Temperature Sensor 94138
-40 … +150 (200) °C – Gas measurement

GENERAL DESCRIPTION

With a temperature measuring range of -40° C up to 200° C and an analog-continuous signal this sensor provides the perfect solution for mobile and industrial applications in temperature measurement. Having most robust and compact design it can be used in nearly all positions. That combination of used materials is especially dedicated to measure fluids. Proven design provides fastest response performance available in the market.

FEATURES

- Wide temperature range -40 … 150° C (200° C)
- Fast signal response in gases (τ63 < 14 sec.)
- Sensing element: resistor with NTC characteristic (PTC possible as well on request)
- Electrical Interface: Analog
- Mechanical Interface 16 mm hole + 6 mm screw with flange
- RoHS / REACH compliant (Pb-free accord. to techn. rules)
- Integrated connector Bosch Compact 2.8 (IP6K9K)

APPLICATIONS

- Easy Handling with screw-on flange fixation (e.g. manifold, ambient air, different gases)
- Harsh environments (stainless steel housing)
- Different O-ring materials available (according to media requirements)

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PRELIMINARY

1 – INTRODUCTION

Based on our long-term experiences in development and production of temperature sensors we created our multi-purpose sensor 94138. With its proved design and used components a measuring range of -40° C to 200° C can be realized. Sensing element is NTC resistor (PTC resistor is possible as well). Well established technologies and used materials make that sensor really robust and functionally safe. This sensor provides the perfect solution for general industrial applications, testing labs, automotive or smart home applications in above mentioned temperature range.

Manufacturer of the product

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2 – SAFETY INSTRUCTIONS

- Please observe the usual regulations and safety requirements for electrical installations, low and high current systems (e.g. VDE 0100)!
- Use the product only in enclosed spaces!
- Only use the device outside of potentially explosive areas!
- Please make sure to use the sensor properly to avoid damage. Improper handling can damage the sensor itself and also damage connected devices. Please note that in case of damage caused by improper use of the sensor on your connected devices, no warranty claim can be made. The manufacturer assumes no liability for such damage.
- **Please note that this device is not suitable for safety applications, emergency shutdown devices, or applications where a malfunction could lead to injury or property damage. Do not ignore this notice, as improper use can cause serious health and property damage!**

3 – DESCRIPTION OF THE SENSOR

Structure and functioning of the sensor

Heart of that temperature sensor is a simple resistor with NTC conditions. If temperature around changes value of the resistor is changing accordingly. Each temperature leads to a certain resistance value. “NTC” = Negative Temperature Coefficient which means as higher temperature as lower resistance value. Using power divider circuit user can get a certain signal power according to measured temperature.

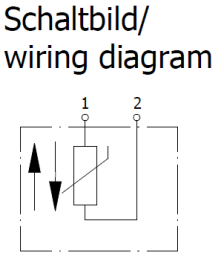

Figure 1: Circuit of the sensor

Components of the sensor

The sensor is composed of four main components: stainless steel measuring housing, lead frame with measuring element, flange and electric connector. The measuring tip contains the resistor which is thermally connected to the housing by some heat conducting material. It is than the measuring heart of the sensor. The electric connection is realized by an automotive proven 2-pin connector. Because of its original purpose in automotive applications this connector provides safe connection and best-in class sealing performance at IP6K9K level together with original sealed mating connector. Media sealing is realized by O-ring off different polymers (e.g. FKM, EPDM).

