



temperature



humidity



CO<sub>2</sub>



atm. pressure



VOC

Product Catalogue for Railway Vehicles

EN 61373

EN 50121-3-2

EN 50155

EN 45545-2



extend your senses



*The mission of SENSIT s.r.o. is to develop, manufacture and supply sensors for non-electric quantities.*

Our goal is to provide a wide range of quality products, competitive prices and high quality services, including the provision of servicing and consultancy. Our priority commitment is to ensure our offered products and services optimally meet the expectations and requirements of our customers, positively influence their satisfaction and ensure the building of long-term partnerships.

In terms of development, production and utilization of sensors throughout their entire life cycle, we also deal with the issue of minimizing negative impacts on the environment and ensuring safety in production and actual use of these sensors.

To fulfil the specified mission, we rely on the following internal values of the company:

#### **QUALITY**

the high quality of processes ensures the flawlessness of the offered products and services

#### **COSTS**

by reducing input and operating costs we achieve competitive prices

#### **SPEED**

by improving the efficiency of processes we increase the speed of delivery of our products and services

#### **RELIABILITY**

by repeatedly verifying and testing basic properties, including compliance with current legislation, we ensure the reliability of our products and services

#### **FLEXIBILITY**

by selecting qualified, motivated and loyal employees we create conditions enabling us to respond flexibly to customer requirements

Ing. Petr Brzezina  
CEO



*The company SENSIT s.r.o. from Rožnov pod Radhoštěm, known in the Czech market of temperature sensors since 1991, has begun the development, manufacture and supply of special temperature, relative humidity, CO<sub>2</sub>, atm. pressure and VOC sensors for railway vehicles since 2004. SENSIT s.r.o. manufactures electronic and bimetallic temperature switches and converters for railway vehicles as well.*

Products for this segment must have specific properties defined in the so-called railway standards: **EN 50155**, **EN 61373**, **EN 50121-3-2**, **EN 45545-2** and **NFPA 130** as amended. They include especially resistance to vibration and electrical safety. They have to meet fire standards, and electronic components have to meet the conditions for electromagnetic compatibility (EMC). All these characteristics are taken into consideration during development – this is confirmed with a test report and a certificate issued by an independent technical and properly accredited testing laboratory.

SENSIT, s.r.o., is also engaged in the manufacture of temperature sensors in various industries. The standard temperature range of the sensors is from **-200 °C to 1100 °C** and the diameter of the resistance temperature sensors is from **1.0 mm**. In recent years, company's product range has expanded with relative humidity sensors, CO<sub>2</sub> sensors, atmospheric pressure and VOC sensors, level sensors, flow sensors and inductive sensors.

As a significant competitive advantage, SENSIT s.r.o. maintains the capability of small series or piece production. High flexibility in relation to the special requirements of customers enables the company to react flexibly to their needs in terms of composition of the custom range, as well as in time performance.

The high level of quality of its products is ensured, among other ways, through the performance of regular and repeat type tests of the properties of products or through the sophisticated operation of cycling 7 to 10 cycles in temperature intervals from -10 °C to 80 °C with the objective of detecting critical manufacturing defects. A standard part of production processes is initial calibration and output inspection. The final products are thus supplied in the guaranteed quality, which is reflected in the low percentage of justified complaints.

SENSIT s.r.o. meets the requirements of standards EN ISO 9001, EN ISO 14001 and EN ISO 45001 as amended for all areas of its activities, as evidenced by valid certificates.



The Authorized Metrology Centre authorized by the Czech Office for Standards, Metrology and Testing has been a part of SENSIT s.r.o. since 2001. SENSIT s.r.o. has its own laboratory carrying out calibrations of company's own products as well as specialist products from other manufacturers.

The competitiveness of the company's products is continuously tested on the Czech market, as well as abroad, with regard to the implementation of long-term supplies to significant manufacturers of technological units and components in the following fields:

- |   |   |
|---|---|
|  Paired temperature sensors – qualified meters   |  Sensors of temperature, humidity and flow in food processing applications         |
|  Temperature sensors for railway vehicles        |  Sensors of temperature, humidity and flow for air conditioning equipment          |
|  Temperature sensors for heating systems control |  Temperature sensors in applications for renewable resources                       |
|  Temperature sensors for machines and equipment  |  Temperature sensors for applications in rubber and plastic industries             |
|  Temperature sensors for chemical industry       |  Sensors of temperature, humidity and flow in white goods and medical applications |
|  Custom production of temperature sensors        |  Temperature sensors for science and research                                      |

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**KTR 156/R**

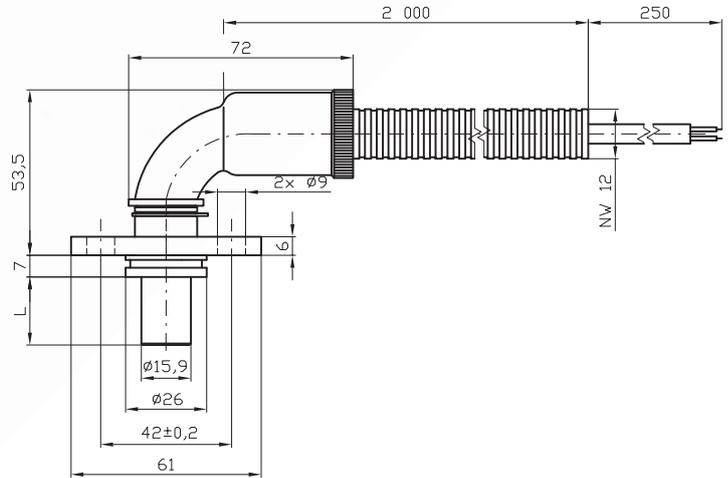
Temperature measurement of axle bearings



Z017.8a



temperature


**DESCRIPTION AND APPLICATION**

The KTR 156/R resistance temperature sensor is designed to measure temperature of solid substances. In the application segment of Railway Vehicles, it is intended to measure temperature of carriage axle bearings. The sensor configuration is depended on achieving the required resistance of the entire structure, in particular against vibrations and shocks.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 68 (1 bar) according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KTR 156/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 68 (1 bar) in accordance with EN 60529
Case dimension	$15.9 \pm 0.05\text{ mm}$
Length of case L	10 to 100 mm
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Protection tube	PA12, NW12/RLTPF12B, could be different
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 3 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$

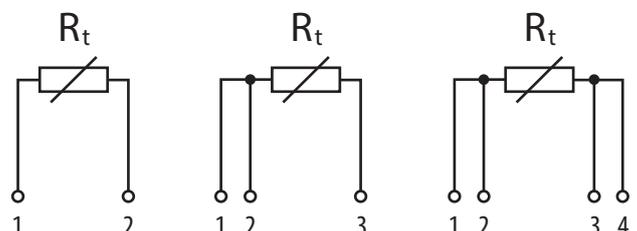
\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM**

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSIC, KTY, SMT, etc.)

**In case of change cable to silicone shielded  $2 \times 0.56 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $150 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)

## SENSOR INSTALLATION ↓

1. Place the sensor on the surface to be measured and attached by means of two screws of suitable length.
2. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
3. Provide fixing the cable and the protective tube so as to prevent their free movement during measuring process.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z017.8a | 08/22

replace Z017.7a

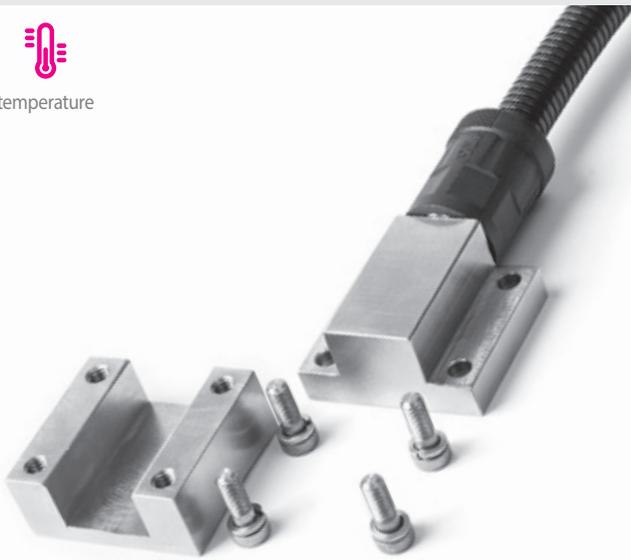



**KTR 167/R**

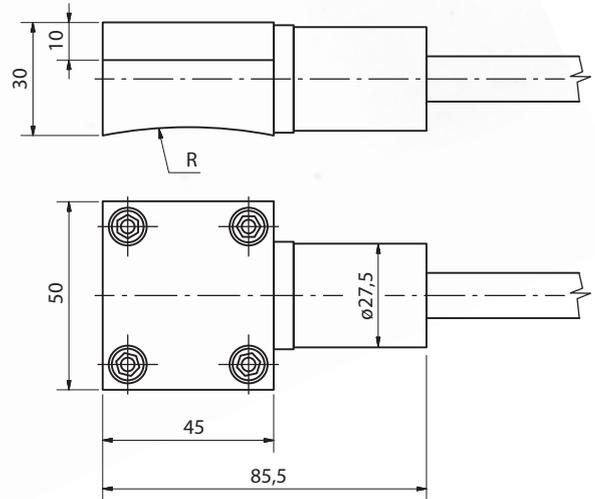
Temperature measurement of axle bearings



temperature



Z052.4a


**DESCRIPTION AND APPLICATION** ↓

The KTR 167/R resistance temperature sensor is designed to measure temperature of solid substances. In the application segment of Railway Vehicles, it is intended to measure temperature of carriage axle bearings. The sensor configuration is depended on achieving the required resistance of the entire structure, in particular against vibrations and shocks.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 68 (1 bar) according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS** ↓

Sensor type	KTR 167/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 68 (1 bar) in accordance with EN 60529
Case dimension	$45 \times 50 \times 30\text{ mm}$ / R162 + 4
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Connector	HARTING Han 3A-F
Protection tube	PA12, NW12/RLTPF12B, could be different
Insulation resistance	$> 200\ \text{M}\Omega$ at $500\ \text{V}_{\text{DC}}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 3 in accordance with EN 61373
Insulation test	$4\ \text{kV}_{\text{DC}}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6$ hrs

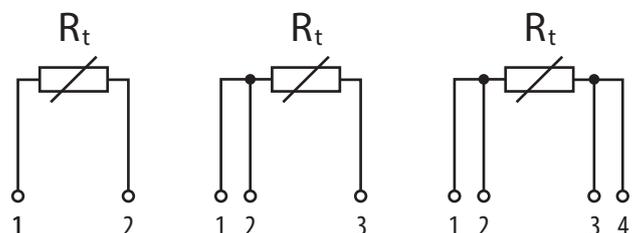
\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM** ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)

**In case of change cable to silicone shielded  $2 \times 0.56 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $150 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)

## SENSOR INSTALLATION ↓

1. Before placing the sensor in the place measured, clean the contact surface with a file or use a thermally conductive paste between the measured surface and the metal sensor case.
2. Remove the four mounting screws and separate the two parts of the cases. Weld the lower part of the case with a radius to the measured point and let the metal part to cool.
3. Insert the top part of the case with a cable into the welded part and fasten with four mounting screws.
4. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
5. Provide fixing the cable and the protective tube so as to prevent their free movement during measuring process.
6. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z052.4a 08/22

replace Z052.3a



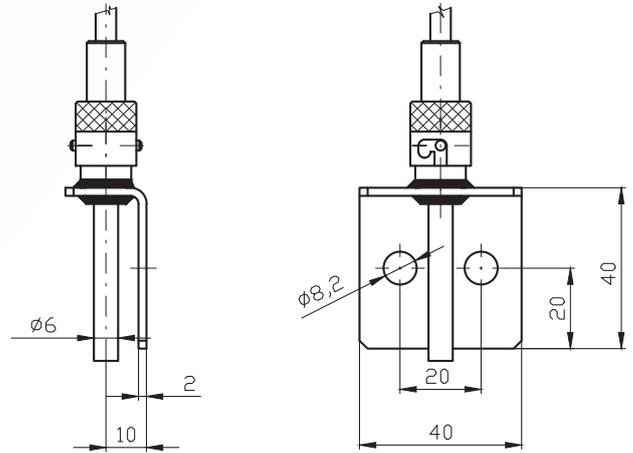

**KTR 069/R**

Measuring temperature of cooling air of traction electric motors



temperature

Z014.7a


**DESCRIPTION AND APPLICATION** ↓

The KTR 069/R temperature sensor is designed to measure temperature of gaseous, liquid or solid substances. In the application segment of Railway Vehicles, it has been produced to measure temperature of cooling air of traction electric engines of shunting locomotives. A special adapter with a bayonet mount prevents the sensor from loosening.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The case of the temperature sensor and the adapter with bayonet mount is made of stainless steel. The sensor can be used for any control system compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS** ↓

Sensor type	KTR 069/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimension	$6 \pm 0.1\text{ mm}$
Length of case L	10 to 100 mm
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Accessories	special holder with bayonet mount
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2, class B in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$

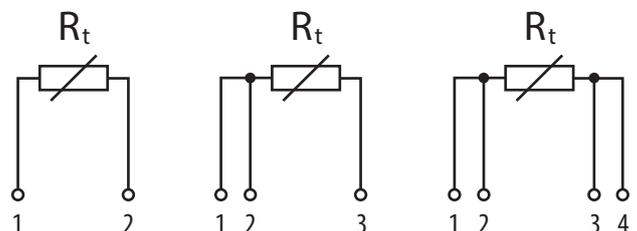
\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM** ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSIC, KTY, SMT, etc.)

**In case of change cable to silicone shielded  $2 \times 0.34 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensors

## SENSOR INSTALLATION ↓

1. Mount the holder on a solid base using two screws.
2. Insert the sensor thorough the hole on the lock side and fasten the bayonet locking head.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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replace 2014.6a





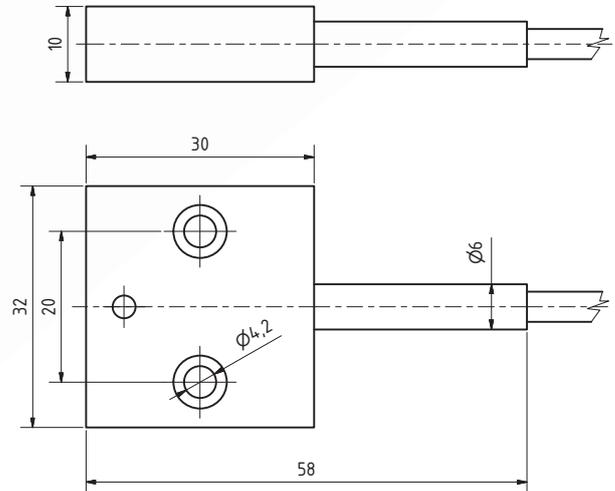
# KTR 164/R

Measuring the temperature of coolants, batteries or other parts with planner surface



temperature

Z018.7a



## DESCRIPTION AND APPLICATION ↓

The KTR 164/R resistance temperature sensor is designed to measure temperature of solid substances. In the application segment of Railway Vehicles, the sensor is intended to be used for measurement of temperature of coolers, accumulators or other parts with a flat surface.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensors meets ingress protection IP 67 according to EN 60529.

Sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

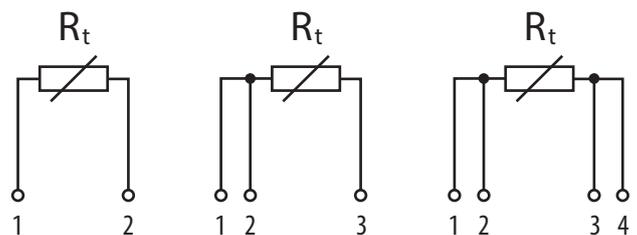
## SPECIFICATIONS ↓

Sensor type	KTR 164/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimension	$32 \times 30 \times 10\text{ mm}$
Case material	brass
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Insulation resistance	$> 200\ \text{M}\Omega$ at $500\ \text{V}_{\text{DC}}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 1, class B in accordance with EN 61373
Insulation test	$4\ \text{kV}_{\text{DC}}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\ \text{hrs}$

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

- 2wire
- 3wire
- 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)

**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensors

## SENSOR INSTALLATION ↓

1. Prior to mounting the sensor it is necessary to clean the surface to be measured, to make it flat and to apply a heat transfer paste or silicone vaseline, which will ensure a faster response and minimize the error of the method during contact sensor temperature measurement.
2. Place the sensor on the surface to be measured and attach by means of two M4 screws of a suitable length. When the sensor is to be used in an environment with the occurrence of vibrations and shocks, use suitable means to secure the threads. Secure the cable against oscillation in all directions by means of a fixed holder at a distance of 10 to 15 cm from the brass housing.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. **The operating position of the sensor is adjustable according to need.**



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2018.7a | 08/22  
replace 2018.6a




**KTR 107**

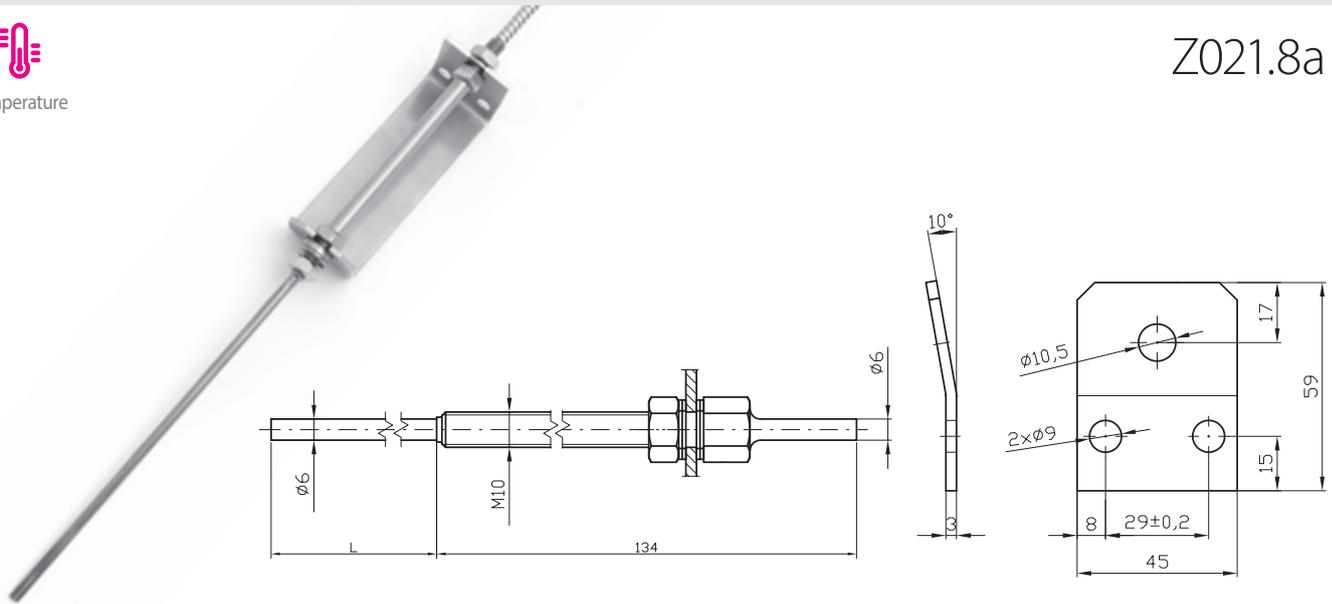
For secondary temperature measurements of electric resistors of electrodynamic breaks



Z021.8a



temperature


**DESCRIPTION AND APPLICATION**

The KTR 107 resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is intended for secondary measurement of temperature of electrical resistors of electrodynamic brakes of electric and diesel-electric locomotives.

Maximum temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $400\text{ }^{\circ}\text{C}$  and these limits may be exceeded for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The temperature sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KTR 107
Type of sensing element	Pt 100/3850; Pt 1000/3850
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $400\text{ }^{\circ}\text{C}$
Ingress protection	IP 65 in accordance with EN 60529
Case dimension	$6 \pm 0.1\text{ mm}$
Length of case L	10 to 500 mm
Thread / OK	M 10 $\times$ 1 / OK 17
Case material	stainless steel DIN 1.4301
Lead-in cable	silicone shielded $2 \times 0.34\text{ mm}^2$ silicone shielded $4 \times 0.15\text{ mm}^2$
Wire resistance	$0.11\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Accessories	metal holder
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$3\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

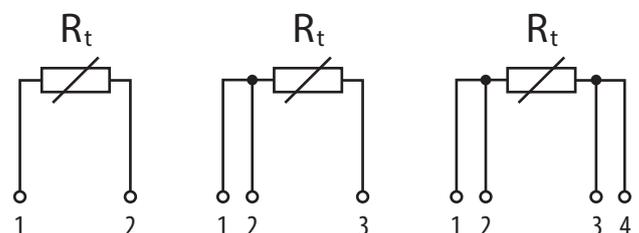
\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM**

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility of encasing two sensing elements
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)

## SENSOR INSTALLATION ↓

1. Installation of the sensor in the measured place – the sensor is mounted by means of the threading, which is part of the sensor, screwed into a special holder. Use OK17 wrenches for the sensor assembling and fixing. The supply includes stainless steel nuts M10 × 1 and special anti-vibration washers Nord-Lock.
2. Connect the wires of the lead-in cable according to the wiring diagram. Supply cable with the length of 3 m is shielded, silicone insulated and protected at by 1.5 m long by metal hose with the diameter of 10 mm that is attached to the sensor.
3. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The operating position of the sensor is adjustable according to need.**



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Z021.8a | 08/22

replace Z021.7a




**KTR 149**

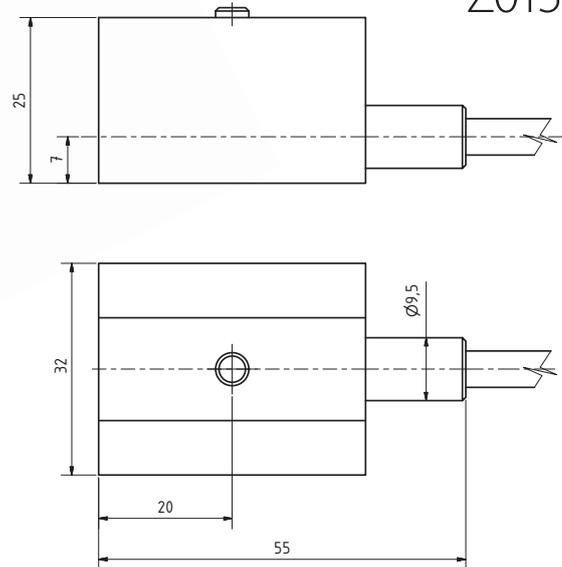
Measuring temperature of rail for automatic heating of track exchanges



temperature



Z015.6a


**DESCRIPTION AND APPLICATION** ↓

The KTR 149 temperature sensors are designed to measure surface temperature of solid substances. In the application segment of Railway Vehicles, it is intended to measure temperature of rails and is a part of the system for automatic heating of railroad switches. The sensor has double insulation, which provides high value of electrical breakdown in its own sensor.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $100\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor meets ingress protection IP 68 (1 bar) according to EN 60529 standard, as amended. The KTR 149 temperature sensor is attached to the rail from the bottom side with a special elastic holder D001 or D006 (depending on the rail) that is delivered separately. The sensor design ensures meeting the conditions for security equipment according to requirements of EN 50125-3 standard and EN 60068-2-1 and EN 60068-2-2 standards. Because of this, they can be used to measure surface temperature of the rails. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS** ↓

- Shock and Vibration Test in accordance with **EN 50125-3** standard, as amended
- Cold Test (AC) in accordance with **EN 60068-2-1** standard, as amended
- Dry Heat Test in accordance with **EN 60068-2-2** standard, as amended
- Insulation Test in accordance with **EN 50124-1** standard, as amended

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

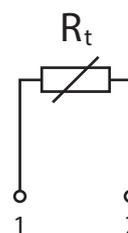
**SPECIFICATIONS** ↓

Sensor type	KTR 149
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $100\text{ }^{\circ}\text{C}$
Ingress protection	IP 68 h (1 bar) in accordance with EN 60529
Case dimensions / diameter	$40 \times 25\text{ mm}$ / diameter 32 mm
Case material	stainless steel DIN 1.4301
Lead-in cable	Polyuretan unshielded H05BQ $2 \times 0.75\text{ mm}^2$
Wire resistance	$0.047\ \Omega$ for 1 m of cable for 2-wire connection
Type of protection tube	PMAFLEX PCST-10
Accessories	metal holder D001 or D006 according rail type
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50124-1
Mean working life $\approx$ MTTF *	$1.95 \times 10^6$ hrs

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM** ↓

- 2wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 k $\Omega$ )
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

- 1. Prior to mounting the switch it is necessary to clean the surface to be measured, to make it flat and to apply a heat transfer paste or silicone vaseline, which will ensure a faster response and minimize the error of the method during contact sensor temperature measurements.**
2. Place the temperature sensor on the surface of the rail. Stainless steel spring D 001 with arresting opening, supplied as separate accessories, serves for mounting on the bottom side of the rail.
3. Connection of the wires of the lead-in cable according to the wiring diagram.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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2015.6a | 08/22

replace 2015.5a





# KTG 12

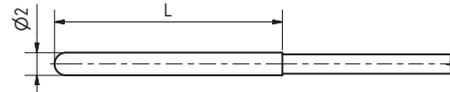
Temperature sensor with case  $\varnothing$  2 mm



Z050.4a



temperature



## DESCRIPTION AND APPLICATION

The KTG 12 resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is intended to be used for example in the air conditioning system and the temperature control system.

Temperature range of the sensor use is  $-50\text{ }^{\circ}\text{C}$  to  $200\text{ }^{\circ}\text{C}$ . The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended. Case diameter of 2 mm ensures fast sensor response to temperature changes.

The sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

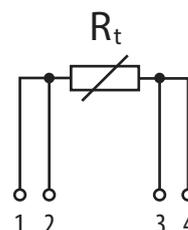
## SPECIFICATIONS

Sensor type	KTG 12
Type of sensing element	Pt 100/3850, Pt 1000/3850
Temperature range	$-50\text{ }^{\circ}\text{C}$ to $200\text{ }^{\circ}\text{C}$
Ingress protection	IP 52 in accordance with EN 60529
Case dimension	$2 \pm 0.1\text{ mm}$
Length of case L	25 to 60 mm
Case material	stainless steel DIN 1.4301
Lead-in cable	teflon unshielded $4 \times 0.02\text{ mm}^2$ ( $4 \times \text{AWG } 34$ )
Wire resistance	$0,07\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 1.5\text{ s}$ (in flowing water at $0.4\text{ m s}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM

- 4wire



## SENSOR INSTALLATION ↓

1. If the sensor is used for contact temperature measurements of surface, purify surface and use a thermal conductive paste or silicone vaseline on a surface.
2. Install the sensor in the measured location and ensure fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram. The connection terminals must be adapted to the wire cross section.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z050.4a | 08/22

replace Z050.3a

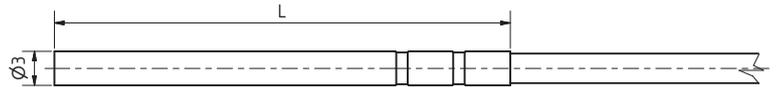



**KTG 3**
**KTG 3A**

 Temperature sensor with case  $\varnothing$  3 mm


temperature

Z067.4a



## DESCRIPTION AND APPLICATION ↓

The KTG 3 and KTG 3A resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is intended to be used for example in the air condition system and the temperature control system.

Temperature range of the sensor use is  $-50\text{ }^{\circ}\text{C}$  to  $200\text{ }^{\circ}\text{C}$ . The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended. Case diameter of 3 mm ensures fast sensor response to temperature changes.

The sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTG 3	KTG 3A
Type of sensing element	Pt 100/3850, Pt 500/3850, Pt 1000/3850	
Temperature range	$-50\text{ }^{\circ}\text{C}$ to $200\text{ }^{\circ}\text{C}$	$-50\text{ }^{\circ}\text{C}$ to $260\text{ }^{\circ}\text{C}$
Ingress protection	IP 64	IP 54
	in accordance with EN 60529	
Case dimension	$3 \pm 0.1\text{ mm}$	
Length of case L	25 to 60 mm (in 10 mm)	
Case material	stainless steel DIN 1.4301	
Lead-in cable	teflon unshielded $2 \times$ AWG24 teflon shielded $2 \times$ AWG26 teflon shielded $4 \times$ AWG30	
Wire resistance	$0.178\ \Omega$ for 1 m of cable for 2-wire connection	
Time response	$\tau_{0.5} < 3\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )	
Insulation resistance	$> 200\ \text{M}\Omega$ at $500\ \text{V}_{\text{DC}}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$	
Shock and vibration tests	category 2 in accordance with EN 61373	
Insulation test	$4\ \text{kV}_{\text{DC}}$ for time 1 minute in accordance with EN 50155	
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation	

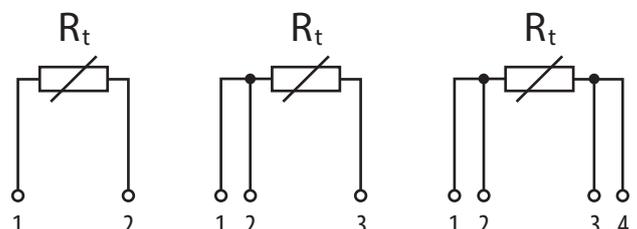
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision
- possibility of connecting cable shielding to the case (KTG 3H)

## SENSOR INSTALLATION ↓

1. If the sensor is used for contact temperature measurements of surface, purify surface and use a thermal conductive paste or silicone vaseline on a surface.
2. Install the sensor in the measured location or insert it in the thermowell and ensure fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**For 3 and 4wire connection with shielded cable, The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element. For 3 and 4wire connection is necessary customize connection terminals to cross-section of the cable.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z067.4a | 08/22

replace Z067.3a





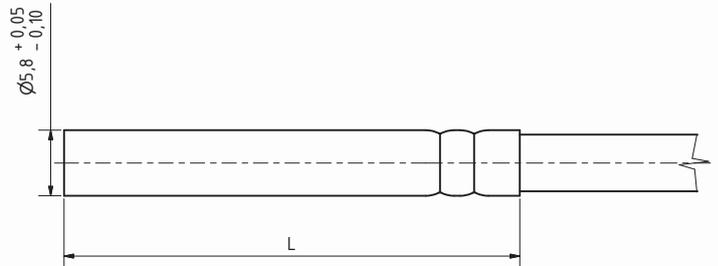
# KTG 8/R

 Temperature sensor with case  $\varnothing$  5,8 mm


Z049.4a



temperature



## DESCRIPTION AND APPLICATION

The KTG 8/R resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is intended to be used for example in the air condition system and the temperature control system.

Temperature range of the sensor use is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$ . The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

## ACCESSORIES

- thermowell JTG 8

## TESTS, DECLARATION, CALIBRATIONS

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

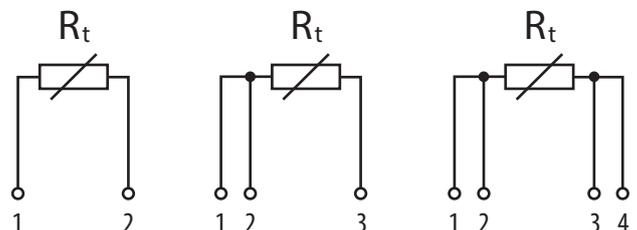
## SPECIFICATIONS

Sensor type	KTG 8/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimension	$5.8 \pm 0.1\text{ mm}$
Length of case L	40 to 100 mm (in 10 mm)
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 7\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM

- 2wire
- 3wire
- 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSIC, KTY, SMT, TC, etc.)

**In case of change cable to silicone shielded  $2 \times 0.34 \text{ mm}^2$  or silicone shielded  $4 \times 0.22 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. If the sensor is used in combination with the thermowell, screw the thermowell in the welded-on piece on the piping or in the specific threaded location.
2. Install the sensor in the measured location or insert it in the thermowell and ensure fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z049.4a | 08/22

replace Z049.3a



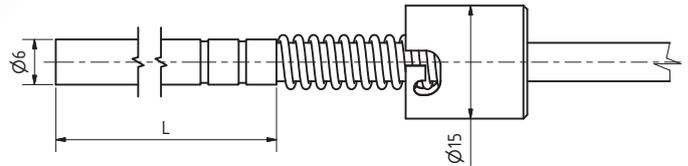

**KTG 68B/R**

 Temperature sensor with case  $\varnothing$  6 mm


Z019.8a



temperature


**DESCRIPTION AND APPLICATION** ↓

The KTG 68B/R resistance temperature sensor has been developed for the segment of Railway Vehicles to measure the temperature of diesel oil in tanks of diesel and diesel-electric locomotives as a part of measurement system and an indication of operation economy. In the diesel tank, there is a tube with a special adapter for bayonet mount. The temperature sensor with the bayonet mount preventing the mechanical loosening is inserted into the tube.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 68 (1 bar) according to EN 60529 standard, as amended.

