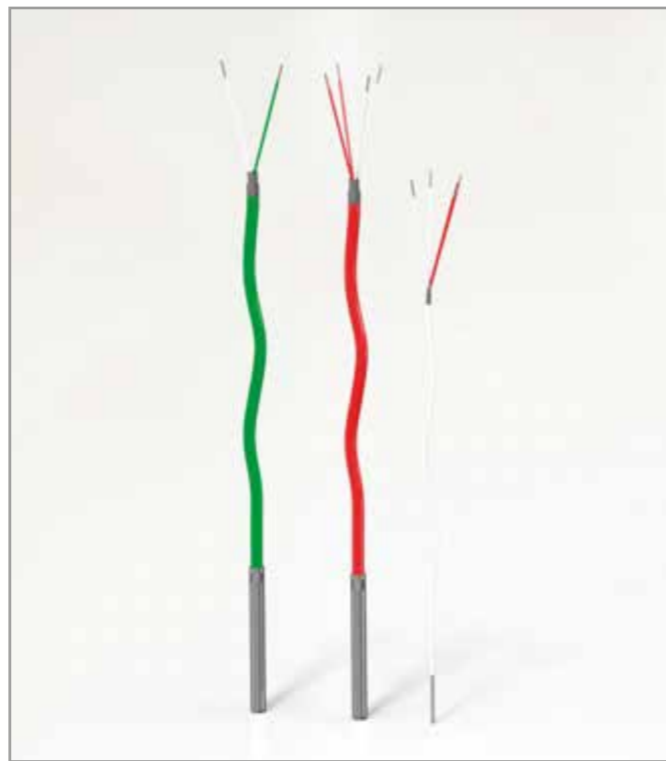
Temperature sensor with cable

Features

- temperature range -200...+350 °C
- Pt100 or thermocouple as sensing element
- AISI 316L as standard delivery material, other materials on request
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- ATEX and IECEx compatible Ex e and Ex i versions available
- tailored solutions according to customer specific needs
- 3D step models available on request.

Typical applications

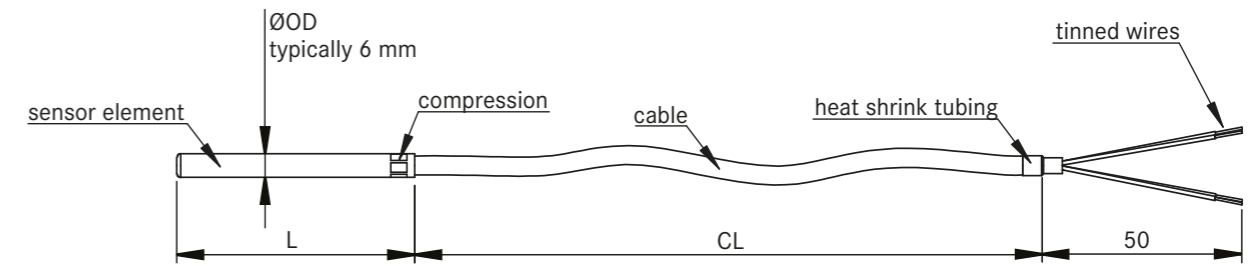
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, maximum temperature +300 °C, temporarily +350 °C, other materials on request
Diameter	3, 4, 5, 6, 8 mm, other diameters on request
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+350 °C, depending on cable material
Temperature range thermocouple	-200...+350 °C, depending on thermocouple type and cable material
Approvals	ATEX, IECEx, EAC Ex, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

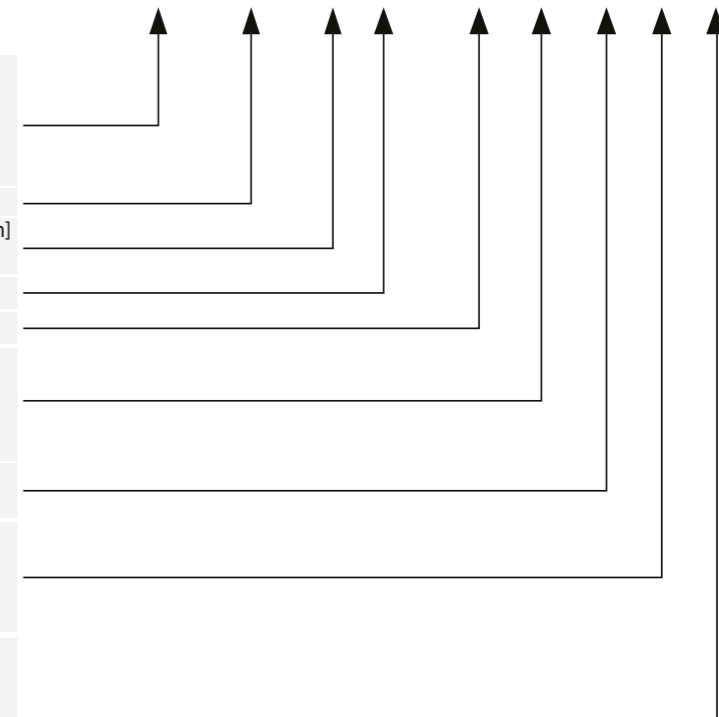
Drawing



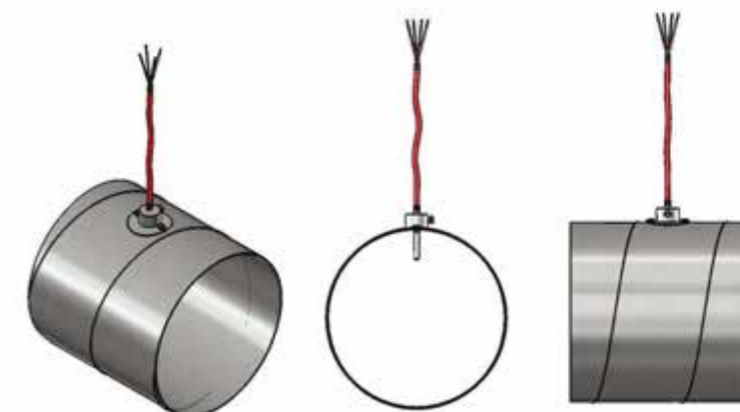
Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
CABLE	= cable sensor (constant in code)
3, 4, 5, 6, 8	= outer diameter of sensor element (ØOD) [mm] (other diameters on request)
100	= sensor element length, L [mm]
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EX	= Ex e certified sensor
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — CABLE — 6 / 100 — 5000 / SIL — 4 — A — X



Installation examples



EPIC® SENSORS T-BAJO / W-BAJO Bayonet temperature sensor

Features

- temperature range -200...+300 °C
- quick installation due to bayonet connection
- spring-loaded
- suitable for bearings
- vibration proof
- IP56 or higher (GGD glass silk cable version excluded)
- AISI 316L as standard delivery material, other materials on request
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- ATEX and IECEx compatible Ex e and Ex i versions available
- tailored solutions according to customer specific needs
- 3D step models available on request.

Typical applications

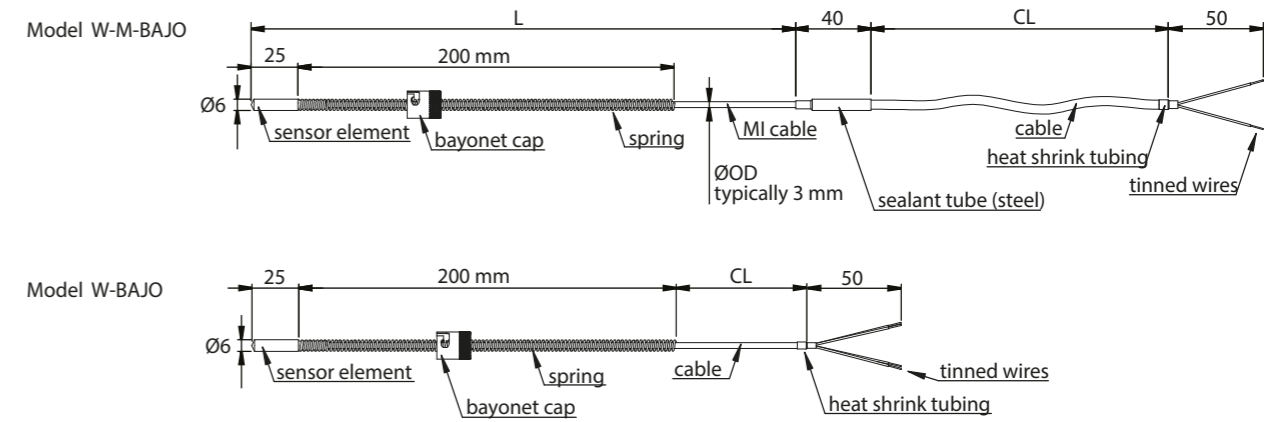
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, max. temperature +250 °C, temporarily +300 °C, other materials on request
Sensor diameter	6 or 8mm, other diameters on request
Bayonet cap diameter	12.2 mm, other diameters on request
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
IP rating	IP56, higher IP rating on request IP20 for GGD glass silk cable version
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	Model W-BAJO: -200...+260 °C, depending on materials, Model W-M-BAJO: -200...+300 °C, depending on materials and MI element length.
Temperature range thermocouple	Model T-BAJO: -200...+260 °C, depending on thermocouple type and materials, Model T-M-BAJO: -200...+300 °C, depending on thermocouple type, materials and MI element length.
Approvals	ATEX, IECEx, EAC Ex (Ex e), METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Drawing



Product code key

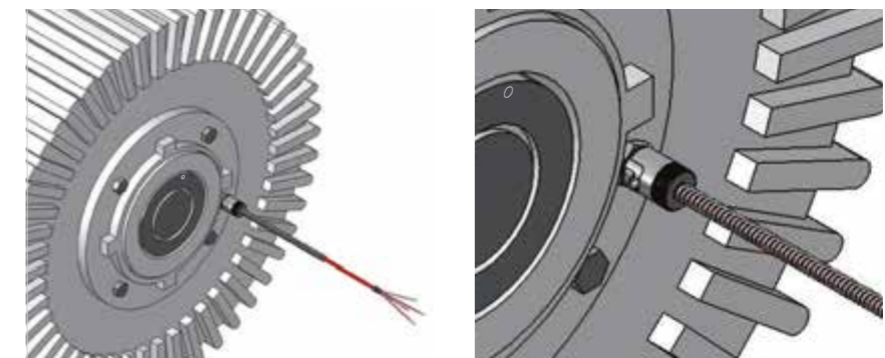
Example code: W — M — BAJO — 6 / 25 — 3 / 500 — 200 / SPRING — 5000 / SIL — 4 — A — X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
M	= MI cable in structure
empty	= no MI cable in structure
BAJO	= bayonet sensor (constant in code)
6, 8	= outer diameter of sensor element (ØOD) [mm]
25	= length of sensor element [mm]
3	= outer diameter of MI cable [mm]
500	= MI cable length, L [mm]
200	= spring length [mm]
SPRING	= spring in structure (constant in code)
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EX	= Ex e certified sensor
EXI	= Ex i certified sensor
X	= additional details on the text line

W-BAJO-6/25-200/SPRING-2000/FDF-4-A-X

Pt100 resistance thermometer for 4 wire measurement with accuracy class A, bayonet sensor without MI cable, sensor element with diameter 6 mm and tip length 25 mm, spring length 200 mm, delivered with 2 meters long FEP insulated and shielded cable, for cable maximum temperature +205°C. X stands for additional details and customizations in product according to customer specific needs.

Installation example



EPIC® SENSORS T-MAGN / W-MAGN

Magnetic temperature sensor

Features

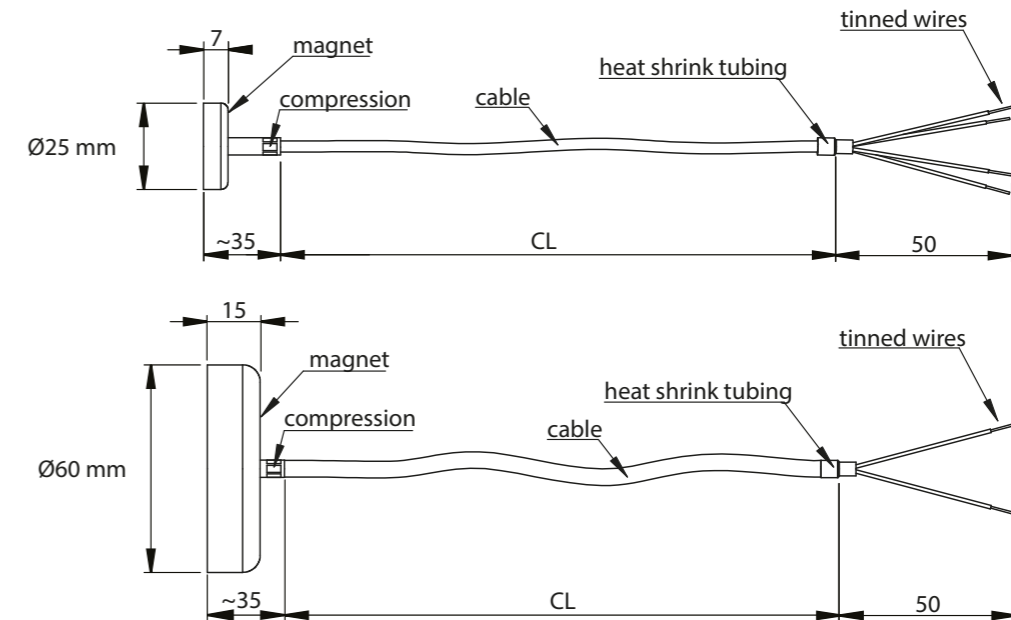
- temperature range -50...+350 °C
- quick installation
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- AISI 316L as standard delivery material, other materials on request
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Drawing



Technical data

Materials	AISI 316L, max. temperature +250 °C, temporarily +350 °C, other materials on request
Dimensions	Small magnet, external Ø25 mm / height 7 mm, other dimensions on request Large magnet, external Ø60 mm / height 15 mm, other dimensions on request
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	-50...+350 °C for large magnet, depending on cable material -50...+200 °C for small magnet, depending on cable material
Temperature range thermocouple	-50...+350 °C for large magnet, depending on cable material -50...+200 °C for small magnet, depending on cable material
Approvals	ATEX, IECEx, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
MAGN	= magnetic sensor (constant in code)
D25	= magnet diameter
D60	= magnet diameter
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EXI	= Ex i certified sensor
X	= additional details on the text line

Example code: W — MAGN — D25 — 5000 / SIL — 4 — A — X

EPIC® SENSORS T-106 / W-106

Temperature sensor for food industry

Features

- temperature range -200...+300 °C
- sharp tip
- handle
- Pt100 resistance thermometer as sensing element
- Pt100 accuracy class A as standard delivery
- AISI 316L as standard delivery material, other materials on request
- tailored solutions according to customer specific needs
- 3D step models available on request.

Typical applications

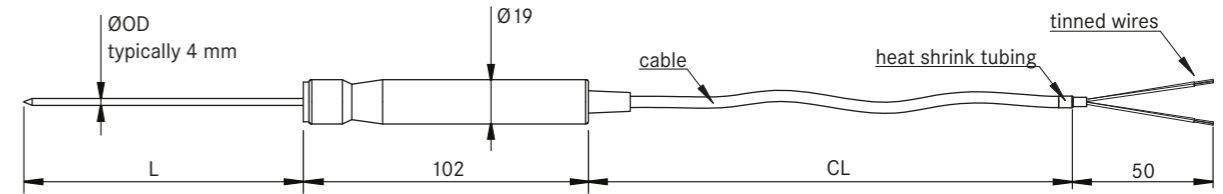
- food industry
- chemical industry.



Technical data

Materials	AISI 316L, maximum temperature +250 °C, temporarily +300 °C, other materials on request (Note: plastic covered handle max. temperature +110 °C)
Tip diameter	3, 4 or 6 mm, other diameters and tip shapes on request
Handle material	Plastics as standard delivery material, maximum temperature +110 °C Available also in acid proof stainless steel
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	-200...+300 °C, depending on material
Temperature range thermocouple	-200...+300 °C, depending on thermocouple type and material
Approvals	METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

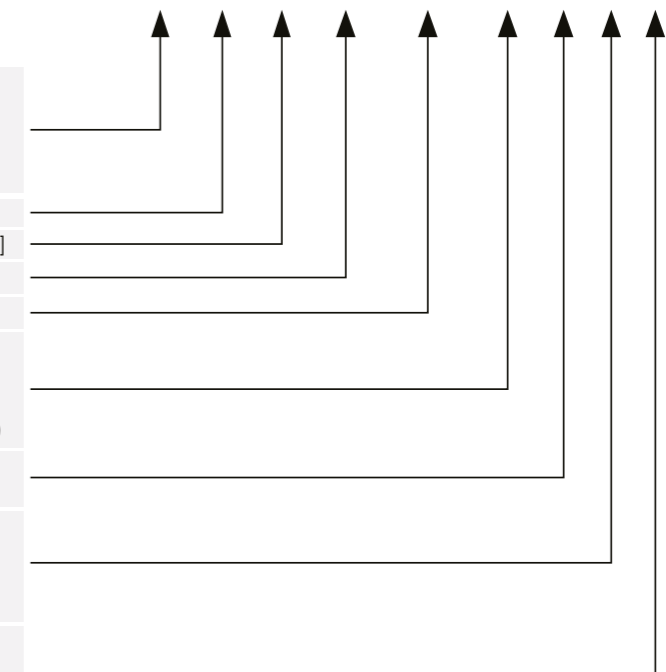
Drawing



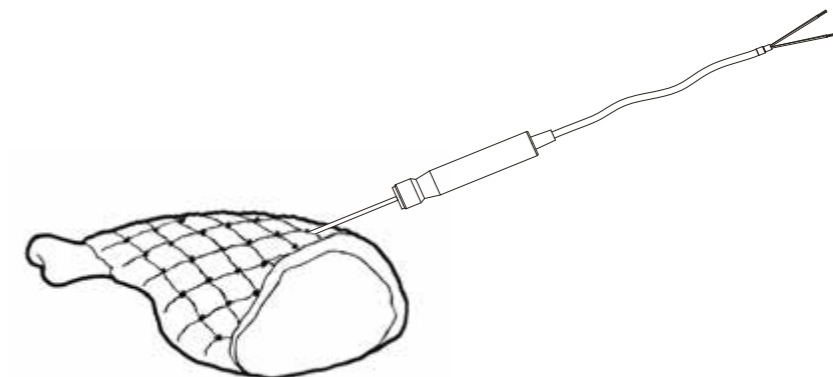
Product code key

Example code: W - 106 - 4 / 100 - 5000 / SIL - 4 - A - X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
106	= sensor for food industry (constant in code)
3, 4, 6	= outer diameter of sensor element (ØOD) [mm]
100	= sensor element length, L [mm]
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
X	= additional details on the text line



Installation example



EPIC® SENSORS T-BTD / W-BTD

Bearing temperature sensor

Features

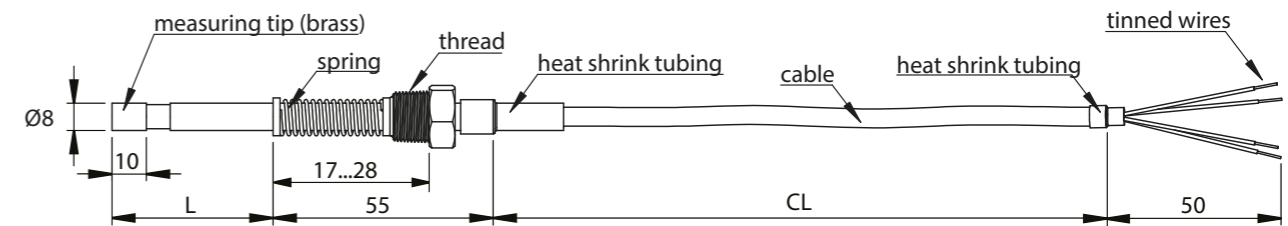
- temperature range -200...+300 °C
- suitable for bearing temperature measurement
- flat tip
- spring-loaded screw for installation
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- AISI 316L as standard delivery material, other materials on request
- brass tip as standard delivery material, other tip materials on request
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

- machinery
- motor manufacturing industry
- gear manufacturing industry.



