

Temperature sensor type T.3., Construction type 3, plug-in sensor for protection tube with lateral cable outlet (Pt100/Pt1000, NTC)



Measuring principle	Type TH...: NTC Type TP...: Pt100 / Pt1000
Temperature range	Type TH31: Measuring tip: 40...120 °C Type TH32: Measuring tip: 0...70 °C Type TP31: Measuring tip: 0...120 °C
Protection class	IP54; in use with protection tube IP68 at measuring tip
Mounting	Protection tube
Material	Sensor tube: Copper nickel-plated Adapter: plastic
Immersion depth	56 mm, 100 mm (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, machinery and equipment. They measure the temperatures of cooling water, lube oil, etc. e. g. of engines or gearboxes.

Measuring 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 measuring 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 are:

- 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)
- easier handling towards thermocouples as cold junction is not necessary

Functioning of NTC types

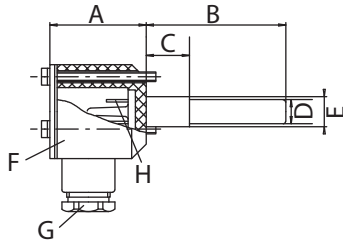
NTC is a temperature sensitive semiconductor resistor with a negative temperature coefficient. It is a volume resistance that consists of ceramic materials based on metal oxides, such as ferric oxide (Fe_2O_3), ZnTiO_4 , and magnesium dichromate ($\text{Mg-Cr}_2\text{O}_4$). With high temperatures the 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 immersion depths
- Suitable measuring transducers, limit value switches and analogue indicators available
- Sensor with Pt100 or NTC measuring element 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 + 2 mm (see type code)

C: Length 18 mm

D: Diameter \varnothing 10 mm

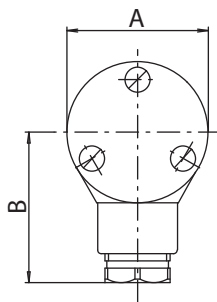
E: Diameter \varnothing 12.5 mm

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

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

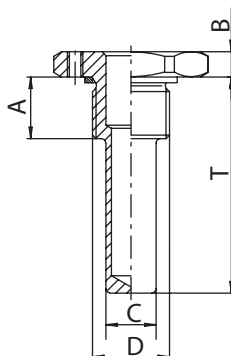


Explanation to the illustration

A: Diameter \varnothing 39 mm

B: Length 55 mm

Dimensions of the protection tubes MX2 (brass) and MX5 (stainless steel)



Explanation to the illustration

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

A: Length 16 mm

B: Length 6.5 mm

C: Diameter \varnothing 13 mm

D: Thread (see type code protection tube)

T: Immersion depth (see type code protection tube)

Technical data

Signal acquisition	
Measuring principle	Type TH3...: NTC Type TP3...:Pt100
Temperature range type TH31	Measuring tip: 40...120 °C Cable outlet: 0...120 °C
Temperature range type TH32	Measuring tip: 0...70 °C Cable outlet: 0...120 °C
Temperature range type TP31	Measuring tip: 0...120 °C Cable outlet: 0...120 °C
Response time	With protective tube MX2 in water >0.3 m/s: t 0.5 = 40 s / t 0.9 = 120 s; With protective tube MX5 in water >0.3 m/s: t 0.5 = 60 s / t 0.9 = 150 s

Environmental influences	
Storage temperature	-40...+105 °C
Protection class	IP54; 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
Immersion depth	56 mm, 100 mm (other lengths on request)
Installation position	Any (note possible liquid inlet)
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 (in water)	5 m/s (in water)
Maximum operating pressure	40 bar (from 15 bar or higher Cu sealing ring required)	40 bar (from 15 bar or higher Cu sealing ring required)

Type code

Type code structure				
	T P	3	1 -01	
	Measuring principle / measuring element			
	Construction type 3 (pre-set index)			
	Measuring range			
	Insertion length			
Type code				
Measuring principle/	H	NTC		✱
Measuring element	P	Pt100 (Pt1000 on request)		✱
Construction type	3	Construction type 3, plug-in sensor for protection tube with lateral cable outlet		
Measuring range		1	Type TH31: Measuring tip: 40...120 °C Type TP31: Measuring tip: 0...120 °C	✱
		2	Type TH32 only: Measuring tip: 0...70 °C	✱
Insertion length		- _ _	Without index 56 mm	✱
		- 01	100 mm	
		- 02	120 mm	
		- 03	150 mm	
		- _ _	Customer specific lengths on request	
	T	3	- _ _ Example: TP31-01	

Preferred types

Features marked with a ✱ symbol at the end of the line (see previous table) are preferred features. If you select a preferred feature for each placeholder, the device is specified as preferred type. Preferred types are available quickly from stock. Other types will be delivered according to scheduled appointments.

Special types

If our standard types do not correspond with your expectation, we are pleased to develop a special solution together with you.

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	
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