The sensor is intended for operation in non-aggressive environment.

**ACCESSORIES** ↓

- thermowell JS 130G
- bayonet adapter

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

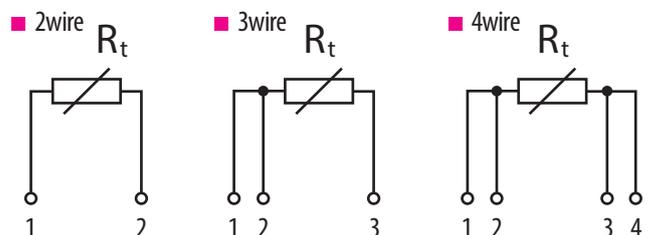
Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS** ↓

Sensor type	KTG 68B/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 68 (1 bar) in accordance with EN 60529
Case dimension	$6 \pm 0.1\text{ mm}$
Length of case L	10 to 100 mm (in 10 mm)
Case material	stainless steel DIN 1.4301
Material/Dimension of bayonet head	nickel-plated brass /L = 16 mm, inner $\varnothing$ 12.8 mm
Material/Dimension of spring	stainless steel DIN 1.4301 /L = 200 mm, outer $\varnothing$ 6 mm, $\varnothing$ of wire 0.7 mm
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Accessories	thermowell, bayonet adapter
Mean working life $\approx$ MTF*	$1.95 \times 10^6\text{ hrs}$

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM** ↓


## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, TC, etc.)

**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. Turn the bayonet head placed on a spring in one direction or the other direction to adjust desired distance of nut from the case.  
By moving the nut, the depth of sensor placement in the measurement point as well as spring pressure can be adjusted.
2. Install the sensor in the measured location or insert it in the thermowell and ensure fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z019.8a | 08/22

replace Z019.7a

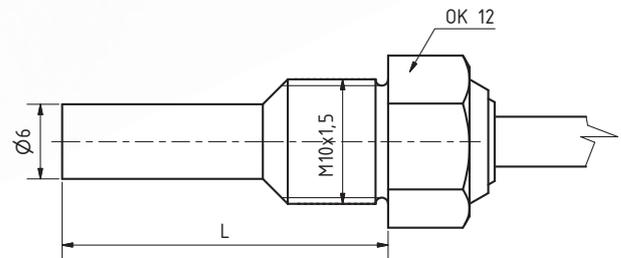



**KTG 2/R**

 Temperature sensor with case  $\varnothing$  6 mm, thread M10x1.5


temperature

Z024.10a



## DESCRIPTION AND APPLICATION ↓

The temperature sensor KTG 2/R is designed to measure temperature of gaseous, liquid or solid substances. In the application segment of Railway Vehicles, it is intended to be used for example in the air condition system and the temperature control system or for measurement of temperature in pipeline.

The standard thread M10 × 1.5 allowing installation of the sensor directly into the environment measured is a part of the case of the KTG 2/R sensor. Maximum temperature range of the sensor use is -50 °C to 200 °C. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 as amended, and it is designed for temperature measurement in pipelines. Its design allows faster response to changes in temperature compared to sensors with a thermowell.

The temperature sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTG 2/R
Type of sensing element	all types
Temperature range	-40 °C to 120 °C (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimension	6 ± 0.1 mm
Length of case L	10 to 100 mm (in 10 mm)
Thread / OK	M 10 × 1.5 / OK 12
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded 2 × 0.5 mm <sup>2</sup> RADOX shielded 4 × 0.5 mm <sup>2</sup>
Wire resistance	0.07 Ω for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 8$ s (in flowing water at 0.4 ms <sup>-1</sup> )
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25 °C ± 3 °C, humidity < 80%
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF *	1.95 × 10 <sup>6</sup> hrs

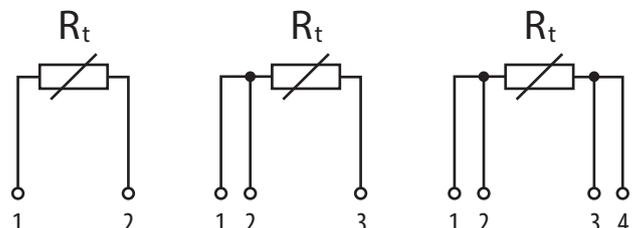
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility to change the thread
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, TC, etc.)

**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-30 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. Install the sensor to the measured place – for own installation and mounting of the sensor use an OK 12 wrench. As a sealant, you can use suitable sealing cements, oakum or a sealling tape.
2. Ensure fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The lead-in cable shielding is not conductively connected with the external housing of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z024.10a | 08/22

replace Z024.9a



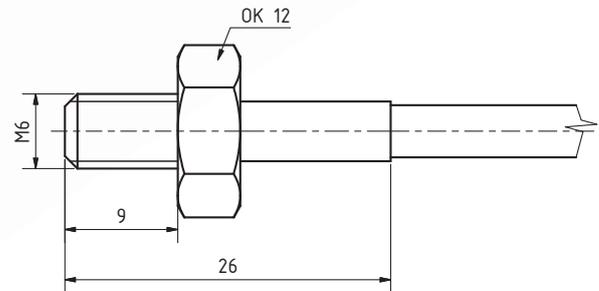

**KTG 6/R**
**KTG 6E/R**

Temperature sensor, thread M6, OK 12



temperature

Z013.8a



## DESCRIPTION AND APPLICATION ↓

The KTG 6/R and KTG 6E/R temperature sensors are designed to measure temperature of solid substances. In the application segment of Railway Vehicles, the temperature sensors are used for example to measure surface temperature of baseboards of converters and coolers of performance elements of electric locomotives (drive units) where, due to the lack of space, the lead-in cable is needed to guide at a right angle to the base board and in close proximity to the performance elements under power. The sensor is attached to the surface of measured parts with the thread M6, which is a part of the sensor.

The temperature range of temperature sensor KTG 6/R and KTG 6E/R is  $-40^{\circ}\text{C}$  to  $120^{\circ}\text{C}$ , these limits must not be exceeded even for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended. The temperature sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
  - Shock and Vibration tests in accordance with **EN 61373**, as amended
- The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

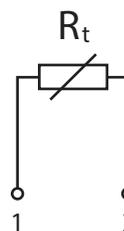
## SPECIFICATIONS ↓

Sensor type	KTG 6/R	KTG 6E/R
Type of sensing element	Pt, Ni, NTC, TC	
Temperature range	$-40^{\circ}\text{C}$ to $120^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)	
Ingress protection	IP 67 in accordance with EN 60529	
Length of thread	9 mm	
Thread / OK	M 6 / OK 12	
Case material	brass	
Lead-in cable	RADOX shielded $2 \times 0.5 \text{ mm}^2$	
Wire resistance	$0.07 \Omega$ for 1 m of cable for 2-wire connection	
Time response	$\tau_{0.5} < 4 \text{ s}$ (in flowing water at $0.4 \text{ ms}^{-1}$ )	
Insulation resistance	$> 200 \text{ M}\Omega$ at $500 \text{ V}_{\text{DC}}$ , $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , humidity $< 80\%$	
Shock and vibration tests	category 2 in accordance with EN 61373	
Insulation test	$2.5 \text{ kV}_{\text{DC}}$	$5 \text{ kV}_{\text{DC}}$
Mean working life $\approx$ MTTF *	$8.2 \times 10^5 \text{ hrs}$	

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

- 2wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- possibility to change the thread
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing thermocouples

**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)

## SENSOR INSTALLATION ↓

1. Install the sensor to the measured place – for own installation and mounting of the sensor use an OK 12 wrench.  
**When installing, the cable has to be laid freely and it has to be allowed to rotate together with the case.**
2. Connection of the wires of the lead-in cable according to the wiring diagram.  
**The shielding of the lead-in cable is not connected to the outer case of the sensor or with the sensing element.**
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use.  
**The sensor does not require any special servicing maintenance.**



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2013.8a | 08/22

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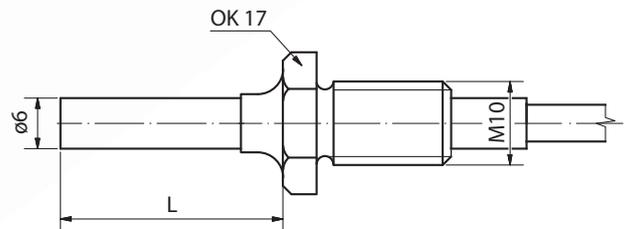
# KTR 028A/R

 Temperature sensor with case  $\varnothing$  6 mm, thread M10x1.5


Z030.6a



temperature



## DESCRIPTION AND APPLICATION ↓

The KTR 028A/R resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, the temperature sensor is used for example as an indicator of inlet and outlet temperature control of hot air heating units in passenger compartments of railway vehicles.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. Threaded mounting screw oriented towards the lead-in cable is a fixed part of the temperature sensor. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The temperature sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTR 028A/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimension	$6 \pm 0.1\text{ mm}$
Length of case L	10 to 100 mm (in 10 mm)
Thread / OK	M 10 $\times$ 1.5 / OK 17
Case material	stainless steel DIN 1.4301
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 8\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$

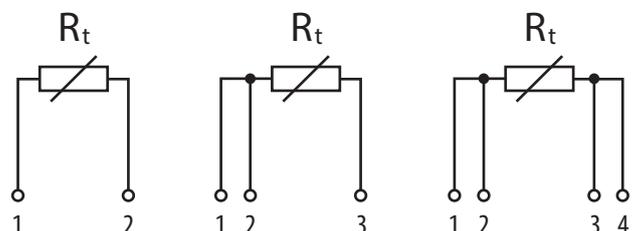
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility to change the thread
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, TC, etc.)

**In case of change cable to silicone shielded  $2 \times 0.34 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. Place the sensor in the location of temperature measurement. To install and attach the sensor use a combination wrench OK according to the type of supplied screw, which is a part of the stem. As a seal can be used suitable sealing mastic or sealing tape.
2. Provide fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The shielding of the lead-in cable is not connected to the outer case of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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Z030.6a | 08/22

replace Z030.5a

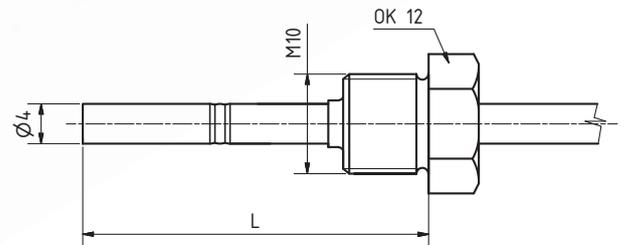



**KTR 030A**
**KTR 030F**

 Temperature sensor with case  $\varnothing$  4 mm, thread M10x1.5


temperature

Z022.7a



## DESCRIPTION AND APPLICATION ↓

The KTR 030A and KTR 030F resistance temperature sensors are designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, they are intended to measure temperature of air in air condition units of carriages and passenger compartments of train units in order to control the temperature in spaces for passengers.

The temperature range is  $-30\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. These sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. These sensors meet ingress protection IP 67 according to EN 60529 standard, as amended. The stem design allows the use of sensors for direct temperature measurement in pipelines and at the same time, provides a fast sensors response to changes in temperature compared to sensors with a thermowell.

These sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTR 030A	KTR 030F
Type of sensing element	all types	
Temperature range	$-30\text{ }^{\circ}\text{C}$ to $150\text{ }^{\circ}\text{C}$	
Ingress protection	IP 67 in accordance with EN 60529	
Case dimension	$4 \pm 0.1\text{ mm}$	$5.7 \pm 0.1\text{ mm}$
Length of case L	10 to 100 mm (in 10 mm)	
Thread / OK	M 10 $\times$ 1.5 / OK 12	M 12 $\times$ 1.5 / OK 19
Case material	stainless steel DIN 1.4301	
Lead-in cable	silicone shielded $2 \times 0.15\text{ mm}^2 / 4 \times 0.15\text{ mm}^2$	silicone unshielded $2 \times 0.5\text{ mm}^2 / 4 \times 0.25\text{ mm}^2$
Wire resistance	$0.254\ \Omega$	$0.07\ \Omega$
	for 1 m of cable for 2-wire connection	
Time response	$\tau_{0.5} < 5\text{ s}$	$\tau_{0.5} < 73\text{ s}$
	(in flowing water at $0.4\text{ m s}^{-1}$ )	
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{\text{DC}}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$	
Shock and vibration tests	category 2 in accordance with EN 61373	
Insulation test	$4\text{ kV}_{\text{DC}}$ for time 1 minute in accordance with EN 50155	
Mean working life $\approx$ MTTF *	$8.2 \times 10^5\text{ hrs}$	

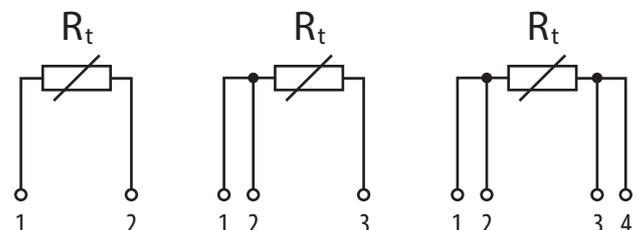
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility to change the thread
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSIC, KTY, SMT, TC, etc.)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. Install the sensor to the measured place – for own installation and mounting of the sensor use an OK 12 wrench.  
As a sealant, you can use suitable sealing cements, oakum or a sealling tape.
2. Provide fix installation of the sensor to prevent its movement.
3. Connection of the wires of the lead-in cable according to the wiring diagram.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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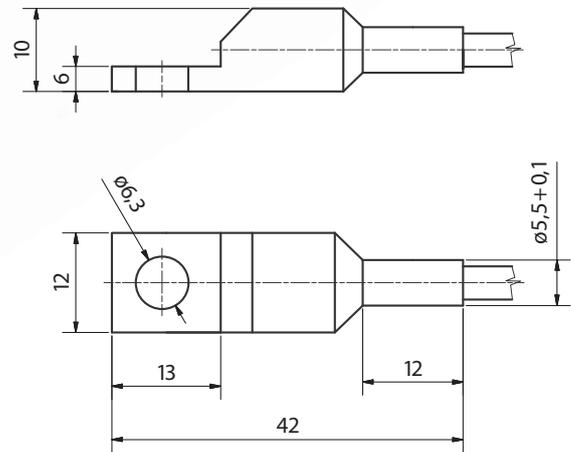



**KTR 141A/R**
**KTR 141E/R**

 Contact temperature sensor  
aluminium alloy or steel


temperature

Z016.9a



## DESCRIPTION AND APPLICATION ↓

The KTR 141A/R and KTR 141E/R resistance temperature sensors are designed to measure surface temperature of solid substances with a smooth surface. In the application segment of Railway Vehicles, the sensors are intended for example to measure surface temperature of baseboards of converters and coolers of performance elements and backup battery sources of electric locomotives.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTR 141A/R	KTR 141E/R
Type of sensing element	all types	
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)	
Ingress protection	IP 65 in accordance with EN 60529	
Case dimensions	$40 \times 12 \times 8\text{ mm}$	
The diameter of the hole for attachment	4.1 mm	
Case material	stainless steel DIN 1.4301	aluminium alloy 424441.6
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$ RADOX shielded $4 \times 0.5\text{ mm}^2$	
Wire resistance	$0.07\ \Omega$ for 1 m of cable for 2-wire connection	
Time response	$\tau_{0.5} < 10\text{ s}$ (in flowing water at $0.4\text{ m s}^{-1}$ )	
Insulation resistance	$>200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$	
Shock and vibration tests	category 2 in accordance with EN 61373	
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155	
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$	

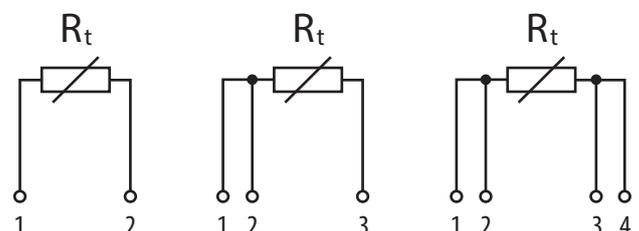
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- possibility of dimension and material of the case
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSIC, KTY, SMT, TC, etc.)

**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements

## SENSOR INSTALLATION ↓

1. Make a M4 thread in the measured material for attaching the sensor. The minimum material thickness is 3 mm.  
In thinner materials which do not allow making a thread, drill a 4.2 mm hole through material.
2. Before placing the sensor in the place measured, clean the contact surface with a file or use a thermally conductive paste between the measured surface and the metal sensor case.
- 3a. Place the temperature sensor on the surface of the measured material and fasten it using a mounting screw M4.  
For the materials in which the thickness is less than 3 mm, use a screw and a nut.
- 3b. If the hole is not possible to be drilled in the material surface, use a special adhesive bonding technology suitable for the case material (Duralumin) and the surface measured to attach to the surface to be measured.
4. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The shielding of the lead-in cable is not connected to the outer case of the sensor or with the sensing element.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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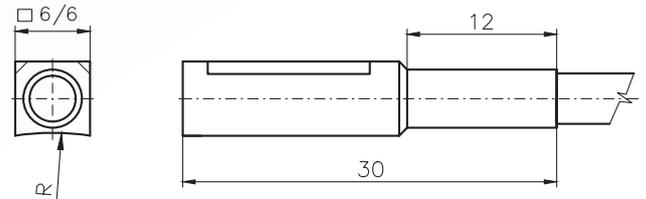

**KTR 026D/R**

Contact temperature sensor made of brass



temperature

Z012.8a



## DESCRIPTION AND APPLICATION ↓

The KTR 026D/R temperature sensor is designed to measure surface temperature of solid substances with a smooth surface. In the application segment of Railway Vehicles, it is used for example to measure temperature of water and sewage pipelines of carriage or cooling system pipelines of diesel engines or diesel-electric locomotives and units. Sensor is a part of the system ensuring the non-freezing of pipelines.

The temperature range is  $-40\text{ }^{\circ}\text{C}$  to  $120\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor consists of a brass block, whose one area has a concave recess of particular radius for surface contact with the pipeline measured. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensor is attached to the pipeline using a mounting tape with a screw lock and as part of anti-freezing systems, it absolutely must not be thermal isolated, unlike in other applications.

The sensor is intended for operation in non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. The materials also meet the requirements of the **NFPA 130** fire safety standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

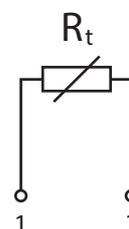
## SPECIFICATIONS ↓

Sensor type	KTR 026D/R
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 67 in accordance with EN 60529
Case dimensions	$6 \times 6\text{ mm}$
Length of case	30 to 60 mm
The radius of curvature of the contact surfaces	$R =$ according R of pipe
Case material	brass
Lead-in cable	RADOX shielded $2 \times 0.5\text{ mm}^2$
Wire resistance	$0.142\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 4\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.95 \times 10^6\text{ hrs}$

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

- 2wire



## MODIFICATIONS ↓

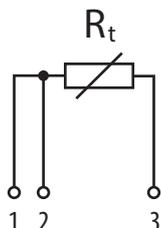
FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing thermocouples

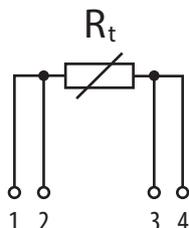
**In case of change cable to silicone shielded  $2 \times 0.22 \text{ mm}^2$  or silicone shielded  $4 \times 0.15 \text{ mm}^2$  (does not meet standard EN 45545-2) applies:**

- temperature range  $-50 \text{ }^\circ\text{C}$  to  $200 \text{ }^\circ\text{C}$  (the measuring range can be extended – see the modifications)
- possibility of encasing two sensing elements
- possibility of 3wire or 4wire connection:

3wire



4wire



## SENSOR INSTALLATION ↓

1. Before placing the sensor in the place measured, clean the contact surface with a file or use a thermally conductive paste between the measured surface and the metal sensor case.
2. Place the temperature sensor onto the measured surface and attach it using a fixing tape with temperature resistance up to  $200 \text{ }^\circ\text{C}$ .
3. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The shielding of the lead-in cable is not connected to the outer case of the sensor or with the sensing element.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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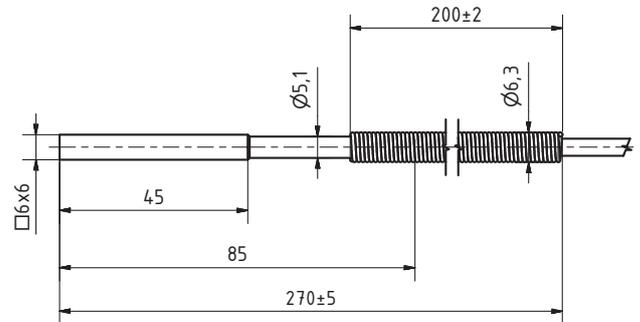

**KTR 026H**

Contact temperature sensor made of stainless steel



temperature

Z051.4a



## DESCRIPTION AND APPLICATION ↓

The KTR 026H temperature sensor is designed to measure surface temperature of solid substances with a smooth surface. In the application segment of Railway Vehicles, was developed to control the heating of trolleybus pulleys.

The temperature range of the sensor use, relating only to the square-shaped part of the case is from  $-30\text{ °C}$  to  $350\text{ °C}$ ; the sensor may be exposed to temperature up to  $450\text{ °C}$  for a short period. The sensor consists of a metal case, in which the sensing element and the lead-in cable are placed. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTR 026H
Type of sensing element	Pt 100/3850, Pt 1000/3850
Temperature range	$-30\text{ °C}$ to $350\text{ °C}$ , shorttime up to $450\text{ °C}$
Ingress protection	IP 67 in accordance with EN 60529
Case dimensions	$6 \times 6\text{ mm}$
Length of case	45/85 mm
Case material	stainless steel DIN 1.4301
Lead-in cable	silicone shielded $2 \times 0.22\text{ mm}^2$ silicone shielded $4 \times 0.15\text{ mm}^2$
Wire resistance	$0.162\ \Omega$ for 1 m of cable for 2-wire connection
Time response	$\tau_{0.5} < 4\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ °C} \pm 3\text{ °C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$2.7\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

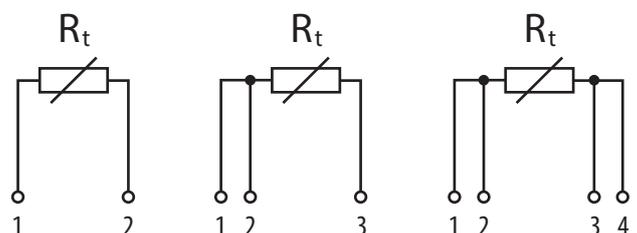
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

■ 2wire

■ 3wire

■ 4wire



## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing two sensing elements
- possibility of encasing thermocouples

## SENSOR INSTALLATION ↓

1. Place the temperature sensor into the measured place and provide fix installation of the sensor to prevent its movements.
2. Connect the wires of the lead-in cable to the evaluation unit according the wiring diagram.  
**The shielding of the lead-in cable is not connected to the outer case of the sensor or with the sensing element.**
3. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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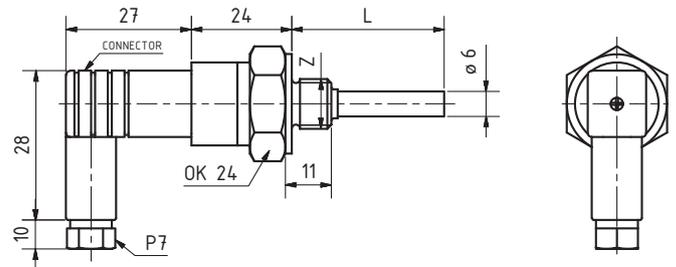



**KTR 021**

 Temperature sensors with case  $\varnothing$  6 mm with connector


temperature

Z011.8a


**DESCRIPTION AND APPLICATION**

The KTR 021 resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is used for example for specific needs of temperature measurement on engines, both compression ignition engines and electric engines, and on gearboxes or machines and equipment, for which operation vibrations are typical.

The temperature range is  $-50\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensor can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

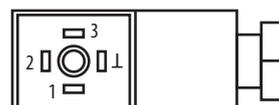
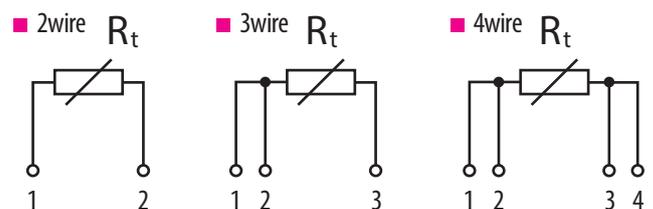
Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KTR 021
Type of sensing element	all types
Temperature range	$-50\text{ }^{\circ}\text{C}$ to $200\text{ }^{\circ}\text{C}$
Ingress protection	IP 67 in accordance with EN 60529
Diameter of case	$6 \pm 0.1\text{ mm}$
Length of case L	20 to 350 mm
Thread / OK	M 10 $\times$ 1, M12 $\times$ 1.5, M20 $\times$ 1.5, G 1/2" and another according customer / OK according thread type
Case material	stainless steel DIN 1.4301
Connector	according to DIN 43650
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	1,5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM**


## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility of encasing two sensors
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)

## SENSOR INSTALLATION ↓

1. Place the sensor in the location of temperature measurement. For assembly and attachment of sensor must be used hexagonal key with the size specified in the table of technical parameters. As a seal can be used suitable sealing mastic or sealing tape.
2. Provide fix installation of the sensor to prevent its movement.
3. Connect the wires of the supply cable to the connector according the wiring diagram.  
**For connecting must be used only the compatible connector.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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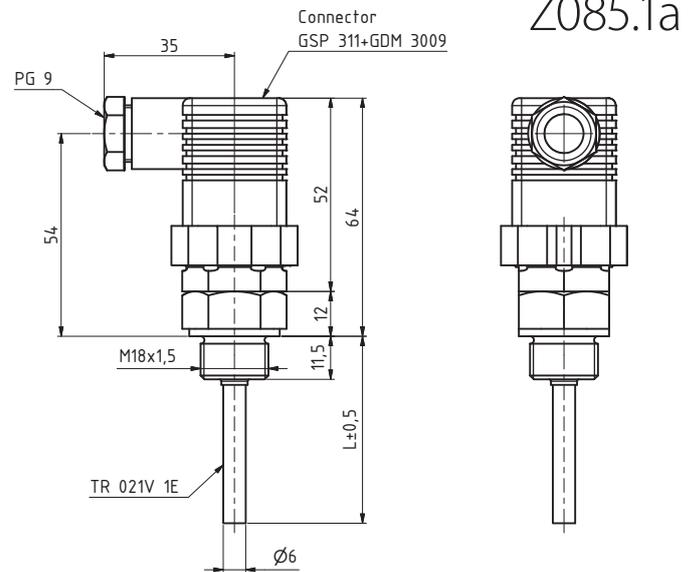
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**KTR 021V**

 Temperature sensors with case  $\varnothing$  6 mm with connector


temperature


**DESCRIPTION AND APPLICATION**

The KTR 021V resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is used for example for specific needs of temperature measurement on engines, both compression ignition engines and electric engines, and on gearboxes or machines and equipment, for which operation vibrations are typical.

The temperature range is  $-50\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60 529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

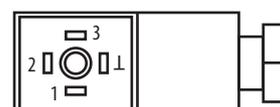
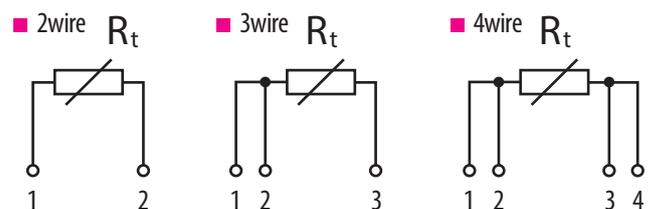
Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KTR 021V
Type of sensing element	all types
Temperature range	$-50\text{ }^{\circ}\text{C}$ to $200\text{ }^{\circ}\text{C}$
Ingress protection	IP 67 in according with EN 60 529, as amended
Diameter of case	$6 \pm 0.1\text{ mm}$
Length of case L	20 to 350 mm
Thread / OK	M 10 $\times$ 1, M12 $\times$ 1.5, M20 $\times$ 1.5, G 1/2" and another according customer / OK according thread type
Case material	stainless steel DIN 1.4301
Connector	according to DIN 43650 – Type A
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM**


## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- possibility of encasing two sensors
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 k $\Omega$ )
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)

## SENSOR INSTALLATION ↓

1. Screw the temperature sensor into the pipe buttering or into the appropriate threaded point. To install and attach the sensor use a combination wrench according to OK indicated in the technical specifications. As a sealant, you can use suitable sealing cements, oakum or sealing tape.
2. Mount the sensor connection so as to prevent its movement
3. Slide the connector seal oriented onto the contacts of the connector located in the sensor housing. Push the power cable through the grommet of the rectangular part of the connector.
4. Connect the wires of the connecting cable to the connector according to the wiring diagram. Fix the rectangular part of the connector using the mounting screw.
5. After installing and connecting to the electrical measuring equipment, the sensor is ready for use.  
**The sensor does not require any special manipulation or maintenance.**



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new



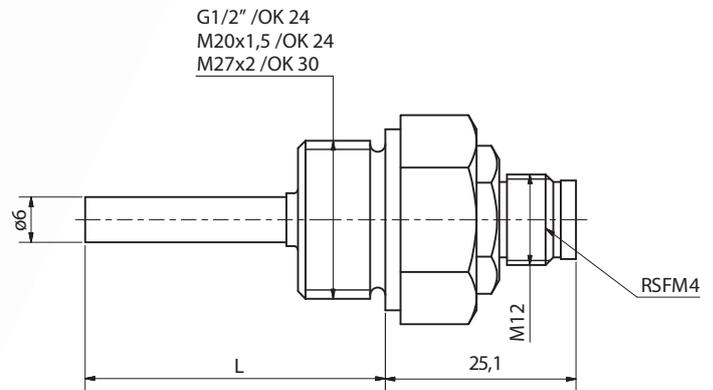

**KTR 021A**

 Temperature sensors with case  $\varnothing$  6 mm, with connector


Z048.4a



temperature


**DESCRIPTION AND APPLICATION**

The KTR 021A resistance temperature sensor is designed to measure temperature of gaseous or liquid substances. In the application segment of Railway Vehicles, it is used for example for specific needs of temperature measurement on engines, both compression ignition engines and electric engines, and on gearboxes or machines and equipment, for which operation vibrations are typical.

The temperature range is  $-50\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$  and these limits must not be exceeded even for a brief period. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 67 according to EN 60529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.