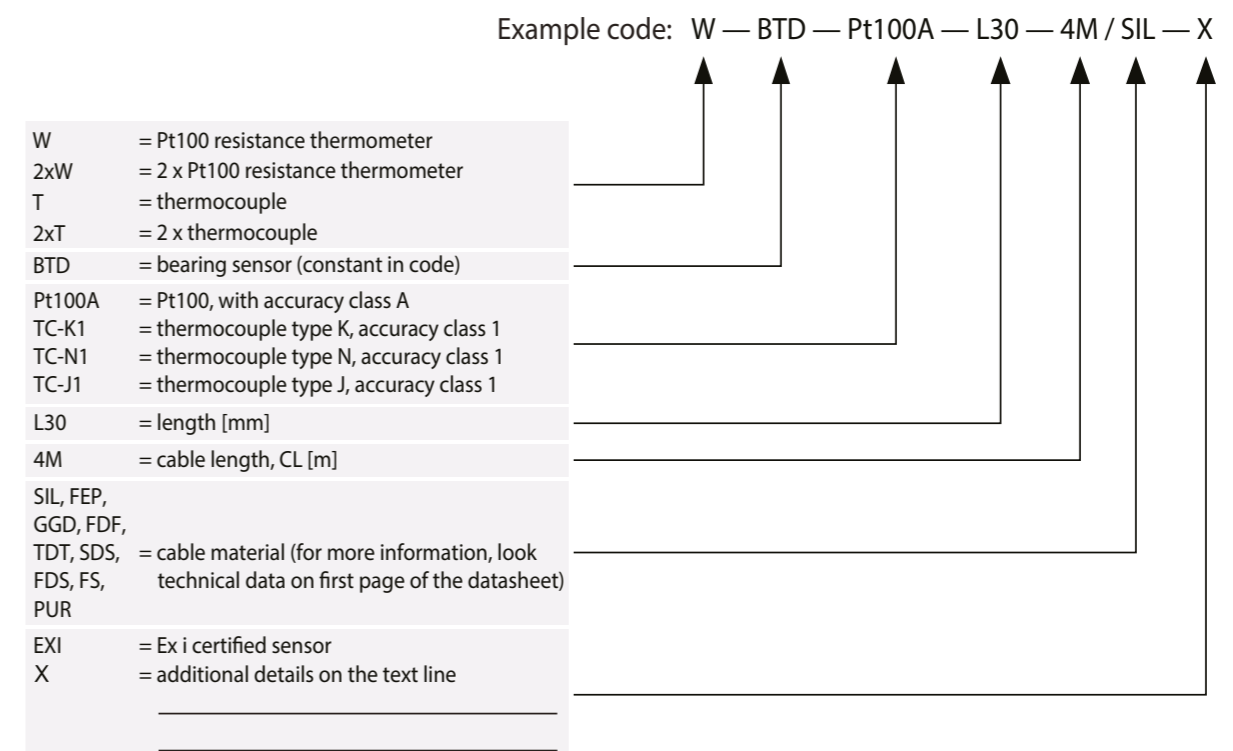
Drawing



Technical data

Materials	AISI 316L/brass tip, maximum temperature +250 °C, temporarily +300 °C, other materials on request (Note: overall max. temperature according to the cable material)
Tip diameter	8 mm, other diameters on request (Note: sensor tube is tapered from tip portion to reduce the heat conduction)
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C PUR = polyurethane cable, extremely good oil resistance, max. +80 °C (Note: PUR cable available only for this sensor type)
Thread	R3/8" as standard delivery, R1/2" as option, other threads on request
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt 100	-200...+300 °C, depending on cable material.
Temperature range thermocouple	-40...+250 °C, depending on thermocouple type and cable material
Approvals	ATEX, IECEx, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Product code key



EPIC® SENSORS T-MP / W-MP or T-MPT / W-MPT

Multi-point temperature sensor

Features

- temperature range -200...+1200 °C
- multi-point measurement
- Pt100 or thermocouple as sensing element
- AISI 316L or INCONEL 600 as standard delivery material, other materials on request
- available with a connection box
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- MI cable structured sensor elements
- bendable
- vibration proof structure
- Flexible armoured conduit version available
- changeable measurement elements
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

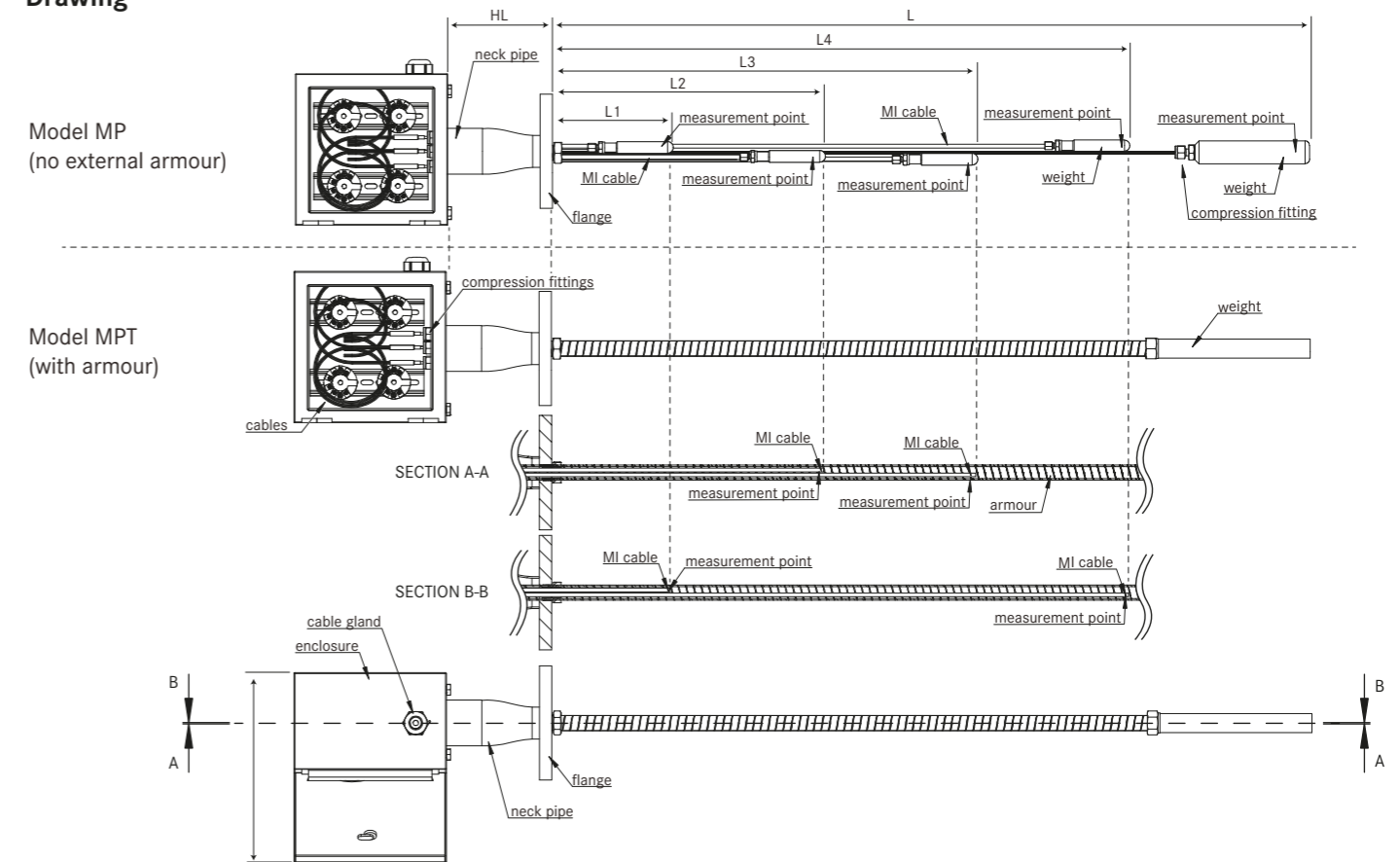
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, INCONEL 600, max. temperature +1000 °C, temporarily +1200 °C, other materials on request
Flange material	AISI 316L, max. temperature +550 °C, temporarily +600 °C, other flange materials on request
Flange type	Flange type according to ANSI, EN 1092-1, other flange types on request
Diameter of sensor elements	3 or 6 mm, other diameters on request
Enclosure	Enclosure according to customer specific needs
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
Tolerances Pt 100 (IEC 60751)	A tolerance ±0.15 + 0.002 x t, operating temperature -100...+450 °C B tolerance ±0.3 + 0.005 x t, operating temperature -196...+600 °C B 1/3 DIN, tolerance ±1/3 x (0.3 + 0.005 x t), operating temperature -196...+600 °C B 1/10 DIN, tolerance ±1/10 x (0.3 + 0.005 x t), operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ±1.5 °C, 375...750 °C ±0.004 x t Type K and N tolerance class 1 = -40...375 °C ±1.5 °C, 375...1000 °C ±0.004 x t
Temperature range Pt 100	-200...+550 °C, depending on materials
Temperature range thermocouple	-200...+1200 °C, depending on thermocouple type, neck pipe length and other materials
Approvals	ATEX, IECEx, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Drawing

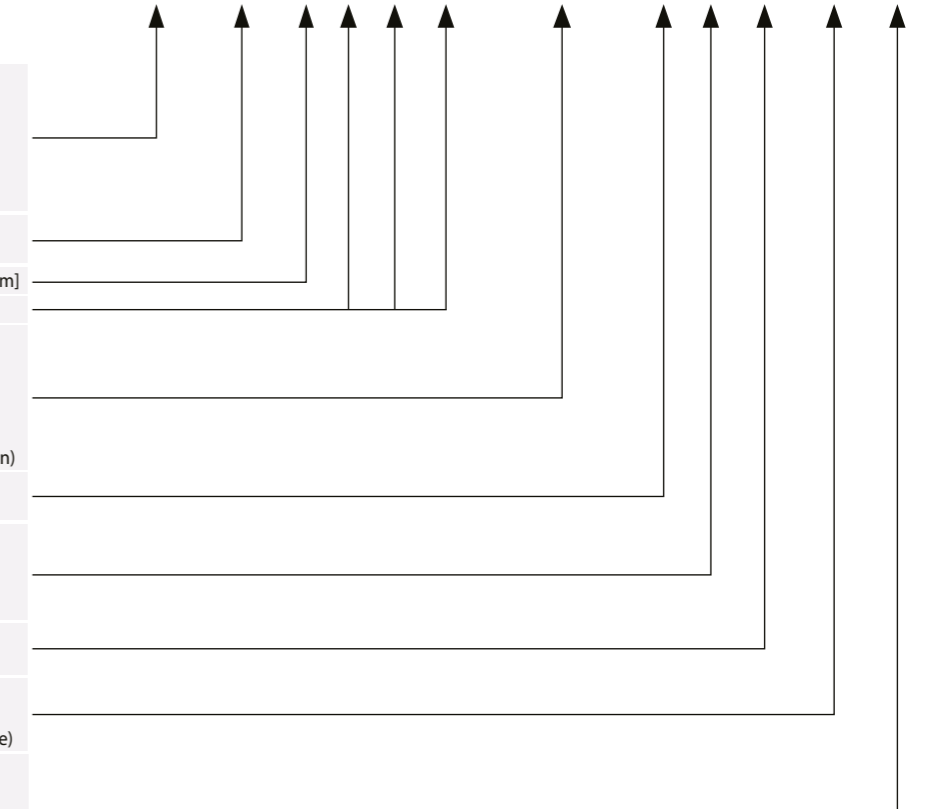


Product code key

- W = Pt100 resistance thermometer
- 2xW = 2 x Pt100 resistance thermometer
- nxW = n x Pt100 resistance thermometer
- T = thermocouple
- 2xT = 2 x thermocouple
- nxT = n x thermocouple
- MP = multipoint sensor, no armour
- MPT = multipoint sensor, with armour
- 3, 6 = outer diameter of sensor elements (ØOD) [mm]
- 2500/... = sensor element lengths [mm]
- DN25/PN40, DN40/PN40 = flange size / flange thickness (only typical stocked values listed)
- DN50/PN16, DN50/PN40, DN80/PN16, DN80/PN40 = flange size / flange thickness (all flange sizes available) (please contact our sales for more information)
- 4,3,2 = Pt100 wire count
- K,N,J = thermocouple type
- A,B = Pt100 accuracy class, (class A as standard delivery)
- 1,2,3 = thermocouple accuracy class, (class 1 as standard delivery)
- TR = wires for transmitter connection
- CB = with ceramic terminal block
- empty = no junction box
- BOX = supplied with junction box, (add info of supplier, type, etc. to the text line)
- EXI = Ex i certified sensor
- X = additional details on the text line

n times the lengths, according to the amount of measurement points

Example code: 3XW — MPT — 3 / 2500/.../7500 — DN50/PN16 — 4 — A — TR — BOX — X



EPIC® SENSORS T-SCREW / W-SCREW

Threaded temperature sensor with cable

Features

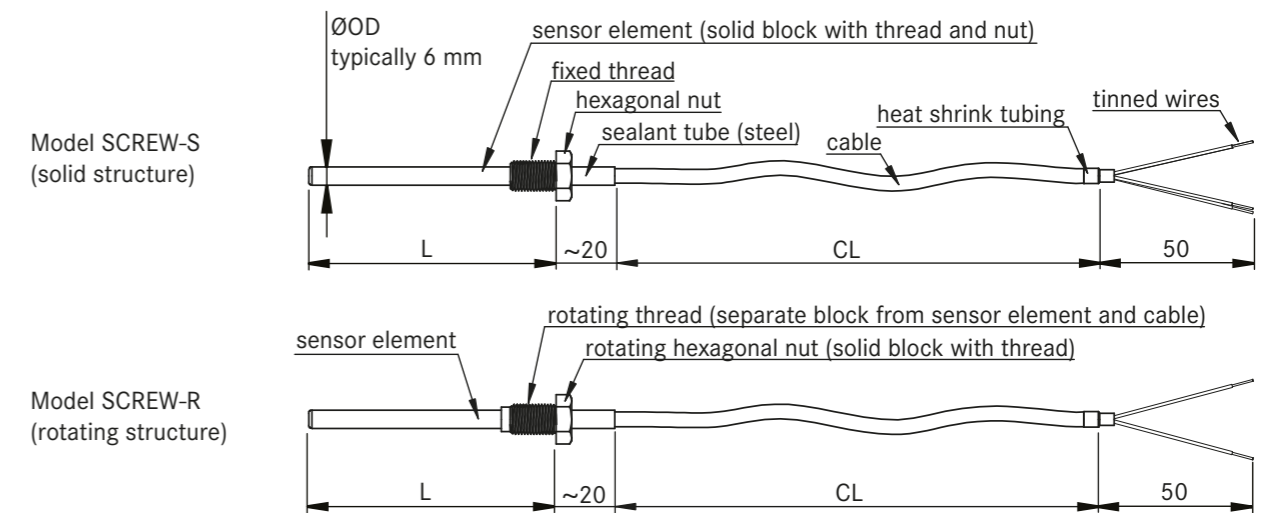
- temperature range -200...+300 °C
- Pt100 or thermocouple as sensing element
- AISI 316L as standard delivery material, other materials on request
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- tailored solutions according to customer specific needs
- ATEX and IECEx compatible Ex i versions available
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Drawing



