

Temperature sensor type T.3., Construction type 3, Plug-in sensor for protection tube with lateral cable outlet



Measuring element/Measuring principle	Type TH...: NTC Type TP...: Pt100 / Pt1000
Temperature range (measuring tip)	Type TH31: Measuring tip: 40...120 °C Type TH32: Measuring tip: 0...70 °C Type TP31: Measuring tip: 0...120 °C
Protection class	IP 54; in use with protection tube IP68 at measuring tip
Mounting	Protection tube
Material	Sensor tube: Copper nickel-plated Adapter: plastic
Length	Immersion depth 56mm / 100mm (other lengths on request)



Temperature sensor T.3.

Application range

Temperature sensors of the T.3. series are especially designed for use in: Shipbuilding industry, mechanical engineering . They measure the temperature of engines or gearboxes, of cooling water, lube oil, etc.

Measurement principle

Temperature sensors of the TH3. series operate with the measuring element: NTC . Temperature sensors of the TP3. series operate with the measuring element: Pt100 (or Pt1000 on request).

Functioning of platinum measuring elements

With this measurement principle the temperature-sensitive resistance value of the measuring element is acquired. For platinum measuring elements the electrical resistance increases with increasing temperature and decreases with decreasing temperature (temperature linear). Advantages of platinum measuring elements:

- accurate and reproducible thermoelectric characteristics
- nearly linear temperature characteristic
- easy to replace (no calibration necessary, corresponding to international standards, e. g. IEC 751 / DIN EN 60751)
- measurement is faster and more precise than with thermocouples

Functioning of NTC types

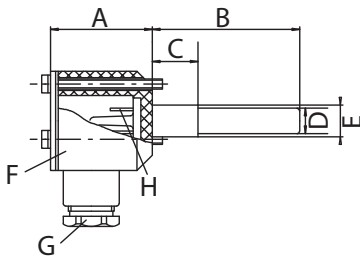
NTC is a temperature sensitive semiconductor resistor with a negative temperature coefficient. It is a volume resistance that consists of ceramic materials based on metal oxides, such as ferric oxide (Fe_2O_3), $ZnTiO_4$, and magnesium dichromate ($MgCr_2O_4$). With high temperatures the conducting capacity is better than with lower temperatures.

Specific features

- Compact, robust design
- Easy installation via protection tube
- Connection with flat connector, lateral cable outlet
- Pressure resistance up to 40 bar
- Available in different lengths
- Suitable measuring transducers, limit value switches and analogue indicators available
- Sensor as Pt100 or as NTC available

Dimensions, connections and drawings

Dimensions temperature sensor



Explanation to the illustration

The left illustration shows *type T.3...* (see type code)

A: Length 40 mm

B: Insertion length $T + 2$ mm (see type code)

C: Length 18 mm

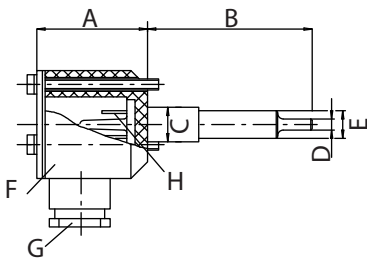
D: Diameter $\varnothing 10$ mm

E: Diameter $\varnothing 12.5$ mm

F: Colour of the sensor head (see type code)

G: Cable entry not included in scope of delivery, see table below

H: Flat connector A6.3 x 0.8 DIN46244



Explanation to the illustration

The left illustration shows *type T.3...-S* with faster response time (see type code)

A: Length 40 mm

B: Insertion length (see type code)

C: Diameter $\varnothing 12.5$ mm

D: Diameter $\varnothing 4$ mm

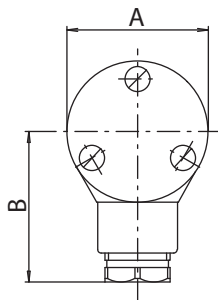
E: Diameter $\varnothing 10$ mm

F: Colour of the sensor head (see type code)

G: Cable entry not included in scope of delivery, see table below

H: Flat connector A6.3 x 0.8 DIN46244

Cable entry	Order no.
Pg11 DIN46255	#243013
M18x1.5 DIN89280	#243014

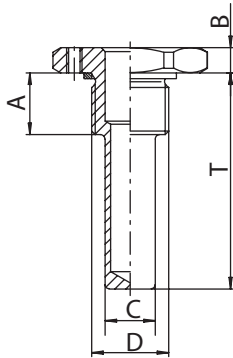


Explanation to the illustration

A: Diameter $\varnothing 39$ mm

B: Length 55 mm

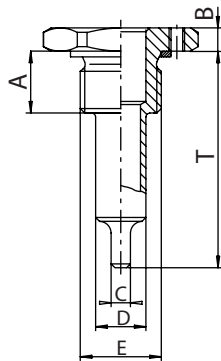
Dimensions of the protection tubes type MX2 (brass), MX5 (stainless steel) and type MX19 (brass), MX20 (stainless steel)