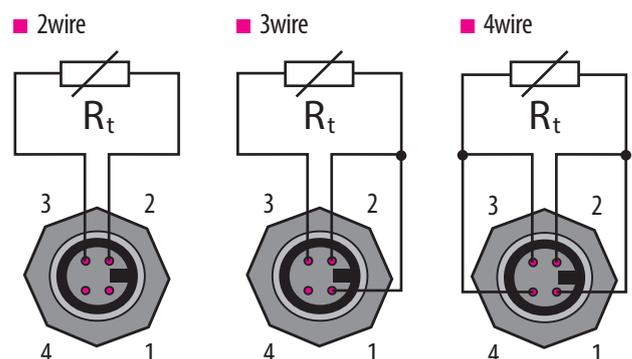
Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KTR 021A
Type of sensing element	all types
Temperature range	$-50\text{ }^{\circ}\text{C}$ to $150\text{ }^{\circ}\text{C}$
Ingress protection	IP 67 in accordance with EN 60529
Diameter of case	$6 \pm 0.1\text{ mm}$
Length of case L	20 to 350 mm
Thread / OK	M 10 $\times$ 1, M12 $\times$ 1.5, M20 $\times$ 1.5, G1/2" and another according customer / OK according thread type
Case material	stainless steel DIN 1.4301
Connector	LUMBERG RSFM4, M12
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	$3\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM**


## MODIFICATIONS ↓

FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)
- possibility of encasing two sensors

## SENSOR INSTALLATION ↓

1. Place the sensor in the location of temperature measurement. For assembly and attachment of sensor must be used hexagonal key with the size specified in the table of technical parameters. As a seal can be used suitable sealing mastic or sealing tape.
2. Provide fix installation of the sensor to prevent its movement.
3. Connect the wires of the lead-in cable to the connector according the wiring diagram.  
**For connecting must be used only the compatible connector, for example connector ELKA 4012.**
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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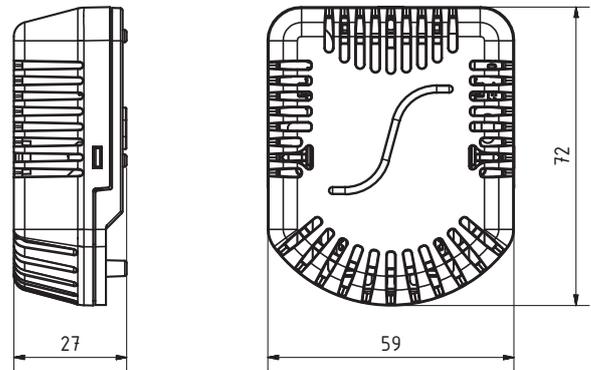

**KNS 100**

Series of resistance temperature sensor for interior



temperature

Z053.4a



## DESCRIPTION AND APPLICATION ↓

The series of KNS 100 temperature sensors is designed to measure temperature of gaseous substances in spaces protected against water. In the application segment of Railway Vehicles, the sensors are used to measure temperature in passenger compartments of train units and carriages and is a part of the temperature control system.

The sensors consist of the plastic ribbing head, where the sensing element is placed. Maximum temperature range of sensor use is  $-40\text{ }^{\circ}\text{C}$  to  $100\text{ }^{\circ}\text{C}$ . The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. The sensor meets ingress protection IP 30 according to EN 60529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The material of the plastic box and PCB meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

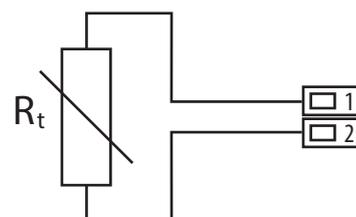
## SPECIFICATIONS ↓

Sensor type	KNS 100
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $100\text{ }^{\circ}\text{C}$
Ingress protection	IP 30 in accordance with EN 60529
Dimensions of the head	$71.9 \times 59 \times 27\text{ mm}$
Head material	LEXAN (meets standard EN 45545-2)
Recommended wire cross section	0.35 to $1\text{ mm}^2$
Time response	$\tau_{0.5} < 8\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Shock and vibration tests	category 1, class B in accordance with EN 61373
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

- 2wire

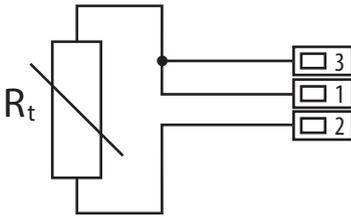


## MODIFICATIONS ↓

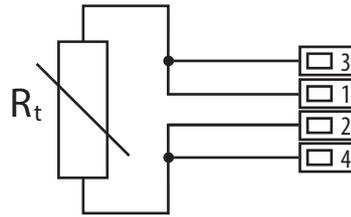
FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 k $\Omega$ )
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)
- possibility of 3wire or 4wire connection:

3wire



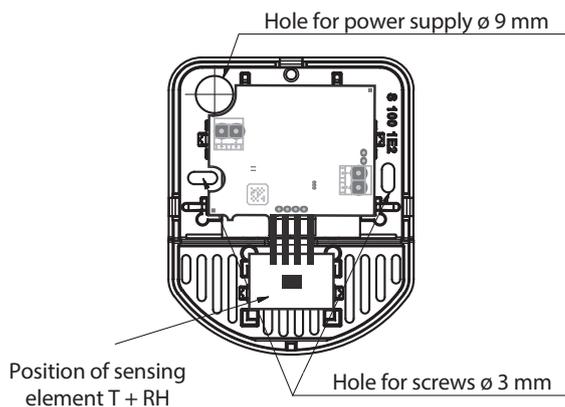
4wire



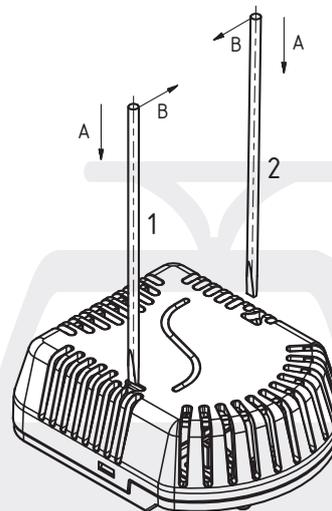
## SENSOR INSTALLATION ↓

1. Prior to connecting the lead-in cable, separate the perforated lid from the plastic box base.  
**While doing this, proceed carefully not to mechanically damage the sensing element or the converter components.**
2. The lead-in cable is connected according to the wiring diagram by pushing it through the 9 mm opening and fastening it in the terminals.
3. The sensor is mounted on a flat surface by screw with a maximum diameter of 4 mm. Last operation of the mounting sensor is deployment of a perforated cover into the holes of the plastic base. The length of the mounting bolts or screws for fastening must be chosen with regard to the thickness of the plastic head base.
4. After installing the sensor, put and secure the perforated cover to base holes.
5. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special manipulation or maintenance.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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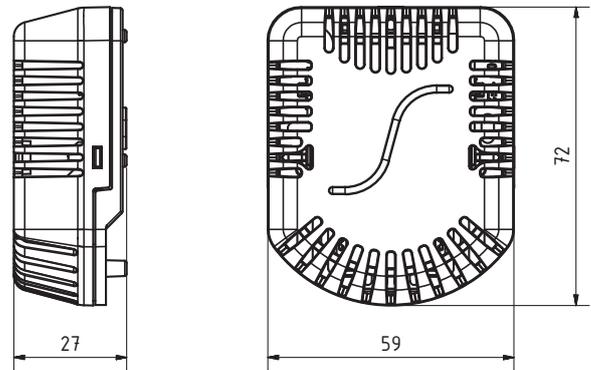

**KNS 500**

Temperature sensor with output 4 to 20 mA



temperature

Z056.4a



## DESCRIPTION AND APPLICATION ↓

The KNS 500 temperature sensor is designed to measure temperature of gaseous substances in spaces protected against water. In the application segment of Railway Vehicles, it is used to measure temperature in passenger compartments of train units and carriages and is a part of the temperature control system.

The temperature sensor consists of a plastic ribbing head, where a printed circuit board with a temperature–current converter and a resistance temperature sensor is placed. The sensors can be used for any control systems compatible with the current output of 4 to 20 mA. Standard temperature ranges of the sensor are shown in the table of technical parameters, while the maximum temperature around the sensor head is 80 °C. The sensor meets ingress protection IP 30 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.7, 12.2.8 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic box and PCB meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

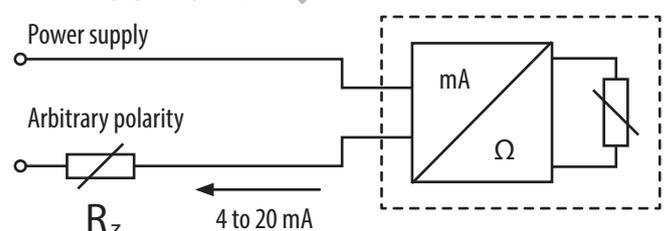
**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KNS 500
Output signal	4 to 20 mA
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 100 °C, 0 °C to 150 °C, 0 °C to 200 °C
Supply voltage U	12 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	12 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 23 mA
Output signal when the sensor is short-circuited	< 3.5 mA
Measurement error is dependence to supply voltage for the flow rate 0 to 0.4 m/s	in range U <sub>NS</sub> = 12V: ± (0.5 °C) 0–40°C U <sub>NS</sub> = 24V: (-0.2 to +0.80 °C) in range U <sub>NS</sub> = 12V: ± (0.5 °C) + 0.2% from range -30–70 °C U <sub>NS</sub> = 24V: (-0.2 to +0.80 °C) ± 0.2% from range
Ambient temperature	-40 °C to 80 °C
Material of the head	LEXAN (meets standard EN 45545-2)
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Time response	τ <sub>0,5</sub> ≤ 8 s (in flowing air at 1 ms <sup>-1</sup> )
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF *	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology  
\*\* see modifications

## WIRING DIAGRAM ↓



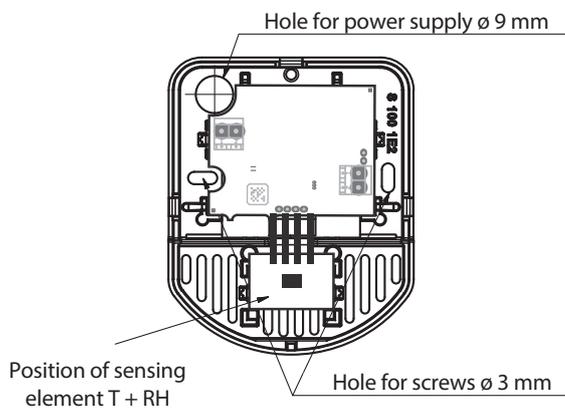
## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from  $-40\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ ; the minimum span of the range must be  $35\text{ }^{\circ}\text{C}$  (e.g.  $-20\text{ }^{\circ}\text{C}$  to  $15\text{ }^{\circ}\text{C}$ ;  $-30\text{ }^{\circ}\text{C}$  to  $80\text{ }^{\circ}\text{C}$ )

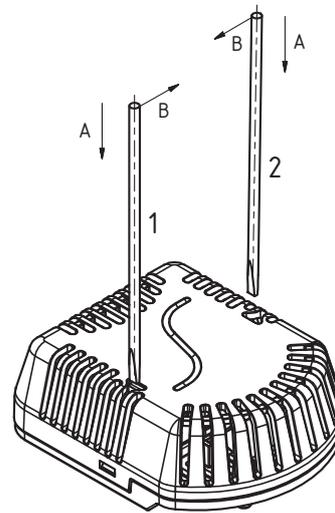
## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable separate perforated plastic cover from the base of the head.  
**Take care to avoid mechanical damage to the sensor during this operation.**
2. The power supply cable through the hole in the base and connect to the terminals according to the wiring diagram.
3. The base of plastic head place on horizontal surface using the screw with diameter 4 mm locate in the inner hole of the base plastic case.  
**Operating sensor position is shown in the diagram and it must be followed.** The length of the mounting screws for mounting must be chosen with regard to the thickness of the base of plastic head.
4. After mounting the sensor, put and secure the perforated cover into the holes in the base.
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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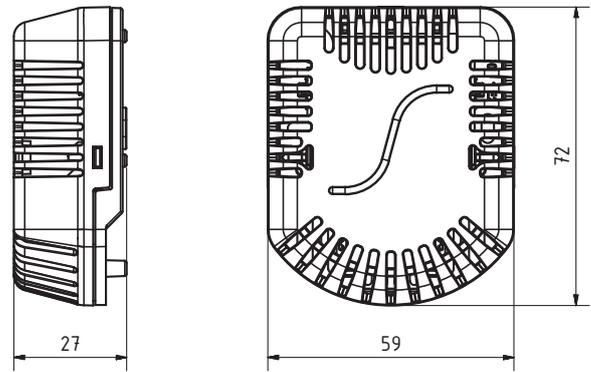

**KNS 700**

Temperature sensor with output 0 to 10 V



temperature

Z059.4a



## DESCRIPTION AND APPLICATION ↓

The KNS 700 temperature sensor is designed to measure temperature of gaseous substances in spaces protected against water. In the application segment of Railway Vehicles, it is used to measure temperature in passenger compartments of train units and carriages and is a part of the temperature control system.

The temperature sensor consists of a plastic ribbing head, where a printed circuit board with a temperature–voltage converter and a resistance temperature sensor is placed. The sensors can be used for any control systems compatible with the current output of 0 to 10 V. Standard temperature ranges of the sensor are shown in the table of technical parameters, while the maximum temperature around the sensor head is 80 °C. The sensor meets ingress protection IP 30 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.7, 12.2.8 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic box and PCB meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

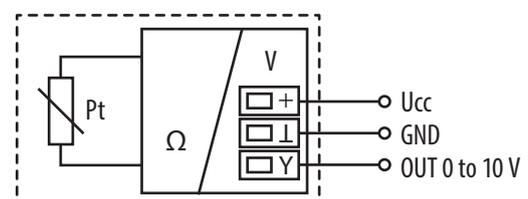
## SPECIFICATIONS ↓

Sensor type	KNS 700
Output signal	0 to 10 V
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 100 °C, 0 °C to 150 °C, 0 °C to 200 °C
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	15 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 10.5 V
Output signal when the sensor is short-circuited	~ 0 V
Measurement error is dependence to supply voltage for the flow rate 0 to 0.4 m/s	in range U <sub>NS</sub> = 12V: ± (0.5 °C) 0–40°C U <sub>NS</sub> = 24V: (-0.2 to +0.80 °C) in range U <sub>NS</sub> = 12V: ± (0.5 °C) + 0.2% from range -30–70 °C U <sub>NS</sub> = 24V: (-0.2 to +0.80 °C) ± 0.2% from range
Ambient temperature	-40 °C to 80 °C
Material of the head	LEXAN (meets standard EN 45545-2)
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Time response	τ <sub>0,5</sub> ≤ 8 s (in flowing air at 1 ms <sup>-1</sup> )
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF *	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology

\*\* see modifications

## WIRING DIAGRAM ↓



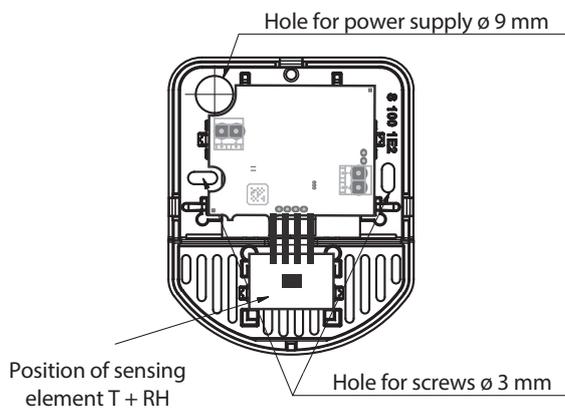
## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from  $-40\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ ; the minimum span of the range must be  $35\text{ }^{\circ}\text{C}$  (e.g.  $-20\text{ }^{\circ}\text{C}$  to  $15\text{ }^{\circ}\text{C}$ ;  $-30\text{ }^{\circ}\text{C}$  to  $80\text{ }^{\circ}\text{C}$ )

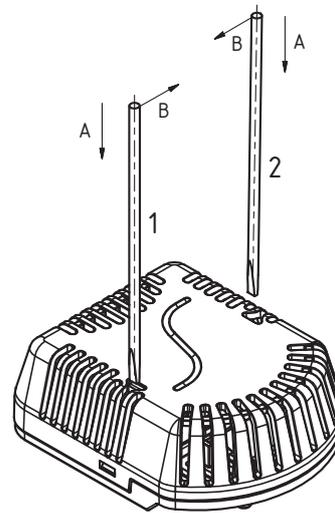
## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable separate perforated plastic cover from the base of the head.  
**Take care to avoid mechanical damage to the sensor during this operation.**
2. The power supply cable through the hole in the base and connect to the terminals according to the wiring diagram.
3. The base of plastic head place on horizontal surface using the screw with diameter 4 mm locate in the inner hole of the base plastic case.  
**Operating sensor position is shown in the diagram and it must be followed.** The length of the mounting screws for mounting must be chosen with regard to the thickness of the base of plastic head.
4. After mounting the sensor, put and secure the perforated cover into the holes in the base.
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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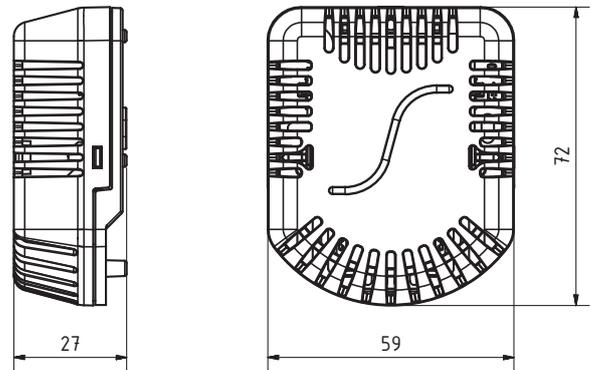

**KSD 102**

Temperature sensor with output RS 485 (MODBUS) for interiors



temperature

Z098.1a



## DESCRIPTION AND APPLICATION ↓

This temperature sensor with a digital output RS 485 / MODBUS – KSD 102 for interiors is designed to measure temperature of gaseous substances in spaces protected against water. In the application segment of Railway Vehicles, it is used to measure temperature in passenger compartments of train units and carriages and is a part of the temperature control system.

The temperature sensor with a digital output RS 485 / MODBUS – KSD 102 for interiors consist of a plastic ribbing head, where a printed circuit board with the individual sensors or a converter is placed to establish a particular digital output according to the type of a sensor. Suitable design and high-quality material ensure that the sensors do not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 30 according to EN 60529, as amended. Installation is recommended on an inner wall at the height of 1.5 m, in areas of movement of persons, at places not exposed to direct sunlight and not influenced by heat from walls, heating radiators or lighting.

The sensor is designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended, Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

## SPECIFICATIONS ↓

Sensor type	KSD 102
Output signal	RS 485 / MODBUS RTU
Measurement range	-40 to 80 °C
Measurement accuracy	± 0.5 °C
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	72 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max 85 % atmospheric pressure: 87 to 107 kPa
Weight	min 50 g

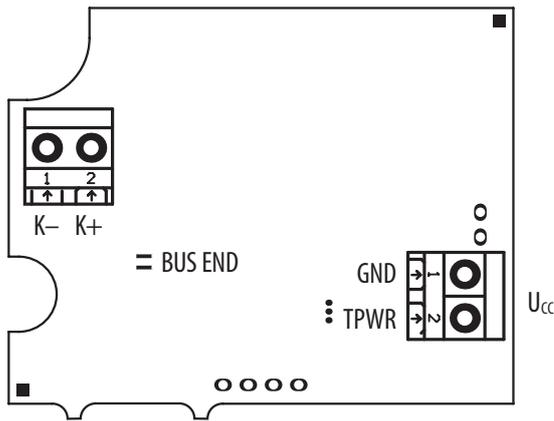
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, TPWR –  $U_{cc}$  supply voltage  
K+/K- – communication line  
BUS END – RS 485 termination

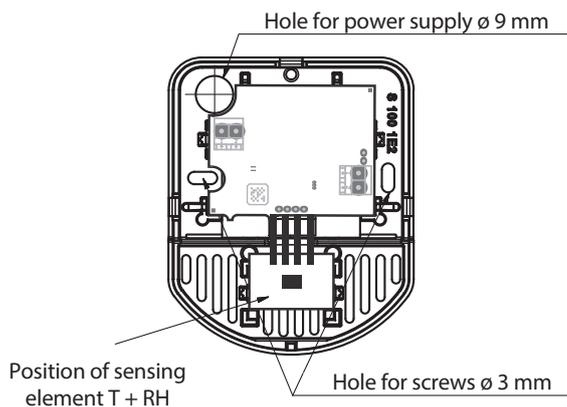
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

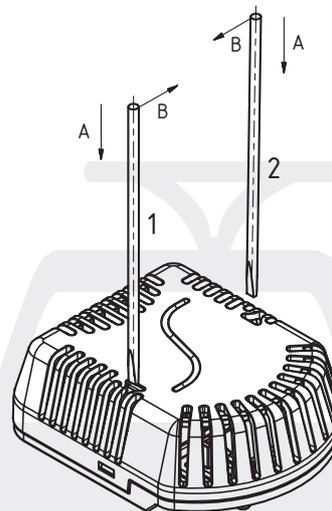
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z098.1a | 05/23

new



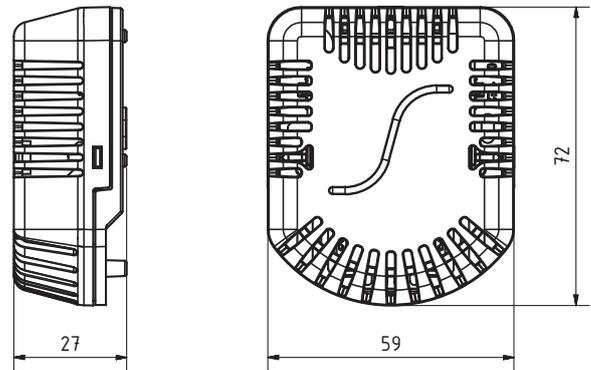

**KSD 104**

Temperature sensor with output CAN protocol for interiors



temperature

Z101.1a



## DESCRIPTION AND APPLICATION ↓

This temperature sensor with a digital output CAN / CANopen - KSD 104 for interiors is designed to measure temperature of gaseous substances in spaces protected against water. In the application segment of Railway Vehicles, it is used to measure temperature in passenger compartments of train units and carriages and is a part of the temperature control system.

The temperature sensor with a digital output CAN / CANopen - KSD 104 for interiors consist of a plastic ribbing head, where a printed circuit board with the individual sensors or a converter is placed to establish a particular digital output according to the type of a sensor. Suitable design and high-quality material ensure that the sensors do not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 30 according to EN 60529, as amended. Installation is recommended on an inner wall at the height of 1.5 m, in areas of movement of persons, at places not exposed to direct sunlight and not influenced by heat from walls, heating radiators or lighting.

The sensor is designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended, Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

## SPECIFICATIONS ↓

Sensor type	KSD 104
Output signal	CAN / CANopen-CIA DS 301
Measurement range	-40 °C to 80 °C
Measurement accuracy	± 0.5 °C
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	72 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max 85 % atmospheric pressure: 87 to 107 kPa
Weight	min 50 g

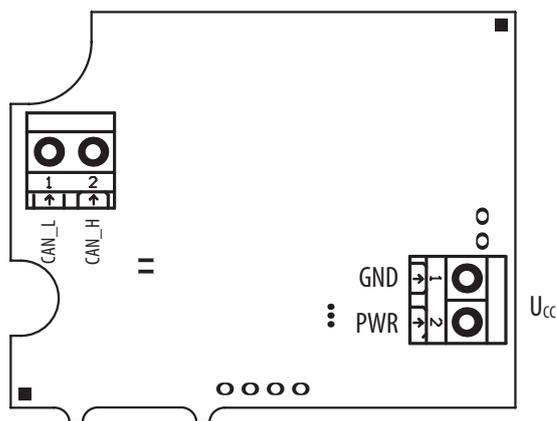
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

### CANopen



GND, TPWR – power supply U<sub>CC</sub>  
CAN\_L/CAN\_H – communication line

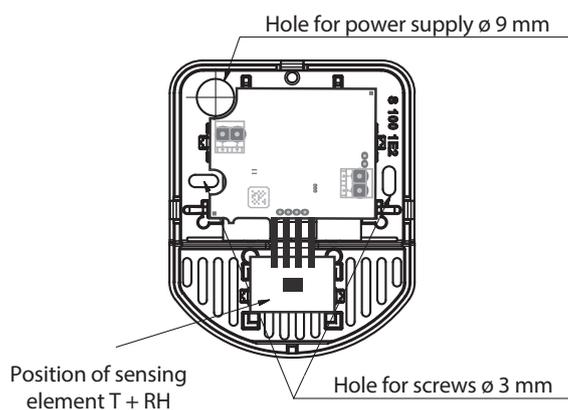
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

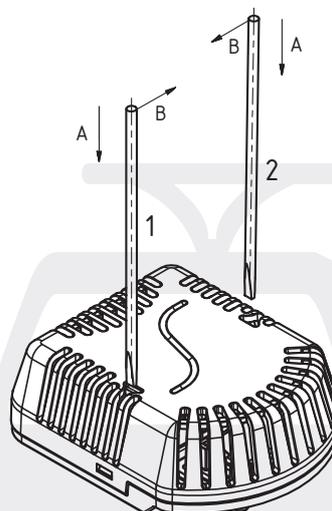
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z101.1a | 05/23

new




**KNS 110A**

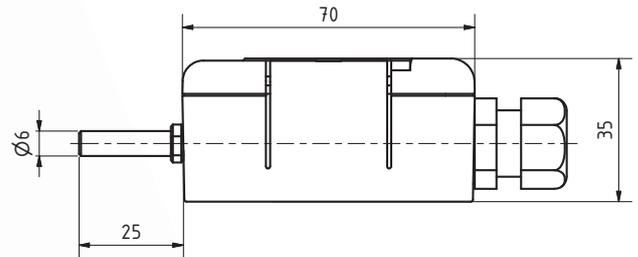
Series of resistance temperature sensor for outdoor use



temperature



Z054.4a


**DESCRIPTION AND APPLICATION** ↓

The series of KNS 110A temperature sensors is designed to measure outdoor air temperature. In the application segment of Railway Vehicles, the sensors are used for example to measure temperature of the air in locomotive engine rooms; it can be a part of the temperature control system in passenger compartments or is used to indicate temperature in the engine room as a part of the fire protection system.

The sensors consist of the plastic head, where the sensing element is placed. All metal parts are made of stainless steel DIN 1.4301. The length of the stem is 25 mm. The supply cable is connected to the terminal board through a grommet, which is a part of the plastic head. The basic material of the head is LEXAN. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. Maximum temperature range of sensor use is  $-40\text{ }^{\circ}\text{C}$  to  $100\text{ }^{\circ}\text{C}$ . The sensors meet ingress protection IP 65 according to EN 60529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

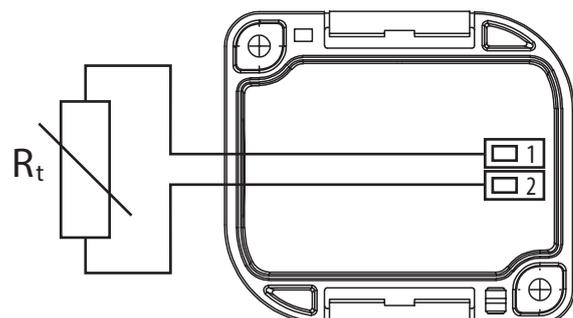
**SPECIFICATIONS** ↓

Sensor type	KNS 110A
Type of sensing element	all types
Temperature range	$-40\text{ }^{\circ}\text{C}$ to $100\text{ }^{\circ}\text{C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 65 in accordance with EN 60529
Connection head material	LEXAN (meets standard EN 45545-2)
Stem material	stainless steel DIN 1.4301
Recommended wire cross section	0.35 to $1.5\text{ mm}^2$
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ , humidity $< 80\%$
Shock and vibration tests	category 1, class B in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

**WIRING DIAGRAM** ↓

- 2wire

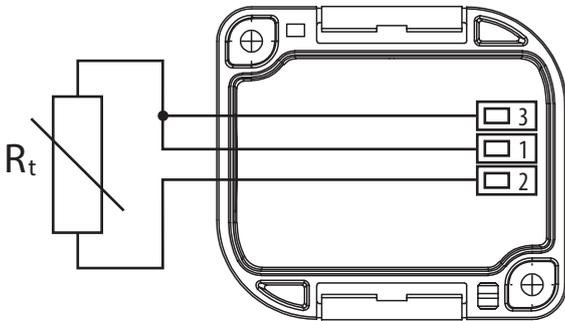


## MODIFICATIONS ↓

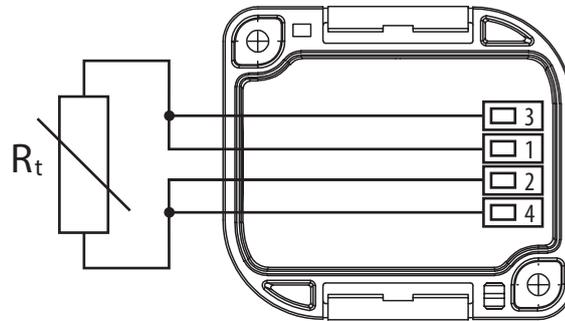
FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)
- possibility of encasing two sensors
- possibility of 3wire or 4wire connection:

3wire



4wire



## SENSOR INSTALLATION ↓

1. Before connecting the lead-in cable, lift off the lid of the plastic connection head by means of a flat screwdriver, which will be gradually engaged in to the one's and second groove in the lid and its misalignment will release the lid.
2. The lead-in cable is connected to the terminals according to the wiring diagram through the loosened grommet.  
**Tighten the bushing to ensure the tightness after connecting the power cable.**
3. Install the sensors on a horizontal surface using two mounting bolts or screws of 4 mm located within inner holes of the sensor head. The holes are accessible after removing the head cap. The length of the mounting bolts or screws for fastening must be chosen with regard to the depth of inner holes of the plastic head – 13 mm.
4. After installing the sensor, close the head by placing the cap. **The holds on the plastic head must to click into the original position.**
5. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance. The operating position is optional but the bushing should not be directed upwards.**



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Z054.4a | 08/22

replace Z054.3a




**KNS 510A**

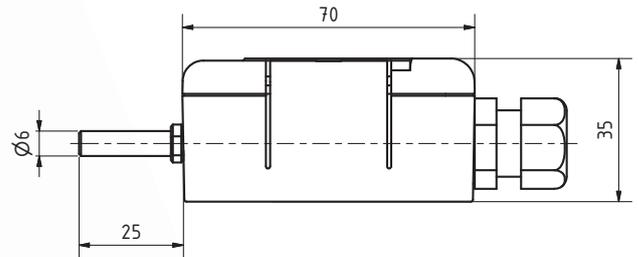
Temperature sensor with output 4 to 20 mA



temperature



Z057.4a


**DESCRIPTION AND APPLICATION**

The KNS 510A temperature sensor is designed to measure outdoor air temperature. In the application segment of Railway Vehicles, it is used for example to measure temperature of the air in locomotive engine rooms, it can be a part of the temperature control system in passenger compartments or is used to indicate temperature in the engine room as a part of the fire protection system.

The temperature sensor consists of a plastic head, where a converter of the resistance signal of the temperature sensor to the current signal of 4 to 20 mA and a metal stem are placed. All metal parts are made of stainless steel DIN 1.4301. The length of the stem is 50 mm. The lead-in cable is connected to the terminal board through a grommet, which is a part of the connection head. The basic material of the head is LEXAN. The sensor can be used for any control systems compatible with the output signal of 4 to 20 mA. Standard temperature ranges are shown in the table of technical parameters, while the maximum temperature around the connection head is 80 °C and must not be exceeded even for a brief period. The sensor meets ingress protection IP 65 according to EN 60529.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

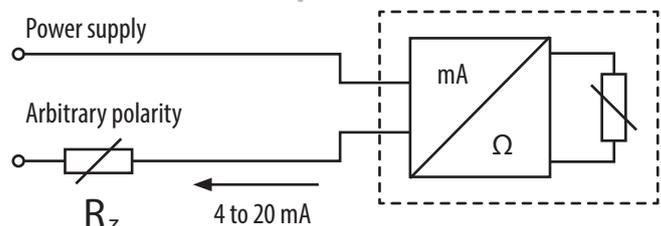
**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KNS 510A
Output signal	4 to 20 mA
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 35 °C, 0 °C to 100 °C, 0 °C to 150 °C
Supply voltage U	12 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	12 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 24 mA
Output signal when the sensor is short-circuited	< 3.5 mA
Measurement error	< 0.6% for range with span, min. 0.5 °C
Ambient temperature	-40 °C to 80 °C
Connection head material	LEXAN (meets standard EN 45545-2)
Material of the stem	stainless steel DIN 1.4301
Diameter / length of the stem	6 ± 0.1 mm / 50 mm
Ingress protection	IP 65 dle EN 60529
Insulation resistance	>200 M Ω at 500 V <sub>DC</sub> , 25° ± 3°C, humidity < 80%
Time response	τ <sub>0,5</sub> ≤ 9 s (in flowing air at 1 ms <sup>-1</sup> )
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTF *	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology

\*\* see modifications

**WIRING DIAGRAM**


## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from -40 °C to 150 °C; the minimum span of the range must be 35 °C (e.g. -20 °C to 15 °C; -30 °C to 80 °C)

## SENSOR INSTALLATION ↓

1. Before connecting the power lead-in cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the sensor directly on flat surface using two screws Ø 4 mm placed in the inner hole in head corners. The holes are available after opening the plastic head. The length of the screws must be chosen regarding to depth of the internal holes of plastic head – the minimum length is 13mm.
4. The lid has to be put on after connecting the lead-in cable. **The holds on the plastic head must to click into the original position.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z057.4a | 08/22

replace Z057.3a




**KNS 710A**

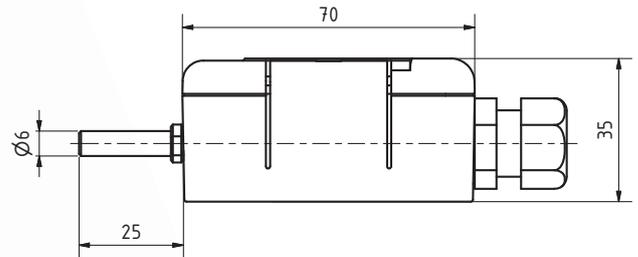
Temperature sensor with output 0 to 10 V



temperature



Z060.4a


**DESCRIPTION AND APPLICATION**

The KNS 710A temperature sensor is designed to measure outdoor air temperature. In the application segment of Railway Vehicles, it is used for example to measure temperature of the air in locomotive engine rooms, it can be a part of the temperature control system in passenger compartments or is used to indicate temperature in the engine room as a part of the fire protection system.