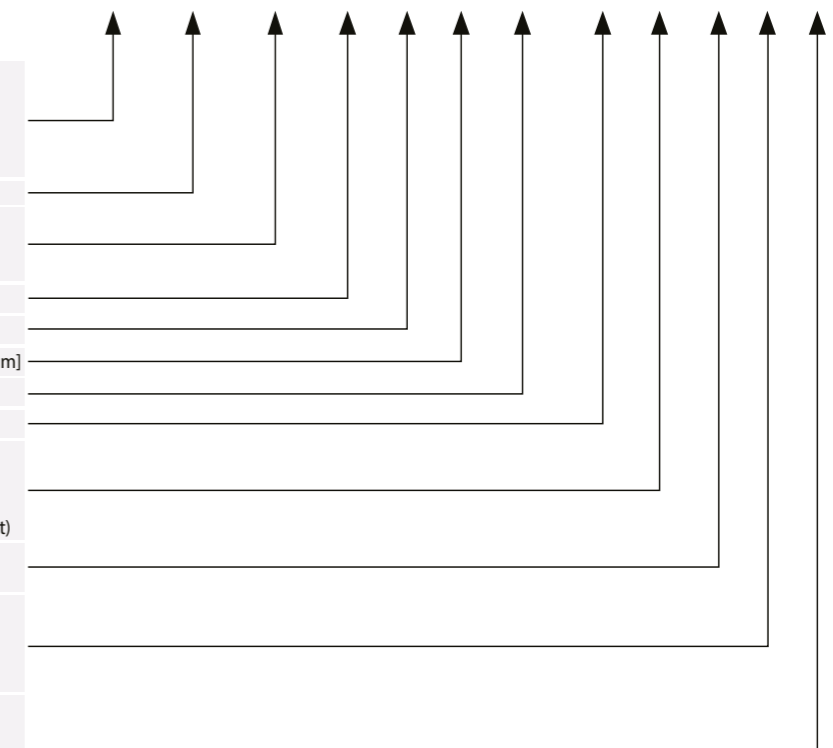
Technical data

Materials	AISI 316L, maximum temperature +250 °C, temporarily +300 °C, other materials on request (Note: overall max. temperature according to the cable)
Diameter	3, 4, 5, 6 or 8 mm, other diameters on request
Thread size and length	According to request, all sizes and lengths available Note: minor diameter of thread cannot be < element diameter
Cable material	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C
Tolerances Pt100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40...375 °C ± 1.5 °C, 375...750 °C $\pm 0.004 \times t$ Type K and N tolerance class 1 = -40...375 °C ± 1.5 °C, 375...1000 °C $\pm 0.004 \times t$
Temperature range Pt100	-200...+300 °C, depending on material
Temperature range thermocouple	-200...+300 °C, depending on thermocouple type and material
Approvals	ATEX, IECEx, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Product code key

Example code: W — SCREW — R — M8x1 / 10 — 6 — 100 — 5000 / SIL — 4 — A — X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
SCREW	= sensor with thread (constant in code)
S	= solid structure
R	= rotating structure (easy to assemble, note: does not obstruct gas or liquid flow)
M8x1	= thread size (all available)
10	= thread length [mm]
3, 4, 5, 6, 8	= outer diameter of sensor element (ØOD) [mm]
100	= immersion length, L [mm]
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
EXI	= Ex i certified sensor
X	= additional details on the text line



EPIC® SENSORS W-M-TRACE or 2x W-M-TRACE

Trace heating sensor

Features

- temperature range -60...+450 °C, temporarily +550 °C
- temperature range -40...+80 °C for standard delivery enclosure
- Pt100 as sensing element
- Pt100 accuracy class A as standard delivery
- 1 or 2 measurement points
- replaceable sensor elements
- AISI 316L as standard delivery material for the sensor elements, other materials on request
- components are available as ATEX compatible Ex e, however subsequent approval of the entity is required
- tailored solutions according to customer specific needs
- 3D step models available on request.

Typical applications

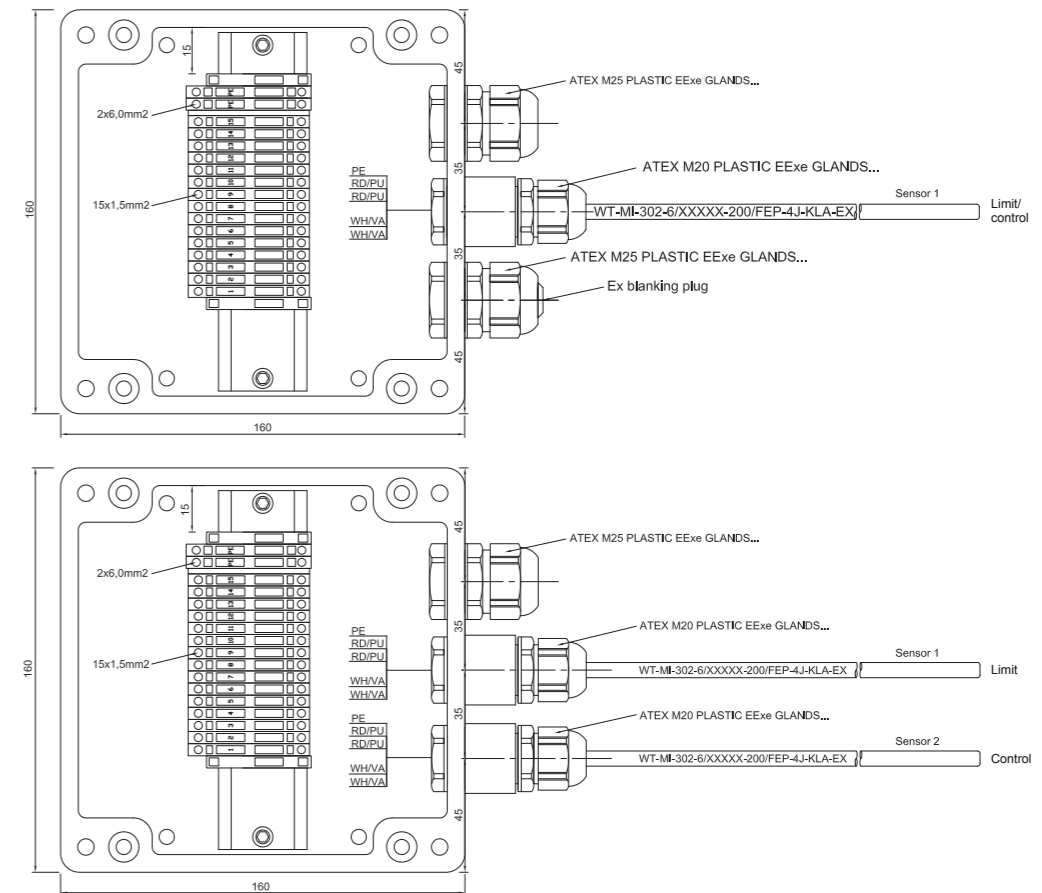
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Materials	AISI 316L, maximum temperature +450 °C, temporarily +550 °C, other materials on request
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Temperature range Pt 100	-60...+450 °C, temporarily +550 °C
Sensing element classification	II 2 GD Ex e T1-T6 Ex tD A21 IP66 T 60 °C T amb (max.) -40...+125/550 °C
Length	1000 or 2000 mm as standard delivery, other lengths on request
Diameter	3 or 6 mm, other diameters on request
Enclosure dimensions	160x160x90 mm (WxHxD)
Enclosure material	Glass-reinforced polyester as standard delivery, other materials on request
Enclosure classification	II 2 GD Ex e IIC T6 Gb (Ta = -65...+40 °C, +55 °C, +60 °C or +65 °C) Ex e IIC T4 Gb (Ta = -65 °C...+90 °C) Ex Ib IIC T6 Gb (Ta = -65 °C...+40 °C, +55 °C, +60 °C or +65 °C) Ex Ib IIC T4 Gb (Ta = -65 °C...+90 °C) Ex tb IIIC T85 °C Db (Ta = -65 °C...+40 °C, +55 °C, +60 °C or +65 °C) Ex tb IIIC T100 °C Db (Ta = -65 °C...+90 °C)
Box temperature range	-40...+80 °C
Cable glands	Product with 2 sensing elements: 1 x cable gland, M25x1.5, for cable diameters 6-13 mm Product with 1 sensing element: 2 x cable gland, M25x1.5, for cable diameter 6-13 mm
Approvals	Available with Ex e approved components, subsequent approval of the entity is required.
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP66 or IP67, other IP rating on request

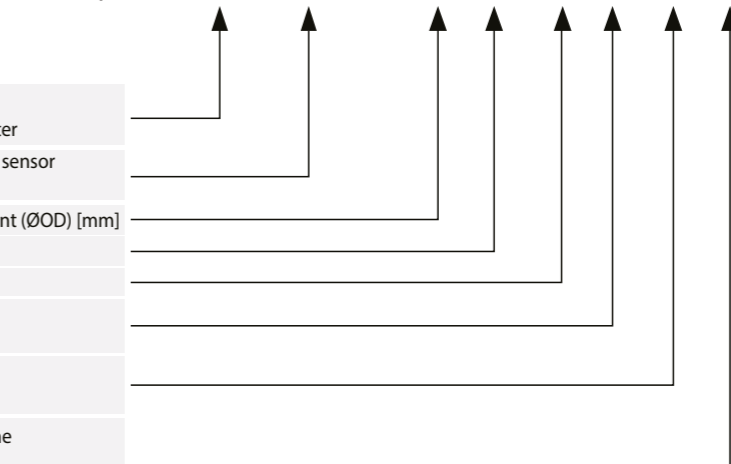
Drawing



Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
M-TRACE	= mineral insulated trace heating sensor (constant in code)
3, 6	= outer diameter of sensor element (ØOD) [mm]
1000	= sensor element length, L [mm]
4,3,2	= Pt100 wire count
A,B	= Pt100 accuracy class, (class A as standard delivery)
empty	= no Ex e -approval
EX	= Ex e -approved components
X	= additional details on the text line

Example code: W — M — TRACE — 6 / 1000 — 4 — A — EX — X



Installation example



EPIC® SENSORS T-SIL-PATCH / W-SIL-PATCH or 2xT-SIL-PATCH / 2xW-SIL-PATCH

Silicone patch sensor

Features

- temperature range -40...+180 °C
- Pt100 or thermocouple as sensing element
- Pt100 accuracy class A as standard delivery
- thermocouple accuracy class 1 as standard delivery
- EMI shielded version available
- ELASTOSIL® RT 607 A/B silicone material
- aluminum tape on measuring surface as option
- tinned fine stranded copper wires
- supplied with cable or twisted wires
- tailored solutions according to customer specific needs
- 3D step models available on request.

Typical Applications

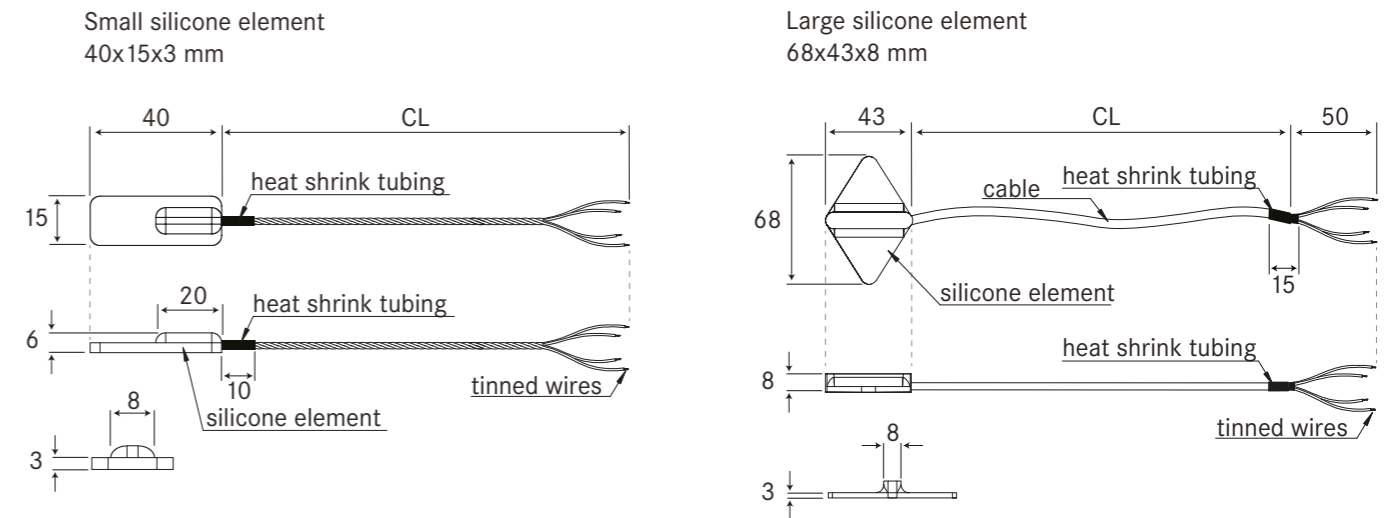
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40... 375 °C $\pm 1,5$ °C, 375...750 °C $\pm 0,004 \times t$ Types K and N tolerance class 1 = -40...375 °C $\pm 1,5$ °C, 375...1000°C $\pm 0,004 \times t$
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C CON = no cable, individual single wires, FEP wire insulation, max. +205 °C
Wire materials	2 wires = FEP insulated twisted wires 2x0,22/+205°C 3 wires = FEP insulated twisted wires 3x0,22/+205°C 4 wires = FEP insulated twisted wires 4x0,22/+205°C
Temperature range	-40...+180 °C (Note: range is for silicone sensor head, cable range according to selection)
Approvals	METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

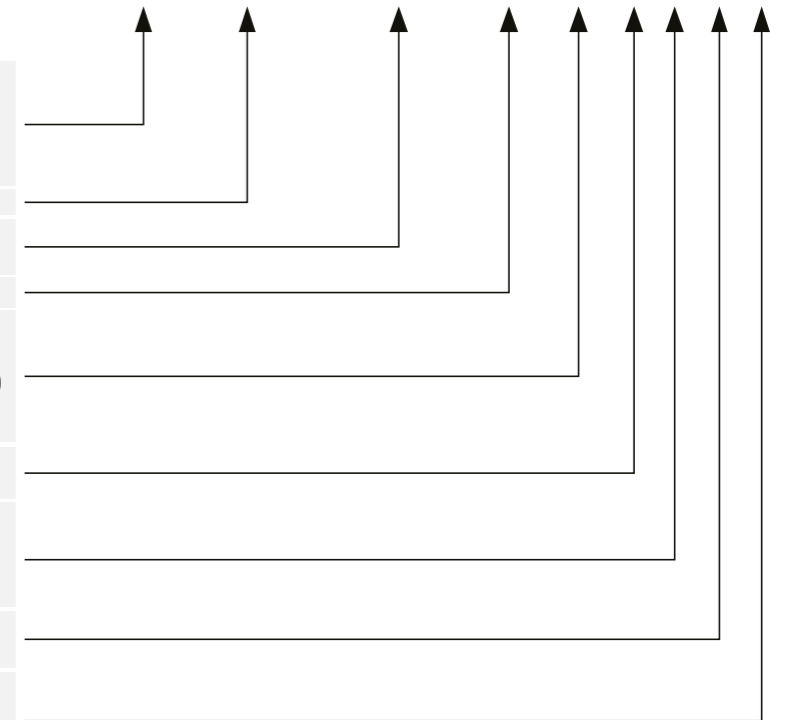
Drawing



Product code key

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
SIL-PATCH	= silicone patch sensor (constant in code)
40X15X3	= silicone element size [mm]
68X43X8	= silicone element size [mm]
5000	= cable or wiring length, CL [mm]
CON, SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
Y	= with aluminum foil on installation surface
N	= no aluminum foil
X	= additional details on the text line

Example code: W - SIL - PATCH - 40X15X3 - 5000 / SIL - 4 - A - Y - X



Installation examples



EPIC® SENSORS nxT-MP-303

Mineral insulated temperature sensor for multipoint measurement

Features

- according to DIN 43721
- temperature range -200...+1200 °C
- AISI 316L or INCONEL 600 as standard delivery material, other materials on request
- customer specific lengths
- customer specific amount of measurement points
- MI cable structured sensor element
- depending on the customer application, the sensor element can be constructed as a bendable or non-bendable element
- vibration proof
- thermocouple as sensing element
- thermocouple accuracy class 1 as standard delivery
- EMI shielded version available
- 3D step models available on request.



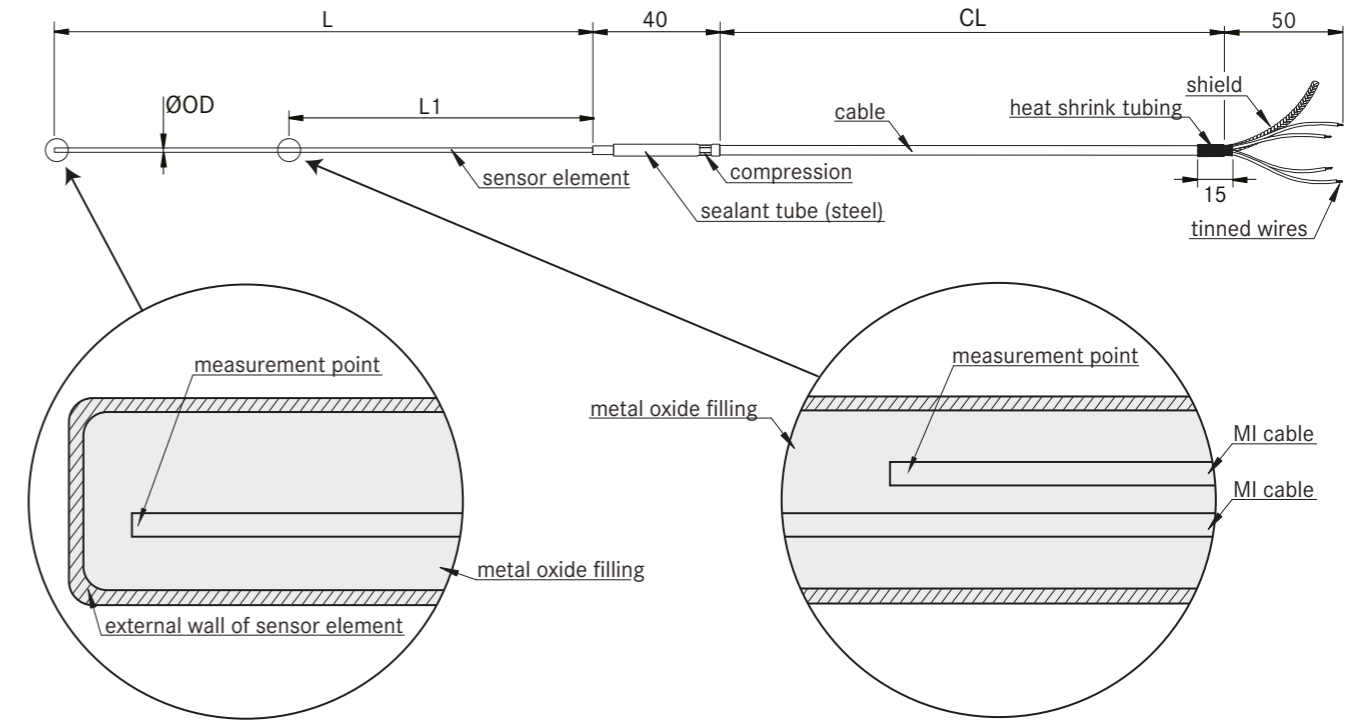
Typical applications

- steel industry, chill molds
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, INCONEL 600, maximum temperature +1100 °C, temporarily +1200 °C Other materials on request (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Tolerances thermocouple (IEC 60584)	Type J tolerance class 1 = -40... 375 °C ±1,5 °C, 375...750 °C ±0,004 x t Types K and N tolerance class 1 = -40...375 °C ±1,5 °C, 375...1000°C ±0,004 x t
Cable materials	SIL = silicone, max. +180 °C FEP = fluoropolymer, max. +205 °C GGD = glass silk cable/metal braid jacket, max. +350 °C FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C TDT = fluoropolymer wire insulation/braid shield/fluoropolymer jacket, max. +205 °C FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C FS = FEP wire insulation/silicone jacket, max. +180 °C (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Temperature range	-200...+1200 °C depending on thermocouple type and cable material (Note. max. safe temperature +100 °C for the sealant tube in cable to sensor element transition)
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing



Product code key

n times the lengths, according to the amount of measurement points

Example code: 2XT – MP – 303 – 2.7 / 2750 / ... / AISI – 5000 / SIL – K – 1 – X

nxT	= n x thermocouple (n = amount of measurement points)
MP-303	= multipoint sensor (constant in code)
2.7	= outer diameter of sensor element (ØOD) [mm]
2750	= MI cable (sensor 1) length, L [mm]
650	= MI cable (sensor 2) length, L1 [mm]
AISI	= AISI316L, max. temp. +550 °C
INCO	= Inconel 600, max. temp. +1100 °C (other materials on request)
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
K,N,J	= thermocouple type
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
X	= additional details on the text line

EPIC® SENSORS W-63 or 2xW-63

Autoclave temperature sensor with cable

Features

- temperature range -60...+180 °C
- suitable for autoclaves and steam chambers
- medical grade components
- material AISI316/AISI 316L
- Pt100, accuracy class A as standard delivery
- sensor type W-63 available with M12 connector (5 poles, 4 signal and 1 ground)
- EMI shielded cable
- 3D step models available on request.

