16

TEMPERATURE SENSORS ASSEMBLED TO THE MACHINE PARTS

Designed for temperature measurements of various parts of machines, such as housings, bearings and other elements which warm up while working and need temperature control for safety reasons.

There are resistance thermometers eg. Pt100, Pt1000 or thermocouples J, T, K available. Depending on the material used (thermowell, cable), temperature sensors are suitable for measurements up to a maximum of 400 °C.

16	sensor type	accuracy class	junction type or number of wires	measuring tip	cable length Lp	cable type	construction (with or without the connector)	max operating temperature

Pt100, Pt500, Pt1000, J, K, T *) other on request

Give accuracy class, table 1

Give junction type or the number of wires, table 2 (eg. I1 or Z1 or 2 or 3 or 4)

Give tip code, table 3

Give cable length Lp [mm]

Give cable type, table 4

Give connector type, table 5 (skip in not requested)

Give max. operating temperature [°C]

TAB. ORDERING CODE:

16	Pt100	A	3	Z3M6	1500	RW301	–	250 °C

16 – Pt100 – A – 3 – Z3M6 – 1500 – RW301 – 250 °C

Temp. sensor type 16 (assembled to machine parts), type Pt100, accuracy class A, 3-wire configure, terminated to the M6 bolt with thread 10 mm long, cable length 1500 mm type RW301 (3x0,22m² fiberglass insulated with stainless steel overbraid Max. operating temperature is 250 °C.

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TAB. 1 TEMP SENSORS TOLERANCE CLASS AND OPERATING RANGE *)

TOLERANCE CLASS	FOR WIRE WOUND RESISTORS	FOR THIN FILM RESISTORS	TOLERANCE VALUE **)
AA	-50 ÷ +250	0 ÷ +150	± (0.1+0.0017 | t |)
A	-100 ÷ +400	-30 ÷ +300	± (0.15+0.002 | t |)
B	-196 ÷ +400	-50 ÷ +400	± (0.3+0.005 | t |)
C	-196 ÷ +400	-50 ÷ +400	± (0.6+0.01 | t |)

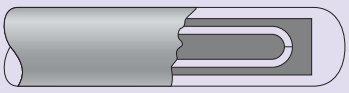
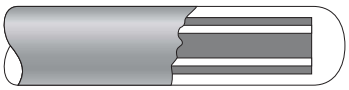
*) to PN-EN60751:2009

**) \| t \| = modul in °C degrees, no matter what unit (absolute value)

OPERATING TEMP. RANGE *)			
SENSOR TYPE	TYPE OF THERMOCOUPLE WIRE	LONG-TERM OPERATING RANGE [°C] *)	SHORT-TERM OPERATING RANGE [°C] *)
J	Fe - CuNi	+20 ÷ 400	-180 ÷ 400
T	Cu - CuNi	-185 ÷ 300	-250 ÷ 400
K	NiCr - NiAl	0 ÷ 400	-180 ÷ 400

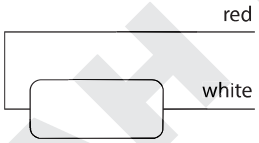
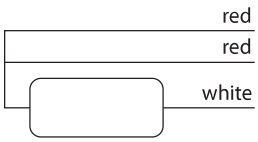
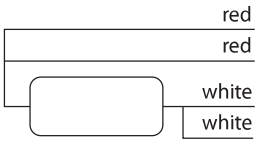
*) Given temperature ranges are mostly dependent on the outer thermowell material. Tolerance to PN-EN 60584-1; table I, page 63

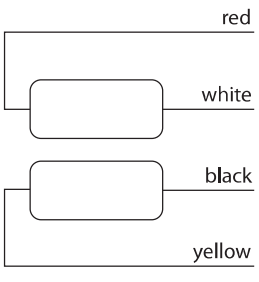
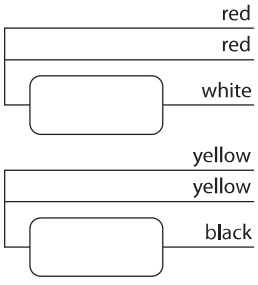
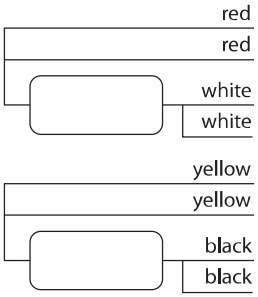
TAB. 2 JUNCTION TYPE, CONFIGURATION AND COLOUR MARKING

HOT JUNCTION TYPES		
HOT JUNCTION CODE	DESCRIPTION	DRAWING
I1	Simplex insulated junction	
Z1	Simplex grounded junction	

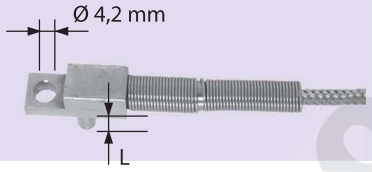
*) in case of duplex senssor, hot junctions are grounded also with each other.

**) hot junctions are insulated also from each other

SIINGLE (ONE RESISTOR)		
2-WIRE DESIGN	3-WIRE DESIGN	4-WIRE DESIGN
		

DOUBLE (2 RESISTORS)		
2-WIRE DESIGN	3-WIRE DESIGN	4-WIRE DESIGN
		

TAB. 3 MEASURING TIPS

MEASURING TIP SYMBOL	THREAD TYPE [G]	HOLE DIAMETER	LENGTH L	MEASUREMENT WAY	HOW IT LOOKS
Z1L10 *	N/D	N/D	10 mm	Thermocouple/ RTD	
Z1L15 *			15 mm		
Z1L20 *			20 mm		
Z242	N/D	Ø 4.2 mm	N/D	Thermocouple/ RTD	
Z252		Ø 5.2 mm			
Z262		Ø 6.2 mm			
Z3M6	M6	N/D	10 mm	Thermocouple/ RTD	
Z3M81	M8x1		12 mm		
Z3M101	M10x1		15 mm		
Z3M1215	M12x1.5		20 mm		
Z442	N/D	Ø 4.2 mm	N/D	Thermocouple (only with grounded junction)	
Z452		Ø 5.2 mm			
Z462		Ø 6.2 mm			

*) probe diameter is Ø 4mm

TAB. 4 LEAD WIRES

The sensors can be supplied complete with cables of various design. The following isulation types are available: PCV, PTFE, fiberglass, Kapton or combination of the mentioned materials. Standards cable sections are 0.22mm² (7/0.2 mm).

The most cammon cables:

RTD cables:
RS301 - 3x0,22 mm² – Silicone insulated / 3 wires
RS401 - 4x0,22 mm² – Silicone insulated/ 4 wired
RW301 - 3x0,22 mm² – fiberglass insulated/ steel braid, 3 wires
RW401 - 4x0,22 mm² – fiberglass insulated / steel braid, 4 wires

Thermocouple cables:
TS201 - 2x0,22 mm² – Silicone insulated
TW204 - 2x0,22 mm² – fiberglass insulated / stainless steel overbraid
TT201 - 2x0,22 mm² – Teflon insulated
TT204 - 2x0,22 mm² - Teflon insulated / stainless steel overbraid

TAB. 5 THERMOCOUPLE AND RTD CONNECTORS

If you need a RTD or thermocouple compensated pin plug, see table B, page 51 to specify a model, eg. MW1, SW1, MW2 or MW3 etc.

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