The temperature sensor consists of a plastic head, where a converter of the resistance signal of the temperature sensor to the voltage signal of 0 to 10 V and a metal stem are placed. All metal parts are made of stainless steel DIN 1.4301. The length of the stem is 50 mm. The lead-in cable is connected to the terminal board through a grommet, which is a part of the connection head. The basic material of the head is LEXAN. The sensor can be used for any control systems compatible with the output signal of 0 to 10 V. Standard temperature ranges are shown in the table of technical parameters, while the maximum temperature around the connection head is 80 °C and must not be exceeded even for a brief period. The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

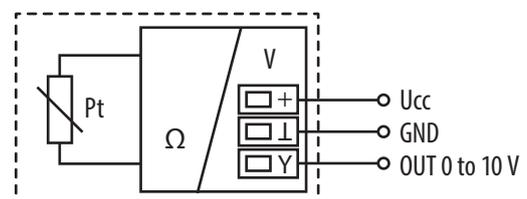
**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS**

Sensor type	KNS 710A
Output signal	0 to 10 V
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 35 °C, 0 °C to 100 °C, 0 °C to 150 °C
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	15 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 12 V
Output signal when the sensor is short-circuited	~ 0 V
Measurement error	< 0.6% for range with span, min. 0.5 °C
Ambient temperature	-40 °C to 80 °C
Connection head material	LEXAN (meets standard EN 45545-2)
Stem material	stainless steel DIN 1.4301
Diameter / length of the stem	6 ± 0.1 mm / 50 mm
Ingress protection	IP 65 in accordance with EN 60529
Insulation resistance	>200 M Ω at 500 V <sub>DC</sub> , 25° ± 3°C, humidity < 80%
Time response	τ <sub>0,5</sub> ≤ 9 s (in flowing air at 1 ms <sup>-1</sup> )
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF *	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology

\*\* see modifications

**WIRING DIAGRAM**


## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from -40 °C to 150 °C; the minimum span of the range must be 35 °C (e.g. -20 °C to 15 °C; -30 °C to 80 °C)

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the sensor directly on flat surface using two screws Ø 4 mm placed in the inner hole in head corners. The holes are available after opening the plastic head. The length of the screws must be chosen regarding to depth of the internal holes of plastic head – the minimum length is 13mm.
4. The lid has to be put on after connecting the lead-in cable. **The holds on the plastic head must to click into the original position.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z060.4a | 08/22

replace Z060.3a




**KSD 112**

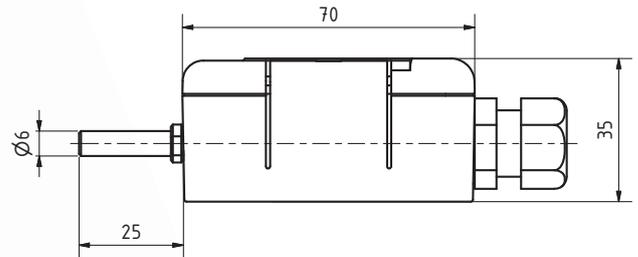
Temperature sensor with output RS 485 (MODBUS) for outdoor environment



temperature



Z099.1a



## DESCRIPTION AND APPLICATION ↓

This temperature sensor with a digital output RS 485 (MODBUS) – KSD 112 is designed to outdoor environment. In the application segment of Railway Vehicles, it is used for example to measure temperature of the air in locomotive engine rooms, it can be a part of the temperature control system in passenger compartments or is used to indicate temperature in the engine room as a part of the fire protection system.

The temperature sensor with a digital output RS 485 (MODBUS) – KSD 112 for outdoor environment consist of a plastic head and a metal case, where the sensing element for temperature measurement (sensor) is placed. In the head, there is a terminal block with a converter located, to which a supply cable for sensor supply and digital output signal according to the sensor type is connected through a cable grommet or a connector.

KSD 112A, KSD 112AK – MODBUS/RTU communication protocol, communication via the RS485 bus

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 65 according to EN 60529, as amended. Recommended installation of the sensor:

- for measurement of outdoor air temperature – the installation is recommended on the coolestside of the building (the northern or the northwest one) in a way that the sensor is not exposed to a direct sun light. The installation is recommended in 2/3 of the height of the building wall.
- for measurement of indoor air temperature in rooms, offices or in production halls – the installation is recommended on an inner wall at the height of 1.5 m, in areas of movement of persons, at places not exposed to sunlight and not influenced by heat from heating radiators or lighting

The sensor is designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

## SPECIFICATIONS ↓

Sensor type (K - with connector)	KSD 112A, KSD 112AK
Output signal	RS 485 / MODBUS RTU
Measuring range	-40 to 80 °C
Accuracy of the electronics *	± 0.2 °C
Type / Accuracy of the sensing element	Pt 1000 / ± (0.3 °C + 0.0005 t )
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption / Supply current	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 65 in accordance with EN 60529, as amended
Length of the stem	50 mm
Standard stem diameter	6 ± 0.2 mm
Material of the stem	stainless steel DIN 1.4301
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25°C ± 3 °C; humidity < 85 %
Dimensions of the head	70 × 63 × 34 mm
Material of the head	LEXAN (meets standard EN 45545-2, as amended)
Connector type in the head (for sensors with a connector)	RSFM4 - M12- Lumberg
Recommended wire cross-section (for sensors with a grommet)	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max. 100 % atmospheric pressure: 70 to 107 kPa
Weight	min. 150 g

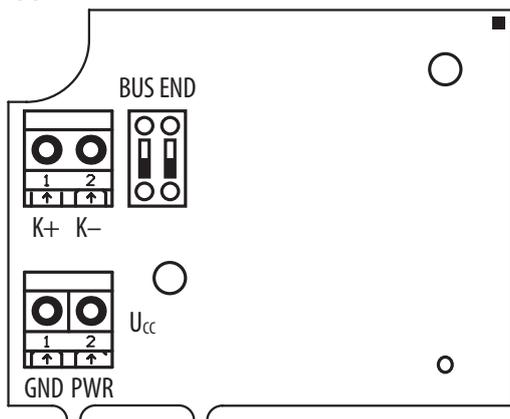
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

\* Measurement error of KSD 112A temperature sensor depends on the flow rate and supply voltage (method error) and can be within -1.0 to 1.5 °C.

Note: Manufacturer reserves the right to make changes in design and technical characteristics of the products. For actual information, please always contact your dealer.

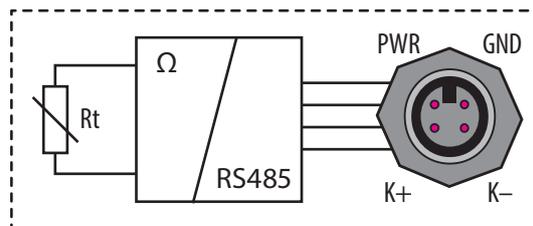
## WIRING DIAGRAM ↓

### RS 485



GND, PWR –  $U_{cc}$  supply voltage  
K+/K– – communication line  
BUS END – RS 485 termination

### RS 485 with connector



GND, PWR –  $U_{cc}$  supply voltage  
K+/K– – communication line

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## ACCESSORIES ↓

- CONEC 43-00092 connection plug
- connection cables with a straight RKT connector or right-angled RKWT connector

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the sensor directly on flat surface using two screws  $\varnothing 4$  mm placed in the inner hole in head corners. The holes are available after opening the plastic head. The length of the screws must be chosen regarding to depth of the internal holes of plastic head – the minimum length is 13mm.
4. The lid has to be put on after connecting the lead-in cable. **The holds on the plastic head must to click into the original position.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z099.1a | 05/23

new




**KSD 114**

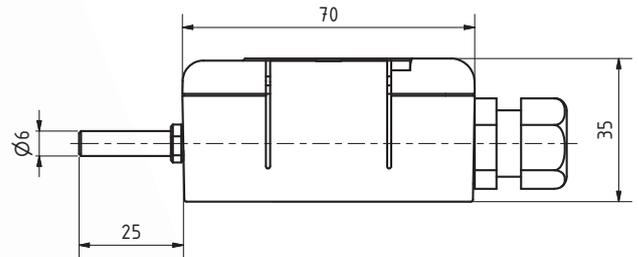
Temperature sensor with output CAN protocol for outdoor environment



temperature



Z102.1a



## DESCRIPTION AND APPLICATION ↓

This temperature sensor with a digital output CAN (CANopen) - KSD 114 is designed to measure outdoor air temperature. In the application segment of Railway Vehicles, it is used for example to measure temperature of the air in locomotive engine rooms, it can be a part of the temperature control system in passenger compartments or is used to indicate temperature in the engine room as a part of the fire protection system.

The temperature sensor with a digital output CAN (CANopen) - KSD 114 for outdoor environment consist of a plastic head and a metal case, where the sensing element for temperature measurement (sensor) is placed. In the head, there is a terminal block with a converter located, to which a supply cable for sensor supply and digital output signal according to the sensor type is connected through a cable grommet or a connector.

SD 114A, SD 114AK – CANopen/CiA DS 301 communication protocol, communication via the CAN bus

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 65 according to EN 60529, as amended. Recommended installation of the sensor:

- for measurement of outdoor air temperature – the installation is recommended on the coolestside of the building (the northern or the northwest one) in a way that the sensor is not 097.11en exposed to a direct sun light. The installation is recommended in 2/3 of the height of the building wall.
- for measurement of indoor air temperature in rooms, offices or in production halls – the installation is recommended on an inner wall at the height of 1.5 m, in areas of movement of persons, at places not exposed to sunlight and not influenced by heat from heating radiators or lighting.

The sensor is designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

## SPECIFICATIONS ↓

Sensor type (K - with connector)	KSD 114A, KSD 114AK
Output signal	CAN / CANopen-CiA DS 301
Measuring range	-40 to 80 °C
Accuracy of the electronics *	± 0.2 °C
Type / Accuracy of the sensing element	Pt 100 / ± (0.3 °C + 0.0005 t )
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption / Supply current	maximum: 500 mW, typical: 300 mW
typical: 300 mW	-40 °C to 80 °C
Ingress protection	IP 65 in accordance with EN 60529, as amended
Length of the stem	50 mm
Standard stem diameter	6 ± 0.2 mm
Material of the stem	stainless steel DIN 1.4301
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25°C ± 3 °C; humidity < 85 %
Dimensions of the head	70 × 63 × 34 mm
Material of the head	LEXAN (meets standard EN 45545-2, as amended)
Connector type in the head (for sensors with a connector)	RSFM4 - M12- Lumberg
Recommended wire cross-section (for sensors with a grommet)	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max. 100 % atmospheric pressure: 70 to 107 kPa
Weight	min. 150 g

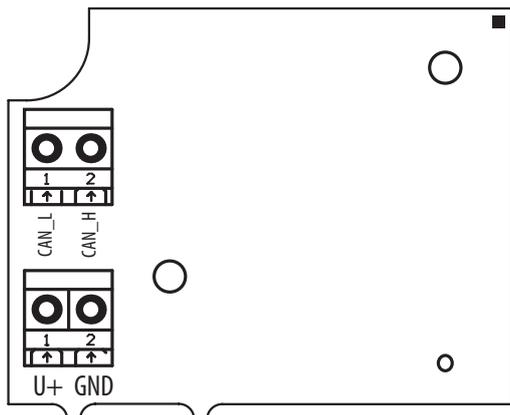
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

\* Measurement error of KSD 114A temperature sensor depends on the flow rate and supply voltage (method error) and can be within -1.0 to 1.5 °C.

Note: Manufacturer reserves the right to make changes in design and technical characteristics of the products. For actual information, please always contact your dealer.

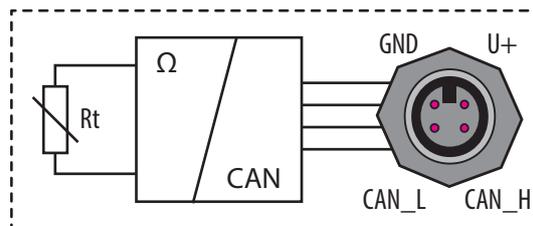
## WIRING DIAGRAM ↓

With a grommet



GND, U+ – power supply  
CAN\_L/CAN\_H – data bus

With a connector



GND, U+ – power supply  
CAN\_L/CAN\_H – data bus

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## ACCESSORIES ↓

- CONEC 43-00092 connection plug
- connection cables with a straight RKT connector or right-angled RKWT connector

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the sensor directly on flat surface using two screws  $\varnothing 4$  mm placed in the inner hole in head corners. The holes are available after opening the plastic head. The length of the screws must be chosen regarding to depth of the internal holes of plastic head – the minimum length is 13mm.
4. The lid has to be put on after connecting the lead-in cable. **The holds on the plastic head must to click into the original position.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z102.1a | 05/23  
new




**KNS 120**

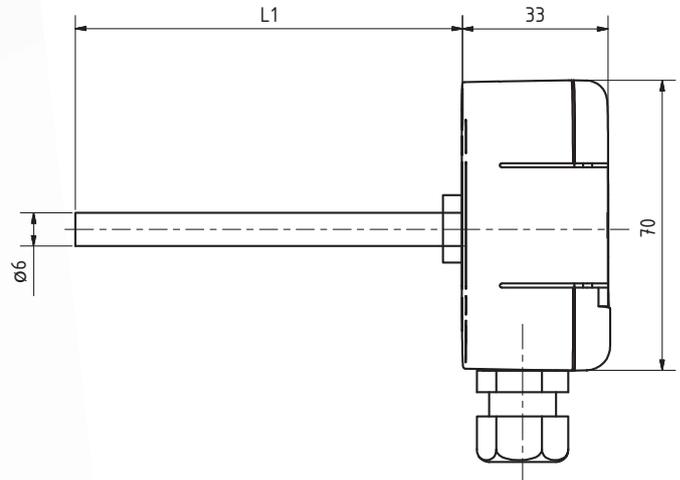
Series of resistance temperature sensor with measuring stem



temperature



Z055.4a



## DESCRIPTION AND APPLICATION ↓

The series of KNS 120 temperature sensors is designed to measure temperature of liquid or gaseous substances. In the application segment of Railway Vehicles, the sensors are used for example to measure temperature of the outdoor air under the vehicle floor. For this purpose, the sensors are equipped with a stem with high mechanical resistance.

The sensors consist of the plastic head, where the sensing element is placed, and the measuring metal case. All metal parts are made of stainless steel DIN 1.4301. The lead-in cable is connected to the terminal board through a grommet, which is a part of the connection head. The basic material of the head is LEXAN. The sensors can be used for any control systems compatible with types of sensing elements listed in the table of technical parameters. Maximum temperature range of sensor use is  $-40\text{ °C}$  to  $150\text{ °C}$ . The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The sensors are intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155**, as amended
- Shock and Vibration tests in accordance with **EN 61373**, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

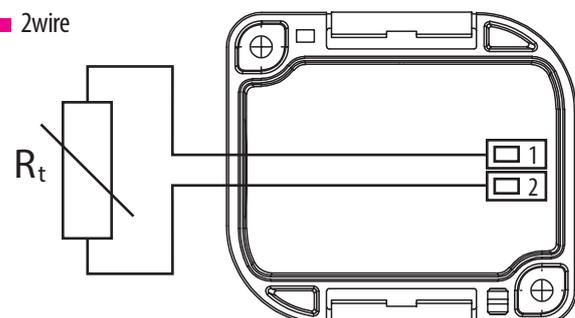
## SPECIFICATIONS ↓

Sensor type	KNS 120
Type of sensing element	all types
Temperature range	$-40\text{ °C}$ to $150\text{ °C}$ (the measuring range can be extended – see the modifications)
Ingress protection	IP 65 in accordance with EN 60529
Connection head material	LEXAN (meets standard EN 45545-2)
Stem material	stainless steel DIN 1.4301
Stem diameter	$6 \pm 1\text{ mm}$
Stem length	70, 120, 180 mm (others according to customer)
Recommended wire cross section	0.35 to $1.5\text{ mm}^2$
Time response	$\tau_{0.5} < 9\text{ s}$ (in flowing water at $0.4\text{ ms}^{-1}$ )
Insulation resistance	$> 200\text{ M}\Omega$ at $500\text{ V}_{DC}$ , $25\text{ °C} \pm 3\text{ °C}$ , humidity $< 80\%$
Shock and vibration tests	category 1, class B in accordance with EN 61373
Insulation test	$4\text{ kV}_{DC}$ for time 1 minute in accordance with EN 50155
Mean working life $\approx$ MTTF *	$1.2 \times 10^5$ hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

- 2wire

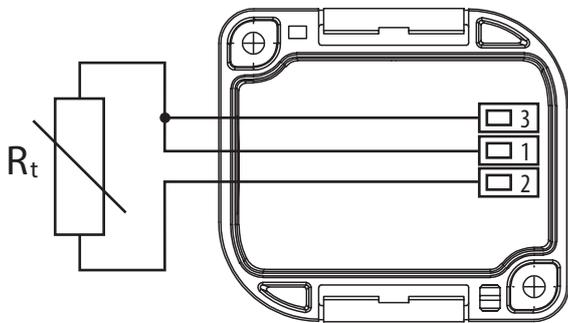


## MODIFICATIONS ↓

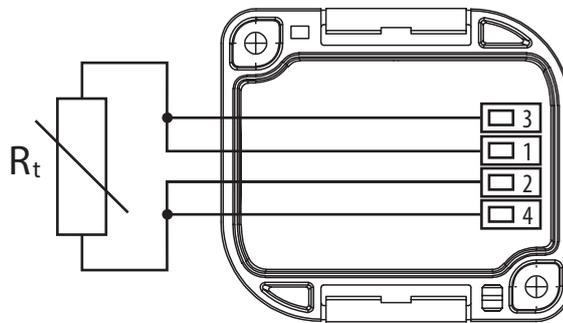
FOR STANDARD MANUFACTURED SENSORS, IT IS POSSIBLE TO MODIFY THE FOLLOWING PARAMETERS:

- variable stem design – length L
- A class precision (with the exception Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, NTC 20 kΩ)
- possibility of encasing non-standard temperature sensors (DALLAS, TSiC, KTY, SMT, etc.)
- possibility of encasing two sensors
- possibility of 3wire or 4wire connection:

3wire



4wire



## SENSOR INSTALLATION ↓

1. Before connecting the supply lead-in cable, lift off the lid of the plastic connection head by means of a flat screwdriver, which will be gradually engaged in to the one's and second groove in the lid and its misalignment will release the lid.
2. The lead-in cable is connected to the terminals according to the wiring diagram through the loosened grommet.  
**Tighten the bushing to ensure the tightness after connecting the power cable.**
3. Place the selected accessories (central holder or tube) into the point of temperature measurement, then insert the sensor into the holder or up to the tube bottom and fasten it with a screw. The holes for the holder mounting are to be drilled according to the attached template, on which the hole diameters are indicated.
4. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance. The operating position is optional but the bushing should not be directed upwards.**



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Z055.4a | 08/22

replace Z055.3a




**KNS 520**

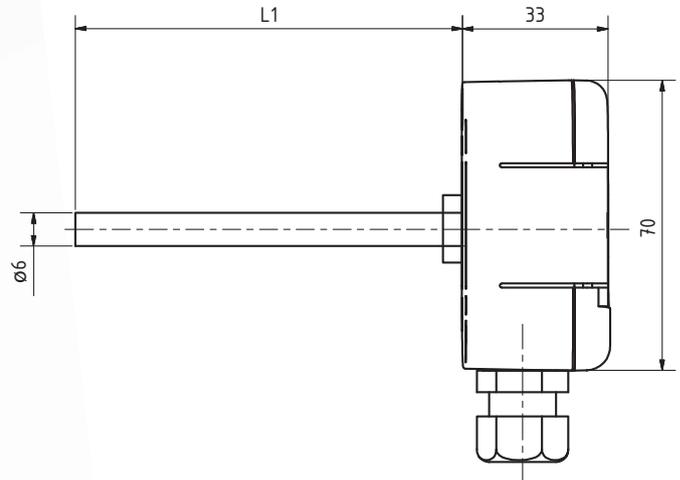
Temperature sensor with output 4 to 20 mA



temperature



Z058.4a



## DESCRIPTION AND APPLICATION ↓

The KNS 520 temperature sensor is designed to measure temperature of liquid or gaseous substances. In the application segment of Railway Vehicles, it is used for example to measure temperature of the outdoor air under the vehicle floor. For this purpose, the sensor is equipped with a stem with high mechanical resistance.

The sensor consists of a plastic head, where a converter of the resistance signal of the temperature sensor to the current signal of 4 to 20 mA and a metal measuring case are placed. All metal parts are made of stainless steel DIN 1.4301. The lead-in cable is connected to the terminal board through a grommet, which is a part of the connection head. The basic material of the head is LEXAN. The sensor can be used for any control systems compatible with the output signal of 4 to 20 mA. Standard temperature ranges are shown in the table of technical parameters, while the maximum temperature around the connection head is 80 °C and must not be exceeded even for a brief period. The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

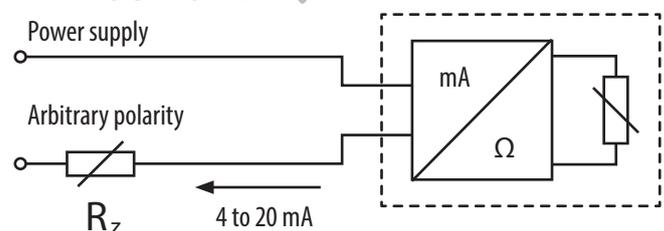
## SPECIFICATIONS ↓

Sensor type	KNS 520
Output signal	4 to 20 mA
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 35 °C, 0 °C to 100 °C, 0 °C to 150 °C
Supply voltage U	12 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	12 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 24 mA
Output signal when the sensor is short-circuited	< 3.5 mA
Measurement error	< 0.6% for range with span, min. 0.5 °C
Ambient temperature	-40 °C to 80 °C
Connection head material	LEXAN (meets standard EN 45545-2)
Stem material	stainless steel DIN 1.4301
Stem diameter	6 ± 0.2 mm
Stem lengths L1	70, 120, 180 mm (others according to customer)
Ingress protection	IP 65 in accordance with EN 60529
Insulation resistance	>200 M Ω at 500 V <sub>DC</sub> , 25° ± 3°C, humidity < 80%
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTF*	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology

\*\* see modifications

## WIRING DIAGRAM ↓



## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from  $-40\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ ; the minimum span of the range must be  $35\text{ }^{\circ}\text{C}$  (e.g.  $-20\text{ }^{\circ}\text{C}$  to  $15\text{ }^{\circ}\text{C}$ ;  $-30\text{ }^{\circ}\text{C}$  to  $80\text{ }^{\circ}\text{C}$ )

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the selected accessories (central holder or termowell) into the point of temperature measurement, then insert the sensor into the holder or up to the tube bottom and fasten it with a screw. The holes for the holder mounting are to be drilled according to the attached template, on which the hole diameters are indicated.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z058.4a | 08/22

replace Z058.3a




**KNS 720**

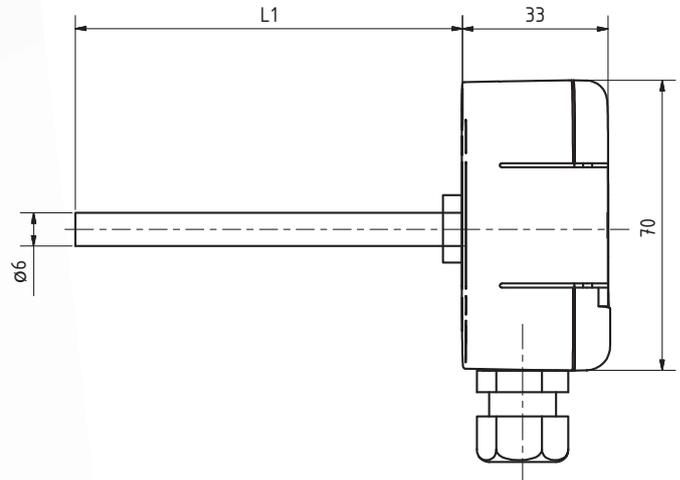
Temperature sensor with output 0 to 10 V



temperature



Z061.4a



## DESCRIPTION AND APPLICATION ↓

The KNS 720 temperature sensor is designed to measure temperature of liquid or gaseous substances. In the application segment of Railway Vehicles, it is used for example to measure temperature of the outdoor air under the vehicle floor. For this purpose, the sensor is equipped with a stem with high mechanical resistance.

The sensor consists of a plastic head, where a converter of the resistance signal of the temperature sensor to the current signal of 0 to 10 V and a metal measuring case are placed. All metal parts are made of stainless steel DIN 1.4301. The lead-in cable is connected to the terminal board through a grommet, which is a part of the connection head. The basic material of the head is LEXAN. The sensor can be used for any control systems compatible with the output signal of 0 to 10 V. Standard temperature ranges are shown in the table of technical parameters, while the maximum temperature around the connection head is 80 °C and must not be exceeded even for a brief period. The sensor meets ingress protection IP 65 according to EN 60529 standard, as amended.

The sensor is intended for operation in chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

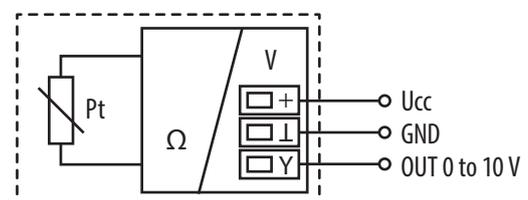
## SPECIFICATIONS ↓

Sensor type	KNS 720
Output signal	0 to 10 V
Standard ranges of measurement **	-30 °C to 60 °C 0 °C to 35 °C, 0 °C to 100 °C, 0 °C to 150 °C
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Output signal when the sensor is interrupted	> 12 V
Output signal when the sensor is short-circuited	~ 0 V
Measurement error	< 0.6% for range with span, min. 0.5 °C
Ambient temperature	-40 °C to 80 °C
Connection head material	LEXAN (meets standard EN 45545-2)
Stem material	stainless steel DIN 1.4301
Stem diameter	6 ± 0.2 mm
Standard lengths of the stem	70, 120, 180 mm (others according to customer)
Ingress protection	IP 65 in accordance with EN 60529
Insulation resistance	>200 M Ω at 500 V <sub>DC</sub> , 25° ± 3°C, humidity < 80%
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTF*	1.2 × 10 <sup>5</sup> hrs, based on a theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology

\*\* see modifications

## WIRING DIAGRAM ↓



## MODIFICATIONS ↓

According to the customer's requirement, it is possible to provide a customized measuring range from  $-40\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ ; the minimum span of the range must be  $35\text{ }^{\circ}\text{C}$  (e.g.  $-20\text{ }^{\circ}\text{C}$  to  $15\text{ }^{\circ}\text{C}$ ;  $-30\text{ }^{\circ}\text{C}$  to  $80\text{ }^{\circ}\text{C}$ )

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet.  
**To insure the ingress protection value of IP 65, the grommet has to be tightened.**
3. Place the selected accessories (central holder or termowell) into the point of temperature measurement, then insert the sensor into the holder or up to the tube bottom and fasten it with a screw. The holes for the holder mounting are to be drilled according to the attached template, on which the hole diameters are indicated.
4. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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Z061.4a | 08/22

replace Z061.3a




**KSD 122**

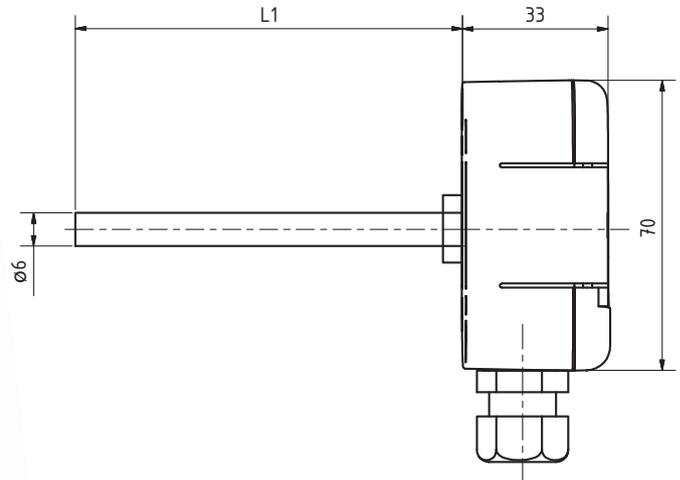
Temperature sensor with a stem and plastic head with output RS 485 (MODBUS)



temperature



Z100.1a


**DESCRIPTION AND APPLICATION** ↓

This temperature sensor KSD 122 with a stem and plastic head with a digital output RS 485 / MODBUS RTU is designed to measure temperature of liquid or gaseous substances. In the application segment of Railway Vehicles, it is used for example to measure temperature of the outdoor air under the vehicle floor. For this purpose, the sensor is equipped with a stem with high mechanical resistance.

The sensors consist of a plastic head and a metal case, where the sensing element for temperature measurement (sensor) is placed. In the head, there is a terminal block with a converter located, to which a supply cable for sensor supply and digital output signal according to the sensor type is connected through a cable grommet or a connector.

KSD 122, KSD 122K – MODBUS/RTU communication protocol, communication via the RS485 bus

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 65 according to EN 60529, as amended.

The sensors are designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

**SPECIFICATIONS** ↓

Sensor type (K - with connector)	KSD 122, KSD 122K
Output signal	RS 485 / MODBUS RTU
Measuring range	-50 to 150 °C
Accuracy of the electronics *	± 0.2 °C
Type / Accuracy of the sensing element	Pt 1000 / ± (0.3 °C + 0.0005 t )
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption / Supply current	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 65 in accordance with EN 60529, as amended
Time response	τ <sub>0.5</sub> ≤ 9 s (in running water at 0.2 m/s <sup>-1</sup> )
Standard stem lengths	70, 120, 180, 240 mm
Standard stem diameter	6 ± 0.2 mm
Material of the stem	stainless steel DIN 1.4301
Resistance to pressure (impact on the stem with the medium)	PN 25 (without thermowell) / PN 63 (with thermowell)
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25°C ± 3 °C; humidity < 85 %
Dimensions of the head	70 × 63 × 34 mm
Material of the head	LEXAN (meets standard EN 45545-2, as amended)
Connector type in the head (for sensors with a connector)	RSFM4 - M12- Lumberg
Recommended wire cross-section (for sensors with a grommet)	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max. 100 % atmospheric pressure: 70 to 107 kPa
Weight	min. 110 g

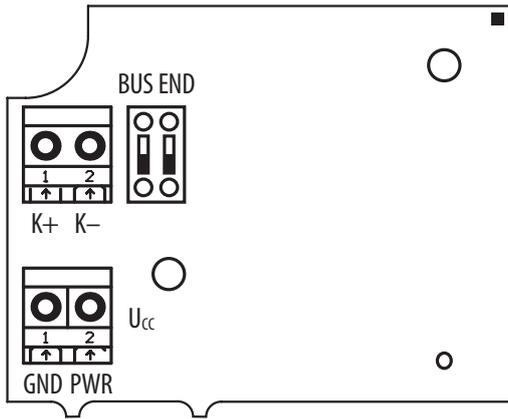
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

\* Measurement error of KSD 122 temperature sensor depends on the flow rate and supply voltage (method error) and can be within -1.0 to 1.5 °C.