Typical applications

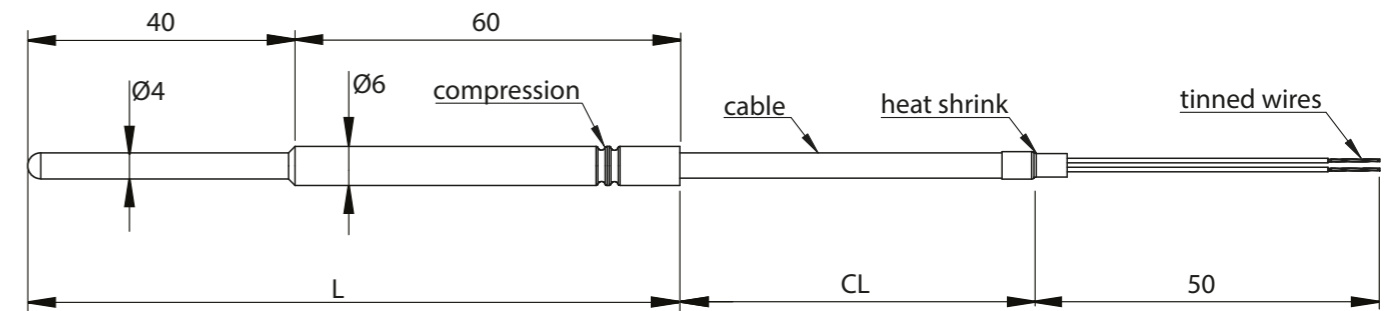
- autoclaves
- sterilization devices
- steam chambers
- manufacturing industry.



Technical data

Materials	AISI316/AISI 316L, maximum temperature +180 °C,
Surface roughness	Ra = 0,6 µm
Cable material	FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C (medical grade silicone)
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Temperature range	-60...+180 °C
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

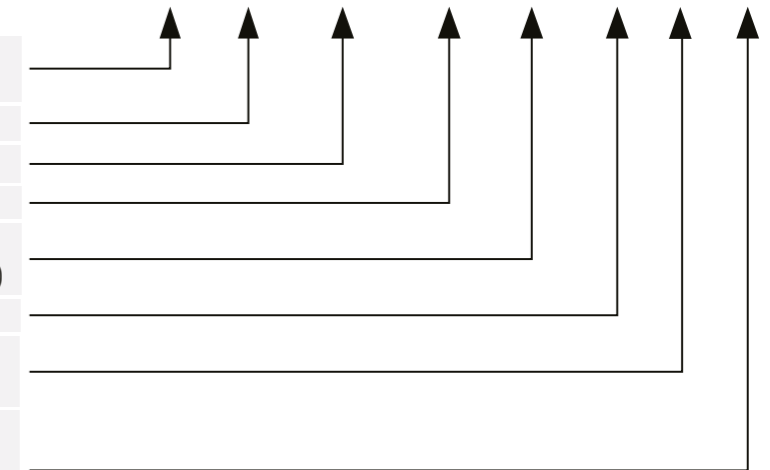
Drawing



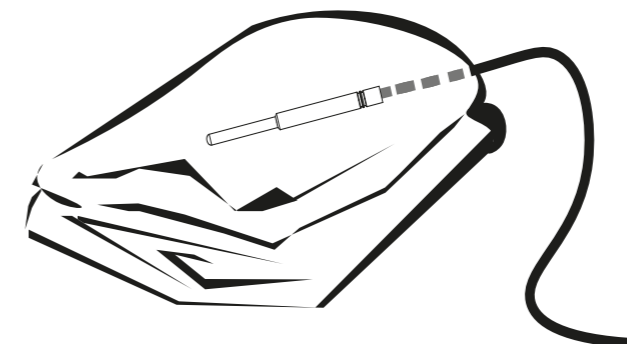
Product code key

Example code: W - 63 - 100 - 5000 / FDS - 4 - A - X

W	= Pt100 resistance temperature sensor
2xW	= 2 x Pt100 resistance temperature sensor
63	= autoclave sensor (constant in code)
100	= length of sensor element, L [mm]
5000	= cable length, CL [mm]
FDS	= cable material (for more information, look technical data on first page of the datasheet)
4,3	= Pt100 wire count
A,B	= Pt100 accuracy class, (class A as standard delivery)
X	= additional details on the text line



Installation example



EPIC® SENSORS W-5802

Compact resistance temperature sensor with transmitter

Features

- temperature range -60...+450 °C, temporarily +550 °C
- temperature range for transmitter -40...+85 °C
- integrated mA transmitter
- output current signal 4...20 mA
- miniature transmitter
- programmable transmitter configurations
- programmable sensor fault indication
- linear temperature measurement
- RTD sensor
- Pt100, accuracy class A as standard delivery
- 4-pin M12 plug
- bendable MI cable structured sensor element
- material AISI316/AISI 316L
- vibration proof
- durable steel enclosure
- 3D step model available on request.

Typical applications

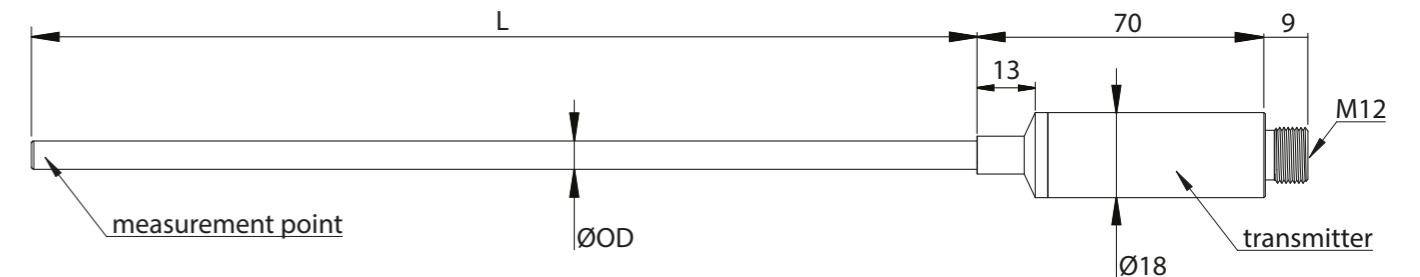
- temperature measurement
- requirements for minimal space usage.



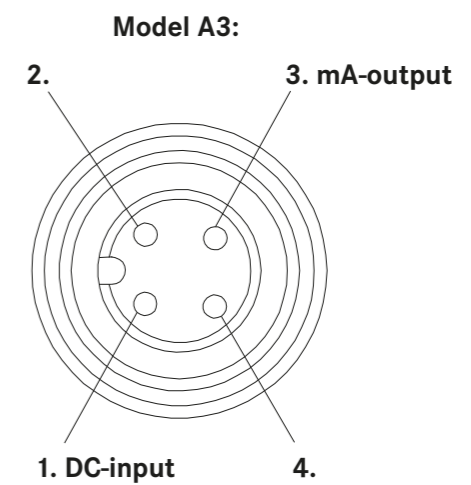
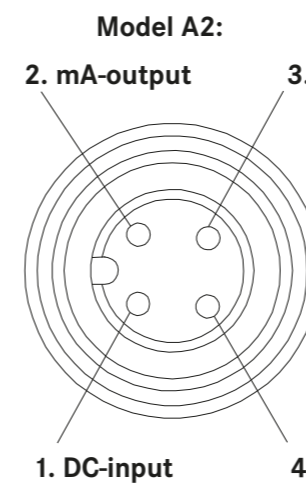
Technical data

Materials	AISI 316/AISI 316L, maximum temperature +450 °C, temporarily +550 °C
Sensor element	MI cable with diameter 3 or 6 mm, other diameters on request
Connector	4 pin, A coded M12 plug
Transmitter	Manufacturer PR electronics, model PR 5802 A2A2 or PR 5802 A2A3
Operation voltage	8,0... 35 VDC
Power loss	25 mW... 0,8 W
Response time	0,33... 60 s
Output signal	4... 20 mA
Tolerances Pt 100 (IEC 60751)	A tolerance $\pm 0.15 + 0.002 \times t$, operating temperature -100...+450 °C B tolerance $\pm 0.3 + 0.005 \times t$, operating temperature -196...+600 °C B 1/3 DIN, tolerance $\pm 1/3 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C B 1/10 DIN, tolerance $\pm 1/10 \times (0.3 + 0.005 \times t)$, operating temperature -196...+600 °C
Temperature range	Temperature measurement range -60...+450 °C, temporarily +550 °C (Note: transmitter temperature range -40...+85 °C)
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing



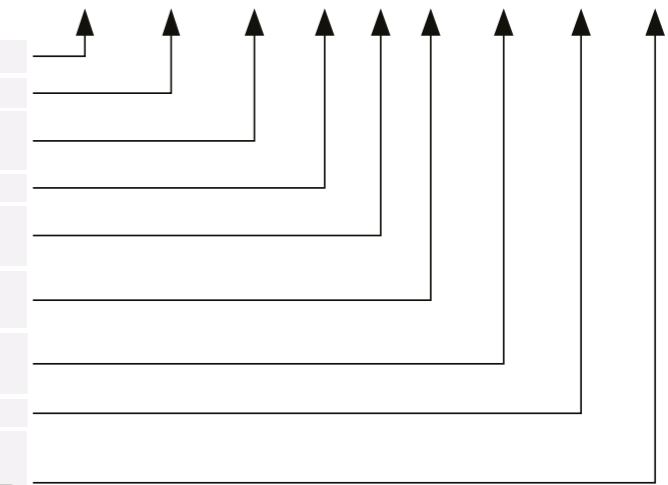
Connections 2-wire installation



Product code key

W	= Pt100 resistance temperature sensor
5802	= transmitter type (constant in code)
A2	= transmitter model
A3	(PR 5802 A2A2 or PR 5802 A2A3)
M	= mineral insulated sensor (constant in code)
3, 6	= outer diameter of sensor element (ØOD) [mm] (other diameters on request)
300	= MI cable length, L [mm]
A, B	= Pt100 accuracy class, (class A as standard delivery)
M12	= connector
X	= additional details on the text line

Example code: W - 5802 - A2 - M - 6 / 300 - A - M12 - X



EPIC® SENSORS

Threaded thermowells without cooling neck

Features

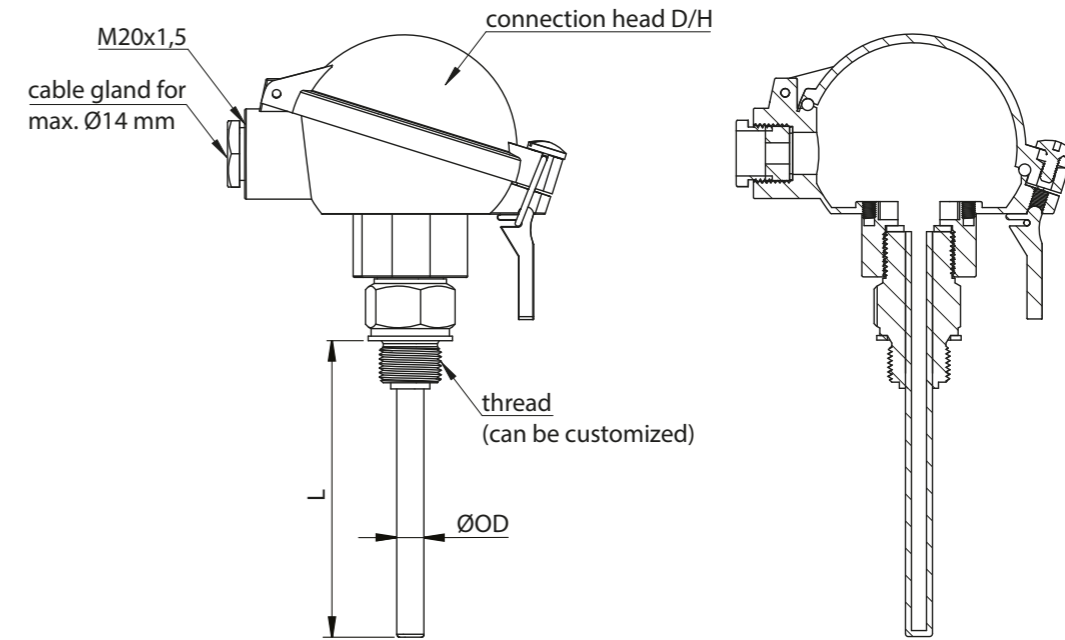
- according to DIN 43772 form 2
- fitted to application with thread, no welding required
- compact size allows installation in tight places
- ideal for low temperatures
- used to house mineral insulated temperature sensor element
- allows easy replacement of sensor element, without interrupting the process
- cable gland for max Ø14 mm
- ATEX compatible Ex db version available
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Drawing



Technical data

Material	AISI 316L / EN1.4404, maximum temperature +250 °C, temporarily +300 °C, Other materials on request
Thread	G, R, metric and NPT, Other threads on request
Diameter	Ø6 mm, Ø9 mm or Ø11 mm, Other diameters available on request
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Product code key

Example code: B — 9K — D/H — 100 — G½" — X

B	= thread in thermowell (constant in code)	↑
6, 9, 11	= thermowell outer diameter (ØOD) [mm], other diameters on request	↑
K	= without cooling neck (constant in code)	↑
B	= connection head B	↑
D/H	= connection head with snap lock	↑
D/H/D	= connection head with snap lock and double barrel (2x cable gland)	↑
D/W/H	= high cover connection head with snap lock	↑
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)	↑
EXD	= ATEX compatible connection head	↑
HST	= acid proof connection head	↑
N	= connection head N	↑
100	= length, L [mm]	↑
G½"	= thread size (all available, also NPT)	↑
X	= additional details on the text line	↑

EPIC® SENSORS

Threaded thermowells with cooling neck

Features

- according to DIN 43772 form 2G
- fitted to application with thread, no welding required
- neck pipe, also known as cooling neck, for heat source clearance
- used in applications where heat sensitive electronics, mainly transmitters, need clearance from heat source
- neck pipe length typically 145 mm
- allows separate insulator layer to be used between connection head and heat source
- thermowell material according to the application
- used to house mineral insulated temperature sensor element
- allows easy replacement of sensor element, without interrupting the process
- cable gland for max Ø14 mm
- ATEX compatible Ex db version available
- 3D step models available on request.



