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Verification as simple apparatus for R.STAHL PT100 cold junction compensation Type 9191/VS-03 and 9191/VS-04

Based on EN 60079-11:2012, chapter 5.7 the R.STAHL Type 9191/VS-03 and 9191/VS-04 can be used as a simple apparatus.



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Remarks EN 60079-11:2012, chapter 5.7

- the type "9191/VS-03 and 9191/VS-04" contains no voltage limiting and / or current limiting and / or protective devices (See vendor documentation).
- the type "9191/VS-03 and 9191/VS-04" contain no devices to increase the available voltage and available current.(see vendor documentation).
- the type "9191/VS-03 and 9191/VS-04" maintains the integrity of the isolation from earth of the intrinsically safe circuit, it withstands the test voltage to earth (500VAC) in accordance with 6.3.13. The terminals are according to 6.2.1.
- the type "9191/VS-03 and 9191/VS-04" shall be accommodated in an enclosure that meets the requirements of an approved type of protection as specified in EN 60079-0:2014 chapter 1.
- Technical data:
 Heraeus TO 92 PT100: temperature range -50°C to 150°C; $R_{th} = 0,4K/mW$
 Phoenix terminal UKK 3 BU : temperature range -60°C to 130°C

Max. temperature rise of the PT100 with a P_i of 100mW:
 $\Delta T_{PT100} = R_{th} * P_i = 0,4K/mW * 100mW = 40K$

At the max. allowed ambient temperature for the type "9191/VS-03 and 9191/VS-04" of $T_a = 80^\circ C$ a max. component temperature can be assumed as:

$$T_{Terminal} = \Delta T_{PT100} + T_{a(ambient)} = 40K + 80^\circ C = 120^\circ C \leq T_{allowed Terminal} = 130^\circ C$$

The max. allowed temperature of the UKK 3 BU will not be exceeded.

For T4 classification the maximum allowed temperature is $T_{T4} = 130^\circ C$.

$$T_{Terminal} = \Delta T_{PT100} + T_a = 40K + 80^\circ C = 120^\circ C \leq T_{T4} = 130^\circ C$$

The max. allowed surface temperature for a Temperature classification T4 will not be exceeded.

P_i (mW)	$T_a(ambient)$		$T_{terminal}/T_{T4}$
100	80°C	≤	130°C
80	90°C	≤	130°C
50	100°C	≤	130°C
35	110°C	≤	130°C

- the values C_i and L_i of the type "9191/VS-03 and 9191/VS-04" are negligible.

Summarization:

the type "9191/VS-03 and 9191/VS-04" can be classified to be used for:
 EPL Gb, ib, IIC, $P_i = 100mW$, temperature class T4 $-40^\circ C \leq T_a \leq 80^\circ C$
 (For other P_i and T_a see above table)

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