Note: Manufacturer reserves the right to make changes in design and technical characteristics of the products. For actual information, please always contact your dealer.

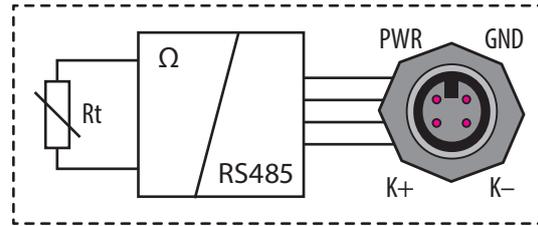
## WIRING DIAGRAM ↓

### RS 485



- GND, PWR –  $U_{cc}$  supply voltage
- K+/K- – communication line
- BUS END – RS 485 termination

### RS 485 with connector



- GND, PWR –  $U_{cc}$  supply voltage
- K+/K- – communication line

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## ACCESSORIES ↓

- plastic holder (supplied in the package) ■ JS 130 stainless steel thermowell ■ K 120 metal holder
- CONEC 43-00092 connection plug ■ connection cables with a straight RKT connector or a right-angled RKWT connector
- fitting with a collet or with cutting rings – for setting of different immersion lengths of the temperature sensor stem

## SENSOR INSTALLATION ↓

1. Before connecting the supply lead-in cable, lift off the lid of the plastic connection head by means of a flat screwdriver, which will be gradually engaged in to the one's and second groove in the lid and its misalignment will release the lid.
2. The lead-in cable is connected to the terminals according to the wiring diagram through the loosened grommet.  
**Tighten the bushing to ensure the tightness after connecting the power cable.**
3. Place the selected accessories (central holder or tube) into the point of temperature measurement, then insert the sensor into the holder or up to the tube bottom and fasten it with a screw. The holes for the holder mounting are to be drilled according to the attached template, on which the hole diameters are indicated.
4. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance. The operating position is optional but the bushing should not be directed upwards.**



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Z100.1a | 05/23

new




**KSD 124**

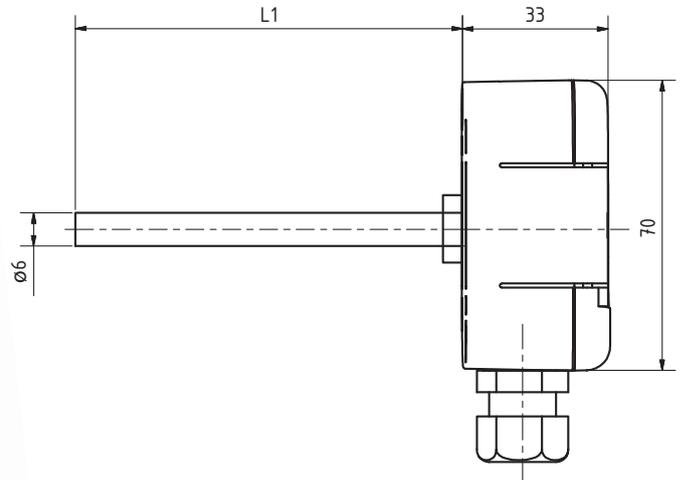
Temperature sensor with a stem and plastic head with output CAN protocol



temperature



Z103.1a


**DESCRIPTION AND APPLICATION**

This temperature sensor KSD 124 with a stem and plastic head with a digital output CAN / CANopen - KSD 124 is designed to measure temperature of liquid or gaseous substances. In the application segment of Railway Vehicles, it is used for example to measure temperature of the outdoor air under the vehicle floor. For this purpose, the sensor is equipped with a stem with high mechanical resistance.

The sensors consist of a plastic head and a metal case, where the sensing element for temperature measurement (sensor) is placed. In the head, there is a terminal block with a converter located, to which a supply cable for sensor supply and digital output signal according to the sensor type is connected through a cable grommet or a connector. The basic versions of digital outputs are:

KSD 124, KSD 124K – CANopen/CiA DS 301 communication protocol, communication via the CAN bus

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors. The sensors meet the ingress protection of IP 65 according to EN 60529, as amended.

The sensors are designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the sensor head.

**SPECIFICATIONS**

Sensor type (K - with connector)	KSD 124, KSD 124K
Output signal	CAN / CANopen-CiA DS 301
Measuring range	-50 to 150 °C
Accuracy of the electronics *	± 0.2 °C
Type / Accuracy of the sensing element	Pt 100 / ± (0.3 °C + 0.0005 t )
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption / Supply current	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 65 in accordance with EN 60529, as amended
Time response	τ <sub>0.5</sub> ≤ 9 s (in running water at 0.2 m/s <sup>-1</sup> )
Standard stem lengths	70, 120, 180, 240 mm
Standard stem diameter	6 ± 0.2 mm
Material of the stem	stainless steel DIN 1.4301
Resistance to pressure (impact on the stem with the medium)	PN 25 (without thermowell) / PN 63 (with thermowell)
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25°C ± 3 °C; humidity < 85 %
Dimensions of the head	70 × 63 × 34 mm
Material of the head	LEXAN (meets standard EN 45545-2, as amended)
Connector type in the head (for sensors with a connector)	RSFM4 - M12- Lumberg
Recommended wire cross-section (for sensors with a grommet)	0.14 to 1 mm <sup>2</sup>
Working conditions	ambient temperature: -40 to 80 °C relative air humidity: max. 100 % atmospheric pressure: 70 to 107 kPa
Weight	min. 170 g

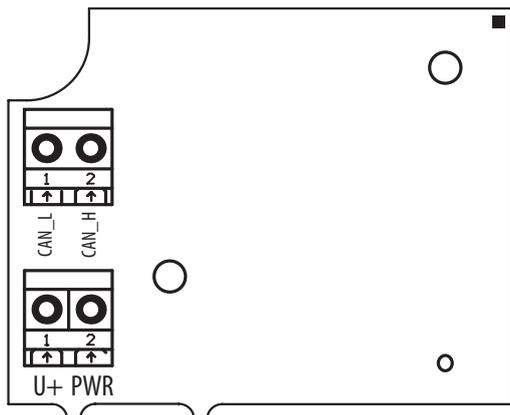
Tests	
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

\* By extending the stem length by 60 mm, the KSD 124 and KSD 124K sensors can be used up to 200 °C.

Note: Manufacturer reserves the right to make changes in design and technical characteristics of the products. For actual information, please always contact your dealer.

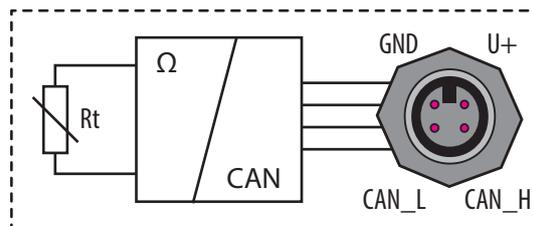
## WIRING DIAGRAM ↓

With a grommet



GND, U+ – power supply  
CAN\_L/CAN\_H – data bus

With a connector



GND, U+ – power supply  
CAN\_L/CAN\_H – data bus

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## ACCESSORIES ↓

- plastic holder (supplied in the package) ■ JS 130 stainless steel thermowell ■ K 120 metal holder
- CONEC 43-00092 connection plug ■ connection cables with a straight RKT connector or a right-angled RKWT connector
- fitting with a collet or with cutting rings – for setting of different immersion lengths of the temperature sensor stem

## SENSOR INSTALLATION ↓

1. Before connecting the supply lead-in cable, lift off the lid of the plastic connection head by means of a flat screwdriver, which will be gradually engaged in to the one's and second groove in the lid and its misalignment will release the lid.
2. The lead-in cable is connected to the terminals according to the wiring diagram through the loosened grommet.  
**Tighten the bushing to ensure the tightness after connecting the power cable.**
3. Place the selected accessories (central holder or tube) into the point of temperature measurement, then insert the sensor into the holder or up to the tube bottom and fasten it with a screw. The holes for the holder mounting are to be drilled according to the attached template, on which the hole diameters are indicated.
4. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance. The operating position is optional but the bushing should not be directed upwards.**



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Z103.1a | 05/23

new



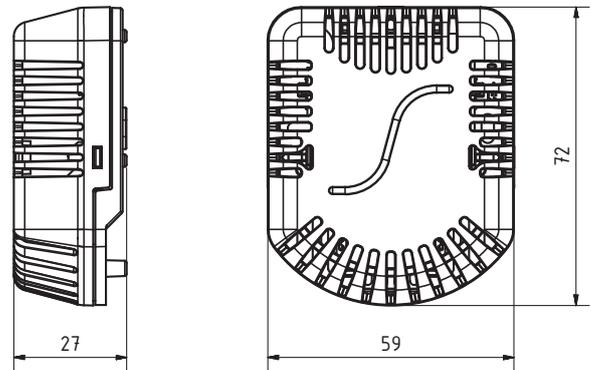

**KSTH 102**

Temperature and relative humidity sensor to the interior with RS 485 output (MODBUS)



temperature humidity

Z070.3a


**DESCRIPTION AND APPLICATION** ↓

The sensor of temperature and relative humidity KSTH 102 is designed to measure the temperature and relative humidity of the air in spaces protected against water. In the application segment of railway vehicles, it is used to measure both of the variables in passenger compartments of train units and carriages and is a part of the temperature and relative humidity control system.

The sensor of temperature and relative humidity KSTH 102 consists of a plastic ribbing head, where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the RS 485 bus. The temperature and relative humidity are measured by a common internal sensor whose signal is processed in a microprocessor and is converted to an output signal of MODBUS RTU. The sensors meet ingress protection IP 30 according to EN 60529 standard, as amended. Suitable design and high-quality material ensure that the sensors do not feel disturbing even in the interiors with high aesthetic requirements. The installation is recommended on an inner wall at the height of 1.5 m, in areas with moving persons, not exposed to direct sunlight and not influenced by heat from walls, heat sources or lighting.

The sensor of temperature and relative humidity KSTH 102 is designed to be operated in a chemically non-aggressive environment; the use must be chosen with regard to the temperature and chemical resistance of the sensor head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: - 40 °C to 80 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied

**SPECIFICATIONS** ↓

Sensor type	KSTH 102
Temp. measurement range	-40 °C to 80 °C
Temperature measurement accuracy	± 0.5 °C in the range from 0 °C to 65 °C ± 0.7 °C in the range from 65 °C to 80 °C ± 1.1 °C in the range from -40 °C to 0 °C
Relative humidity measurement range	0 to 95 %
Relative humidity measurement accuracy	± 3 % in the range from 10 to 90 % ± 4.5 % in the range from 0 to 10 % a 90 to 95 %
Output signal	RS 485 / MODBUS RTU
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

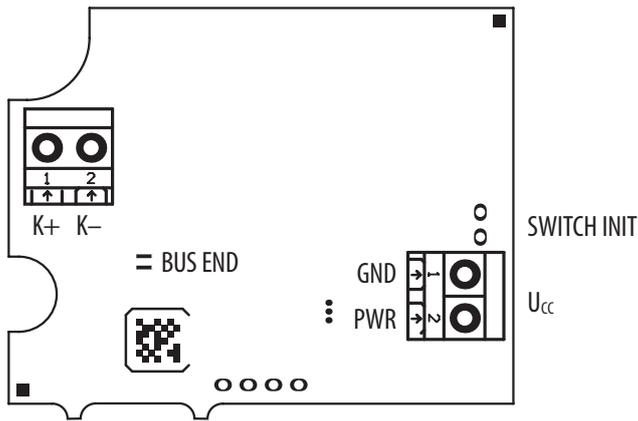
with materials complying with fire protection standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
K+/K- – communication line  
BUS END – RS 485 termination

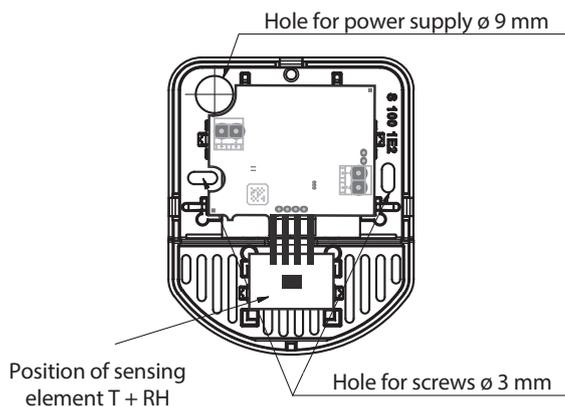
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

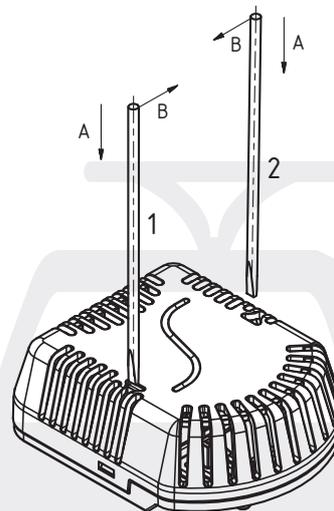
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z070.3a | 08/22

replace Z070.2a



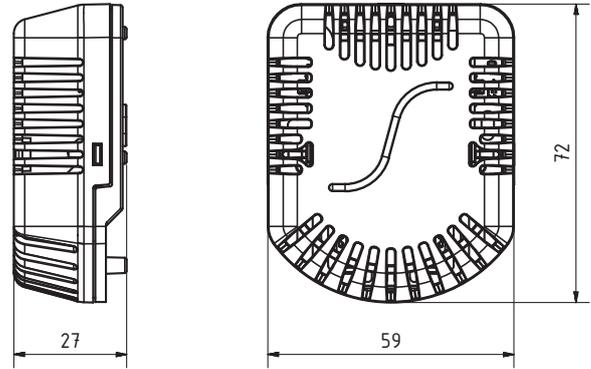

**KSTH 104**

Temperature and relative humidity sensor to the interior with CAN protocol output (CANopen)



temperature humidity

Z071.3a


**DESCRIPTION AND APPLICATION** ↓

The KSTH 104 temperature and relative humidity sensor is designed to measure the temperature and relative humidity of the air in spaces protected against water. In the application segment of railway vehicles, it is used to measure both of the variables in passenger compartments of train units and carriages and is a part of the temperature and relative humidity control system. The KSTH 104 temperature and relative humidity sensor consists of a plastic ribbing head where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the CAN bus. The temperature and relative humidity are measured by a common internal sensor whose signal is processed in a microprocessor and is converted to a CANopen output signal with CiA DS 301 specification. The sensors meet the ingress protection of IP 30 according to EN 60529 standard, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements.

The KSTH 104 temperature and relative humidity sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: -40 °C to 80 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

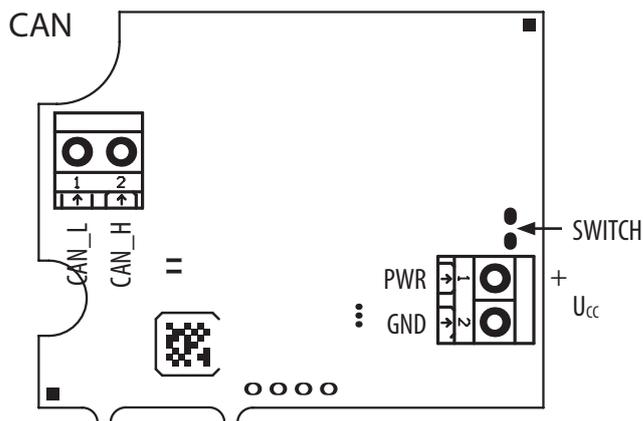
**SPECIFICATIONS** ↓

Sensor type	KSTH 104
Temp. measurement range	-40 °C to 80 °C
Temperature measurement accuracy	± 0.5 °C in the range from 0 °C to 65 °C ± 0.7 °C in the range from 65 °C to 80 °C ± 1.1 °C in the range from -40 °C to 0 °C
Relative humidity measurement range	0 to 95 %
Relative humidity measurement accuracy	± 3 % in the range from 10 to 90 % ± 4.5 % in the range from 0 to 10 % a 90 to 95 %
Output signal	CAN / CANopen – CiA DS 301
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Fire protection resistance	in accordance with EN 45545-2 (possible in acc. to NFPA 130)

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



GND, PWR – U<sub>CC</sub> supply voltage  
CAN\_L/CAN\_H – communication line

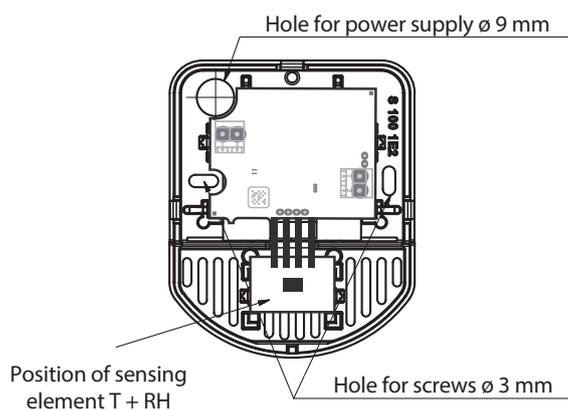
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

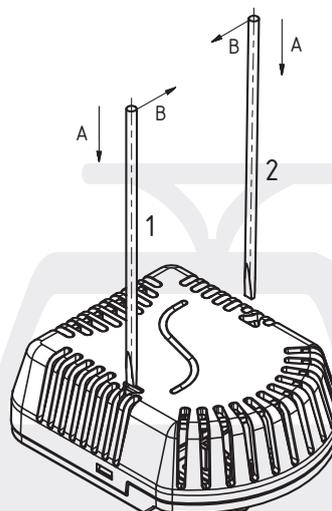
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z071.3a | 08/22

replace Z071.2a




**KSTH 122**

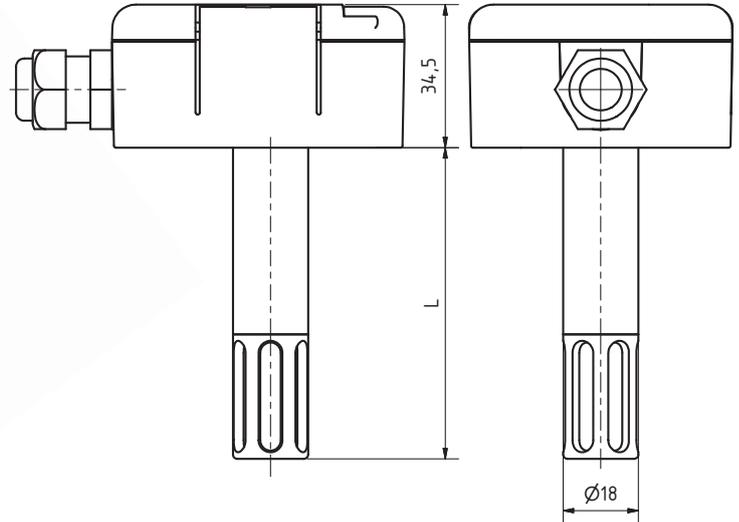
Temperature and relative humidity sensors for usage into air condition ducts



Z086.1a



temperature humidity


**DESCRIPTION AND APPLICATION**

Temperature and relative humidity sensor KSTH 122 is designed to measure the temperature and relative humidity of the air into air condition ducts. In the application segment of railway vehicles, it is used to measure both of the variables in air condition ducts of train units and carriages and is a part of the temperature and relative humidity control system.

The KSTH 122 temperature and relative humidity sensor consists of a plastic connection head and measuring stem, where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the RS 485 bus. The temperature and relative humidity are measured by a common internal sensor whose signal is processed in a microprocessor and is converted to an output signal of MODBUS RTU. The sensors meet ingress protection IP 65 according to EN 60 529, as amended.

The KSTH 122 temperature and relative humidity sensor is designed to be operated in a chemically non-aggressive environment; the use must be chosen with regard to the temperature and chemical resistance of the sensor head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: -40 to 80 °C
- Relative ambient humidity: 0 to 100 %
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

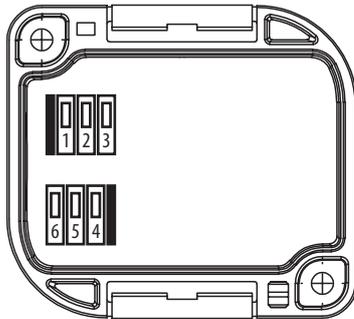
**SPECIFICATIONS**

Sensor type	KSTH 122
Temperature measurement range	-40 °C to 125 °C
Temperature measurement accuracy	± 0.2 °C in range 0 °C to 60 °C ± 1.75 °C in range -30 °C to 80 °C
Relative humidity measurement range	0 to 100 %
Relative humidity measurement accuracy	± 1.8 % RH in +23 °C (0 to 90 % RH) ± 4 % RH in range 0 to 100 %
Output signal	RS 485 / MODBUS RTU
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection of the terminal block	IP 65 in accordance with EN 60529
Ingress protection of the sensors	IP 65 in accordance with EN 60529
Sensor dust filter	filtration capacity 0.025 mm
Dimension of the head	70 × 63 × 34 mm
Standard stem length L	100 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 50 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Fire protection resistance	in accordance with EN 45545 (possible acc. to NFPA 130)

Note – Manufacturer reserves the right to make changes in design and technical characteristics of the products. For actual information, please always contact your dealer.

## WIRING DIAGRAM ↓

- 1 – SG (ground)
  - 2 – Communication line K+
  - 3 – Communication line K1
  - 4 – Power supply PWR
  - 5 – Power supply GND
  - 6 – TE (technical ground)
- BUS END – Integrated Resistor 180 Ω



## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable to the terminals according to the wiring diagram through the loosened grommet. **Don't connect transmitter while power supply voltage is on.** It is recommended to use shielded twisted copper cable, maximal length 1200 m.
3. **To insure the ingress protection value of IP 65, the grommet has to be tightened and the lid has to be put on after connecting the lead-in cable. The holds on the plastic head must to click into the original position.**
4. Put the temperature and humidity sensor to the place at which they should be measured both variable and provide free access of air to the sensor.
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance. **Operating position is arbitrary, it is recommended to lead the power cable to the grommet from the bottom and the grommet must not be directed upwards.**



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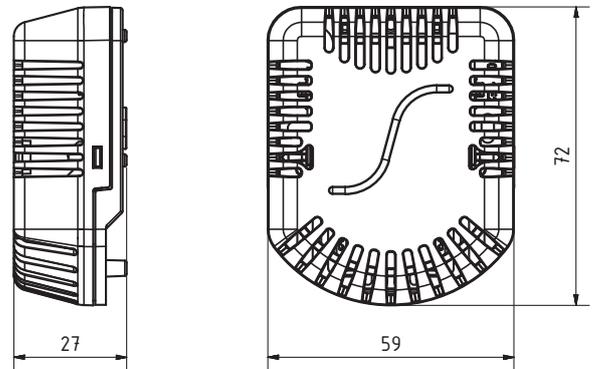



**KSC 500**

CO2 sensors to the interior with output 4 to 20 mA


 CO<sub>2</sub>


Z087.1a


**DESCRIPTION AND APPLICATION** ↓

The KSC 500 – CO<sub>2</sub> sensor with 4 to 20 mA output is designed to measure the carbon dioxide concentration of the air in spaces protected against water. This sensor with 4 to 20 mA output consists of a plastic ribbing head where a printed circuit board with the CO<sub>2</sub> sensor and a converter is placed to establish a communication via voltage output 4 to 20 mA. The CO<sub>2</sub> value is measured by a NDIR module whose output signal is also converted to an output signal 4 to 20 mA. For the CO<sub>2</sub> concentration sensor KSC 500, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSC 500 – CO<sub>2</sub> sensor with 4 to 20 mA output meets the ingress protection of IP 30 according to EN 60529, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The KSC 500 – CO<sub>2</sub> sensor with 4 to 20 mA output is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

**SPECIFICATIONS** ↓

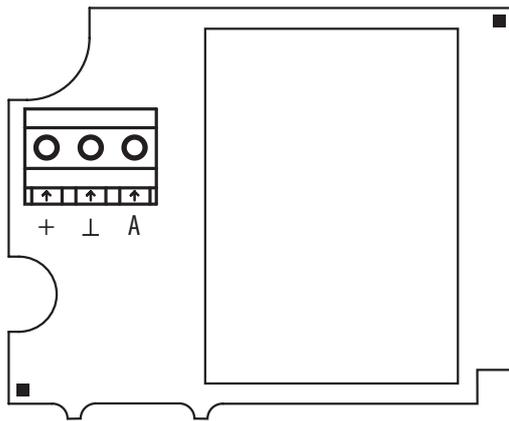
Sensor type	KSC 500
Output signal	4 to 20 mA
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 50 ppm
Time response CO <sub>2</sub> (90%)	20 s
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



- + – Supply voltage U
- ⊥ – GND
- A – Output signal 4 to 20 mA

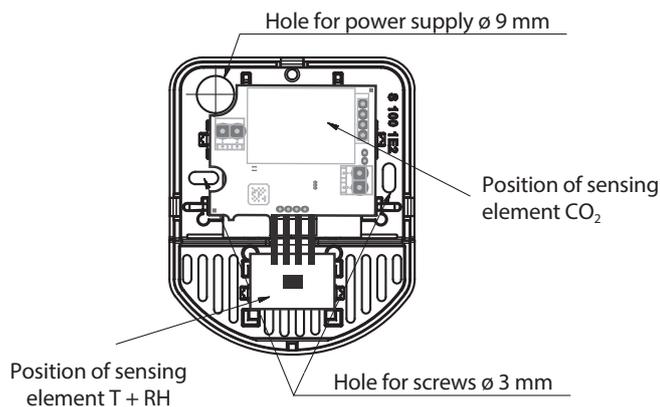
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

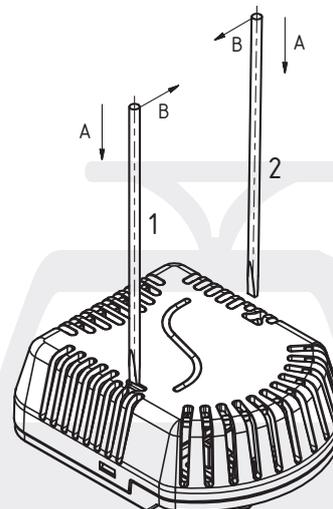
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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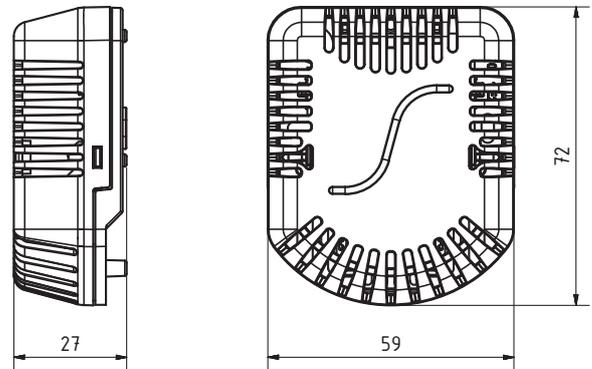



**KSC 700**

CO2 sensors to the interior with output 0 to 10 V


 CO<sub>2</sub>


Z088.1a


**DESCRIPTION AND APPLICATION** ↓

The KSC 700 – CO<sub>2</sub> sensor with 0 to 10 V output is designed to measure the carbon dioxide concentration of the air in spaces protected against water. This sensor with CO<sub>2</sub> output consists of a plastic ribbing head where a printed circuit board with the CO<sub>2</sub> sensor and a converter is placed to establish a communication via voltage output 0 to 10 V. The CO<sub>2</sub> value is measured by a NDIR module whose output signal is also converted to an output signal 0 to 10 V. For the CO<sub>2</sub> concentration sensor KSC 700, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSC 700 – CO<sub>2</sub> sensor with 0 to 10 V output meets the ingress protection of IP 30 according to EN 60529, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The KSC 700 – CO<sub>2</sub> sensor with 0 to 10 V output is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95 % (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

**SPECIFICATIONS** ↓

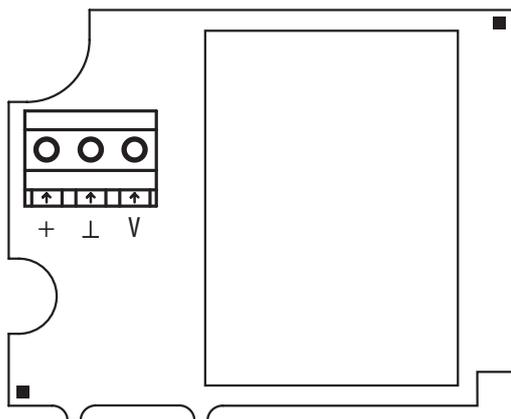
Sensor type	KSC 700
Output signal	0 to 10 V
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 50 ppm
Time response CO <sub>2</sub> (90%)	20 s
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



- + – Supply voltage U
- ⊥ – GND
- V – Output signal 0 to 10 V

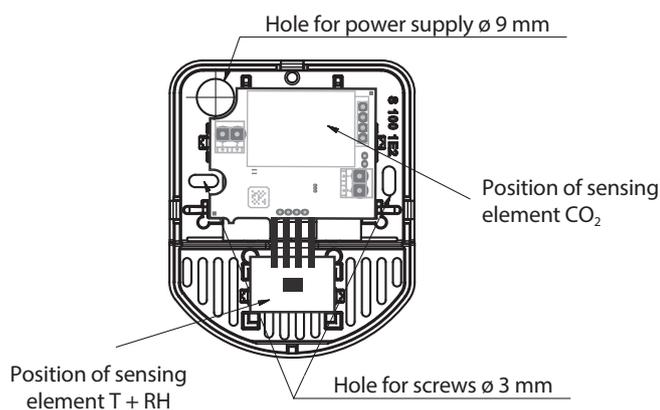
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

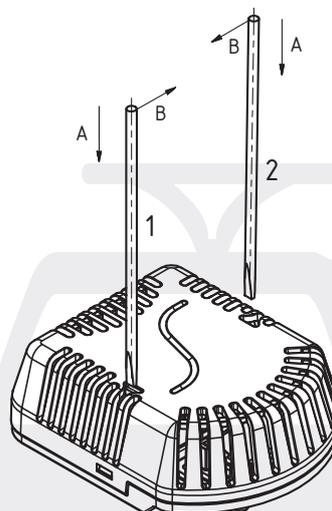
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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## KSC 102

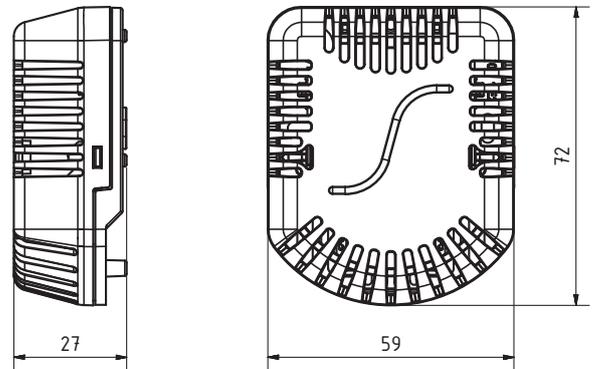
CO2 sensors to the interior with output RS 485 (MODBUS)



CO<sub>2</sub>



Z089.1a



### DESCRIPTION AND APPLICATION ↓

The KSC 102 – CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration of the air in spaces protected against water. This sensor consists of a plastic ribbing head where a printed circuit board with the CO<sub>2</sub> sensor and a converter is placed to establish a communication via the RS 485 bus. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of MODBUS RTU. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSC 102 – CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60529. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The KSC 102 – CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95 % (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

### TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

### SPECIFICATIONS ↓

Sensor type	KSC 102
Output signal	RS 485 / MODBUS RTU
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

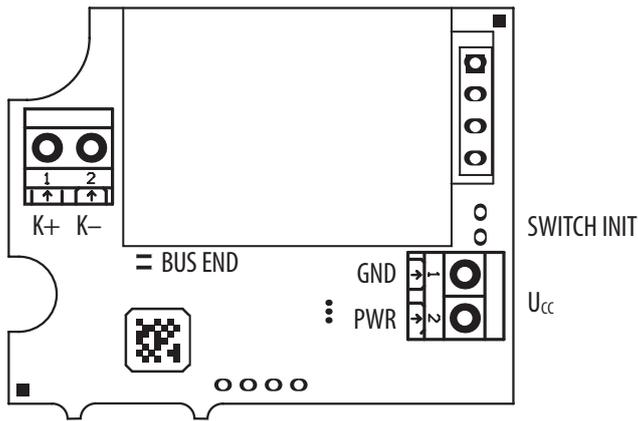
\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
K+/K- – communication line  
BUS END – RS 485 termination