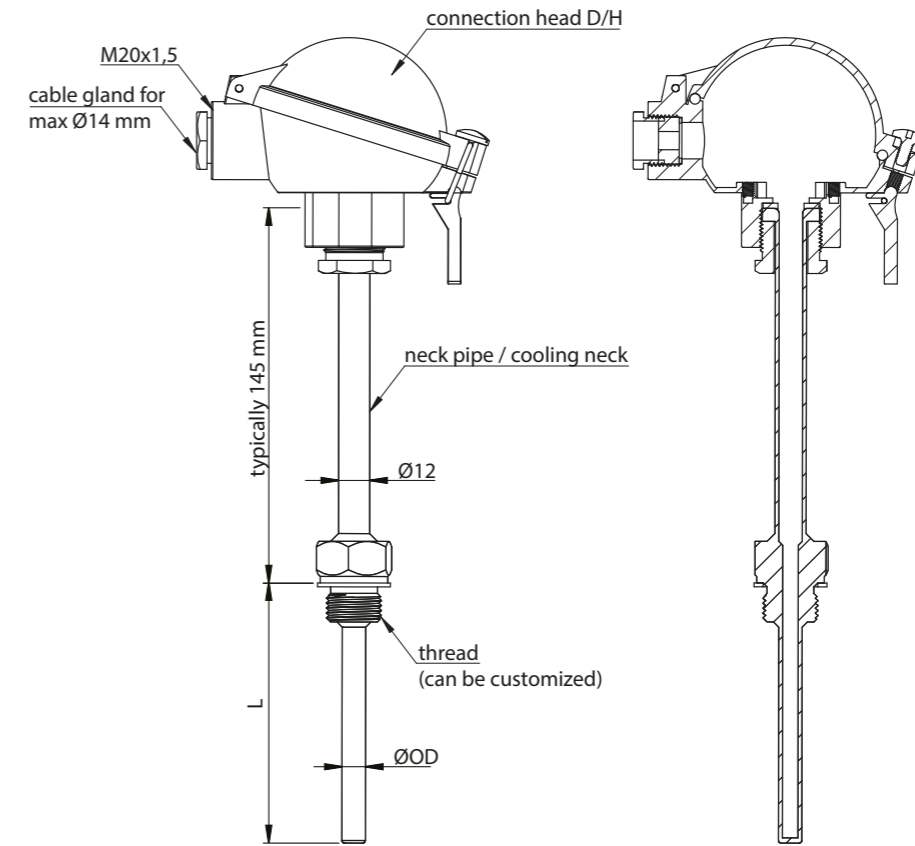
Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

Materials	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, Other materials on request
Thread	G, R, metric and NPT, Other threads on request
Diameter	Ø6 mm, Ø9 mm or Ø11 mm, Other diameters available on request
Neck pipe diameter	Typically Ø12 mm, Other diameters available on request
Temperature range	Neck pipe length = 250 mm → maximum temperature +750 °C, Neck pipe length = 300 mm → maximum temperature +1000 °C, Neck pipe length = 350 mm → maximum temperature +1200 °C, Note: maximum temperature will be limited by the type of thermocouple insert used
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

Drawing



Product code key

Example code: B — 9 — D/H — 100 — G½" — X

B	= thread in thermowell (constant in code)
6, 9, 11	= thermowell outer diameter (ØOD) [mm] other diameters on request
B	= connection head B
D/H	= connection head with snap lock
D/H/D	= connection head with snap lock and double barrel (2x cable gland)
D/W/H	= high cover connection head with snap lock
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)
EXD	= ATEX-compatible connection head
HST	= acid proof connection head
N	= connection head N
100	= length, L [mm]
G½"	= thread size (all available, also NPT)
X	= additional details on the text line

EPIC® SENSORS

Immersible thermowells

Features

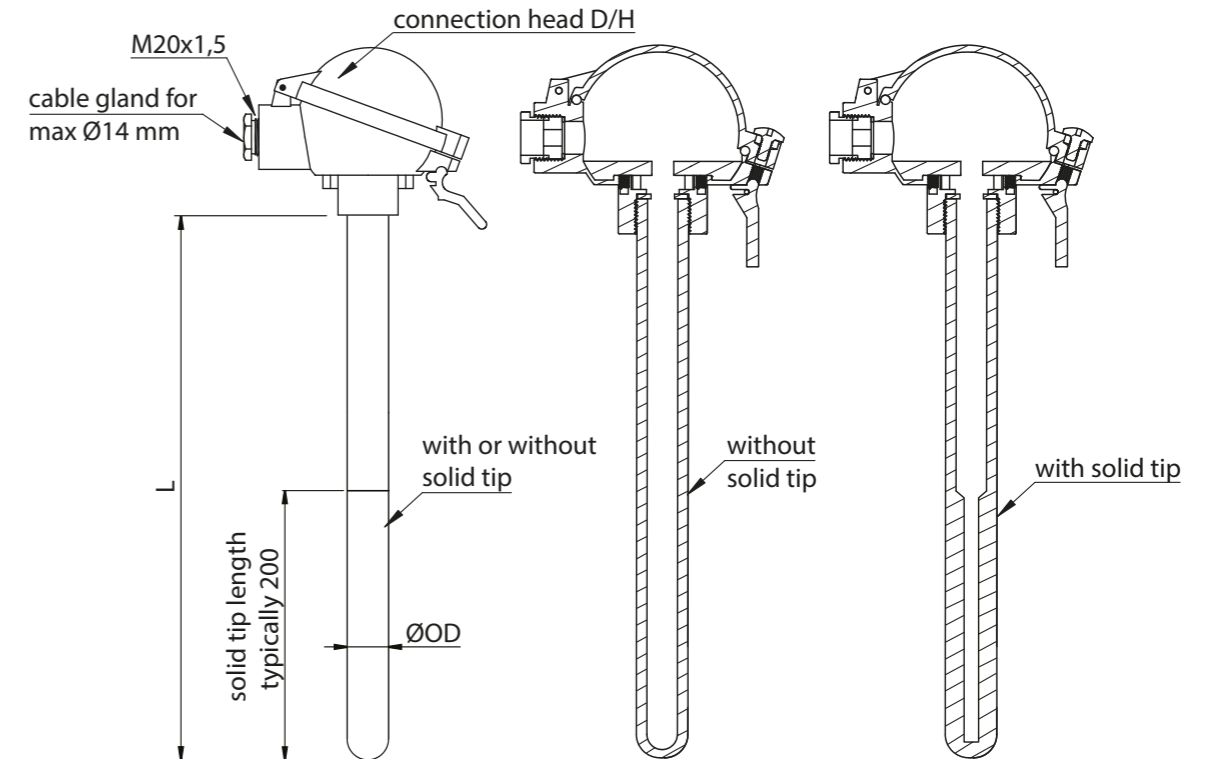
- immersion depth can be adjusted when installed with gas-tight threaded couplings or adjustable flanges
- used to house mineral insulated temperature sensor element
- allows easy replacement of sensor element, without interrupting the process
- available as solid tip version with thicker tip material, for more wear resistance
- cable gland for max Ø14 mm
- ATEX compatible Ex db version available
- special coatings available to increase wear and heat resistance
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Drawing



Technical data

Materials	AISI 316L / EN1.4404, max. temperature +550 °C, temporarily +600 °C, AISI 446-1 / EN1.4749, max. temperature +1100 °C, temporarily +1200 °C Other materials available on request
Diameter	Ø10 mm or Ø22 mm, Other diameters available on request
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request
Special coatings	FEP - known as a fluoropolymer, good for low temperature, exhaust gases and various acids, resistant to sunlight PFA - very similar to FEP, slightly better thermal stability and higher temperature resistance than FEP METCO - hardmetal coating especially for applications where sensors are exposed to grinding like crude oil pipes (sand/stones), rock wool blasting, etc. HALAR - for anticorrosion applications DIAMALLOY - corrosion protection with hard surface Other coating materials available on request

Product code key

Example code: A — 22 — D/H — U / 1000 / 1.4749 — X

A	= immersible thermowell type (constant in code)	↑
10, 22	= outer diameter of thermowell (ØOD) [mm]	↑
B	= connection head B	
D/H	= connection head with snap lock	↑
D/H/D	= connection head with snap lock and double barrel (2x cable gland)	↑
D/W/H	= high cover connection head with snap lock	↑
D/W/H/D	= high cover connection head with snap lock and double barrel (2x cable gland)	↑
EXD	= ATEX-compatible connection head	
HST	= acid proof connection head	
N	= connection head N	
empty	= without solid tip	
U	= with solid tip (tip length typically 200 mm)	↑
1000	= length, L [mm]	↑
empty	= thermowell material AISI 316L / EN1.4404	
1.4749	= thermowell material AISI 446-1 / EN1.4749	↑
X	= additional details on the text line	↑

EPIC® SENSORS Welded thermowells

Features

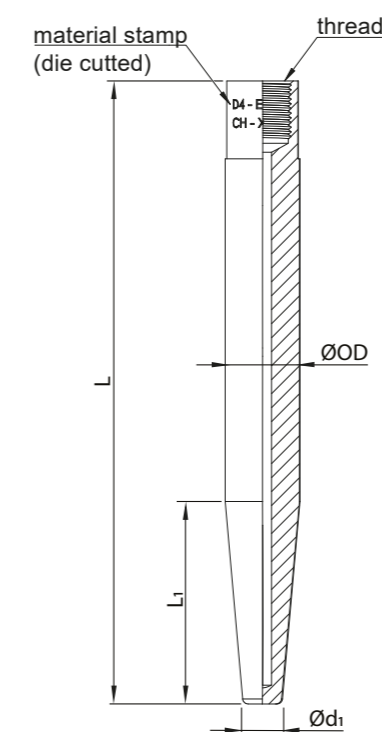
- according to DIN 43772 form 2F
- fitted to application with weld
- typically used with threaded temperature sensor
- threaded temperature sensor has separate cooling neck and connection head
- threaded temperature sensor has mineral insulated temperature sensor element inside, which will be sleeved with welded thermowell
- used to protect MI cable structured sensor element
- in some cases welded thermowells are referred as weld-in thermowells, product is the same
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Drawing



Technical data

Materials	L = 13CrMo44 / EN1.7335, max. temperature +550 °C, M = 10CrMo910 / EN1.7380, max. temperature +580 °C, O = 16Mo3 / EN1.5415, max. temperature +480 °C, K = AISI 316L / EN1.4404, max. temperature +600 °C Other materials available on request
Thread	M18x1.5 or M14x1.5, Other threads available on request
Diameter	Ø18 mm or Ø24 mm (tolerances class h7 according to ISO 286-2), Other diameters available on request
Length	140 mm, 200 mm or 260 mm, Other lengths available on request
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Product codes

Product Code	Thermowell type	Material	L [mm]	L ₁ [mm]	Ød ₁ [mm]	ØOD [mm]	Tolerance (ISO 286-2)	Thread	Compatible sensor element, diameter [mm] / length [mm]
911890	D1	K - EN1.4404	140	65	12,5	24	h7	M18x1,5	6/315
911966	D1	L - EN1.7335	140	65	12,5	24	h7	M18x1,5	6/315
911907	D1	M - EN1.7380	140	65	12,5	24	h7	M18x1,5	6/315
911906	D1	O - EN1.5415	140	65	12,5	24	h7	M18x1,5	6/315
912061	D2	K - EN1.4404	200	125	12,5	24	h7	M18x1,5	6/375
912062	D2	L - EN1.7335	200	125	12,5	24	h7	M18x1,5	6/375
912063	D2	M - EN1.7380	200	125	12,5	24	h7	M18x1,5	6/375
912064	D2	O - EN1.5415	200	125	12,5	24	h7	M18x1,5	6/375
911161	D4	K - EN1.4404	200	65	12,5	24	h7	M18x1,5	6/375
911144	D4	L - EN1.7335	200	65	12,5	24	h7	M18x1,5	6/375
911165	D4	M - EN1.7380	200	65	12,5	24	h7	M18x1,5	6/375
911145	D4	O - EN1.5415	200	65	12,5	24	h7	M18x1,5	6/375
911967	D5	K - EN1.4404	260	125	12,5	24	h7	M18x1,5	6/435
911968	D5	L - EN1.7335	260	125	12,5	24	h7	M18x1,5	6/435
911457	D5	M - EN1.7380	260	125	12,5	24	h7	M18x1,5	6/435
911969	D5	O - EN1.5415	260	125	12,5	24	h7	M18x1,5	6/435
912065	D1/S	K - EN1.4404	140	65	9	18	h7	M14x1,5	3/315
912066	D1/S	L - EN1.7335	140	65	9	18	h7	M14x1,5	3/315
912067	D1/S	M - EN1.7380	140	65	9	18	h7	M14x1,5	3/315
912068	D1/S	O - EN1.5415	140	65	9	18	h7	M14x1,5	3/315
-	D2/S	K - EN1.4404	200	125	9	18	h7	M14x1,5	3/375
-	D2/S	L - EN1.7335	200	125	9	18	h7	M14x1,5	3/375
-	D2/S	M - EN1.7380	200	125	9	18	h7	M14x1,5	3/375
-	D2/S	O - EN1.5415	200	125	9	18	h7	M14x1,5	3/375
911162	D4/S	K - EN1.4404	200	65	9	18	h7	M14x1,5	3/375
911164	D4/S	L - EN1.7335	200	65	9	18	h7	M14x1,5	3/375
911166	D4/S	M - EN1.7380	200	65	9	18	h7	M14x1,5	3/375
911163	D4/S	O - EN1.5415	200	65	9	18	h7	M14x1,5	3/375
1074150	D5/S	K - EN1.4404	260	125	9	18	h7	M14x1,5	3/435
-	D5/S	L - EN1.7335	260	125	9	18	h7	M14x1,5	3/435
-	D5/S	M - EN1.7380	260	125	9	18	h7	M14x1,5	3/435
1005008	D5/S	O - EN1.5415	260	125	9	18	h7	M14x1,5	3/435

Where L = length, L₁ = tip length, ØOD = body diameter, Ød₁ = tip diameter

h7 tolerance according to ISO 286-2:
for 18 mm shaft, upper limit deviation 0 mm, lower limit deviation -0.018 mm
for 24 mm shaft, upper limit deviation 0 mm, lower limit deviation -0.021 mm

EPIC® SENSORS
Flanged thermowells

Features

- according to DIN 43772 form 2F
- fitted to application with bolts, no welding required
- allows the replacement of thermowell during process maintenance
- flanged thermowell with connection head typically houses the mineral insulated element for temperature sensing, this allows on the fly replacement of temperature sensor
- flanged thermowell with female thread and no connection head is typically used with threaded temperature sensor
- ATEX compatible Ex db version available
- special coatings available to increase wear and heat resistance
- 3D step models available on request.



Typical applications

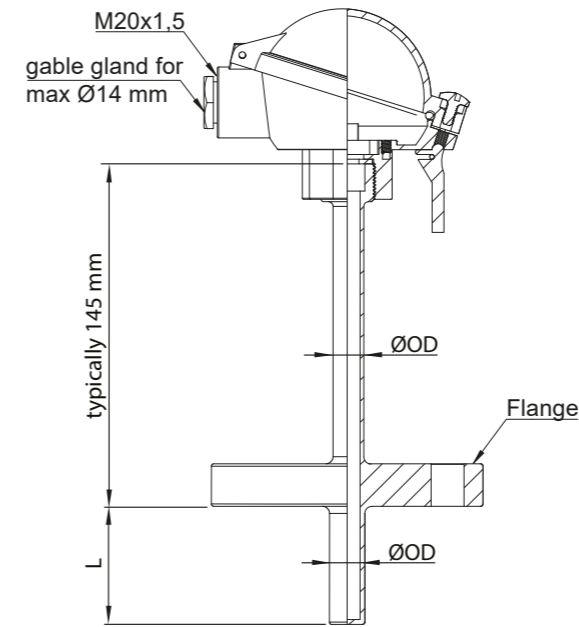
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

Technical data

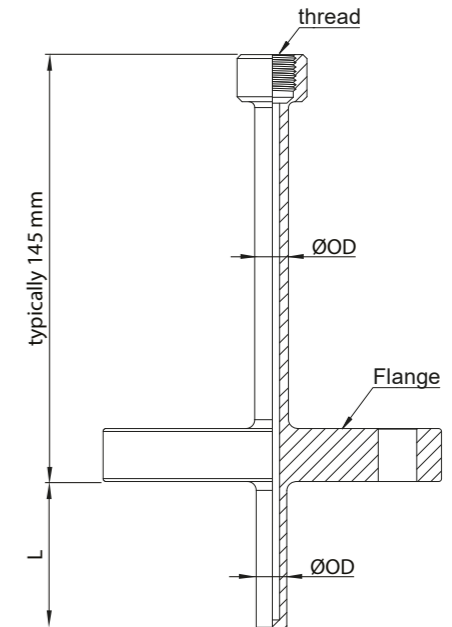
Materials	13CrMo44 / EN1.7335, max. temperature +550 °C, 10CrMo910 / EN1.7380, max. temperature +580 °C, 16Mo3 / EN1.5415, max. temperature +480 °C, AISI 316L / EN1.4404, max. temperature +600 °C Other materials available on request
Flange	Flat face DIN EN 1092 -1, type 05A, Other flange types available on request
Thread	G, R, metric and NPT, Other threads on request
Diameter	Ø11 mm, Ø15 mm or Ø22 mm, Other diameters available on request
Approvals	ATEX, IECEx, EAC Ex, EAC EMC, METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request
Special coatings	FEP - known as a fluoropolymer, good for low temperature, exhaust gases and various acids, resistant to sunlight PFA - very similar to FEP, slightly better thermal stability and higher temperature resistance than FEP METCO - hardmetal coating especially for applications where sensors are exposed to grinding like crude oil pipes (sand/stones), rock wool blasting, etc. HALAR - for anticorrosion applications DIAMALLOY - corrosion protection with hard surface Other coating materials available on request

Drawing

Flanged thermowell with connection head:

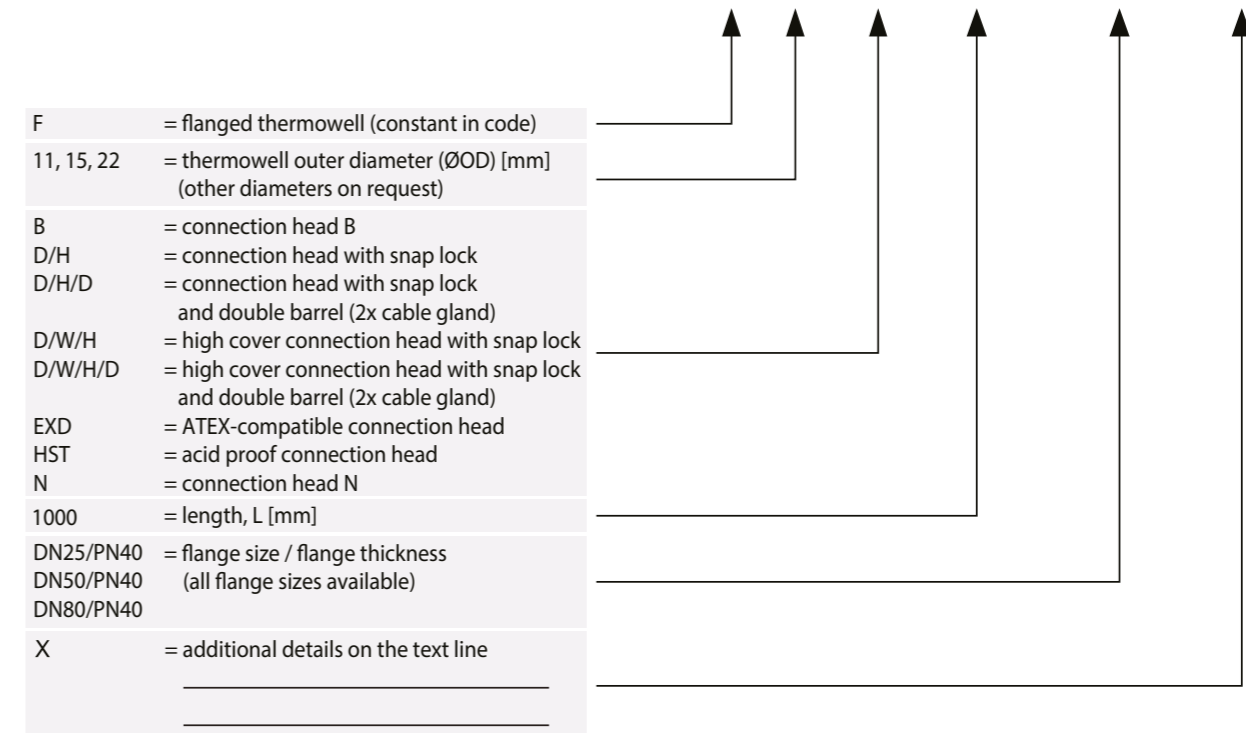


Flanged thermowell without connection head:



Product code key

Example code: F — 15 — D/H — 1000 — DN25/PN40 — X



EPIC® SENSORS
Threaded thermowells

Features

- fitted to application with thread, no welding required
- AISI 316L as delivery material, other materials on request
- length according to customer specific need
- external thread for process or enclosure attachment
- used to house MI cable structured sensor element
- HEX key shape for tightening purposes
- customer specific threads available
- 3D step models available on request.

