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1. APPLICATION

Resistance thermometers and thermocouples measure temperature in industrial process control. The THERMOCONT TSP sensors are installed in various kinds of mediums (e.g., liquids, gas, fumes) inside pipes, tanks, and furnaces. PFA-coated probe versions having a steel flange with a PTFE insert can be used in chemical and petrochemical applications where aggressive mediums could damage the steel probes. The stainless steel construction includes the inner and external (double) tube and the welded flange.

2. TECHNICAL DATA

Type	Thermo-couples	Resistance thermometers (1× Pt100, 2× Pt100)				
	TSJ (Fe-Cu-Ni) TSK (NiCr-Ni)	Standard		Fast response	Plastic-coated	
		[TSP]	[TSV]	[TSB]	[TSG]	[TPP]
General data	Temperature range	-50...+600 °C (-58...+1112 °F)				-50...+200 °C (-58...+392 °F)
	Process pressure	25 bar (363 psi) at +20 °C (68 °F) 16 bar (232 psi) at +400 °C (752 °F)				1 bar (14.5 psi) ⁽¹⁾
	Damping time	<3 min			<20 sec	4.5 min
	Ambient temperature	-20...+80 °C (-4...+176 °F)				
	Overvoltage category	I				
	Electrical protection	Class III				
	Ingress protection	IP65				
Head	Housing material	Painted aluminum (EN AC-43100)				
	Electrical connection	Nickel-plated aluminum M20×1.5 cable gland, cable outer diameter: Ø8...10 mm (Ø0.3"...Ø0.4"), wire cross section: 0.5...1.5 mm ² (20...16AWG)				
	Cable connection	Terminal with fixing screw				
Sensor	Accuracy class ⁽²⁾	1 or 2 MSZ EN 60584.1	Class A or Class B EN 60751			
	Type	As per order code				
	Vibration resistance	—	EN 60751 6.6.4		—	
	Grounding	Ground-independent				
External Protection	Material	1.4571 (316Ti) stainless steel				PFA / (PTFE / PVDF) coating
	Probe length	60...3000 mm (0.19...9.8 ft) (as per order code)				
	Process connection	As per order code				

⁽¹⁾ The maximum allowable pressure with a flanged process connection is 10 bar (145 psi).

⁽²⁾ In standard temperature ranges (below ~+400 °C (~+752 °F)), the margin of error for Class "A" resistance temperature sensors is below ±1 °C (±1.8 °F); in the case of Class "B" temperature sensors, it is ±2.3 °C (±4.14 °F) maximum.

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2.1. Explosion Protection, Designation, Limit Values

Type	TSG-□□□□-□ Ex	TP□-□□□□-□ Ex	TS□-□□□□-□ Ex (except: TSG)
Ex marking (ATEX)	⊕ II 1 G Ex ia IIC T6...T1 Ga	⊕ II 1 G Ex ia IIB T6...T1 Ga ⊕ II 1/2 G Ex d ia IIB T6...T1 Ga/Gb	⊕ II 1 G Ex ia IIC T6...T1 Ga
Intrinsically safe data	U _{max} = 30 V I _{max} = 100 mA P _{max} = 750 mW C _i = 0 nF L _i = 0 mH	U _{max} = 30 V I _{max} = 140 mA P _{max} = 1 W C _i = 0 nF L _i = 0 mH	U _{max} = 30 V I _{max} = 100 mA P _{max} = 750 mW C _i = 0 nF L _i = 0 mH
Ex marking (ATEX)	—	⊕ II 2 G Ex d IIB T6...T1 Gb	⊕ II 2 G Ex d IIB T6...T1 Gb
Intrinsically safe data	—	U _{max} = 30 V I _{max} = 140 mA	
Ex marking (ATEX)	—	—	⊕ II 1/2 G Ex d ia IIB T6...T1 Ga/Gb
Intrinsically safe data	—	—	U _{max} = 30 V I _{max} = 140 mA P _{max} = 1 W C _i = 0 nF L _i = 0 mH
Reference document number	tsp1210m0600h_08		
Electrical connection	For Ex ia, Ex d and Ex d ia versions: M20×1.5 cable gland, cable outer diameter: Ø6...12 mm (Ø0.24...Ø0.47"), wire cross-section: 0.5...1.5 mm ² (20...16AWG)		

2.2. Ex temperature classes

Temperature class	T6	T5	T4	T3	T2	T1
Max. Ambient temperature	+65 °C (+149 °F)	+70 °C (+158 °F)		+80 °C (+176 °F)		
Max. Process temperature	+85 °C (+185 °F)	+100 °C (+212 °F)	+135 °C (+275 °F)	+200 °C (+392 °F)	+300 °C (+572 °F)	+450 °C (+842 °F)
Min. Ambient temperature	-20 °C (-4 °F)					

2.3. Order code (Not all combinations are available)

THERMOCONT T □ □ □ - □ □ □ - □ *

Sensor tube	Code	Process connection	Code	Pt100 Sensor	Code	Probe length (L) ⁽⁶⁾	Code	Ex certificate	Code
Tube 1.4571	S	Flange DN25 PN25 ⁽⁵⁾	0	Class A, single	1	60 mm	0	—	0
Tube + PFA (PTFE / PVDF) cover ⁽³⁾	P	M20x1.5 external thread	1	Class B, single	2	160 mm	1	Ex ia	7
		1/2" BSP	2	Class A, dual	4	250 mm	2	Ex d ia	8
		1/2" NPT	3	Class B, dual	5	400 mm	3	Ex d	9
		3/8" BSP	4	Class B + 4-wire	6	500 mm	4		
		Flange DN40 PN25/16 ⁽⁵⁾	5	Class A + 4-wire	7	1000 mm	5		
		Flange DN50 PN25/16 ⁽⁵⁾	6			1500 mm	6		
		Flange DN80 PN25/16 ⁽⁵⁾	7			2000 mm	7		
		Flange DN100 PN25 ⁽⁵⁾	8			2500 mm	8		
		Flange DN150 PN25 ⁽⁵⁾	9			3000 mm	9		
				Thermocouple	Code				
				Class 1, single	1				
				Class 2, single	2				
				Class 1, dual	4				
				Class 2, dual	5				

* For explosion-proof devices, the article number is followed by "Ex" on the data plate!