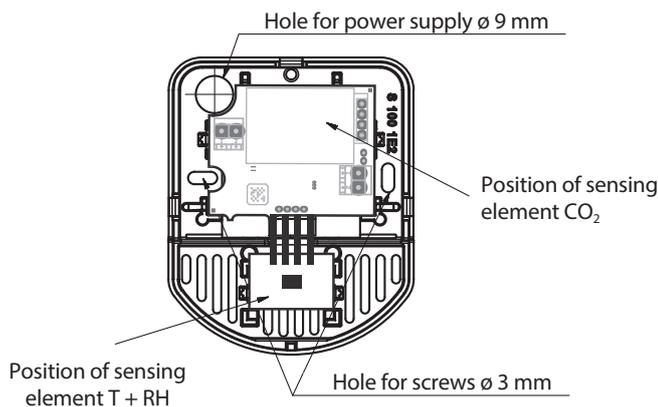
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

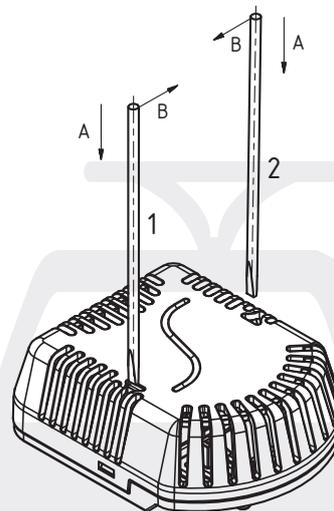
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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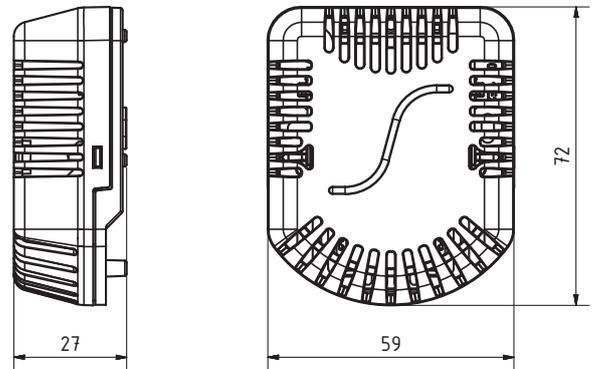



**KSC 104**

CO2 sensors to the interior with CAN protocol output


 CO<sub>2</sub>


Z090.1a


**DESCRIPTION AND APPLICATION** ↓

The KSC 104 – CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration of the air in spaces protected against water. This sensor consists of a plastic ribbing head where a printed circuit board with the sensor and a converter is placed to establish a communication via the CAN bus. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of CAN / CANopen – CiA DS 301. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSC 104 – CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60 529. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The KSC 104 - CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95 % (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

**SPECIFICATIONS** ↓

Sensor type	KSC 104
Output signal	CAN / CANopen – CiA DS 301
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Galvanically separated	no, could be acc. to request
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

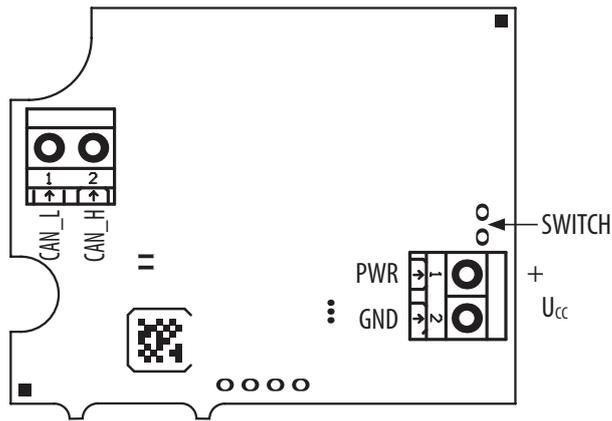
\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
CAN\_L, CAN\_H – communication line

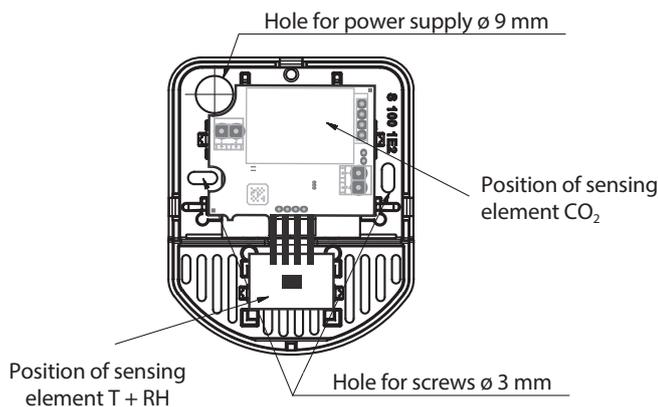
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

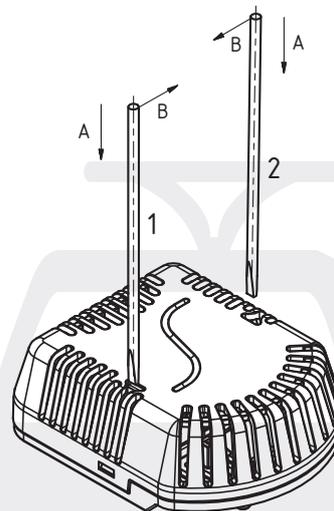
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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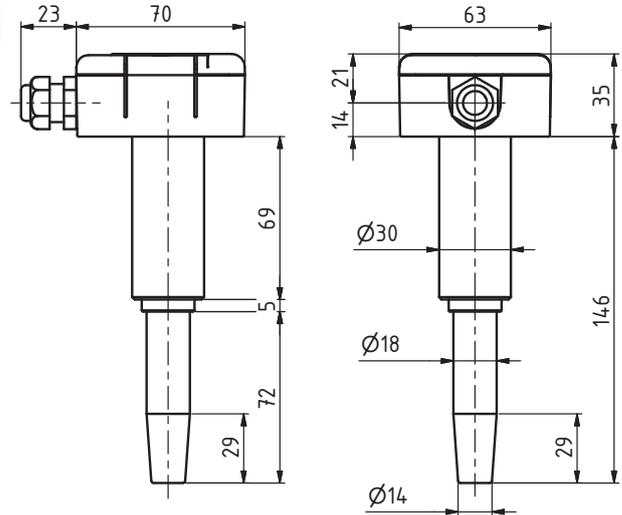
new




**KSC 122**

 CO<sub>2</sub> sensor with RS 485 output (MODBUS)


Z096.1a


**DESCRIPTION AND APPLICATION**

CO<sub>2</sub> sensors KSC 122 with RS 485 output are intended for installation in airconditioning ducts.

These sensors are designed to measure the carbon dioxide concentration in spaces free of aggressive substances in air ducts. The CO<sub>2</sub> measuring sensor is an integral part of the sensor.

The sensor can be used for any control systems compatible with the MODBUS RTU communication protocol; communication takes place through the RS 485 bus. The working range is specified in the table of technical parameters. The sensors meet the ingress protection of IP 65 according to ČSN EN 60 529.

The sensors consist of a plastic head, which houses a transducer to convert the CO<sub>2</sub> concentration to a MODBUS RTU output signal. The measuring sensor is located in an external probe, which is firmly connected to the electronics in the head. The supply cable is connected to the terminal board through a grommet, which is a part of the plastic head. The base material of the head is LEXAN™ RESIN – EXL 5689. The sensor stem consists of two materials – stainless steel and Tecaform. Sensor is ensured by the unique „**Shead**“ design invented by SENSIT s.r.o.

The operating conditions to establish the correct function of CO<sub>2</sub> modul are:

- Ambient temperature around the sensor: -40 °C to 80 °C
- Relative ambient humidity: 0 to 100 %
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS**

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended, Railway applications – Electronic equipment used on rolling stock.

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

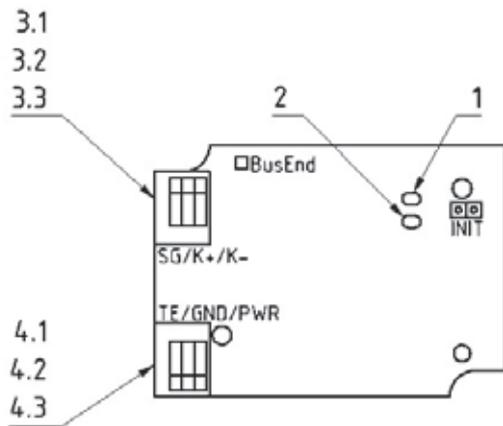
Manufacturer provides **EU Declaration of Conformity**.

**SPECIFICATIONS**

Sensor type	KSC 122
Measuring value	CO <sub>2</sub>
Output signal	RS 485 / MODBUS RTU
CO <sub>2</sub> measuring range*	0 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 50 ppm (+3 % of measured values)
Temperature and pressure dependence	± (1 + measured value of CO <sub>2</sub> / 1000) ppm/°C 0.014 % of measured value of CO <sub>2</sub> /mbar
Response rate	60 s
U <sub>cc</sub> supply voltage range	16.8 to 30 V <sub>DC</sub>
Recommended U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 1 W, typical: 400 mW
Ingress protection	IP 65 electronic, IP 40 sensor in accordance with EN 60529
Dimension of the head	70 × 63 × 35 mm
Material of the head	LEXAN™ RESIN – EXL 5689
External probe material	Stainless steel DIN 1.4301 + TECAFORM AH NATURAL 38.5 g
External probe length	Standard 146 mm
External probe diameter	ø 30 mm
Sensor dust filter	Filtration capacity 0.025 mm
Shock and vibration tests	category 1, class B in accordance with <b>EN 61373</b> , as amended
Elektromagnetic compatibility	in accordance with <b>EN 50121-3-2</b> , as amended
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with <b>EN 50155</b> as amended
Recommended supply line	Wire cross-section: 0.14 to 0.5 mm <sup>2</sup> Outer cable diameter 4 to 8 mm
Weight	min 200 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

## WIRING DIAGRAM ↓



- 1 – GREEN LED –RS485 communication
- 2 – RED LED – Power PWR
- 3.1 – Signal ground SG
- 3.2 – Data bus RS485 K+
- 3.3 – Data bus RS485 K-
- 4.1 – Technical earth TE
- 4.2 – GND
- 4.3 – PWR
- INIT – Putting into initialization mode
- BusEnd – For connecting the bus termination

## SENSOR INSTALLATION ↓

1. Before connecting the supply cable, open the plastic head. To open, successively slide a flat-head screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the supply cable to the terminals through a grommet according to the wiring diagram.
3. **To ensure tightness after connecting the supply cable, tighten the grommet and put the lid. When closing the head, handles have to click into the original position.**
4. Install the CO<sub>2</sub> sensor in the place where the concentration is to be measured and ensure free air access to the sensor.
5. After the installation and connection to the electrical measuring equipment, the sensor is ready for use.  
**The sensor does not require any special servicing or maintenance.**



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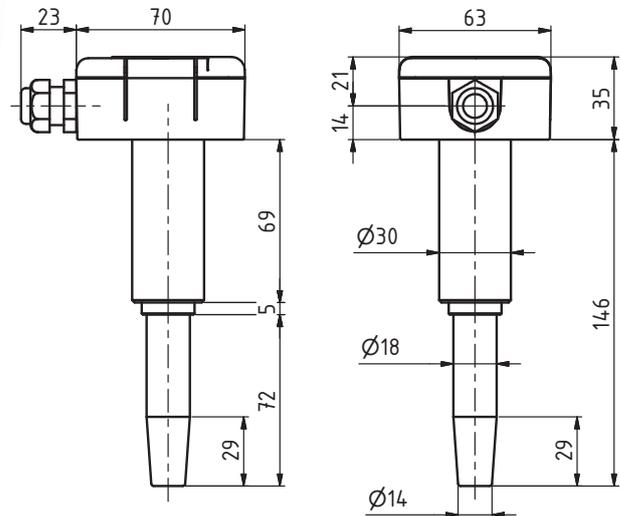
new




**KSC 520**

 CO<sub>2</sub> sensor with 4 to 20 mA output


Z097.1a


**DESCRIPTION AND APPLICATION** ↓

CO<sub>2</sub> sensors KSC 520 with output 4 to 20 mA are intended for installation in airconditioning ducts.

The sensor can be used for any control systems compatible with the output signal of 4 to 20 mA. The working range is specified in the table of technical parameters. The sensors meet the ingress protection of IP 65 according to ČSN EN 60 529.

The sensors consist of a plastic head, which houses a transducer to convert the CO<sub>2</sub> concentration to a 4 to 20 mA output current signal. The measuring sensor is located in an external probe, which is firmly connected to the electronics in the head. The supply cable is connected to the terminal board through a grommet, which is a part of the plastic head. The base material of the head is LEXAN™ RESIN – EXL 5689. The sensor stem consists of two materials – stainless steel and Tecaform.

Easy mounting of the temperature sensor is ensured by the unique „S head“ design invented by SENSIT s.r.o

The operating conditions to establish the correct function of CO<sub>2</sub> modul are:

- Ambient temperature around the sensor: -40 °C to 80 °C
- Relative ambient humidity: 0 to 100 %
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock.

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

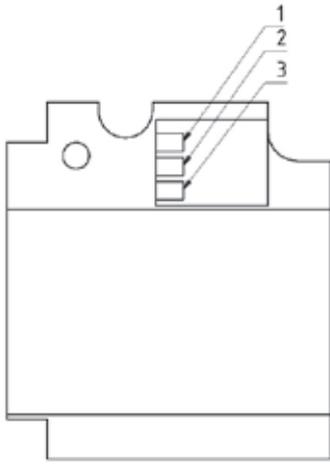
The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended. Manufacturer provides **EU Declaration of Conformity**.

**SPECIFICATIONS** ↓

Sensor type	KSC 1520
Measuring value	CO <sub>2</sub>
Output signal	4 to 20 mA
CO <sub>2</sub> measuring range*	0 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 50 ppm (+3 % of measured values)
Temperature and pressure dependence	± (1 + measured value of CO <sub>2</sub> / 1000) ppm/°C 0.014 % of measured value of CO <sub>2</sub> /mbar
Response rate	60 s
U <sub>cc</sub> supply voltage range	16.8 to 30 V <sub>DC</sub>
Recommended U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 750 mW, typical: 250 mW
Ingress protection	IP 65 electronic, IP 40 sensor in accordance with EN 60529
Dimension of the head	70 × 63 × 35 mm
Material of the head	LEXAN™ RESIN – EXL 5689
External probe material	Stainless steel DIN 1.4301 + TECAFORM AH NATURAL 38.5 g
External probe length	Standard 146 mm
External probe diameter	ø 30 mm
Sensor dust filter	Filtration capacity 0.025 mm
Shock and vibration tests	category 1, class B in accordance with <b>EN 61373</b> , as amended
Elektromagnetic compatibility	in accordance with <b>EN 50121-3-2</b> , as amended
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with <b>EN 50155</b> as amended
Recommended supply line	Wire cross-section: 0.14 to 0.5 mm <sup>2</sup> Outer cable diameter 4 to 8 mm
Weight	min 200 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

## WIRING DIAGRAM ↓



- 1 – PWR
- 2 – GND
- 3 – OUT (4–20 mA)

## SENSOR INSTALLATION ↓

1. Before connecting the supply cable, open the plastic head. To open, successively slide a flat-head screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the supply cable to the terminals through a grommet according to the wiring diagram.
3. **To ensure tightness after connecting the supply cable, tighten the grommet and put the lid. When closing the head, handles have to click into the original position.**
4. Install the CO<sub>2</sub> sensor in the place where the concentration is to be measured and ensure free air access to the sensor.
5. After the installation and connection to the electrical measuring equipment, the sensor is ready for use.  
**The sensor does not require any special servicing or maintenance.**



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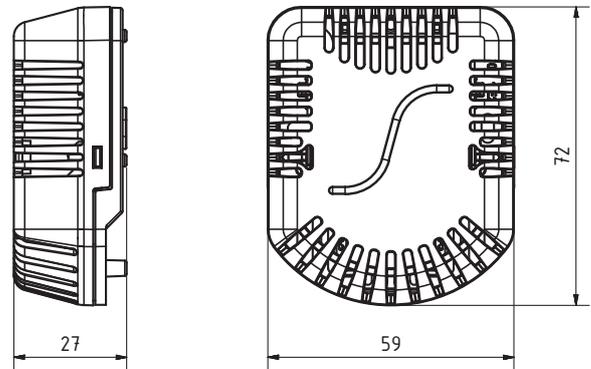
new




**KSTC 102**

 Temperature and CO<sub>2</sub> sensors to the interior with RS 485 output


Z091.1a


**DESCRIPTION AND APPLICATION** ↓

The KSTC 102 temperature and CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration and temperature of the air in spaces protected against water. This temperature and CO<sub>2</sub> sensor consists of a plastic ribbing head where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the RS 485 bus. The temperature is measured by a sensor whose signal is processed in a microprocessor and is converted to an output signal of MODBUS RTU. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of MODBUS RTU. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSTC 102 temperature and CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60529. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray.

The KSTC 102 temperature and CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

**SPECIFICATIONS** ↓

Sensor type	KSTC 102
Temperature measurement range**	0 to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement, -30 to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement
Temp. measurement accuracy*	± 0,5 °C
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Output signal	RS 485 / MODBUS RTU
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 300 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

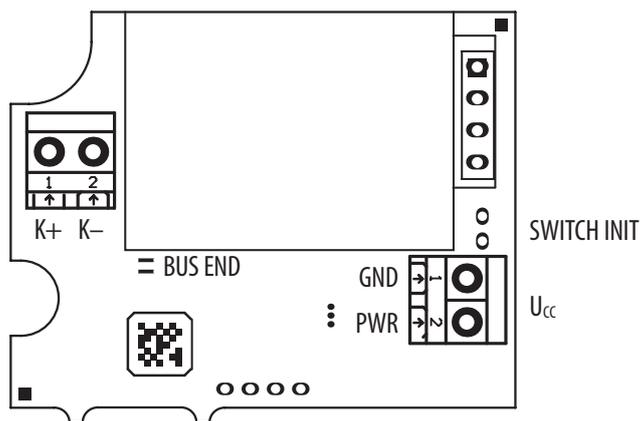
\*\*Temperature sensor can be used in temperature range -40 °C to 80 °C for a short time

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
 K+/K- – communication line  
 BUS END – RS 485 termination

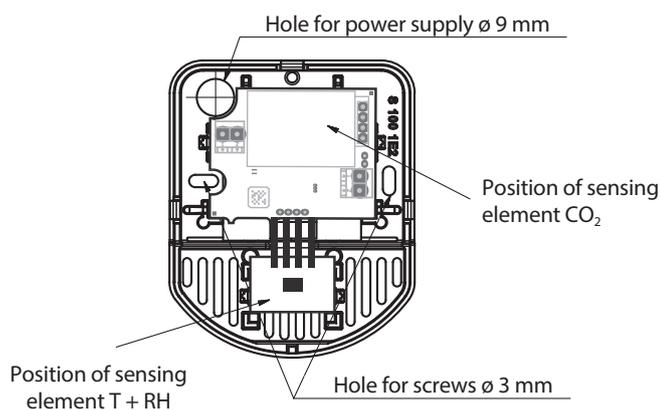
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

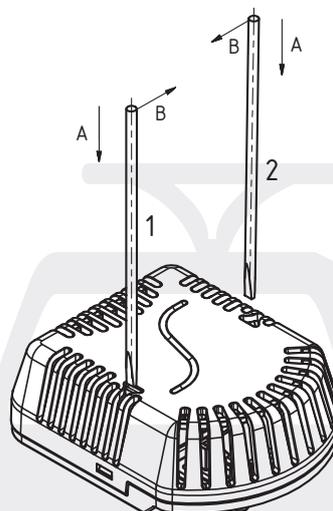
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

For more detailed description of the installation, see the operating instructions for the sensor.

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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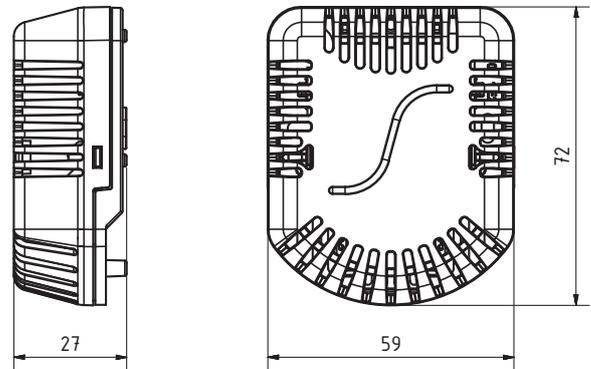
new




**KSTC 104**

 Temperature and CO<sub>2</sub> sensors to the interior with CAN protocol output


Z092.1a


**DESCRIPTION AND APPLICATION** ↓

The KSTC 104 temperature and CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration and temperature of the air in spaces protected against water. This temperature and CO<sub>2</sub> sensor consists of a plastic ribbing head where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the CAN. The temperature is measured by a sensor whose signal is processed in a microprocessor and is converted to an output signal of CANopen with specification CiA DS 301. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of CANopen. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSTC 104 temperature and CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60529, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements. You can choose the color of the box white or gray. The KSTC 104 temperature and CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

**SPECIFICATIONS** ↓

Sensor type	KSTC 104
Temperature measurement range**	0 to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement, -30 to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement
Temp. measurement accuracy*	± 0,5 °C
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Output signal	CAN / CANopen – CiA DS 301
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

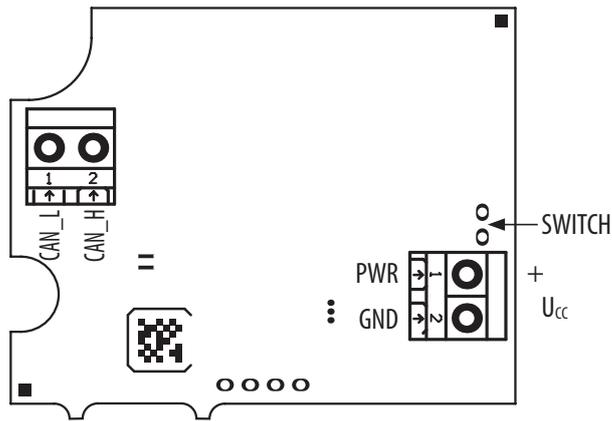
\*\*Temperature sensor can be used in temperature range -40 °C to 80 °C for a short time

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
CAN\_L, CAN\_H – communication line

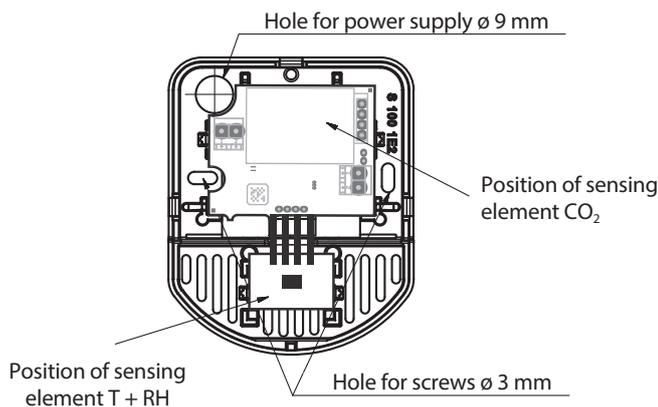
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

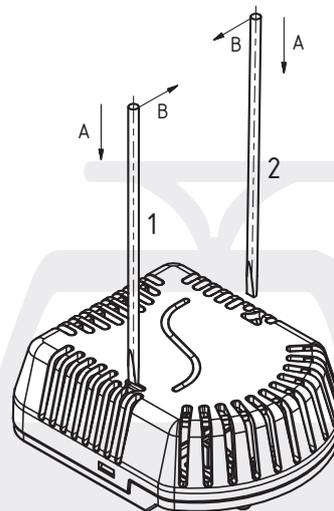
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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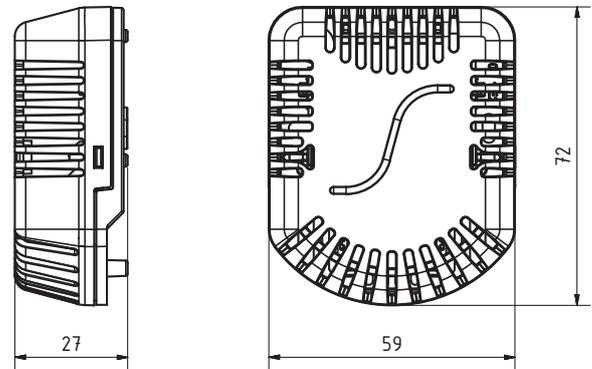
new




**KSTHC 102**

 Temperature, relative humidity and CO<sub>2</sub> sensor to the interior with RS 485 output (MODBUS)


Z072.3a


**DESCRIPTION AND APPLICATION** ↓

The KSTHC 102 temperature, relative humidity and CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration, temperature and relative humidity of the air in spaces protected against water. In the application segment of railway vehicles, it is used to measure all of the three variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity and CO<sub>2</sub> concentration control system.

The KSTHC 102 temperature, relative humidity and CO<sub>2</sub> sensor consists of a plastic ribbing head where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the RS 485 bus. The temperature and relative humidity are measured by a common internal sensor whose signal is processed in a microprocessor and is converted to an output signal of MODBUS RTU. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of MODBUS RTU. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSTHC 102 temperature, relative humidity and CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements.

The KSTHC 102 temperature, relative humidity and CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function of modul CO<sub>2</sub> are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

**SPECIFICATIONS** ↓

Sensor type	KSTHC 102
Temperature measurement range*	0 °C to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement, -30 °C to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement, -40 °C to 80 °C short-term
Temp. measurement accuracy*	± 0,5 °C
Relative humidity measurement range*	0 to 85 % with guaranteed accuracy of CO <sub>2</sub> measurement, 0 to 95 % without guaranteed accuracy of CO <sub>2</sub> measurement
Relative humidity measurement accuracy*	± 3 % in the range from 10 to 90 % ± 4.5 % in the range from 0 to 10 %
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Output signal	RS 485 / MODBUS RTU
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage Un	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

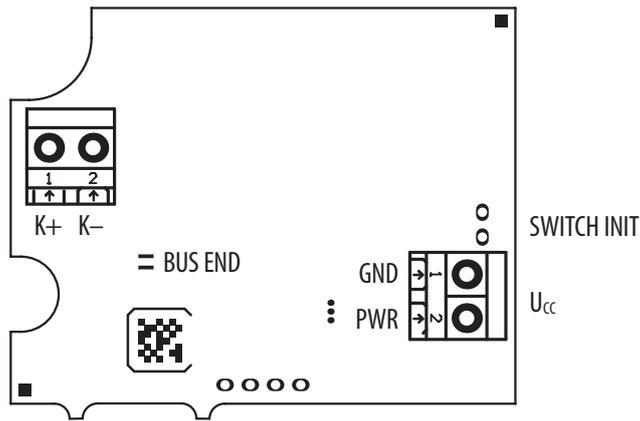
\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓

RS 485



GND, PWR –  $U_{cc}$  supply voltage  
K+/K- – communication line  
BUS END – RS 485 termination

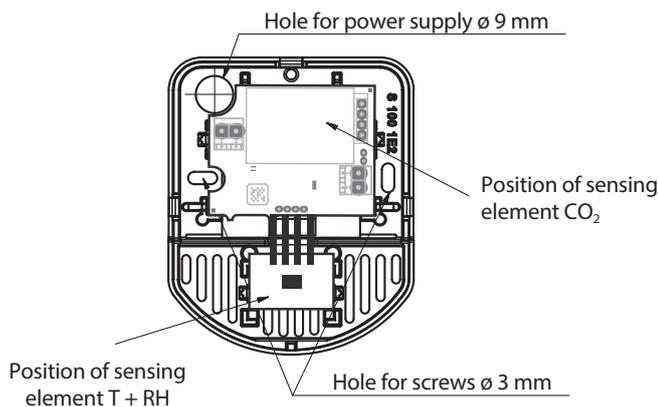
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

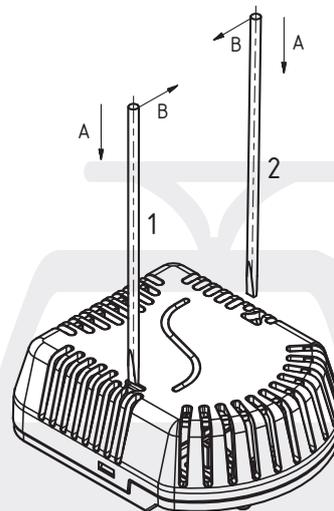
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z072.3a | 08/22

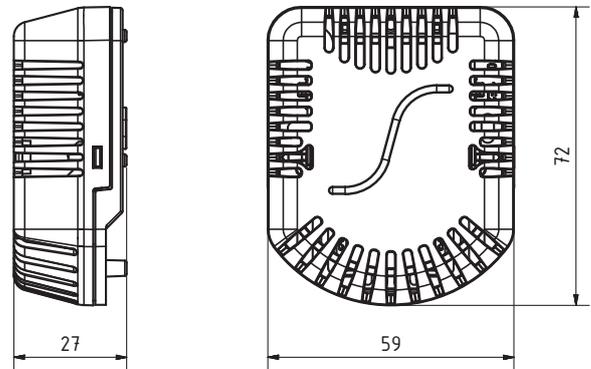
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**KSTHC 104**

 Temperature, relative humidity and CO<sub>2</sub> sensor to the interior with CAN protocol output (CANopen)


Z073.3a


**DESCRIPTION AND APPLICATION** ↓

The KSTHC 104 temperature, relative humidity and CO<sub>2</sub> sensor is designed to measure the carbon dioxide concentration, temperature and relative humidity of the air in spaces protected against water. In the application segment of railway vehicles, it is used to measure all of the three variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity and CO<sub>2</sub> concentration control system. The KSTHC 104 temperature, relative humidity and CO<sub>2</sub> sensor consists of a plastic ribbing head where a printed circuit board with the individual sensors and a converter is placed to establish a communication via the CAN bus. The temperature and relative humidity are measured by a common internal sensor whose signal is processed in a microprocessor and is converted to a CANopen output signal with CiA DS 301 specification. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to an output signal of MODBUS RTU. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor at the minimum CO<sub>2</sub> value corresponding to the outside concentration level. The KSTHC 104 temperature, relative humidity and CO<sub>2</sub> sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. Suitable design and high-quality material ensure that the sensor does not feel disturbing even in the interiors with high aesthetic requirements.