Typical applications

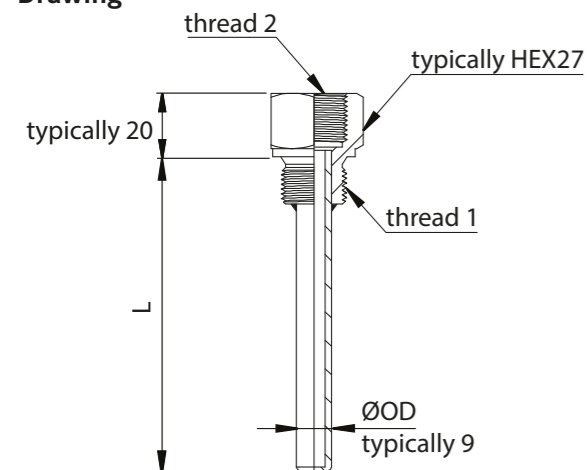
- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



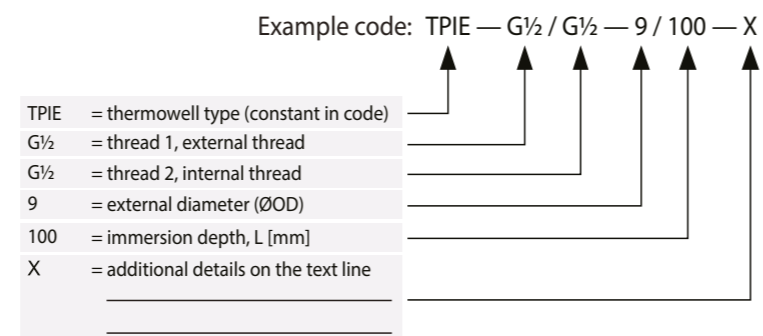
Technical data

Materials	AISI 316L / EN1.4404, max. temperature +550 °C, temporarily +600 °C, Other materials available on request
Thread	G, R, metric and NPT, Other threads available on request
Diameter	Ø9 mm, Other diameters available on request
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Drawing



Product code key



EPIC® SENSORS
Sensors and thermowells with special coating

Special coating materials:

- **FEP** - known as a fluoropolymer,, good for low temperatures, exhaust gases and various acids, resistant to sunlight
- **PFA** - very similar to FEP, slightly better thermal stability and higher temperature resistance than FEP
- **METCO** - hardmetal coating especially for applications where sensors are exposed to grinding like crude oil pipes (sand/stones), rock wool blasting, etc
- **HALAR** - for anticorrosion applications
- **DIAMALLOY** - corrosion protection with hard surface
- other materials on request
- temperature range -200...+1200 °C depending on the coating material.

Most commonly coated sensor types:

- threaded temperature sensor without cooling neck (datasheet 1)
- threaded temperature sensor with cooling neck (datasheet 2)
- flanged temperature sensor (datasheet 3)
- immersible temperature sensor (datasheet 8).



EPIC® SENSORS
Adjustable flanges

Features

- temperature ranges up to +300 °C
- adjustable height, facilitates the installation and replacement of the temperature sensor element
- polished aluminium or cast steel with black powder lacquer coating, other materials on request
- with or without counter flange
- for element sizes Ø6mm, Ø15mm, Ø22mm and Ø32mm
- fitting to process with bolts, or welding
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

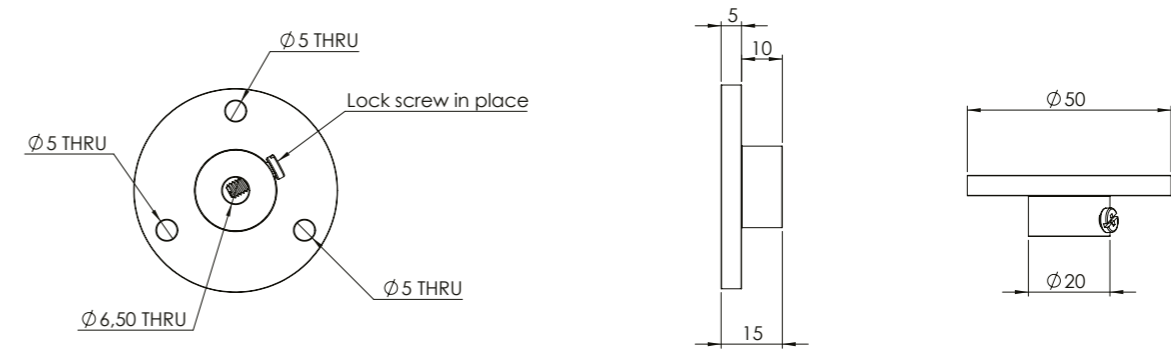
Materials	polished aluminium, maximum temperature +300 °C, temporarily +350 °C, cast steel with lacquer coating, maximum temperature +300 °C, temporarily +350 °C, PTFE ring, maximum continuous temperature +260 °C, temporarily +300 °C, Other materials on request
Element size	Ø6mm, aluminium flange, bolt fitting only Ø15mm, cast steel flange, with or without counter flange Ø22mm, cast steel flange, with or without counter flange Ø32mm, cast steel flange, with or without counter flange Other sizes on request

Installation examples

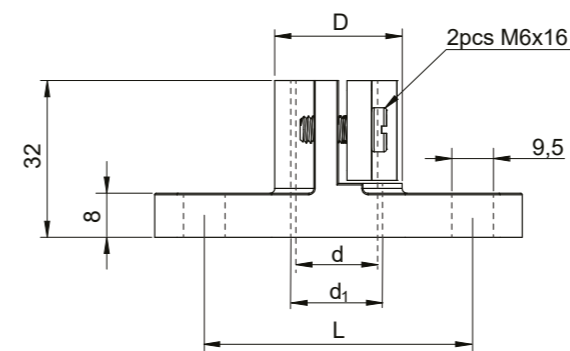


Drawing

For Ø6mm sensor element, aluminium, bolt fitting only, product code 5052098



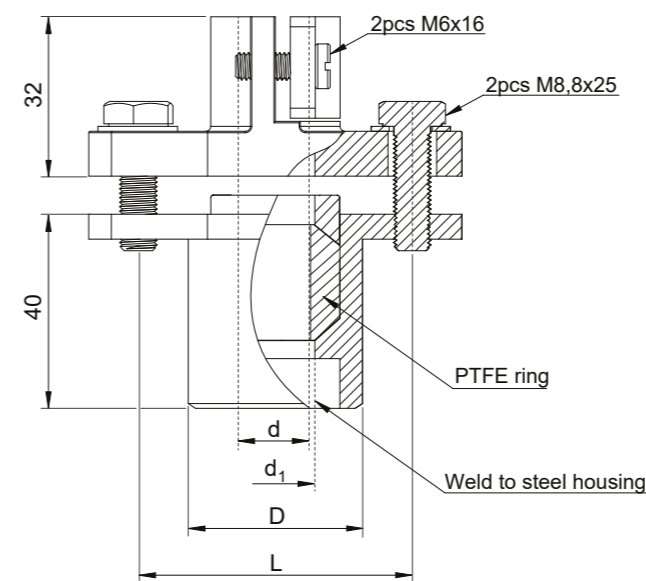
For Ø15mm, Ø22mm or Ø32mm sensor element, cast steel, bolt fitting only, no counter flange



Product Code	Ød [mm]	Ød ₁ [mm]	D [mm]	L [mm]
1018378	15	16	27	55
1018382	22	23	33	70
1018383	32	33	39	70

where
L = bolt distance,
Ød = diameter of sensor element,
Ød₁ = diameter of slot,
D = neck dimension

For Ø15mm, Ø22mm or Ø32mm sensor element, cast steel, weld fitting, with counter flange



Product Code	Ød [mm]	Ød ₁ [mm]	D [mm]	L [mm]
911984	15	16	35	55
911985	22	23	40	70
911986	32	33	50	70

where
L = bolt distance,
Ød = diameter of sensor element,
Ød₁ = diameter of slot,
D = neck dimension

EPIC® SENSORS

Welding sleeves

Features

- typically used with welded thermowells or threaded thermowells
- welding sleeves are equipped with or without thread
- threadless sleeve is first welded to the process pipe and then bored to precise inner dimensions, thermowell type D1/S, D4/S, D1, D4 or D5 is then welded to the sleeve
- sleeve and thermowell must be same material for the welding to succeed
- welded thread sleeve is also first welded to process pipe, threaded thermowell is installed to the sleeve after
- 3D step models available on request.

Typical applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.

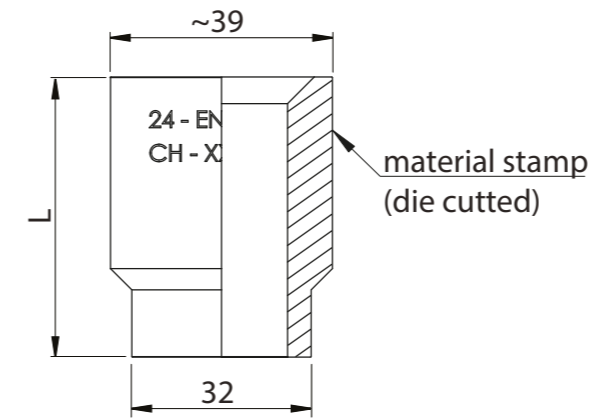


Technical data

Materials	L = 13CrMo44 / EN1.7335, max. temperature +550 °C, M = 10CrMo910 / EN1.7380, max. temperature +580 °C, O = 16Mo3 / EN1.5415, max. temperature +480 °C, K = AISI 316L / EN1.4404, max. temperature +600 °C Other materials available on request
Thread	G, R, metric and NPT, Other threads available on request
Internal diameter	Ø18 mm or Ø24 mm (tolerances class G7 according to ISO 286-2), Other diameters available on request
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV

Drawing

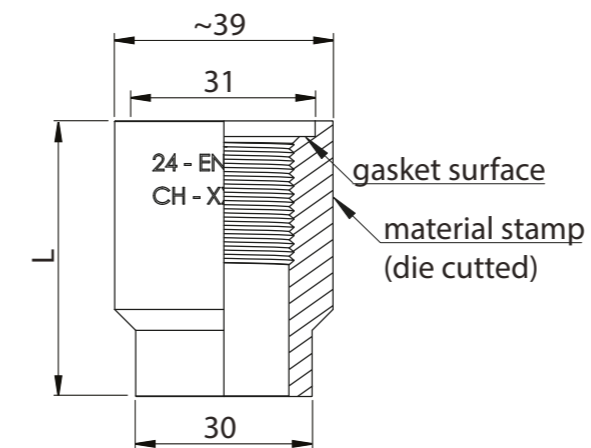
Welding sleeves for welded thermowells:



Product Code	Internal diameter [mm]	Material	Tolerance (ISO 286-2)	Compatible thermowell type
1025309	18	K - EN1.4404	G7	D1S and D4S
1025312	18	L - EN1.7335	G7	D1S and D4S
1025313	18	M - EN1.7380	G7	D1S and D4S
918138	18	O - EN1.5415	G7	D1S and D4S
912333	24	K - EN1.4404	G7	D1, D4 and D5
912331	24	L - EN1.7335	G7	D1, D4 and D5
912332	24	M - EN1.7380	G7	D1, D4 and D5
912334	24	O - EN1.5415	G7	D1, D4 and D5

G7 tolerance according to ISO 286-2:
for 18 mm hole, upper limit deviation +0.024 mm, lower limit deviation +0.006 mm
for 24 mm hole, upper limit deviation +0.028 mm, lower limit deviation +0.006 mm

Welded thread sleeves for threaded thermowells:



Product Code	Thread	Length, L [mm]
1025314	G1/2"	30
1002689	G1/2"	70
1003144	G1/2"	100
1028394	G1"	70

EPIC® SENSORS

Clamp fittings

Features

- AISI 316L as standard delivery material, other materials on request
- clamping fitting for process pipe attachment
- thread fitting for enclosure attachment
- available for various pipe sizes
- special coatings available
- tailored solutions according to customer specific needs
- 3D step models available on request.

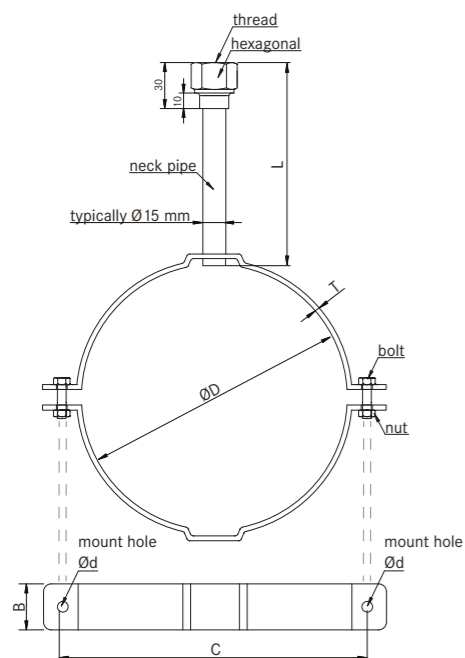
Typical Applications

- energy and power plant technology
- process industry
- chemical industry
- machinery and vessel construction
- manufacturing industry.



Technical data

Material	AISI 316L, maximum temperature +550 °C, temporarily +600 °C, other materials on request
Thread	typically G½”, G, R, NPT, M available as standard delivery, other threads on request
Quality certificate	ISO 9001:2015 issued by DNV-GL



Product Code	Clamp diameter ØD [mm]	Neck pipe length L [mm]	Clamp thickness T [mm]	Clamp width B [mm]	Bolt clearance C [mm]	Bolt hole diameter ød [mm]	Bolt size
1258443	(½ in) 21,3	80	2	25	44	7,5	M6x20
1258444	(½ in) 21,3	150	2	25	44	7,5	M6x20
1258445	(½ in) 21,3	270	2	25	44	7,5	M6x20
1258446	(½ in) 21,3	520	2	25	44	7,5	M6x20
1258447	(¾ in) 26,9	80	3	25	52	7,5	M6x20
5080611	(1 in) 33,7	80	3	25	57	7,5	M6x20
1258448	(1 in) 33,7	150	3	25	57	7,5	M6x20
5080617	(3 in) 88,9	80	3	40	120	9,5	M8x25
5080618	(4 in) 114,3	80	3	40	156	12	M10x35
5080573	(2 in) 60,3	80	3	40	91	9,5	M8x25
1258449	(2 in) 60,3	150	3	40	91	9,5	M8x25
5080621	(6 in) 168,3	80	4	40	206	12	M10x35
1258450	(6 in) 168,3	150	4	40	206	12	M10x35
5078506	(6 in) 168,3	270	4	40	206	12	M10x35
5080622	(8 in) 219,1	80	4	40	262	15	M12x35
5095157	(10 in) 273,0	80	4	50	316	15	M12x50
5132837	(12 in) 304,8	80	4	50	345	15	M12x50

Product code key

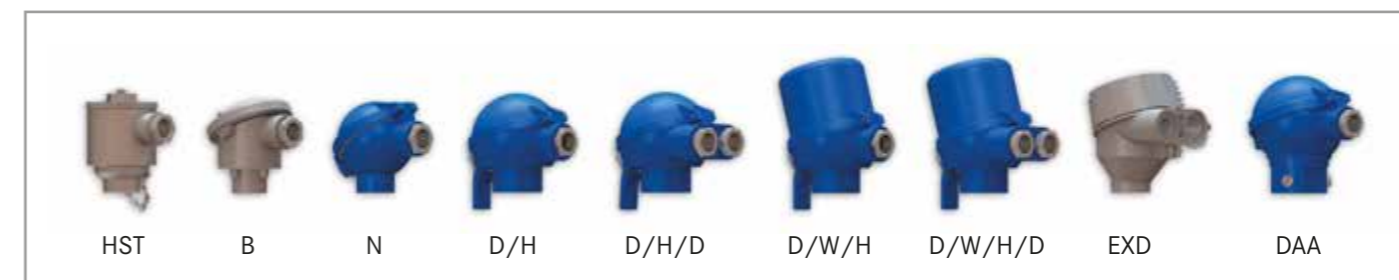
Example code: TPIE-PANTA - ½” - G½ / 270 - X

TPIE-PANTA	= fitting type (constant in code)
½”	= clamp diameter in inches (ØD) [in]
G½	= thread (G½ as standard delivery)
270	= neck pipe length, L [mm]
X	= additional details on the text line

EPIC® SENSORS

Connection heads

Connection heads for EPIC® SENSORS temperature sensors can be purchased as accessories. The D/H types come with a quick release clip and blue epoxy varnish finishing as standard, but other connection heads for different applications are also available.

