

High Temperature Sensor CAN Interface



GENERAL DESCRIPTION

With a temperature measuring range of -40 °C to +1200 °C and a resolution of 0.01325 K, this sensor provides the perfect solution for mobile and industrial applications and testing labs. The entire sensor is powered via CAN Bus interface, making communication and power supply incredibly easy. With the implementation of the sensor through a CAN bus line and simple commands, using the sensor is easy and reliable.

FEATURES

- Temperature Range: -40 ... +1200 °C
- Power Supply: Power line beside CAN
- Interface: CAN J1939
- RoHS/REACH compliant (Pb-free)
- Plug and Play

APPLICATIONS

- Easy Handling with CAN bus interface
- High temperature range (e.g. heating industry, exhaust temp.)
- Easy machine temperature monitoring
- Monitoring of highly different temperatures
- Interface M14 x 1,5 female thread (changeable)
- Sensor length can be defined by user



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High Temperature Sensor

CAN Interface



1 – INTRODUCTION

Discover our brand-new high temperature sensor based on thermocouples with a CAN interface! With a temperature measuring range of -40 °C to +1200 °C and a resolution of 0.03125 K, this sensor provides the perfect solution for general industrial applications, testing labs, automotive or smart home applications.

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

The sensor uses the thermocouple principle: two different metals are welded together in the measuring tip, which generate a thermoelectric voltage in the millivolt range due to the Seebeck effect. This voltage is transmitted via the thermocouple wire to an IC which measures, processes and makes it available via CAN Bus.

Components of the sensor

The sensor is composed of two main components: the measuring tip and the electronics module. The measuring tip contains the "hot junction", which measures the temperature of the end application (**Fehler! Verweisquelle konnte nicht gefunden werden.**). The electronics module takes care of the preparation of the thermocouple voltage and the provision of CAN communication. A thermocouple wire connects the two components together.



High Temperature Sensor CAN Interface

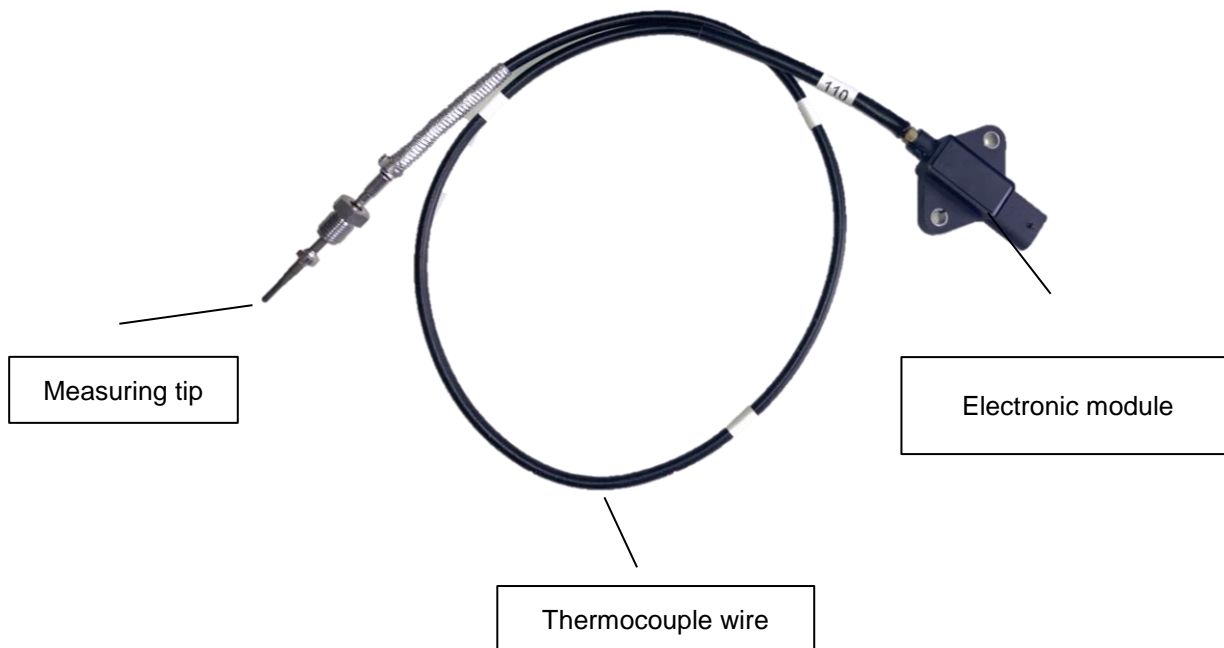


Figure 1: Components of HTS

4 – TECHNICAL SPECIFICATION

Weight

The weight of the entire sensor is approximately 80 g.

Dimensions

The dimensions of the electronics module are shown in Figure 2 and the dimensions of the measuring tip in Figure 1. All dimensions are given in millimeters. 30 mm tip length can be seen as an example. If customer needs to get different sensor tip length it can be changed.