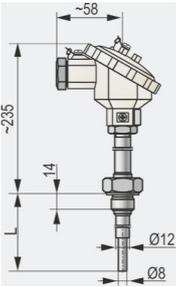
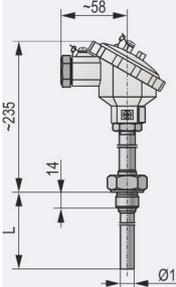
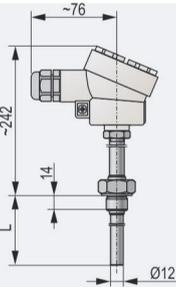
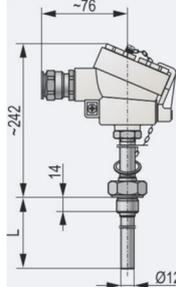
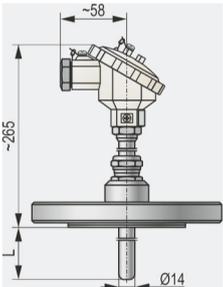
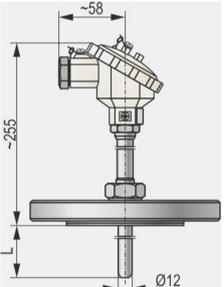
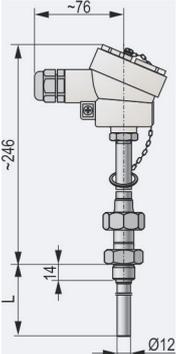
⁽³⁾ TSC□: steel flange; TP□: Steel flange with PTFE insert
⁽⁶⁾ On request: other process connections and probe lengths

⁽³⁾ Only with flange and M20x1.5 or 1/2" process connection
⁽⁴⁾ Shock-proof sensor insert, dismantlable version with chain head (Ex version not available)

2.4. Accessories

- User's Manual
- Warranty Card
- EU-declaration of Conformity
- Connector seal

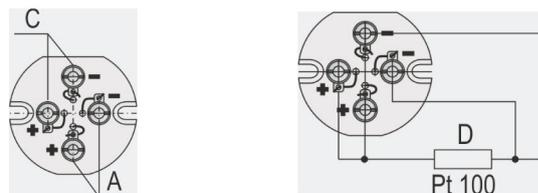
2.5. Dimensions

<p>Fast response version TSG-□□□-□</p> 	<p>Standard version and with shock-proof sensor insert TSP / TSV-□□□-□</p> 
<p>Ex ia version TSP / TSJ / TSK / TSV / TSG-□□□-7 Ex</p> 	<p>Ex d, Ex d ia version TSP / TSJ / TSK / TSV-□□□-8 / 9 Ex</p> 
<p>With PTFE-coated flange TPP / TPV-□□□-□</p> 	<p>With stainless steel flange TSP / TSJ / TSK / TSV-□□□-□</p> 
<p>Shock-proof sensor insert, dismountable design TSB-□□□-□</p> 	

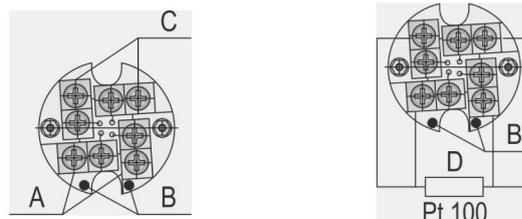
3. INSTALLATION

A threaded connection or flange is used to mount the temperature sensor. Sealed cable entry is provided by a cable gland, which can be standard or explosion-proof.

4. WIRING



Standard



Ex ia, Ex d, Ex d ia devices

Legend:

- A: Pt100 or thermocouple No 1.
- B: Marking
- C: Pt100 or thermocouple No 2.
- D: 4-wire system

The 4-wire system requires the parallel connection of marked and not marked points of the wire terminal to the Pt sensor. Thermocouple + end connection is according to the (+) or (·) point.

4.1 Compliance with Ex requirements

- The location and installation method should ensure that the device is protected against external mechanical influences during operation.
- The units with "ia" protection type should be powered from an Ex ia IIC certified intrinsically safe isolator.
- The units with "d" or „d ia" protection type should be only operated with Ex d IIB certified cable glands.
- The thermal resistance of the cable insulation should be equal to the highest permissible ambient temperature (up to +80 °C [+176 °F]) at the place of installation.
- Since the housing of the device is made of die-cast aluminum, if the units are installed in a location requiring a "Ga" degree of protection, they should be mounted to protect against impacts and friction effects, which can be sources of potential ignition.
- The PFA plastic-coated units must be powered by an Ex ia IIB certified intrinsically safe isolator and, in the case of Ex d units, can only be used in IIB gas group media.
- The housing of the device must be connected to an EP network.

5. MAINTENANCE, REPAIR

The device does not require regular maintenance. Refer to the warranty card for warranty information. The device returned for repair must be cleaned by the user, all chemical deposits must be removed, and the device must be disinfected before sending it back. In addition, the return package must include a properly filled [Returned Equipment Handling Form](#), in which the sender declares that the device is free of all contamination and substances hazardous to health.

6. STORAGE CONDITIONS

Ambient temperature -25...+55 °C (-13...+131 °F).