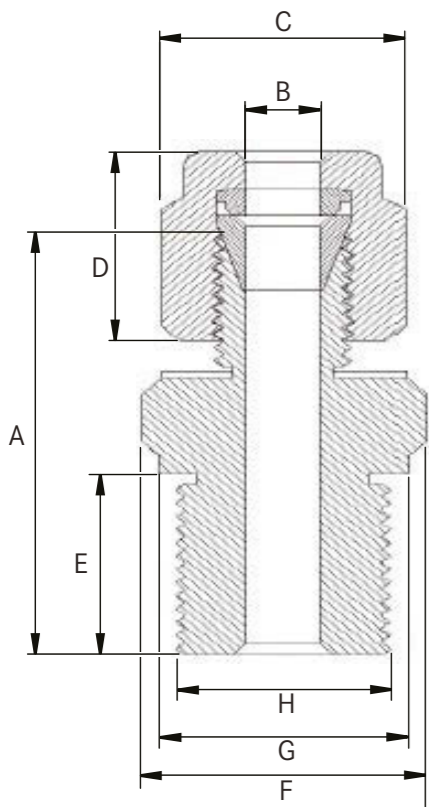


Product code	Type	Code key letters
1020864	SS316 M24	HST
911970	BL M24	B
1027082	NA M24 Epoxy	N
1006145	DAN/H M24 Epoxy	D/H
917962	DAND/H	D/H/D
1006146	DAN/W/H M24 Epoxy	D/W/H
1180999	DAND/W/H	D/W/H/D
5105631	XD-AB M20x1,5 ATEX	EXD
1078902	DAA 32,5MM Epoxy	DAA

EPIC® SENSORS G INCH
Compression fitting

Features

- G thread is equivalent to BSPP thread
- parallel pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flates
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used.

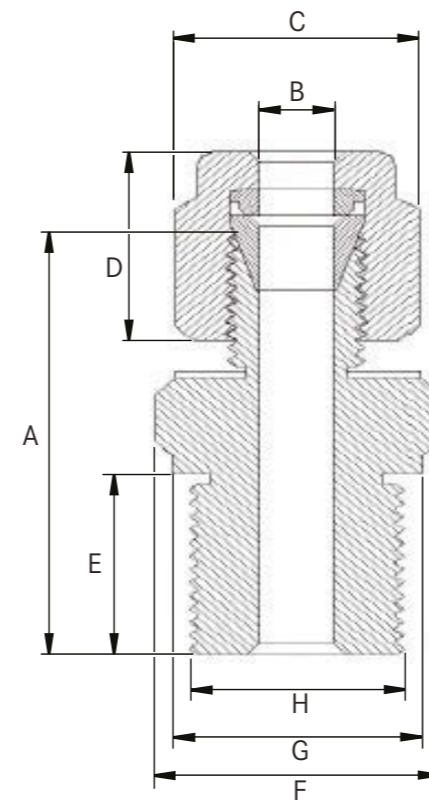


B [in] Tube OD	H [in] G Thread	C [in] Nut	D [mm]	A [mm]	E [mm]	F [in] Body	G [mm]
1/8"	1/8"	7/16"	12,0	23,2	7,1	9/16"	13,8
3/16"	1/8"	1/2"	12,0	24,1	7,1	9/16"	13,8
1/4"	1/8"	9/16"	12,7	25,7	7,1	9/16"	13,8
1/8"	1/4"	7/16"	12,0	28,1	11,2	3/4"	18,2
3/16"	1/4"	1/2"	12,0	29,0	11,2	3/4"	18,2
1/4"	1/4"	9/16"	12,7	30,0	11,2	3/4"	18,2
5/16"	1/4"	5/8"	13,5	31,2	11,2	3/4"	18,2
3/16"	3/8"	1/2"	12,0	30,4	11,1	7/8"	21,7
1/4"	3/8"	9/16"	12,7	31,2	11,2	7/8"	21,4
5/16"	3/8"	5/8"	13,5	32,1	11,1	7/8"	21,7
3/8"	3/8"	11/16"	14,2	32,2	11,2	7/8"	21,4
1/2"	3/8"	7/8"	17,5	32,4	11,2	7/8"	21,4
1/18"	1/2"	7/16"	12,0	35,6	14,2	1.1/16"	25,8
3/16"	1/2"	1/2"	12,0	36,5	14,2	1.1/16"	25,8
1/4"	1/2"	9/16"	12,7	37,5	14,2	1.1/16"	25,8
5/16"	1/2"	5/8"	13,5	38,2	14,2	1.1/16"	25,8
3/8"	1/2"	11/16"	14,2	38,7	14,2	1.1/16"	25,8
1/2"	1/2"	7/8"	17,5	38,9	14,2	1.1/16"	25,8
1/8"	3/4"	7/16"	12,0	39,6	16,0	1.1/4"	31,0
3/16"	3/4"	1/2"	12,0	40,5	16,0	1.1/4"	31,0
1/4"	3/4"	9/16"	12,7	41,5	16,0	1.1/4"	31,0
5/16"	3/4"	5/8"	13,5	42,2	16,0	1.1/4"	31,0
3/8"	3/4"	11/16"	14,2	42,2	16,0	1.1/4"	31,0
1/2"	3/4"	7/8"	17,5	42,2	16,0	1.1/4"	31,0
5/8"	3/4"	1.1/16"	17,5	42,2	16,0	1.1/4"	31,0
3/4"	3/4"	9/8"	17,5	42,5	16,0	1.1/4"	31,0
1/8"	1"	7/16"	12,0	40,8	18,2	1.5/8"	40,5
3/16"	1"	1/2"	12,0	41,7	18,2	1.5/8"	40,5
1/4"	1"	9/16"	12,7	42,2	18,2	1.5/8"	40,5
5/16"	1"	5/8"	13,5	43,4	18,2	1.5/8"	40,5
1/2"	1"	7/8"	17,5	43,4	18,2	1.5/8"	40,5
3/4"	1"	9/8"	17,5	43,7	18,2	1.5/8"	40,5
1"	1"	1.1/2"	20,5	47,8	18,2	1.5/8"	40,5

EPIC® SENSORS G MM
Compression fitting

Features

- G thread is equivalent to BSPP thread
- parallel pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flates
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used.



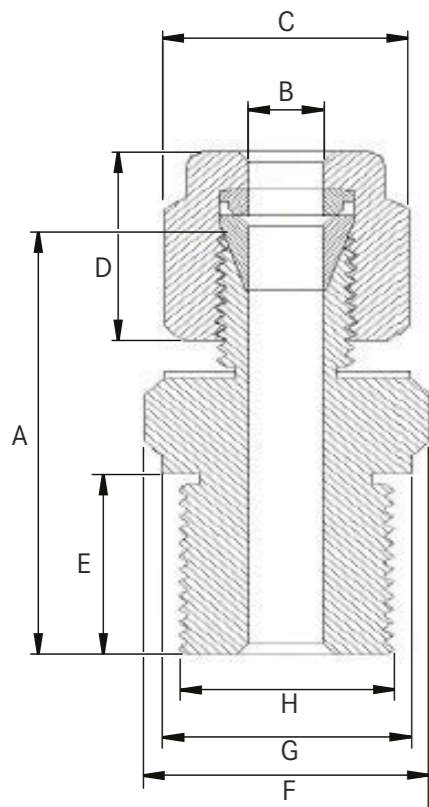
B [mm] Tube OD	H [in] G Thread	C [in] Nut	D [mm]	A [mm]	E [mm]	F [in] Body	G [mm]
1	1/8"	5/16"	8,0	22,0	7,1	9/16"	13,8
1,5	1/8"	5/16"	8,0	22,0	7,1	9/16"	13,8
3	1/8"	7/16"	12,0	23,7	7,1	9/16"	13,8
4	1/8"	1/2"	12,0	24,6	7,1	9/16"	13,8
4,5	1/8"	1/2"	12,0	24,6	7,1	9/16"	13,8
6	1/8"	9/16"	12,7	25,1	7,1	9/16"	13,8
8	1/8"	5/8"	13,5	26,3	7,1	9/16"	13,8
3	1/4"	7/16"	12,0	28,6	11,2	3/4"	18,2
4	1/4"	1/2"	12,0	29,5	11,2	3/4"	18,2
4,5	1/4"	1/2"	12,0	29,5	11,2	3/4"	18,2
6	1/4"	9/16"	12,7	30,5	11,2	3/4"	18,2
8	1/4"	5/8"	13,5	31,2	11,2	3/4"	18,2
3	3/8"	7/16"	12,0	29,5	11,1	7/8"	21,7
4	3/8"	1/2"	12,0	30,4	11,1	7/8"	21,7
4,5	3/8"	1/2"	12,0	30,4	11,1	7/8"	21,7
6	3/8"	9/16"	12,7	31,4	11,1	7/8"	21,7
8	3/8"	5/8"	13,5	32,1	11,1	7/8"	21,7
3	1/2"	7/16"	12,0	35,6	14,2	1.1/16"	25,8
4	1/2"	1/2"	12,0	36,5	14,2	1.1/16"	25,8
4,5	1/2"	1/2"	12,0	36,5	14,2	1.1/16"	25,8
6	1/2"	9/16"	12,7	37,5	14,2	1.1/16"	25,8
8	1/2"	5/8"	13,5	38,2	14,2	1.1/16"	25,8
10	1/2"	11/16"	14,2	39,5	14,2	1.1/16"	25,8
12	1/2"	7/8"	17,5	39,5	14,2	1.1/16"	25,8
15	1/2"	1"	17,5	38,8	14,2	1.1/16"	25,8
3	3/4"	7/16"	12,0	39,6	16,0	1.1/4"	31,0
4	3/4"	1/2"	12,0	40,5	16,0	1.1/4"	31,0
4,5	3/4"	1/2"	12,0	40,5	16,0	1.1/4"	31,0
6	3/4"	9/16"	12,7	41,5	16,0	1.1/4"	31,0
8	3/4"	5/8"	13,5	42,2	16,0	1.1/4"	31,0
12	3/4"	7/8"	17,5	42,7	16,0	1.1/4"	31,0
15	3/4"	1"	17,5	42,7	16,0	1.1/4"	31,0
3	1"	7/16"	12,0	40,8	18,2	1.5/8"	40,5
4	1"	1/2"	12,0	41,7	18,2	1.5/8"	40,5
4,5	1"	1/2"	12,0	41,7	18,2	1.5/8"	40,5
6	1"	9/16"	12,7	42,7	18,2	1.5/8"	40,5
8	1"	5/8"	13,5	43,4	18,2	1.5/8"	40,5
12	1"	7/8"	17,5	43,9	18,2	1.5/8"	40,5
15	1"	1"	17,5	43,9	18,2	1.5/8"	40,5
17,5	1"	1"	17,5	43,9	18,2	1.5/8"	40,5

EPIC® SENSORS METRIC FRAC

Compression fitting

Features

- parallel pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flats
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used



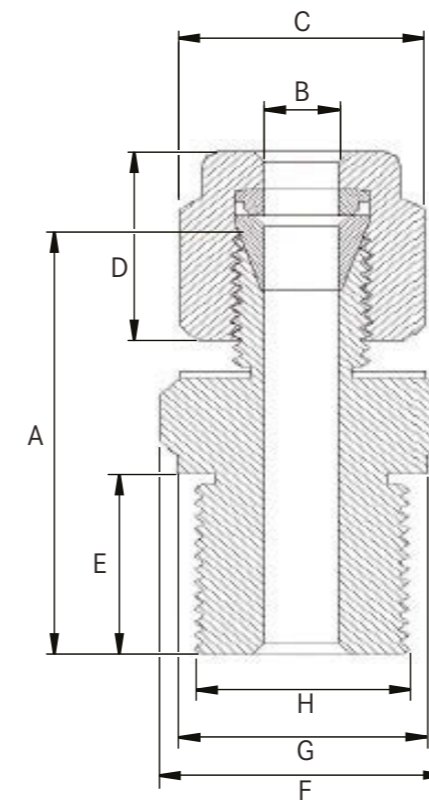
B [in] Tube OD	H Metric Thread	C Nut	D [mm]	A [mm]	E [mm]	F [in] Body	G [mm]
1/8"	M8x1	7/16"	12,0	23,3	7,5	9/16"	13,6
1/8"	M8x1,25	7/16"	12,0	23,3	7,5	9/16"	13,6
1/8"	M12x1	7/16"	12,0	27,2	11,0	11/16"	16,3
3/8"	M22x1,5	11/16"	14,2	35,5	13,0	9/8"	27,0

EPIC® SENSORS METRIC MM

Compression fitting

Features

- parallel pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flats
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used.



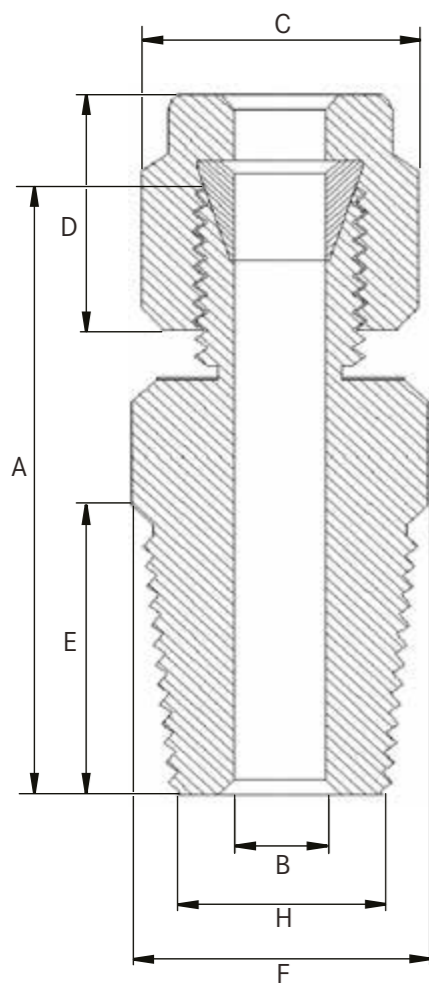
B [mm] Tube OD	H Metric Thread	C [in] Nut	D [mm]	A [mm]	E [mm]	F [in] Body	G [mm]
1	M6x1	5/16"	8,0	22,0	7,5	9/16"	13,6
1,5	M6x1	5/16"	8,0	22,0	7,5	9/16"	13,6
2	M6x1	5/16"	8,0	21,0	7,5	9/16"	13,6
1	M8x1	5/16"	8,0	22,0	7,5	9/16"	13,6
1,5	M8x1	5/16"	8,0	22,0	7,5	9/16"	13,6
2	M8x1	5/16"	8,0	21,0	7,5	9/16"	13,6
4	M8x1	1/2"	12,0	25,0	7,5	9/16"	13,6
4,5	M8x1	1/2"	12,0	25,0	7,5	9/16"	13,6
3	M10x1	7/16"	12,0	27,5	11,0	11/16"	16,5
6	M10x1	9/16"	12,7	29,0	11,0	11/16"	16,5
5,5	M12x1	9/16"	12,7	29,0	11,0	11/16"	16,3
6	M12x1	9/16"	12,7	29,0	11,0	11/16"	16,3
8	M12x1	5/8"	13,5	30,0	11,0	11/16"	16,3
3	M14x1,5	7/16"	12,0	27,0	11,0	3/4"	18,2
9	M14x1,5	11/16"	14,2	30,0	11,0	3/4"	18,2
6	M16x1,5	9/16"	12,7	28,5	11,0	7/8"	21,4
6	M18x1,5	9/16"	12,7	28,5	11,0	7/8"	21,4
1,5	M20x1,5	5/16"	13,0	28,0	11,2	1"	24,5
3	M20x1,5	7/16"	13,5	28,0	11,2	1"	24,5
4,8	M20x1,5	1/2"	12,0	31,7	11,2	1"	24,5
6	M20x1,5	9/16"	12,7	32,7	11,2	1"	24,5

EPIC® SENSORS NPT INCH

Compression fitting

Features

- NPT thread is equivalent to BSPT thread
- taper pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flats
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used



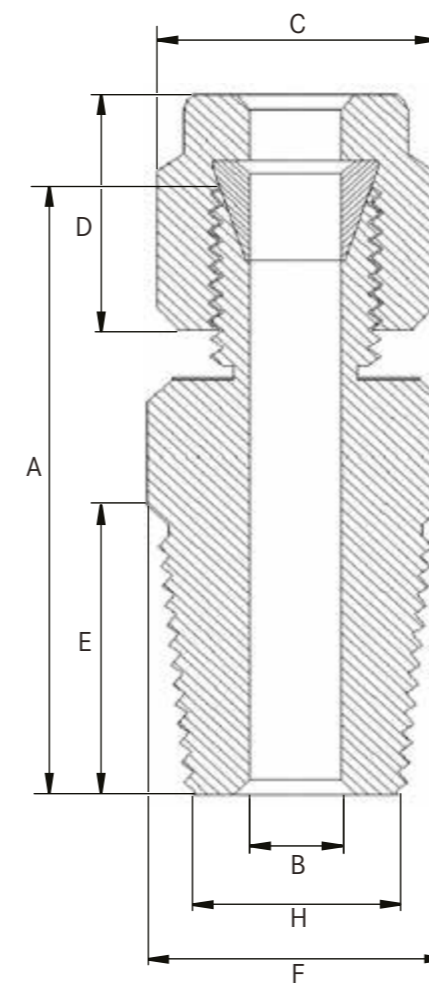
B [in] Tube OD	H [in] NPT Thread	C [in] Nut	D [mm]	A [mm]	E [mm]	F [in] Body
1/16"	1/8"	5/16"	8,0	22,1	9,6	7/16"
1/8"	1/8"	7/16"	12,0	23,8	9,6	7/16"
3/16"	1/8"	7/16"	12,0	24,9	9,6	7/16"
1/4"	1/8"	9/16"	12,7	25,4	9,6	7/16"
1/8"	1/4"	7/16"	12,0	28,9	14,2	9/16"
3/16"	1/4"	1/2"	12,0	29,5	14,2	9/16"
1/4"	1/4"	9/16"	12,7	30,7	14,2	9/16"
1/8"	3/8"	7/16"	12,0	29,5	14,2	11/16"
3/16"	3/8"	1/2"	12,0	30,5	14,2	11/16"
1/4"	3/8"	9/16"	12,7	31,0	14,2	11/16"
5/16"	3/8"	5/8"	13,5	32,2	14,2	11/16"
1/8"	1/2"	7/16"	12,0	35,5	19,0	7/8"
3/16"	1/2"	1/2"	12,0	36,5	19,0	7/8"
1/4"	1/2"	9/16"	12,7	37,3	19,0	7/8"
5/16"	1/2"	5/8"	13,5	38,2	19,0	7/8"
3/8"	1/2"	11/16"	14,2	38,7	19,0	7/8"
1/2"	1/2"	7/8"	17,5	38,7	19,0	7/8"
1/8"	3/4"	7/16"	12,0	36,5	19,0	1,1/16"
3/16"	3/4"	1/2"	12,0	37,5	19,0	1,1/16"
1/4"	3/4"	9/16"	12,7	38,6	19,0	1,1/16"
5/16"	3/4"	5/8"	13,5	39,8	19,0	1,1/16"
1/2"	3/4"	7/8"	17,5	40,3	19,0	1,1/16"
1"	3/4"	1,1/2"	20,5	42,2	19,0	1,1/16"
1/8"	1"	7/16"	12,0	40,9	23,5	1,3/8"
3/16"	1"	1/2"	12,0	42,0	23,5	1,3/8"
1/4"	1"	9/16"	12,7	42,0	23,5	1,3/8"
1"	1"	1,1/2"	20,5	46,7	23,5	1,3/8"