Explanation to the illustration

The left illustration shows the protection tube MX2 (brass) and MX5 (stainless steel) for type T.3...(see type code)

- A: Length 16 mm
- B: Length 6.5 mm
- C: Diameter Ø 13 mm
- D: Thread (see type code)
- T: Immersion depth (see type code)



Explanation to the illustration

The left illustration shows the protection tube MX19 (brass) and MX20 (stainless steel) for type T.3...-S with faster response time (see type code)

- A: Length 16 mm
- B: Length 6 mm
- C: Diameter Ø 5 mm
- D: Diameter Ø 13 mm
- E: Thread (see type code)
- T: Immersion depth (see type code)

Technical data

Signal acquisition	
Measuring element/Measuring principle	Type TH3...: NTC Type TP3...:Pt100
Temperature range (measuring tip) Type TH31	Mesasuring tip: 40...120 °C Cable outlet: 0°C...120 °C
Temperature range (measuring tip) Type TH32	Mesasuring tip: 0...70 °C Cable outlet: 0°C...120 °C
Temperature range (measuring tip)Type TP31	Mesasuring tip: 0...120 °C Cable outlet: 0°C...120 °C
Response time Type TH31	In water >0.3 m/s, type TH31-S10 with protection tube MX19-... t 0.5 = 2.5 s / t 0.9 = 5.2 s, with protection tube MX20-.. t 0.5 = 3.0 s / t 0.9 = 7.5 s
Response time Type TH32	In water >0.3 m/s, type TH32-S10 with protection tube MX19-... t 0.5 = 2.5 s / t 0.9 = 5.2 s, with protection tube MX20-.. t 0.5 = 3.0 s / t 0.9 = 7.5 s
Response time Type TP31	In water >0.3 m/s, type TP31-S10 with protection tube MX19-... t 0.5 = 2.5 s / t 0.9 = 5.2 s, with protection tube MX20-.. t 0.5 = 3.0 s / t 0.9 = 7.5 s

Environmental influences	
Storage temperature	-40...+105 °C
Protection class	IP 54; in use with protection tube IP68 at measuring tip
Vibration resistance	DIN89011: Characteristic curve 2
Insulation voltage	500V/AC
Isolation resistance	>10MΩ @ 500V/DC

Mechanical quantities	
Material	Sensor tube: Copper nickel-plated Adapter: plastic
Mounting	Protection tube
Length	Immersion depth 56mm / 100mm (other lengths on request)
Installation position	Any
Weight	Approx. 70 g
Pressure resistance	40 bar; Cu sealing ring necessary from 15 bar or higher

Technical data protection tubes MX2 and MX5

	MX2	MX5
Weight	Approx. 70 g	Approx. 100 g
Material	Brass (CU Zn 39 Pb3)	Stainless steel (1.4305)
Maximum flow velocity	5 m/s (water)	5 m/s (water)
Maximum operating pressure	40 bar (Cu sealsing ring necessary from 15 bar or higher)	40 bar (Cu sealsing ring necessary from 15 bar or higher)

Type code

Type code structure			
	T P	3	1 -01
		Measuring principle / measuring element	
		Construction type 3 (pre-set index)	
		Measuring range	
		Nominal length / immersion depth	
Type code			
Measuring principle/ Measuring element	H p	NTC Pt100 (Pt1000 on request)	
Construction type	3	Construction type 3, Plug-in sensor for protection tube with lateral cable outlet	
Measuring range		1	Type TH...: 42... 120 °C Type TP...: 0... 120 °C
		2	Type TH...only: 0... 120 °C
Nominal length / immersion depth		- _ _	Without index 56 mm
		-01	100 mm
			Customer specific lengths on request
		-S10	Special type: fast response time, length 56 mm (see technical data)
	T _	3	- _ _ Example: TP31-01

Type	Colour of the sensor head
TH31	Black
TH32	Yellow
TP31	Red

Type code of protection tubes

Type code structure			
	MX 2	-M18	-01
		Protection tube material	
		Thread	
		Immersion depth	
Type code			
Protection tube material	2	Brass	
	5	Stainless steel	
	19	Brass (for T.3...-S)	
	20	Stainless steel (for T.3...-S)	
Thread	-M14	Thread M14 x 1.5 (only as stainless steel version)	
	-M18	Thread M18 x 1.5 (only as brass version)	
	-M20	Thread M20 x 1.5 (only as brass version)	
	-M22	Thread M22 x 1.5 (only as brass version)	
	-R12	Thread G1/2	
		Customer specific threads on request	
Immersion depth	- _ _	Without index, immersion depth T = 56 mm	
	-01	Immersion depth T = 100 mm	
	MX _	- _ _	Example: MX5-R12-01