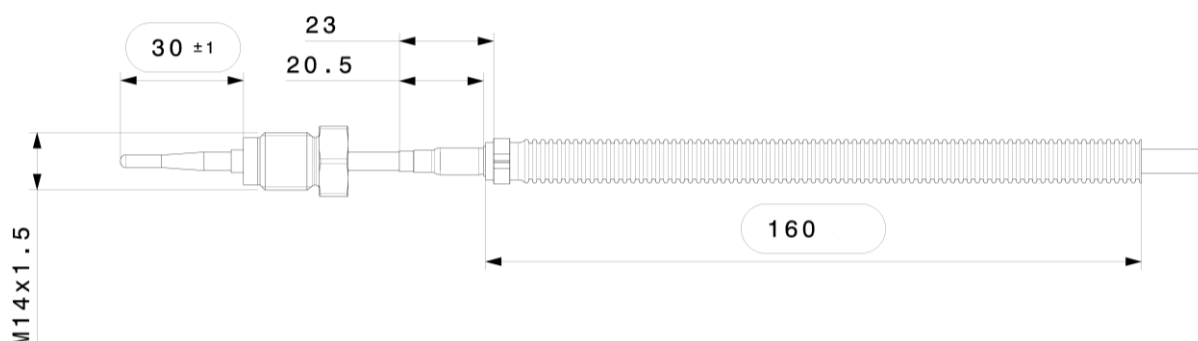


Figure 1: Dimensions of the measuring tip



High Temperature Sensor CAN Interface

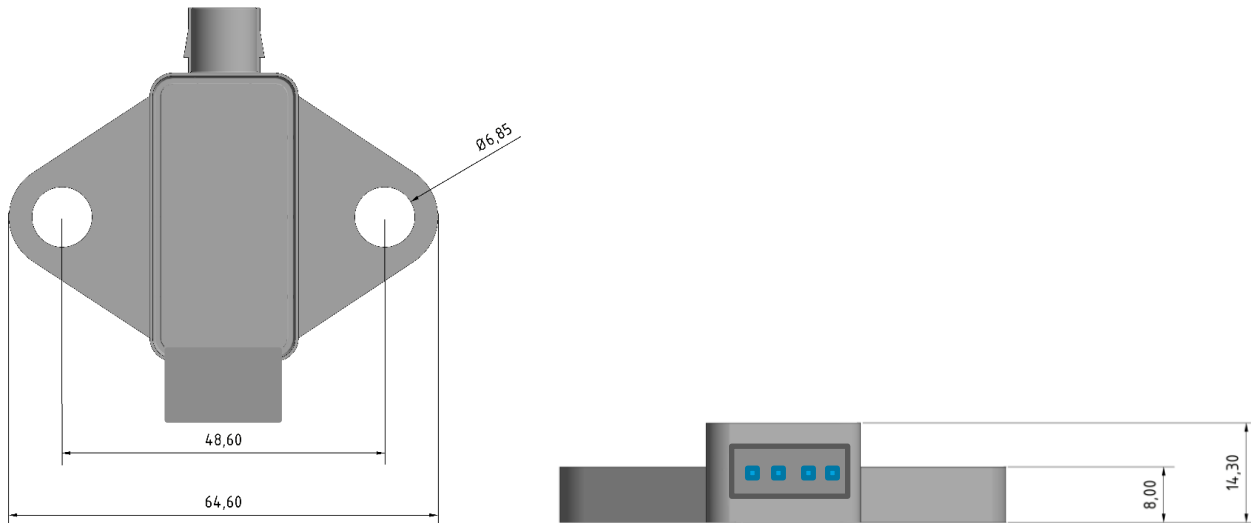


Figure 2: Dimensions electronics module

Connector / Pinout

- Connector type: MLK1.2, 4 way, Coding A
- Connector manufacturer: Hirschmann Automotive
- Manufacturer part number: 805-122-541

- Pinout (The pin numbers are visible inside the connector):
 - Pin 1: Power
 - Pin 2: CAN High
 - Pin 3: CAN low
 - Pin 4: Ground

Electrical characteristics

Supply voltage range: 9 – 36 VDC

Power consumption: typ. 7 mA

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 | +1200 °C |
| Electronics module | 0 °C | 60 °C |



5 – CAN CUSTOMER DATA INTERFACE

The customer data interface corresponds to the SAE J1939. The cyclic CAN message has a cycle time of 500 ms. A short description of the output signal is shown in Table 2. The accuracy of the output signal is shown in **Fehler!**
Verweisquelle konnte nicht gefunden werden..

The temperature values above 1735 °C are diagnosis values.

Table 2: Output signal description

| CAN message ID [hex] | | | | CAN data [hex] | | | | | | | | |
|----------------------|-----|--|----------------------------------|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----|
| 00 | 18 | FE | F6 | 8D | 00 | 00 | 00 | 00 | 00 | 72 | 24 | 00 |
| | PGN | Destination address of the CAN message | Score address of the CAN message | Data byte 0 | Data byte 1 | Data byte 2 | Data byte 3 | Data byte 4 | Data byte 5 | Data byte 6 | Data byte 7 | |

Calculation of the temperature output based of the example in table 2.

- Data byte 5 + (Data byte 6<<8) = 0x72 + (0x24 << 8) = 0x2472 = 9330d
- Real temperature = (9330d / 32d) – 273 = 18,5625°C

Resolution and accuracy of the output signal

(32d = Resolution of the output signal according SAE J1939 Norm/SPN 173)

(-273 = Resolution of the output signal according SAE J1939 Norm/SPN 173)

The measuring tip of the sensor has a measuring range of -40 °C to +1200 °C with a resolution of 0.01325 K. The accuracies of the output signals are shown in Table 3.

Table 3: Accuracy of the output signal

| TEMPERATURE RANGE | MAX. TEMPERATURE TOLERANCE |
|-------------------|----------------------------|
| -40 °C to 0 °C | typ. +/-7 K |
| 0 °C to +1200 °C | typ. +/-6 K |



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 – 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 | |
|---|--|
|  | <p>◆ Risk of environmental damage from improper disposal.</p> <p>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.</p> |

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

8 – DECLARATION OF CONFORMITY AND DISCLAIMER OF LIABILITY

Declaration of conformity to applicable standards and regulations.

Tbd.

Disclaimer

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9 – VERSION HISTORY

Table 3: Version history

| REVISION | RELEASE DATE | DESCRIPTION OF CHANGES |
|----------|--------------|------------------------|
| 0.1 | 03.04.2023 | Initial release |

LEGAL DISCLAIMER

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