EPIC® SENSORS NPT MM

Compression fitting

Features

- NPT thread is equivalent to BSPT thread
- taper pipe threads
- compression fitting will allow tight process fitting without additional welding process for pipe like structures
- nearest metric equivalent may be used for C and F hex flats
- single ferrule (CPI type) will be used upto 2 mm ØOD tube, from 3 mm ØOD tube and onward double ferrule structure will be used



B [mm] Tube OD	H [in] NPT Thread	C [in] Nut	D [mm]	A [mm]	E [mm]	F [in] Body
1	1/16"	5/16"	8,0	22,0	9,5	8
1	1/8"	5/16"	8,0	22,1	9,6	7/16"
1,5	1/8"	5/16"	8,0	22,1	9,6	7/16"
3	1/8"	7/16"	12,0	23,8	9,6	7/16"
4	1/8"	1/2"	12,0	24,9	9,6	7/16"
4,5	1/8"	1/2"	12,0	24,9	9,6	7/16"
6	1/8"	9/16"	12,7	25,4	9,6	7/16"
3	1/4"	7/16"	12,0	28,9	14,2	9/16"
4	1/4"	1/2"	12,0	29,5	14,2	9/16"
4,5	1/4"	1/2"	12,0	29,5	14,2	9/16"
6	1/4"	9/16"	12,7	30,7	14,2	9/16"
8	1/4"	5/8"	13,5	31,2	14,2	9/16"
3	3/8"	7/16"	12,0	29,5	14,2	11/16"
4	3/8"	1/2"	12,0	30,5	14,2	11/16"
4,5	3/8"	1/2"	12,0	30,5	14,2	11/16"
6	3/8"	9/16"	12,7	31,0	14,2	11/16"
8	3/8"	5/8"	13,5	32,2	14,2	11/16"
3	1/2"	7/16"	12,0	35,5	19,0	7/8"
4	1/2"	1/2"	12,0	36,5	19,0	7/8"
4,5	1/2"	1/2"	12,0	36,5	19,0	7/8"
6	1/2"	9/16"	12,7	37,3	19,0	7/8"
8	1/2"	5/8"	13,5	38,2	19,0	7/8"
10	1/2"	11/16"	14,2	38,7	19,0	7/8"
12	1/2"	7/8"	17,5	38,7	19,0	7/8"
15	1/2"	1"	17,5	38,7	19,0	7/8"
3	3/4"	7/16"	12,0	36,5	19,0	1,1/16"
4	3/4"	1/2"	12,0	37,5	19,0	1,1/16"
4,5	3/4"	1/2"	12,0	37,5	19,0	1,1/16"
6	3/4"	9/16"	12,7	38,6	19,0	1,1/16"
8	3/4"	5/8"	13,5	39,8	19,0	1,1/16"
12	3/4"	7/8"	17,5	40,3	19,0	1,1/16"
15	3/4"	1"	17,5	40,3	19,0	1,1/16"
3	1"	7/16"	12,0	40,9	23,5	1,3/8"
4,5	1"	1/2"	12,0	42,0	23,5	1,3/8"
6	1"	9/16"	12,7	42,0	23,5	1,3/8"

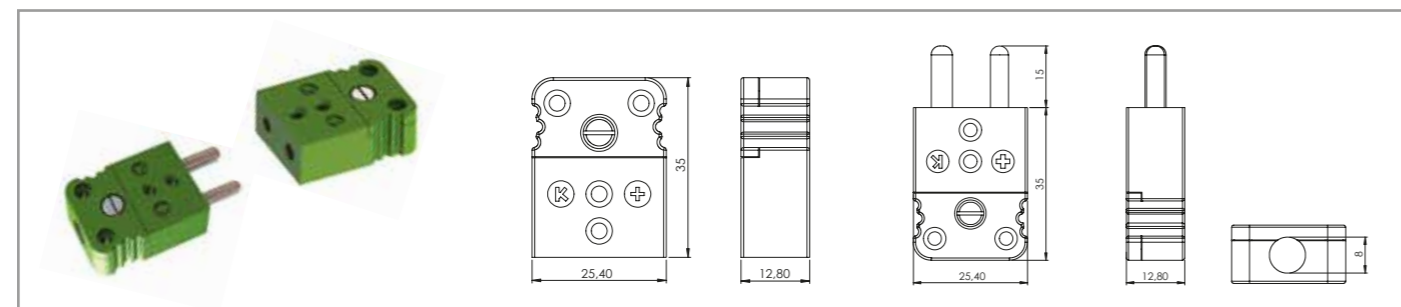
The connectors are available with male and female contacts and are always made of materials suitable for that type of thermocouple. The color of the connector housing depends on the type of thermocouple, e.g. the type K connector is normally green because the type K cable is green according to the IEC 60584 standard.

There are two different thermocouple connector sizes available, the standard type (STD) and the compact type (MINI).

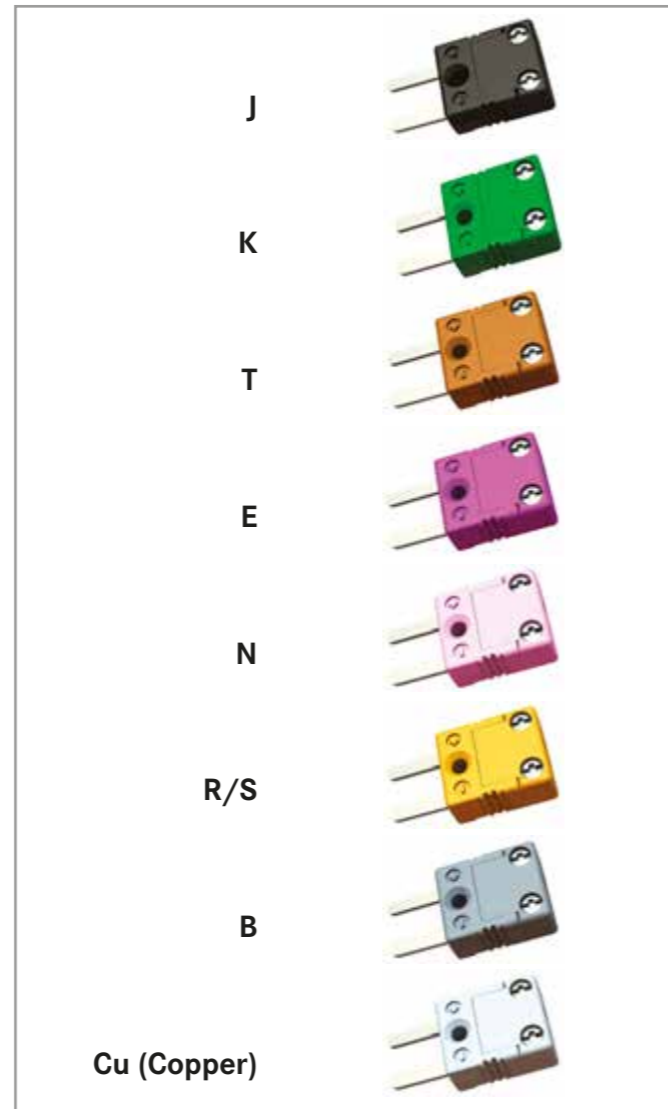
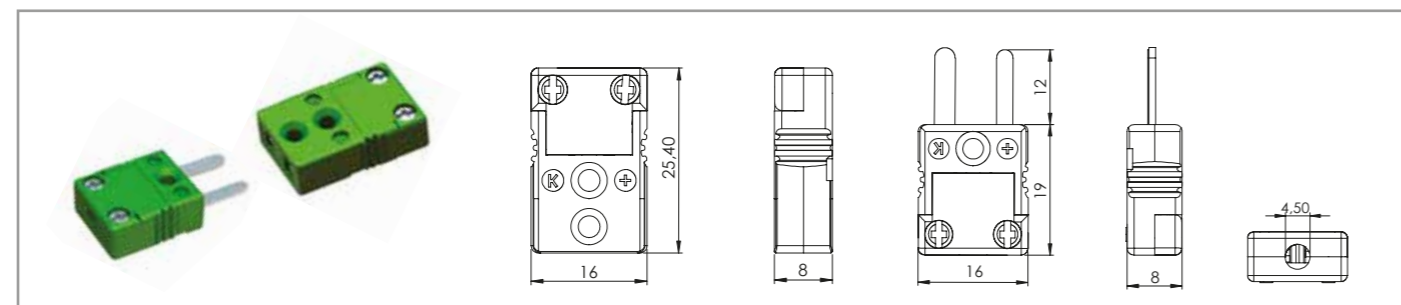
Product code	Type
911476	J-STD-Female
911475	J-STD-Male
911477	J-MINI-Female
911478	J-MINI-Male
911440	K-STD-Female
911439	K-STD-Male
911442	K-MINI-Female
911441	K-MINI-Male
1089977	N-STD-Female
1089978	N-STD-Male
1023763	S-STD-Female
1083322	S-STD-Female 350°C
1023764	S-STD-Male
1083323	S-STD-Male 350°C
1017789	Cable clamps for STD connectors

Other types are quoted upon request.

STD

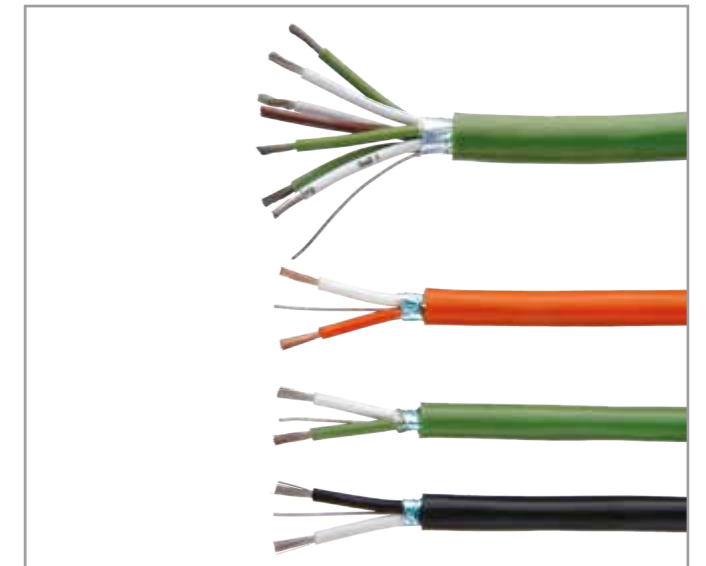


MINI



The thermocouple between the hot and cold ends of the sensor, must use the correct cable to avoid measurement errors due to different materials. The cables used are either extension cable type (X) or compensation cable type (C).

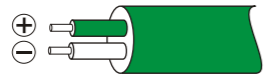
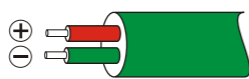
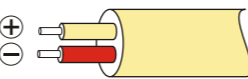


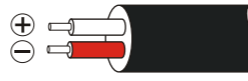
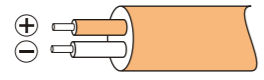
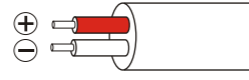

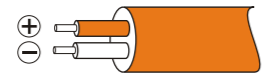
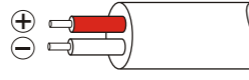

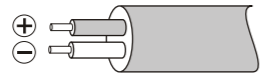
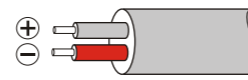
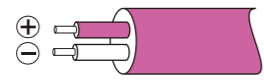
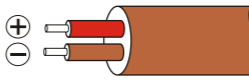
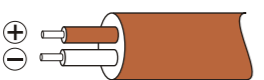

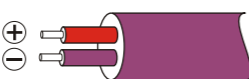
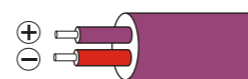
Our stock items are silicon insulated compensating cables according to the IEC 60584 standard, with a maximum temperature of +180 °C. The cable structure of the one pair cables for a J, K and S type thermocouple sensor is 2 × 1,5 mm².



Stock items

Product code	Designation	Number of cores and wire sizes	Colors +/- / sheath	Outer diameter mm
903242	NiCr/Ni 2G ST 2G K	2x1.5	grn/wht/grn	7.50 (±0.15)
1084278	NiCr/Ni 2G ST 2G K	3x(2x1.5)	grn/wht/grn	9.50 (±0.15)
911884	NiCr/Ni 2G ST 2G K	6x(2x1.5)	grn/wht/grn	13.40 (±0.15)
1084281	NiCr/Ni 2G ST 2G K	8x(2x1.5)	grn/wht/grn	14.90 (±0.15)
903256	PtRh/Pt 2G ST 2G S	2x1.5	ora/wht/ora	7.50 (±0.15)
1002534	PtRh/Pt 2G ST 2G S	2x(2x1.5)	ora/wht/ora	8.50 (±0.15)
903257	Fe/CuNi 2G ST 2G J	2x1.5 SIL	bck/wht/bck	7.50 (±0.15)
1210658	NiCrSi/NiSi 2G ST 2G N	2x1.5	pnk/wht/pnk	7.50 (±0.15)

Color abbreviations bck = black, grn = green, ora = orange, pnk = pink, wht = white. Other cable types and wire structures can be delivered on request.

New standards:	IEC 60584-3	DIN EN 60584	ISA MC 96.1
Thermo Type	IEC 584	DIN 43714	ANSI MC 96.1
NiCr-Ni / K KCA: Fe-CuNi	 + green/ - white Jacket: green	 + red/ - green Jacket: green	 + yellow/ - red Jacket: yellow
Fe-CuNi / L		 + red/ - blue Jacket: blue	
Fe-CuNi / J	 + black/ - white Jacket: black		 + white/ - red Jacket: black
Pt10Rh-Pt / S SCA: E-Cu/A-Cu	 + orange/ - white Jacket: orange	 + red/ - white Jacket: white	 + black/ - red Jacket: green
Pt13Rh-Pt / R RCA: E-Cu/A-Cu	 + orange/ - white Jacket: orange	 + red/ - white Jacket: white	 + black/ - red Jacket: green
Pt30Rh-Pt6Rh / B BC: S-Cu/E-Cu	 + grey/ - white Jacket: grey		 + grey/ - red Jacket: grey
NiCrosil-Nisil / N NC: Cu-CuNi	 + pink/ - white Jacket: pink		
Cu-CuNi / U		 + red/ - brown Jacket: brown	
Cu-CuNi / T	 + brown/ - white Jacket: brown		
NiCr-CuNi / E	 + purple/ - white Jacket: purple	 + red/ - purple Jacket: purple	 + purple/ - red Jacket: purple

FACTORY CALIBRATION

Factory calibrations are done with two calibration ovens, which perform in a temperature range of -25...+660 °C.

- Factory calibration is recommended to be done in two measuring points minimum.
- More calibration points can be used depending on the calibration temperature range.
- Factory calibration can be done for RTD and TC sensors.
- The minimum length of the sensor to be calibrated is 255 mm. This limitation does not apply to cable sensors.
- Factory calibration can be executed for sensors with an outer diameter of 3 mm, 4 mm, 6 mm, 8 mm or 10 mm.
- The calibration devices are able to work with single sensors or a combination of a sensor and transmitter connected together.
- In the factory calibration service, customers get a calibration certificate which includes customer data, product data and calibration results with a measuring data table and graph.
- If the factory calibration is not an adequate proof of measuring value deviation, we can, on customers' behalf have the sensors (and transmitters) send to an accredited laboratory for a third party laboratory calibration.

What is calibration?

Temperature sensor deviation in individual points of a measuring range is defined by comparing the readout of the sensor to be calibrated to another reference sensor, of which the readout accuracy is known. The objective of the calibration is to define the deviation between a measured value and a corresponding reference value.

Why calibrate?

Through calibration you can achieve many advantages besides measuring accuracy, for example:

- Traceability for temperature measuring results
- Certainty for temperature measuring results
- Optimizing production process quality, consistency and efficiency
- Energy savings due process control driven by accurate measurements
- Reduced pollution due process control driven by accurate measurements
- Savings in material costs
- Minimizing risk of unexpected repairs and changes of process machinery and sensors.

DESIGN AND ENGINEERING

We can assist you with designing, engineering and documenting of temperature sensors. Whether it is a detailed feature of one sensor or a complete solution, our know-how and practical experience are at your disposal.

Power plant applications

We have experience in designing special temperature measurement applications for power plants and their boilers. We have implemented many different measurement applications for soda, fluidized bed and grate boilers as well as waste incineration plants.

Metal processing applications

Temperature measurement for very demanding conditions in the different stages of metal processing is also our expertise. Ceramic and various coated thermowells and their special applications have been executed in collaboration with customers.

Chemical industry applications

Highly corrosion-resistant temperature measurement in demanding conditions of the chemical industry is our specialty. We have decades experience in designing multi-point temperature measurement for different types of tanks and basins.

We have even designed a specific product suitable for trace heating temperature measurement. The trace heating sensor is qualified for high temperatures of MI-heating and explosive atmospheres.

Mechanical engineering applications

Customized and tailor-made temperature sensors according to customers' specifications are our know-how at its best.

Modeling

3D models can be created of any application as we use SolidWorks and AutoCAD design software. Just send us information of the desired measuring application and we are happy to help you.

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