4 – TECHNICAL SPECIFICATION

Weight

The weight of the entire sensor is approximately 30.5 g +/-5 %

Dimensions

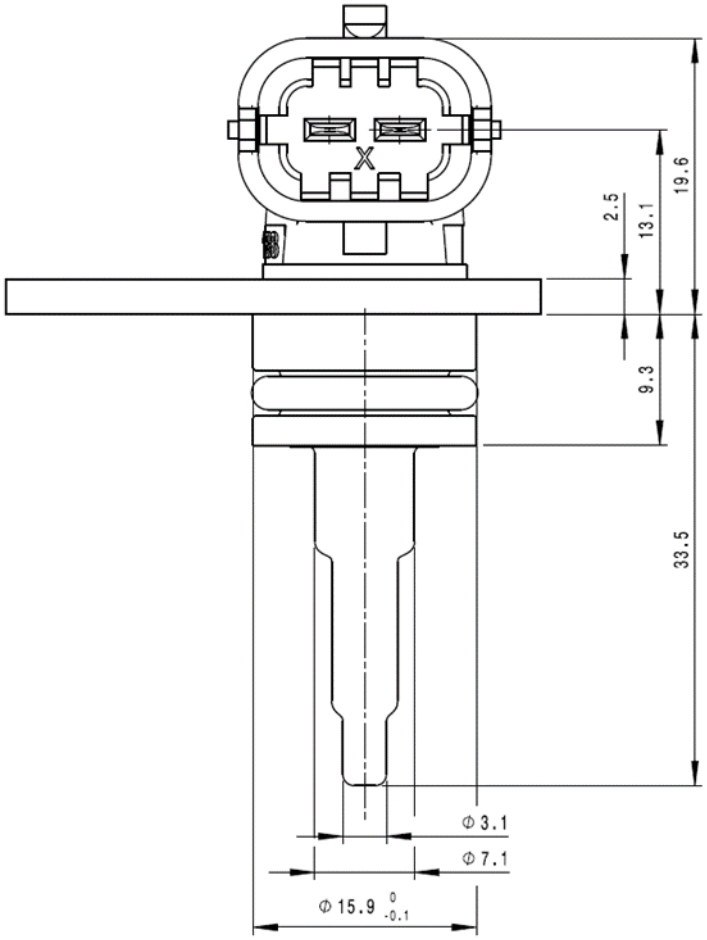

Figure 2: Dimensions of the sensor

Connector / Pinout

- Connector type: Bosch Compact 2.8, 2-way, Coding A
- Manufacturer: Bosch
- Manufacturer part number: D 928 002 69A
- Pinout: no polarity (in / out)

Electrical characteristics

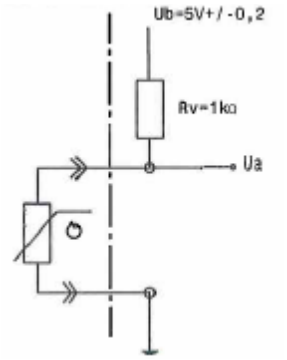

Figure 3: Test Circuit of the sensor

Recommended Power: 1 mW

Response Performance: τ63 < +/- 15 sec. (in air)

Operating temperatures

The operating temperatures of the sensor tip and the evaluation electronics are shown in Table 1.

Table 1: Operating temperatures

SENSOR COMPONENT	LOWER OPERATING TEMPERATURE	UPPER OPERATING TEMPERATURE
Measuring tip	-40° C	200° C
Electric connector	-40° C	125° C

5 – RESOLUTION AND ACCURACY OF THE OUTPUT SIGNAL

Table 2: Accuracy of the output signal

TEMPERATURE	Rnom	DELTA R	DELTA T
-40° C	30418 Ω	7.1 %	1.3° C
25° C	1979 Ω	3.9 %	1.0° C
50° C	602 Ω	3.0 %	0.9° C
100° C	197 Ω	1.5 %	0.6° C
150° C	64 Ω	2.6 %	1.3° C
200° C	25 Ω	3.5 %	2.1° C

6 – MAINTENANCE AND CARE

Maintenance

The sensor does not require any maintenance.

Cleaning and care of the sensor

Please clean the sensor exclusively with a dry and lint-free cloth and be careful while doing so.

7 – VARIANTS AND ORDER-NUMBERS

94138 00900 Temperature sensor 2.000 kΩ @ 25° C. best tolerance @ 100° C, O-ring FKM
94138 00950 Temperature sensor 1.979 kΩ @ 25° C. best tolerance @ 100° C, O-ring EPDM

8 – DISPOSAL

Dispose of disassembled components for recycling:

- Scrap metallic residual components,
- Give plastic parts for recycling,
- Dispose of other components sorted by material properties.

Caution

DANGER	
	◆ Risk of environmental damage from improper disposal. Electronic waste, electronic components, lubricants, and other auxiliary materials are subject to special waste treatment and may only be disposed of by authorized specialist companies.

Municipal authorities and waste disposal companies provide information on environmentally-friendly disposal.

9 – DECLARATION OF CONFORMITY AND DISCLAIMER OF LIABILITY

Declaration of conformity to applicable standards and regulations.

Tbd.

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10 – VERSION HISTORY

Table 3: Version history

VERSION	DATE	DESCRIPTION	NAME
0.1	27.06.2024	Initial version	F. Rothe

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