The KSTHC 104 temperature, relative humidity and CO<sub>2</sub> sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to temperature and chemical resistance of the head and of the individual sensors. The operating conditions to establish the correct function of CO<sub>2</sub> modul are:

- Ambient temperature in the vicinity of the sensor: 0 °C to 45 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 106 kPa

**TESTS, DECLARATION, CALIBRATIONS** ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

**SPECIFICATIONS** ↓

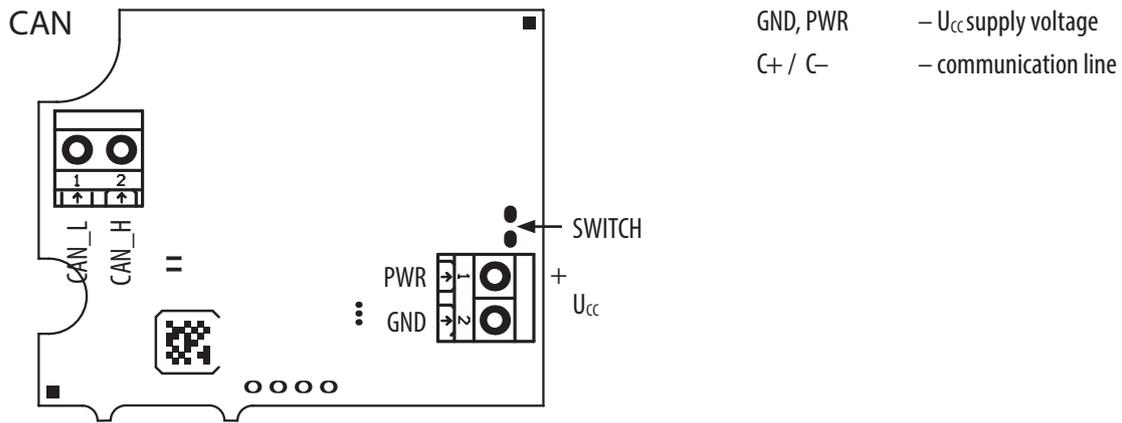
Sensor type	KSTHC 104
Temperature measurement range*	0 °C to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement, -30 °C to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement, -40 °C to 80 °C short-term
Temp. measurement accuracy*	± 0,5 °C
Relative humidity measurement range*	0 to 85 % with guaranteed accuracy of CO <sub>2</sub> measurement, 0 to 95 % without guaranteed accuracy of CO <sub>2</sub> measurement
Relative humidity measurement accuracy*	± 3 % in the range from 10 to 90 % ± 4.5 % in the range from 0 to 10 %
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm
Time response CO <sub>2</sub> (90%)	90 s
Output signal	CAN / CANopen – CiA DS 301
Supply voltage U	15 to 30 V <sub>DC</sub>
Rated supply voltage Un	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimension of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meets standard EN 45545-2)
Weight	min 35 g
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



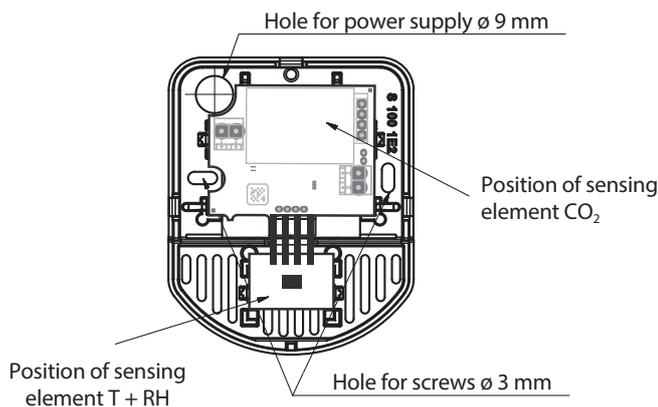
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

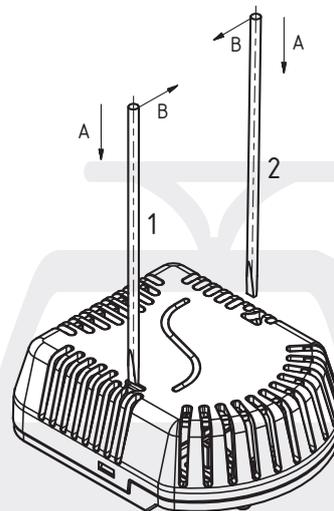
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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**KSTHPV 102**

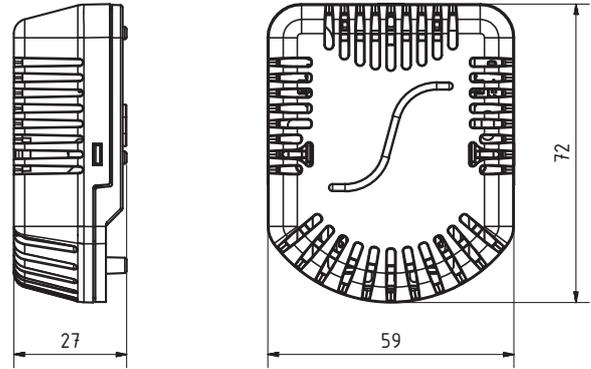
Temperature, relative humidity, atmospheric pressure and VOC interior sensor with RS 485 (MODBUS) output



Z075.2a



temperature humidity atm. pressure VOC


**DESCRIPTION AND APPLICATION**

Temperature, relative humidity, atmospheric pressure and VOC sensor – KSTHPV 102 is designed to measure air temperature, air relative humidity, atmospheric pressure and concentrations of volatile organic compounds. In the application segment of rail vehicles, it is used to measure all variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity, atmospheric pressure and air quality control system.

This combined sensor KSTHPV 102 consists of a plastic ribbing head containing a printed circuit board with the individual sensors and a converter to establish a communication via the RS 485 bus. Temperature, relative humidity, atmospheric pressure and VOC are measured by a common internal sensing element whose signal is processed in a microprocessor and is converted to a MODBUS RTU output signal. The KSTHPV 102 temperature, relative humidity, atmospheric pressure and VOC sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. The pleasant design and high-quality material ensure that this combined sensor does not seem intrusive even in interiors with high aesthetic requirements. Combined sensors KSTHPV 102 sensor is recommended to be installed on an inner wall at a height of 1.5 m, in areas with moving persons, not exposed to direct sunlight and not influenced by heat from walls, heat sources or lighting.

The KSTHC 102 temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to the temperature and chemical resistance of the head and of the individual sensors. Correct sensor function requires the following operating conditions:

- Ambient temperature around the sensor: -30 °C to 70 °C, for short periods -40 °C to 80 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 110 hPa

**TESTS, DECLARATION, CALIBRATIONS**

The type tests are carried out by a notified body according to EN 50155 standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with EN 50121-3-2 standard, as amended
- Insulation test in accordance with EN 50155 standard, as amended
- Shock and Vibrations test in accordance with EN 61373 standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the EN 45545-2 standard, as amended. Can be supplied with materials complying with fire safety standard NFPA 130 as amended.

**SPECIFICATIONS**

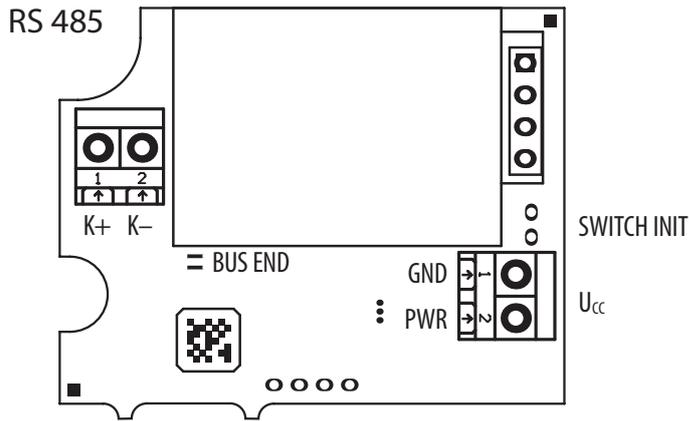
Sensor type	KSTHPV 102
Temperature measurement range*	-30 °C to 70 °C / -40 °C to 80 °C short-term
Temperature measurement accuracy*	± 0.5 °C at 25 °C / ± 1.0 °C in range 0 to 65 °C
Relative humidity measurement range*	0 to 95 %
Relative humidity measurement accuracy*	± 3 % in range 20 to 80 % ± 4.5 % in range 0 to 19 % and 81 to 95 %
VOC measurement range (IAQ index)*	0 to 500
VOC measurement accuracy*	± 15 %
Atm. pressure measurement range*	300 to 1100 hPa
Atm. pressure measurement accuracy* (in temperature range 0 °C to 65 °C in range 300–1100 hPa)	absolute deviation: ±0.6 hPa long-term temperature stability: ±1.0 hPa
Atm. pressure measurement accuracy* (in temperature range 25 °C to 40 °C in range 700–1100 hPa)	absolute deviation: ±0.12 hPa
Output signal	RS 485 / MODBUS RTU
U <sub>cc</sub> supply voltage range	15 to 30 V <sub>DC</sub>
Rated U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimensions of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meet standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration test	Category 1, class B in accordance with EN 61373
Weight	min 35 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



GND, PWR – U<sub>CC</sub> supply voltage  
 K+/K- – communication line  
 BUS END – RS 485 termination

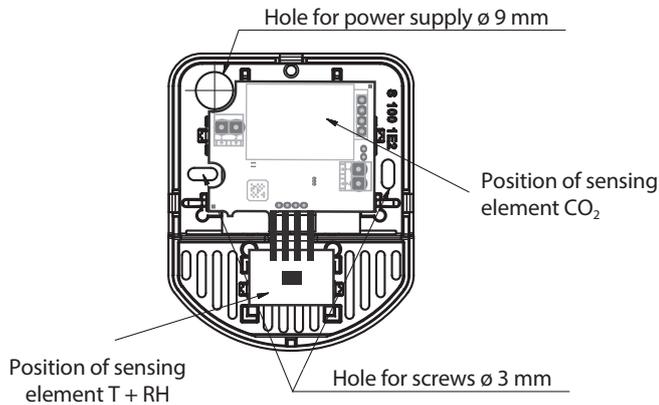
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

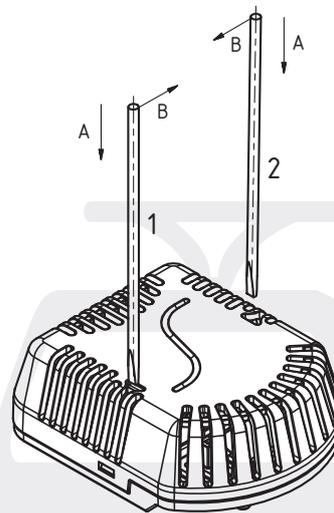
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

**For more detailed description of the installation, see the operating instructions for the sensor.**

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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Z075.2a | 08/22

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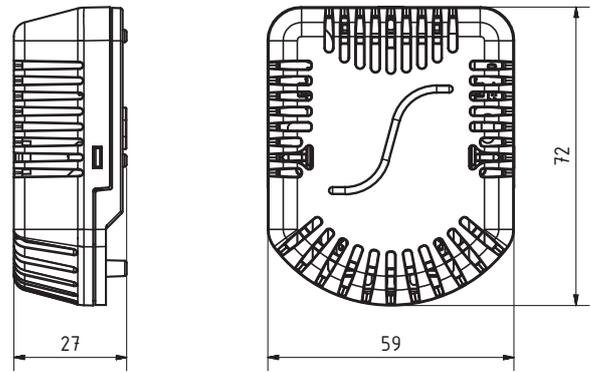


## KSTHPV 104

Temperature, relative humidity, atmospheric pressure and VOC interior sensor with CAN protocol output (CANopen)



Z076.2a



### DESCRIPTION AND APPLICATION ↓

Temperature, relative humidity, atmospheric pressure and VOC sensor – KSTHPV 104 is designed to measure air temperature, air relative humidity, atmospheric pressure and concentrations of volatile organic compounds. In the application segment of rail vehicles, it is used to measure all variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity, atmospheric pressure and air quality control system.

This combined sensor KSTHPC 104 consists of a plastic ribbing head containing a printed circuit board with the individual sensors and a converter to establish a communication via the CAN bus. Temperature, relative humidity, atmospheric pressure and VOC are measured by a common internal sensing element whose signal is processed in a microprocessor and is converted to a CANopen output signal with CiA DS 301 specification output signal. Combined sensors KSTHPC 104 sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. The pleasant design and high-quality material ensure that the combined sensor KSTHPV 104 does not seem intrusive even in interiors with high aesthetic requirements. Combined sensor KSTHPV 104 is recommended to be installed on an inner wall at a height of 1.5 m, in areas with moving persons, not exposed to direct sunlight and not influenced by heat from walls, heat sources or lighting.

The KSTHPV 104 temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to the temperature and chemical resistance of the head and of the individual sensors. Correct sensor function requires the following operating conditions:

- Ambient temperature around the sensor: -30 °C to 70 °C, for short periods -40 °C to 80 °C
- Relative ambient humidity: 0 to 95% (non-condensing humidity)
- Atmospheric pressure: 87 to 110 hPa

### TESTS, DECLARATION, CALIBRATIONS ↓

The type tests are carried out by a notified body according to EN 50155 standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with EN 50121-3-2 standard, as amended
- Insulation test in accordance with EN 50155 standard, as amended
- Shock and Vibrations test in accordance with EN 61373 standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-KL2-HL3 of the EN 45545-2 standard, as amended. Can be supplied with materials complying with fire safety standard NFPA 130 as amended.

### SPECIFICATIONS ↓

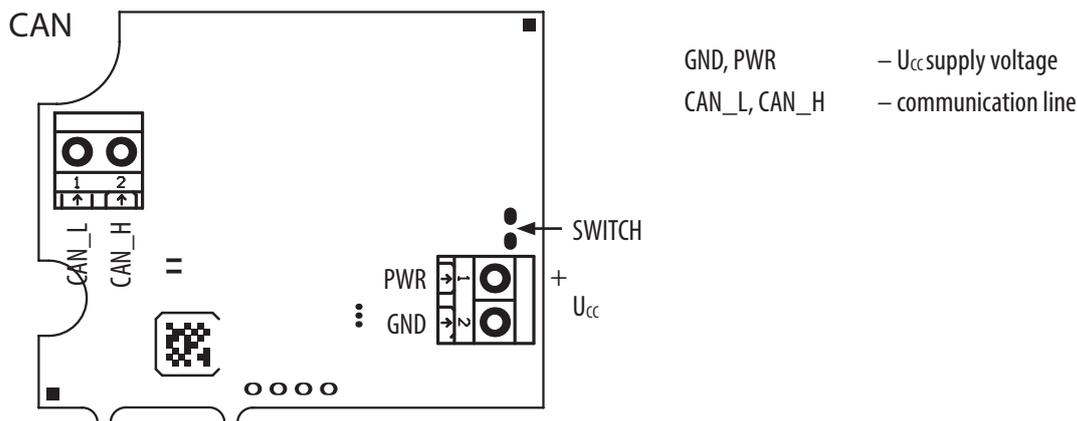
Sensor type	KSTHPV 104
Temperature measurement range*	-30 °C to 70 °C / -40 °C to 80 °C short-term
Temperature measurement accuracy*	± 0.5 °C at 25 °C / ± 1.0 °C in range 0 to 65 °C
Relative humidity measurement range*	0 to 95 %
Relative humidity measurement accuracy*	± 3 % in range 20 to 80 % ± 4.5 % in range 0 to 19 % and 81 to 95 %
VOC measurement range (IAQ index)*	0 to 500
VOC measurement accuracy*	± 15 %
Atm. pressure measurement range*	300 to 1100 hPa
Atm. pressure measurement accuracy* (in temperature range 0 °C to 65 °C in range 300–1100 hPa)	absolute deviation: ±0.6 hPa long-term temperature stability: ±1.0 hPa
Atm. pressure measurement accuracy* (in temperature range 25 °C to 40 °C in range 700–1100 hPa)	absolute deviation: ±0.12 hPa
Output signal	CAN / CANopen – CiA DS 301
U <sub>cc</sub> supply voltage range	15 to 30 V <sub>DC</sub>
Rated U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimensions of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meet standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration test	Category 1, class B in accordance with EN 61373
Weight	min 35 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



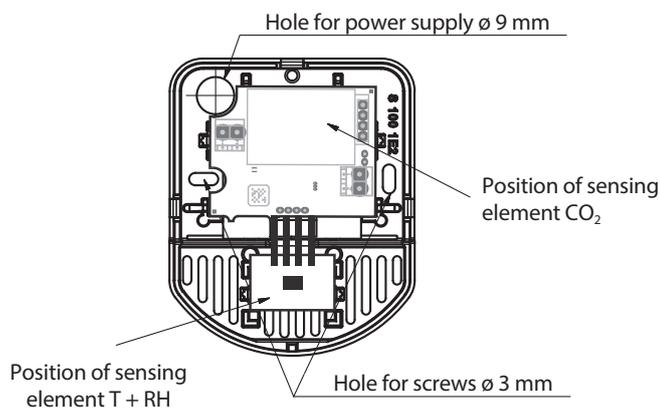
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

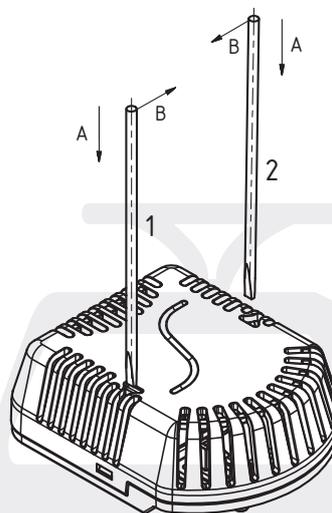
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the “Wiring diagram”,** position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

For more detailed description of the installation, see the operating instructions for the sensor.

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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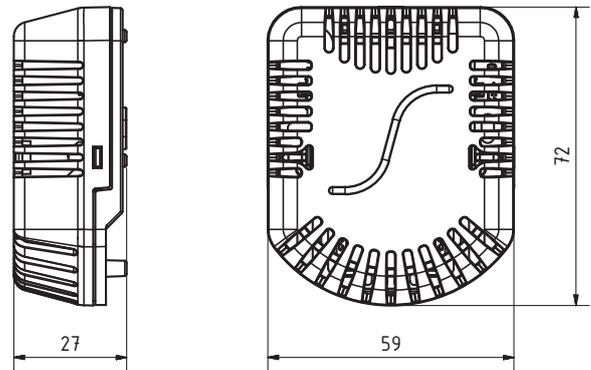
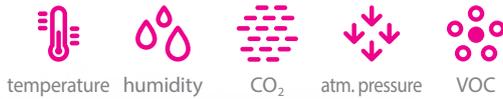
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**KSTHCPV 102**

 Temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC interior sensor with RS 485 (MODBUS) output


Z077.2a


**DESCRIPTION AND APPLICATION**

Temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor - KSTHCPV 102 is designed to measure carbon dioxide concentrations, air temperature, air relative humidity, atmospheric pressure and concentrations of volatile organic compounds. In the application segment of rail vehicles, it is used to measure all variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity, atmospheric pressure and air quality control system.

This combined sensor KSTHCPV 102 consists of a plastic ribbing head containing a printed circuit board with the individual sensors and a converter to establish a communication via the RS 485 bus. Temperature, relative humidity, atmospheric pressure and VOC are measured by a common internal sensing element whose signal is processed in a microprocessor and is converted to a MODBUS RTU output signal. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to a MODBUS RTU output signal. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor to the minimum CO<sub>2</sub> value corresponding to the outside concentration level. This sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. The pleasant design and high-quality material ensure that combined sensor KSTHCPV 102 does not seem intrusive even in interiors with high aesthetic requirements. Combined sensor KSTHCPV 102 is recommended to be installed on an inner wall at a height of 1.5 m, in areas with moving persons, not exposed to direct sunlight and not influenced by heat from walls, heat sources or lighting.

The KSTHCPV 102 temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to the temperature and chemical resistance of the head and of the individual sensors.

Correct function of the CO<sub>2</sub> sensor requires the following operating conditions:

- Ambient temperature around the sensor: 0 to 45 °C
- Relative ambient humidity: 0 to 95 % (non-condensing humidity)
- Atmospheric pressure: 87 to 110 kPa

**SPECIFICATIONS**

Sensor type	KSTHCPV 102
Temperature measurement range*	0 to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement -30 to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement. -40 to 80 °C short-term
Temperature measurement accuracy*	± 0.5 °C in temp. 25 °C / ± 1.0 °C in temp. 0 to 65 °C
Relative humidity measurement range*	0 to 85 % with guaranteed accuracy of CO <sub>2</sub> measurement 0 to 95 % without guaranteed accuracy of CO <sub>2</sub> measurement.
Relative humidity measurement accuracy*	± 3 % in range 20 to 80 % ± 4.5 % in range 0 to 19 % and 81 to 95 %
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm*
Time response CO <sub>2</sub> (90%)	90 s
VOC measurement range (IAQ index)*	0 to 500
VOC measurement accuracy*	± 15 %
Atm. pressure measurement range*	300 to 1100 hPa
Atm. pressure measurement accuracy* (in temperature range 0 °C to 65 °C in range 300–1100 hPa)	absolute deviation: ±0.6 hPa long-term temperature stability: ±1.0 hPa
Atm. pressure measurement accuracy* (in temperature range 25 °C to 40 °C in range 700–1100 hPa)	absolute deviation: ±0.12 hPa
Output signal	RS 485 / MODBUS RTU
U <sub>cc</sub> supply voltage range	15 to 30 V <sub>DC</sub>
Rated U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimensions of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meet standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration test	Category 1, class B in accordance with EN 61373
Weight	min 35 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

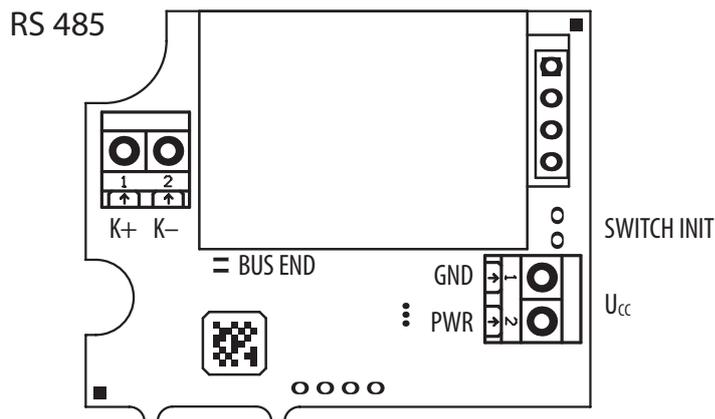
- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



GND, PWR –  $U_{cc}$  supply voltage  
 K+/K- – communication line  
 BUS END – RS 485 termination

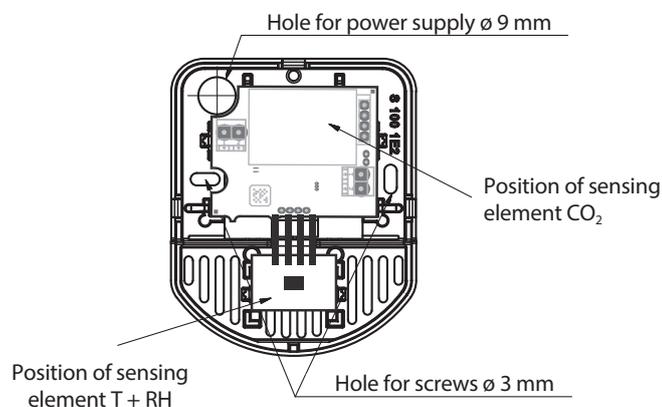
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

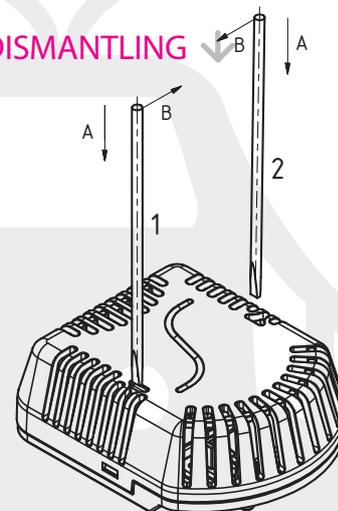
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

For more detailed description of the installation, see the operating instructions for the sensor.

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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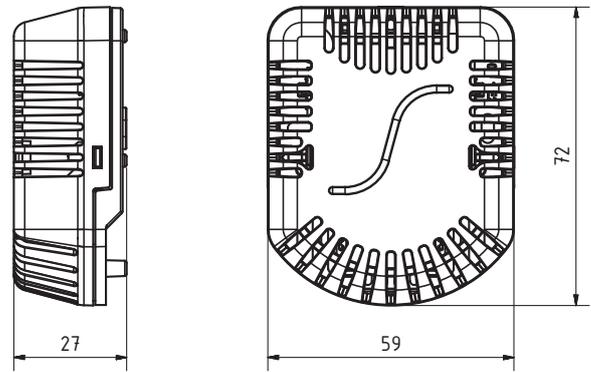
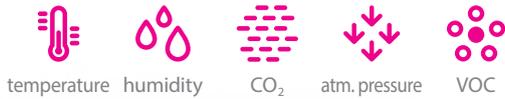
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**KSTHCPV 104**

 Temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC interior sensor with CAN protocol output (CANopen)


Z078.2a


**DESCRIPTION AND APPLICATION**

Temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor - KSTHCPV 104 is designed to measure carbon dioxide concentrations, air temperature, air relative humidity, atmospheric pressure and concentrations of volatile organic compounds. In the application segment of rail vehicles, it is used to measure all variables in passenger compartments of train units and carriages and is a part of the temperature, relative humidity, atmospheric pressure and air quality control system.

This combined sensor KSTHCPV 104 consists of a plastic ribbing head containing a printed circuit board with the individual sensors and a converter to establish a communication via the CAN bus. Temperature, relative humidity, atmospheric pressure and VOC are measured by a common internal sensing element whose signal is processed in a microprocessor and is converted to a CAN open with C/A DS 301 specification output signal. The CO<sub>2</sub> value is measured by a NDIR module whose digital signal is also converted to a CAN open output signal. For the CO<sub>2</sub> concentration sensor, there is an autocalibration function available to set the sensor to the minimum CO<sub>2</sub> value corresponding to the outside concentration level. This sensor meets the ingress protection of IP 30 according to EN 60529 standard, as amended. The pleasant design and high-quality material ensure that combined sensor KSTHCPV 104 does not seem intrusive even in interiors with high aesthetic requirements. Combined sensor KSTHCPV 104 is recommended to be installed on an inner wall at a height of 1.5 m, in areas with moving persons, not exposed to direct sunlight and not influenced by heat from walls, heat sources or lighting.

The KSTHCPV 104 temperature, relative humidity, atmospheric pressure, CO<sub>2</sub> and VOC sensor is designed to be operated in a chemically non-aggressive environment; its use must be chosen with regard to the temperature and chemical resistance of the head and of the individual sensors.

Correct function of the CO<sub>2</sub> sensor requires the following operating conditions:

- Ambient temperature around the sensor: 0 to 45 °C
- Relative ambient humidity: 0 to 95 % (non-condensing humidity)
- Atmospheric pressure: 87 to 110 kPa

**SPECIFICATIONS**

Sensor type	KSTHCPV 104
Temperature measurement range*	0 to 45 °C with guaranteed accuracy of CO <sub>2</sub> measurement -30 to 70 °C without guaranteed accuracy of CO <sub>2</sub> measurement. -40 to 80 °C short-term
Temperature measurement accuracy*	± 0.5 °C in temp. 25 °C / ± 1.0 °C in temp. 0 to 65 °C
Relative humidity measurement range*	0 to 85 % with guaranteed accuracy of CO <sub>2</sub> measurement 0 to 95 % without guaranteed accuracy of CO <sub>2</sub> measurement.
Relative humidity measurement accuracy*	± 3 % in range 20 to 80 % ± 4.5 % in range 0 to 19 % and 81 to 95 %
CO <sub>2</sub> measuring range*	400 to 5000 ppm
CO <sub>2</sub> measuring accuracy*	± 100 ppm*
Time response CO <sub>2</sub> (90%)	90 s
VOC measurement range (IAQ index)*	0 to 500
VOC measurement accuracy*	± 15 %
Atm. pressure measurement range*	300 to 1100 hPa
Atm. pressure measurement accuracy* (in temperature range 0 °C to 65 °C in range 300–1100 hPa)	absolute deviation: ±0.6 hPa long-term temperature stability: ±1.0 hPa
Atm. pressure measurement accuracy* (in temperature range 25 °C to 40 °C in range 700–1100 hPa)	absolute deviation: ±0.12 hPa
Output signal	CAN / CANopen - C/A DS 301
U <sub>cc</sub> supply voltage range	15 to 30 V <sub>DC</sub>
Rated U <sub>cc</sub> supply voltage	24 V <sub>DC</sub>
Consumption	maximum: 500 mW, typical: 250 mW
Ingress protection	IP 30 in accordance with EN 60529
Dimensions of the head	71.9 × 59 × 27 mm
Material of the head	LEXAN (meet standard EN 45545-2)
Recommended wire cross section	0.14 to 1 mm <sup>2</sup>
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for 1 minute in accordance with EN 50155
Shock and vibration test	Category 1, class B in accordance with EN 61373
Weight	min 35 g

\* The stated measurement ranges and accuracies for the individual sensors refer to operating conditions when the supply voltage is connected.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

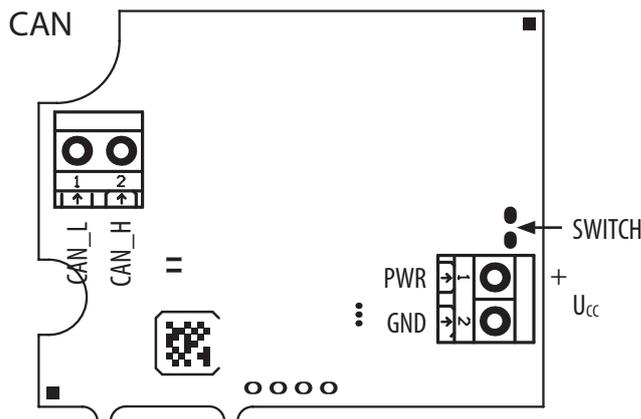
- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130** as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



GND, PWR –  $U_{CC}$  supply voltage  
CAN\_L, CAN\_H – communication line

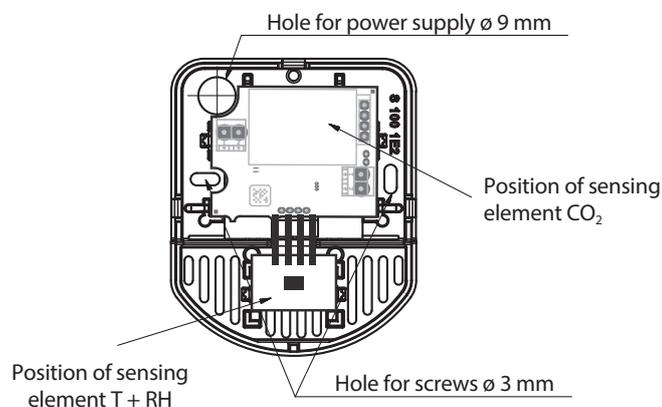
## SENSOR INSTALLATION ↓

The sensors are designed to be mounted on a wall or other horizontal surfaces and for the attachment it is necessary to prepare required holes for mounting screws using a template (delivered with the sensor).

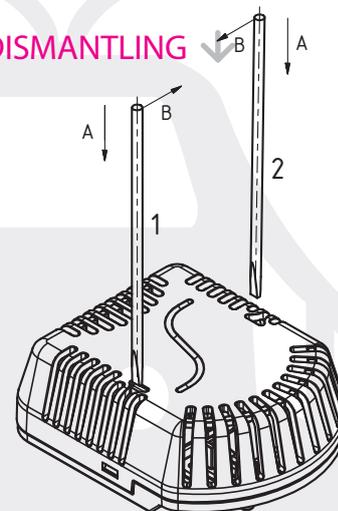
1. Before connecting the supply cable, it is necessary to separate the perforated cover from the plastic head base.
2. Remove the cover and insert the power cable through the 9 mm hole, apply the base to the surface and screw on with two screws or bolts. The length of the mounting bolts or screws for fastening must be chosen with respect to the thickness of the plastic head base. **Connect the power cable to the terminals according to the "Wiring diagram"**, position the perforated cover onto the attached base and lock it by clicking in.
3. After installing and connecting to the electrical measuring equipment, the sensor is ready for use. The sensor does not require any special servicing or maintenance.

For more detailed description of the installation, see the operating instructions for the sensor.

## OPERATING POSITION ↓



## COVER DISMANTLING ↓



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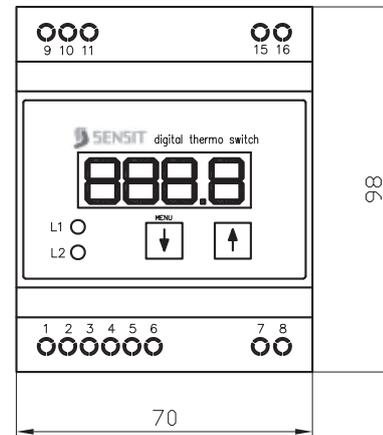



**KTSZ4H-24**

Temperature switch



Z032.7a


**DESCRIPTION AND APPLICATION** ↓

These temperature switches KTSZ4H-24 with display are designed for using as two-state controllers (ON/OFF type control). They compare the temperature set-point with the actual temperature value and enable switching the galvanically separated (electrically insulated) contacts of a connected relay when the set temperature is reached. Supply voltage of the switches is 10–35 V<sub>DC</sub> / 12–24 V<sub>AC</sub> (by the type). Two temperature sensing elements can be connected to the switches. The display indicates the present value of the measuring temperature during measuring process. Setting of individual parameters is executed by two control buttons. The switch can be used in 5 different modes:

- **Mode no. 1** – the switch operates as a single controller which switches the first relay by the set temperature interval and the second relay is switched at the exceeding set emergency temperature (only one sensing element is used)
- **Mode no. 2** – the switch operates as a double controller which switches each relay by the set temperature interval (only one sensing element is used)
- **Mode no. 3** – the switch operates as a double controller, which switch each relay separately according to temperature interval (two sensing elements are used, each separately for each relay)
- **Mode no. 4** – the switch operates as a differential controller which switches on the base of temperature difference of two sensing elements (analogous to mode no. 1)
- **Mode no. 5** – the switch operates as a differential controller which switches on the base of temperature difference of two sensing elements (analogous to mode no. 2)

The time delay of switching-off for the relay 1 within the limits 0–300 s can be set in each mode.

The switches are intended for assembly to the DIN slat. The temperature range of the switch applications depends on used temperature sensing element type (for example for the sensor in the KTG8/R case the range is -40 °C to 120 °C). Maximum operating temperature range of the switch is -50 °C to 400 °C.

The switches are intended for operating in a chemically non-aggressive environment.

**SPECIFICATIONS** ↓

Switch type	KTSZ4H-24
Output	2 relays
Type of sensing element	Pt 100/3850 or Pt 1000/3850 – standard Ni 1000/6180 – modification
Connection of the temperature sensor	<b>Modes of temperature switch 1 to 2:</b> 1 sensor – 2wire or 4wire <b>Modes of temperature switch 3 to 5:</b> 1 sensor – 2wire or 4wire, 2 sensors – 2wire
Maximum temperature operating range	-50 °C to 400 °C
Power supply	10–35 V <sub>DC</sub> / 12–24 V <sub>AC</sub> (recommended 24 V <sub>DC</sub> /V <sub>AC</sub> )
Maximum switched voltage	250 V <sub>AC</sub> / 10 A
Maximum error of the switch*	± (0.15 % from the value + 1 dig) – minimal error 0.2 °C
Resolution	0.1 °C
Setting range	-50 °C to 400 °C, step 0.1 °C
Display	4 digits - red LED, high of the digits 10 mm
Brightness of the display setting	4 levels
Updating of the display	< 0.2 s
Type of terminal board	terminal board ARK 210, wire cross section 0.35 to 1.5 mm <sup>2</sup>
Material of the case	LEXAN (meet standard EN 45545-2)
Case dimensions	98 × 70 × 61 mm
Ingress protection	IP 20 in accordance with EN 60529
Working conditions	ambient temperature: -40 °C to 80 °C relative humidity: max 85 % (at the ambient temperature 25 °C) atmospheric pressure: 87 to 107 kPa
Weight	0.15 kg (without sens. element)
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Fire protection resistance	in accordance with EN 45545-2, as amended (possible acc. to NFPA 130)

\*Error of the sensing element is not incorporated.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

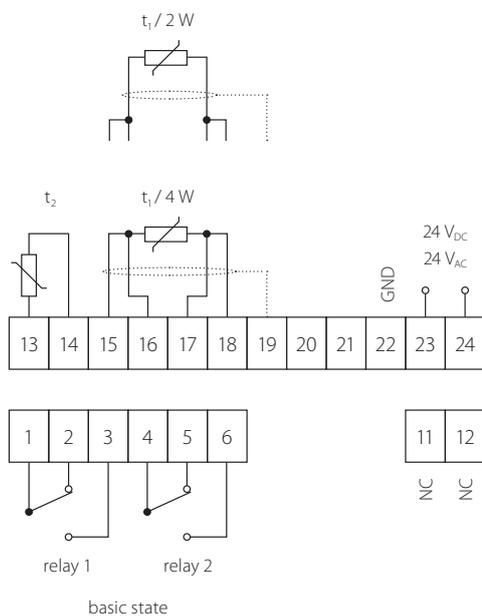
- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



## SWITCH INSTALLATION ↓

1. Place the converter to the DIN standard rail using a grip, which is a part of the plastic box.
2. Connect the cable from resistance sensor Pt 1000/3850 or Ni 1000/6180 and from power supply into appropriate terminals according to wiring diagram. Connect the cable to the output relay contacts according to the wiring diagram.
3. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.  
**The sensor does not require any special manipulation or maintenance.**



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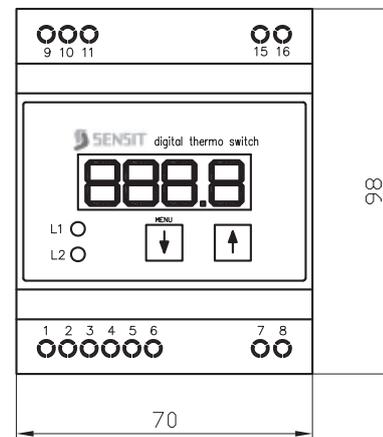



**KTSZ4H-24-RS485**

Temperature switch (MODBUS)



Z093.1a


**DESCRIPTION AND APPLICATION**

These temperature switches KTSZ4H-24 – RS 485 (MODBUS) with display are designed for using as two-state controllers (ON/OFF type control). They compare the temperature set-point with the actual temperature value and enable switching the galvanically separated (electrically insulated) contacts of a connected relay when the set temperature is reached. Supply voltage of the switches is 10–35 V<sub>DC</sub> / 12–24 V<sub>AC</sub> (by the type). Two temperature sensing elements on the base of Pt (Pt 1000/3850) or on the base of Ni (Ni 1000/6180) can be connected to the switches. The display indicates the present value of the measuring temperature during measure process. Setting of individual parameters is executed by two control buttons. The switch can be used in 5 different modes:

- **Mode no. 1** – the switch operates as a single controller which switches the first relay by the set temperature interval and the second relay is switched at the exceeding set emergency temperature (only one sensing element is used)
- **Mode no. 2** – the switch operates as a double controller which switches each relay by the set temperature interval (only one sensing element is used)
- **Mode no. 3** – the switch operates as a double controller, which switch each relay separately according to temperature interval (two sensing elements are used, each separately for each relay)
- **Mode no. 4** – the switch operates as a differential controller which switches on the base of temperature difference of two sensing elements (analogous to mode no. 1)
- **Mode no. 5** – the switch operates as a differential controller which switches on the base of temperature difference of two sensing elements (analogous to mode no. 2)

The time delay of switching-off for the relay 1 within the limits 0–300 s can be set in each mode.

Measurements and setting all parameters can be done by means of the industrial bus RS485 with the protocols ModBus RTU (standardly). With a simple converter RS485/RS232 the switch can be connected to the PC-serial port and so various settings can be made. For this purpose the software placed on the web site in download section. The switches are intended for assembly to the DIN slot. The temperature range of the switch applications depends on used temperature sensing element type (for example for the sensor in the KTG8/R case the range is -40 °C to 120 °C). Maximum operating temperature range of the switch is -50 °C to 400 °C. The switches are intended for operating in a chemically non-aggressive environment.

**SPECIFICATIONS**

Switch type	KTSZ4H-24-RS485
Output	2 relays
Type of sensing element	Pt 100/3850 or Pt 1000/3850 – standard Ni 1000/6180 – modification
Connection of the temperature sensor	<b>Modes of temperature switch 1 to 2:</b> 1 sensor – 2wire or 4wire <b>Modes of temperature switch 3 to 5:</b> 1 sensor – 2wire or 4wire, 2 sensors – 2wire
Maximum temperature operating range	-50 °C to 400 °C (acc. to sensing element type and temperature sensor variant)
Power supply	10–35 V <sub>DC</sub> / 12–24 V <sub>AC</sub> (recommended 24 V <sub>DC</sub> /V <sub>AC</sub> )
Maximum switched voltage	250 V <sub>AC</sub> / 10 A
Maximum error of the switch*	± (0.15 % from the value + 1 dig) – minimal error 0.2 °C
Resolution	0.1 °C
Setting range	-50 °C to 400 °C, step 0.1 °C
Display	4 digits - red LED, high of the digits 10 mm
Brightness of the display setting	4 levels
Updating of the display	< 0.2 s
Type of terminal board	terminal board ARK 210, wire cross section 0.35 to 1.5 mm <sup>2</sup>
Material of the case	LEXAN (meet standard EN 45545-2)
Case dimensions	98 × 70 × 61 mm
Ingress protection	IP 20 in accordance with EN 60529
Working conditions	ambient temperature: -40 °C to 80 °C relative humidity: max 85 % (at the ambient temperature 25 °C) atmospheric pressure: 87 to 107 kPa
Weight	0.15 kg (without sens. element)
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Fire protection resistance	in accordance with EN 45545-2, as amended (possible acc. to NFPA 130)

\*Error of the sensing element is not incorporated.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

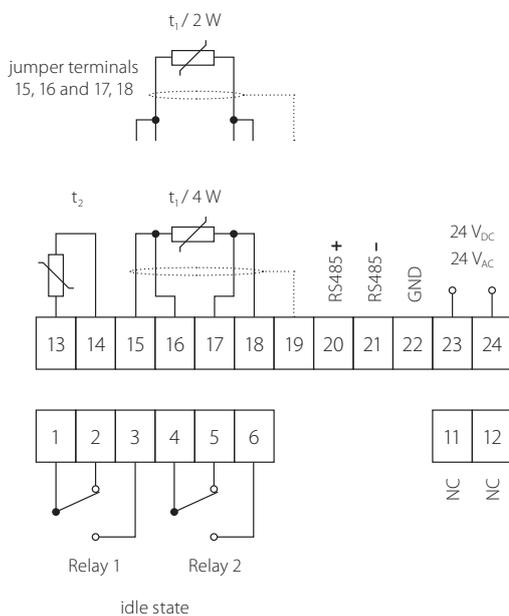
- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2**, as amended, Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## WIRING DIAGRAM ↓



## COMMUNICATION PROPERTIES ↓

Communication via RS485, maximum segment length is 1 200 m, asynchronous transfer

- transfer speed 1200, 2400, 4800 Bd
- 32 modules / 1 serial port
- protocol ModBus 1 stop bit, without parity

## SWITCH INSTALLATION ↓

1. Place the converter to the DIN standard rail using a grip, which is a part of the plastic box.
2. Connect the cable from resistance sensor Pt 1000/3850 or Ni 1000/6180 and from power supply into appropriate terminals according to wiring diagram. Connect the cable to the output relay contacts according to the wiring diagram.
3. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation.

**The sensor does not require any special manipulation or maintenance.**



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new




**KTSB 087/R**

Bimetallic switch with cable and smooth case



Z079.2a



## DESCRIPTION AND APPLICATION ↓

Bimetallic temperature switches series KTSB 087/R are designed as two-state controllers (ON/OFF control) that compare the preset and instantaneous temperature and immediately disconnect the contact when a defined temperature is reached. The required temperature of switching is defined according to the customer's needs by the selection of a bimetal thermal cutoff and cannot be changed.

Bimetallic temperature switches series KTSB 087/R consist of a stainless steel housing containing a bimetal switch (thermal cutoff) and supply cable.

They are used to signal exceeded temperature in various applications, e.g. to protect transformers, power semiconductor stages, motors and powerful batteries. The bimetallic temperature switches KTSB 087/R series are intended for operation in chemically non-aggressive environments.

## TESTS, DECLARATION, CALIBRATIONS ↓

The **type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.7, 12.2.8, 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2** standard, as amended - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTSB 087R
Sensor	bimetal TMC – C1B
Temperature range (selection of the tripping temperature)	70 °C to 120 °C (in 10 °C steps)*, the measuring range can be extended – see modification
Contact design	normally closed / snap action
Maximum switching voltage/current	10 000 cycles 250 V <sub>AC</sub> / 2.5 A 3 000 cycles 250 V <sub>AC</sub> / 6.3 A
Switching tolerance	± 5 °C
Case material	stainless steel DIN 1.4301
Case diameter	10 mm
Case length	50 to 120 mm
Ingress protection	IP 67 in accordance with EN 60529
Insulation resistance in normal environment	min. 20 MΩ
Contact connection	2wires
Lead-in cable	RADOX shielded 2 × 0.5 mm <sup>2</sup>
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Weight	min. 0.2 kg acc. to design

\*In 5 °C steps on request

## WIRING DIAGRAM ↓

■ Normally closed

■ Snap action



## MODIFICATIONS ↓

In case of change cable to silicone shielded  $2 \times 0.34 \text{ mm}^2$  (does not meet standard EN 45545-2) applies: temperature range: 70°C to 180 °C



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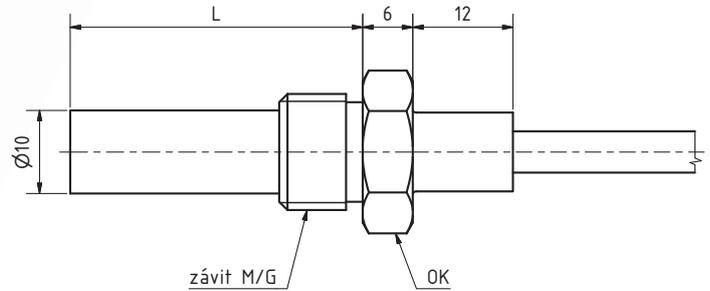



**KTSB 060/R**

Bimetallic switch with cable and smooth case



Z080.2a



## DESCRIPTION AND APPLICATION ↓

Series KTSB 060/R bimetal temperature sensors are designed as two-state controllers (ON/OFF control) that compare the preset and instantaneous temperature and immediately disconnect the contact when a defined temperature is reached. The required temperature is defined according to the customer's needs by the selection of a bimetal thermal cutoff and cannot be changed.

Bimetal switches KTSB 060/R series consist of a stainless steel housing containing a bimetal switch (thermal cutoff) and supply cable.

Bimetal switches KTSB 060/R series are used to signal exceeded temperature in various industrial applications, e.g. to protect transformers, power semiconductor stages, motors and powerful batteries. The Bimetal switches TSB 060/R series are intended for operation in chemically non-aggressive environments.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.7, 12.2.8, 12.2.9, 12.2.11

- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The product meets parameters in accordance with **EN 45545-2** standard, as amended - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Sensor type	KTSB 060/R
Sensor	bimetal TMC – C1B
Temperature range (selection of the tripping temperature)	70 °C to 120 °C (in 10 °C steps)*, measuring range can be extended, see modifications
Contact design	normally closed / snap action
Maximum switching voltage/current	10 000 cycles 250 V <sub>AC</sub> / 2.5 A 3 000 cycles 250 V <sub>AC</sub> / 6.3 A
Switching tolerance	± 5 °C
Case material	stainless steel DIN 1.4301
Case diameter	10 mm
Case length	30 to 100 mm incl. thread
Working range	-25 °C to 180 °C
Ingress protection	IP 67 in accordance with EN 60529
Insulation resistance in normal environment	min. 20 MΩ
Contact connection	2wires
Lead-in cable	RADOX shielded 2 × 0.5 mm <sup>2</sup> , RADOX up to 125 °C
Shock and vibration tests	category 2 in accordance with EN 61373
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Weight	min. 0.2 kg acc. to design

\* In 5 °C steps on request

## WIRING DIAGRAM ↓

■ Normally closed

■ Snap action



## MODIFICATIONS ↓

**In case of change cable to silicone shielded  $2 \times 0.34 \text{ mm}^2$  (does not meet standard EN 45545-2) applies: temperature range: 70°C to 180 °C**



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Z080.2a | 08/22

replace Z080.1a

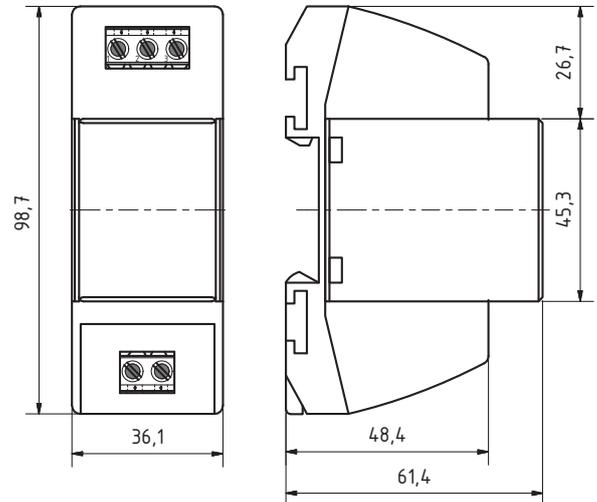



**KSTID**

Temperature to current (4 to 20 mA) converter



Z062.4a



## DESCRIPTION AND APPLICATION ↓

KSTID converters are intended for converting the signal of Ni 1000/6180, Pt 100/3850 or Pt 1000/3850 resistance-type temperature sensing elements to the unified signal 4 to 20 mA. These converters can be utilised in any control system compatible with 4 to 20 mA current output. Standard measuring ranges of the converter are listed in a table of technical parameters. Operating temperature range is -40 °C to 80 °C. These limits must not be exceeded even for a short time.

The sensors are designed to be operated in a chemically non-aggressive environment.

## TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS ↓

Converter type	KSTID Pt 100	KSTID Pt 1000	KSTID Ni 1000
Input signal	Pt 100/3850	Pt 1000/3850	Ni 1000/6180
Output signal	4 to 20 mA		
Standard measuring range	-30 °C to 60 °C 0 °C to 100 °C, 0 °C to 150 °C, 0 °C to 200 °C other according to customer		
Power supply U	11 to 30 V <sub>DC</sub>		
Nominal supply voltage U <sub>n</sub>	24 V <sub>DC</sub>		
Maximum voltage ripple U <sub>n</sub>	0.5 %		
Measurement error	< 0.6 % of the measuring range, minimum 0.5 °C		
Ambient temperature	-40 °C to 80 °C		
Box material	LEXAN (meets standard EN 45545-2)		
Ingress protection box / terminal board	IP 20 / IP 00 according to EN 60529		
Output voltage for sensing element break	> 24 mA		
Output voltage for sensing element short	< 3.5 mA		
Shock and vibration tests	category 1, class B in accordance with EN 61373		
Electromagnetic compatibility	in accordance with EN 50121-3-2		
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155		
Mean working life ≈ MTTF*	1.95 × 10 <sup>6</sup> hrs – based on theoretical calculation		

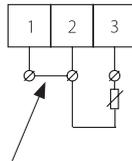
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

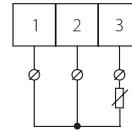


1, 2, 3 – sensor connection terminals  
U<sub>NAP</sub> – power supply arbitrary polarity, output 4 to 20 mA

■ 2wire connection  
(Pt 100, Pt 1000, Ni 1000)



■ 3wire connection  
(Pt 100, Pt 1000)



**NOTE:** For 2wire connection must be short circuit of jumper between terminals 1 and 2 plugged in.

## SENSOR INSTALLATION ↓

1. Connect converter to wall or DIN bar by using clamping strip, which is part of the box.
2. The lead-in cable is connected to the terminals according to the wiring diagram.
3. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance.**



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Z062.4a 08/22

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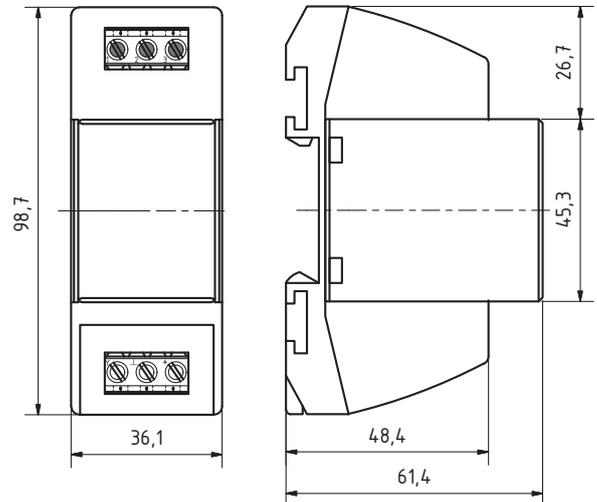



**KSTUD**

Temperature to voltage (0 to 10 V) converter



Z063.4a



### DESCRIPTION AND APPLICATION ↓

The converters of the type KSTUD are intended for converting the signal of the Pt 100/3850 or Pt 1000/3850 resistance-type temperature sensing elements to a unified signal 0 to 10 V. These converters can be utilised in any control system compatible with 0 to 10 V voltage output. Standard measuring ranges of the converter are listed in a table of technical parameters. Operating temperature range is -40 °C to 80 °C. These limits must not be exceeded even for a short time.

The sensors are designed to be operated in a chemically non-aggressive environment.

### TESTS, DECLARATION, CALIBRATIONS ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended.

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

### SPECIFICATIONS ↓

Converter type	KSTUD Pt 100	KSTUD Pt 1000
Input signal	Pt 100/3850	Pt 1000/3850
Output signal	0 to 10 V	
Standard measuring range	-30 °C to 60 °C 0 °C to 100 °C, 0 °C to 150 °C, 0 °C to 200 °C other according customer	
Power supply U	15 to 30 V <sub>DC</sub>	
Nominal supply voltage U <sub>n</sub>	24 V <sub>DC</sub>	
Measurement error	< 0.6 % of the measuring range, minimum 0.5 °C	
Ambient temperature	-40 °C to 80 °C	
Box material	LEXAN (meets standard EN 45545-2)	
Ingress protection box / terminal board	IP 20 / IP 00 according to EN 60529	
Output voltage for sensing element break	> 14 mA	
Output voltage for sensing element short	~ 0 V	
Shock and vibration tests	category 1, class B in accordance with EN 61373	
Electromagnetic compatibility	in accordance with EN 50121-3-2	
Insulation test	4 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155	
Mean working life ≈ MTTF*	1.95 × 10 <sup>6</sup> hrs – based on theoretical calculation	

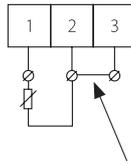
\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓

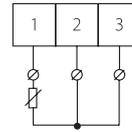
1	2	3
sensor		
output / supply		
Y	⊥	+

1, 2, 3 – sensor connection terminals  
 Y – output 0 to 10 V  
 ⊥ – negative pole of power supply  
 + – positive pole of power supply

■ 2wire connection  
 (Pt 100, Pt 1000)



■ 3wire connection  
 (Pt 100, Pt 1000)



**NOTE:** For 2wire connection must be short circuit of jumper between terminals 2 and 3 plugged in.

## SENSOR INSTALLATION ↓

1. Connect converter to wall or DIN bar by using clamping strip, which is part of the box.
2. The lead-in cable is connected to the terminals according to the wiring diagram.
3. After installing and connecting the sensor to the appropriate evaluating electrical equipment, the sensor is ready to use.  
**The sensor does not require any special attendance or maintenance.**



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Z063.4a | 08/22

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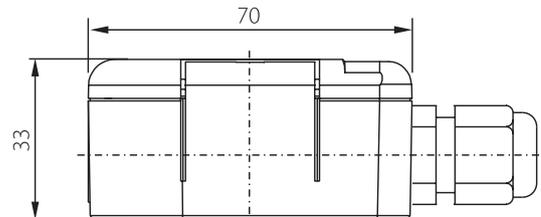



**KST RS485**

Temperature to RS 485 (MODBUS) converter



Z094.1a


**DESCRIPTION AND APPLICATION** ↓

KST RS485 convertor (temperature to RS 485) is intended for converting the signal of Pt 1000/3850 resistance-type temperature sensing elements to the digital signal RS 485 / MODBUS RTU. These converters can be utilised in any control system compatible with RS 485 digital output. Standard measuring ranges of the converter is -50 to 200 °C. Operating temperature range is -40 °C to 80 °C. These limits must not be exceeded even for a short time.

The convertors are designed to be operated in a chemically non-aggressive environment.

KST RS485 convertor - the plastic case is made of LEXAN material meets requirements of EN 45545-2, and is identical to, for example, the connection head of KS 120 sensors. It is provided with a wall bracket or with a clip for attaching to a DIN rail. The plastic box meets the IP 65 ingress protection requirements according to the EN 60529 standard, as amended.

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

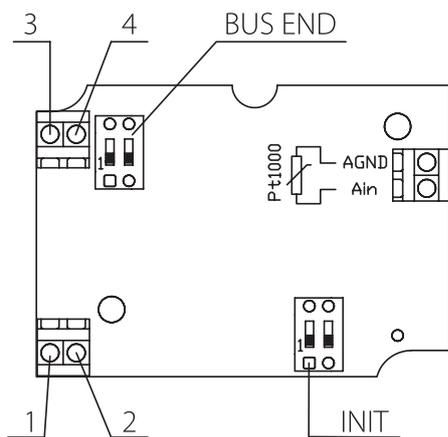
**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS** ↓

Converter type	KST RS485
Input signal	Pt 1000/3850
Output signal	RS 485 / MODBUS RTU
Communication properties	Communication via RS 485 maximum segment length is 1200 m, asynchronous transfer Preset transfer speed 9600 Bd optional transfer speeds 1200, 2400, 4800, 9600, 19200, 57600, 115200 Bd - DIP switch 247 modules / 1 serial port Protocol ModBus RTU 1 stop bit, without parity
Standard measuring range	-50 °C to 200 °C
Power supply U	15 to 35 V <sub>DC</sub> (unstabilized) 14 to 24 V <sub>AC</sub>
Power consumption	max. 1000 mW
Nominal supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Accuracy of electronics	0.05 %
Resolution	0.01 °C
Box material	LEXAN (meets standard EN 45545-2)
Ingress protection	IP 65 in accordance with EN 60529
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF*	1.95 × 10 <sup>6</sup> hrs – based on theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓



- 1 – power supply
- 2 – power supply
- 3 – + data bus RS 485
- 4 – – data bus RS 485
- INIT – INIT mode initialization
- BUS END – connection for bus ending

## SENSOR INSTALLATION ↓

1. Before connecting the power supply cable open the plastic head. To open gradually slide a flat screwdriver into the first and the second lid grooves and release the lid by deflecting the handles.
2. Connect the lead-in cable from Pt 1000/3850, RS 485 and from power supply to the terminals according to the wiring diagram through the loosened grommet. **Connection of the power supply is not dependent on the polarity.** Next grommet can be used for leading of communication line to next converter in case of involvement of more converters in series. **To insure the ingress protection value of IP 65, the grommet has to be tightened after connecting the lead-in cable.**
3. Place the converter according to the type to the DIN standard rail using a grip or on horizontal surface by using two assembly screws or common screws of  $\varnothing 4$  mm, inserted in the inside holes in the converter head. The length of the screws or common screws for fixing must be selected with respect to the depth of the internal openings of the plastic head, which is 13 mm.
4. The lid has to be put on after connecting the lead-in cable. **The holds on the plastic head must to click into the original position.**
5. After installation and connection to the consequential electrical measuring device, the sensor is ready for operation. The sensor does not require any special manipulation or maintenance.



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Z094.1a | 08/22

new

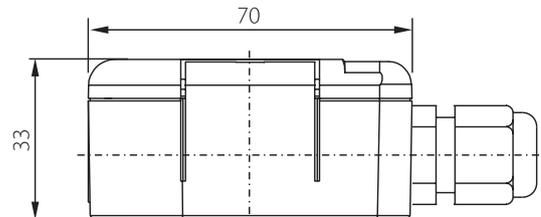



**KST CAN**

Temperature to CAN protocole Converter



Z095.1a


**DESCRIPTION AND APPLICATION** ↓

KST CAN convertor (temperature to CAN protocole) is intended for converting the signal of Pt 100/3850 resistance-type temperature sensing elements to the digital signal CAN / CANopen – CiA DS 301. These converters can be utilised in any control system compatible with CAN protocole digital output. Standard measuring ranges of the converter is -50 °C to 250 °C. Operating temperature range is -40 °C to 80 °C. These limits must not be exceeded even for a short time. The converters are designed to be operated in a chemically non-aggressive environment.

KST CAN converter - the plastic case is made of LEXAN material meets requirements of EN 45545-2, and is identical to, for example, the connection head of KS 120 sensors. It is provided with a wall bracket or with a clip for attaching to a DIN rail. The plastic box meets the IP 65 ingress protection requirements according to the EN 60529 standard, as amended.

**TESTS, DECLARATION, CALIBRATIONS** ↓

**The type tests** are carried out by a notified body according to **EN 50155** standard, as amended Railway applications – Electronic equipment used on rolling stock, Art. 12.2.9, 12.2.11

- Electromagnetic Compatibility in accordance with **EN 50121-3-2** standard, as amended
- Insulation test in accordance with **EN 50155** standard, as amended
- Shock and Vibrations test in accordance with **EN 61373** standard, as amended

The material of the plastic connection head meets a set of requirements for the R 24 materials according to the Table 5 for the fire hazard level HL1-HL2-HL3 of the **EN 45545-2** standard, as amended. Can be supplied with materials complying with fire safety standard **NFPA 130**, as amended.

Manufacturer provides **EU Declaration of Conformity**.

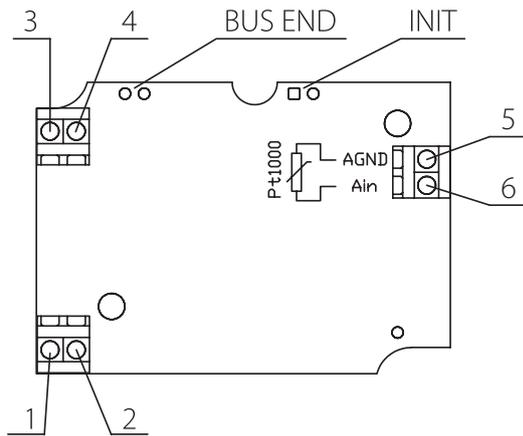
**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

**SPECIFICATIONS** ↓

Converter type	KST CAN
Input signal	Pt 100/3850
Output signal	CAN / CANopen – CiA DS 301
Standard measuring range	-50 °C to 250 °C
Power supply U	10 to 35 V <sub>DC</sub> (unstabilized) 14 to 24 V <sub>AC</sub>
Power consumption	max. 1000 mW
Nominal supply voltage U <sub>n</sub>	24 V <sub>DC</sub>
Accuracy of the electronics	± 0.2 °C
Box material	LEXAN (meets standard EN 45545-2)
Ingress protection	IP 65 in accordance with EN 60529
Working conditions	ambient temperature: -40 °C to 80 °C relative air humidity: max. 100 % atmospheric pressure: 70 to 107 kPa
Shock and vibration tests	category 1, class B in accordance with EN 61373
Electromagnetic compatibility	in accordance with EN 50121-3-2
Insulation test	1.5 kV <sub>DC</sub> for time 1 minute in accordance with EN 50155
Mean working life ≈ MTTF*	1.95 × 10 <sup>6</sup> hrs – based on theoretical calculation

\* Under the environmental and operational conditions specified in approved testing methodology.

## WIRING DIAGRAM ↓



- 1 – power supply PWR
- 2 – power supply GND
- 3 – data bus CANL
- 4 – data bus CANH
- 5 – AI+ input for Pt1000
- 6 – AI- input for Pt1000
- INIT – INIT mode initialization
- BUS END – connection for bus ending



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*Custom production of temperature sensors is a natural part of company SENSIT s.r.o. This means design and production of unit quantities of special temperature sensors for specific customer applications, including all relevant standards for railway vehicles.*

## WE CAN OFFER ↓

1. Cooperation, our experience and support for the development of suitable sensor for your application. The personal negotiation with our technician in your company.
2. Ensure the required certification, norm declaration in english, german, russian and other languages.
3. Design and production of temperature sensors in "customs case"
  - production of sensors according to samples or drawings
  - modification of the standard cases
  - production of sensors with difficult and unusual case design
  - production of sensors with small case diameter – from 1.5 mm
  - proposing of assembly according to the application
4. Encapsulation of special sensing element
  - KTY ■ NTC ■ TSic
  - SMT 160
  - two and more sensing elements to the case
5. Sensors compliant with special requirements for
  - resistance to vibration
  - high resistance to abrasive action
  - use at cryogenic temperatures
  - frequent repeatability and stability
  - required high accuracy
  - execution and compliance standards (tests) el. strenght and puncture
  - very fast response to temperature changes
6. Standardly used materials are replaced according to your requirements, as for example in areas such as housing material
  - tin bronze CuSn9 ■ plastics - makromelt ■ aluminium (alloy)
  - stainless steel DIN 1.4571 ■ brassFor cable, shrinking tubes
  - PFA ■ Viton ■ Kynar ■ flame retardant cable – FM 4910
  - cables for application under soil, and others

## COMPLEX SERVICE INCLUDES ↓

- technical support and consulting to design the sensor which you need, personal approach
- production and delivery of samples
- our quotation is calculated on the base of your required quantity
- production of sensors including control of every sensor, for every piece
- delivery date between 7 to 21 days
- express production and delivery within possibilities of technological process











Sensors, Switches  
and Converters  
for Railway Vehicles



temperature



humidity



CO<sub>2</sub>



atm. pressure



VOC



level



flow



position

Germany

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