

## PRODUCT MANUAL

### APPLICATION

- For remote measurement of temperature, especially measurement of temperature of a plasticizing cylinder of the machines for processing plastic materials and for similar applications, when the sensor is installed in the bore of the measured equipment

The sensors are not rated products pursuant to the Act No. 22/1997 Coll.

### DESCRIPTION

The temperature sensor consists of jacketed thermoelectric couple with connected compensation wiring. The sensor is spring-loaded and a screw-joint with a bayonet closure is used for its connection. Immersion of the sensor can be adjusted within the range of 20 to 110 mm.

To measure temperature, a defined change of the thermoelectric voltage of the thermocouple in dependence on the change of temperature of the measured environment is used.

### TECHNICAL DATA

The sensor is designed pursuant to ČSN EN 61140 ed.2 as an electrical equipment of protection class III for the application in networks with the category of overvoltage in the installation II and pollution grade 2 pursuant to ČSN EN 61010-1, the follow-up (evaluation) device shall comply with Article 6.3 thereof.

**Measurement range:** 0 to 400 °C

**Electric strength** pursuant to ČSN EN 61010-1, Article 6.8.4: 500 V eff

**Electric insulation resistance** pursuant to ČSN EN 61515: min. 1000 M $\Omega$ , at ambient temperature 20  $\pm$  15 °C and max. 80 % relative humidity

**Ingress protection** pursuant to ČSN EN 60529: IP 60

**Operation position:** discretionary

**Type of operation:** continuous

**Weight of sensor with compensation wiring:**

$L_1$	1.5m	approx.	0.135 kg
	3.0m		0.200 kg

**Applied materials:**

Stem tube INCONEL 600  
Adjustable bayonet connection steel class 17.  
Compensation wiring insulation from glass fibres, external jacketing from galvanized steel wire

### OPERATION CONDITIONS

The environment is defined by the group of parameters and their severity grades IE 36 pursuant to ČSN EN 60721-3-3 and the following operation conditions.

**Temperature of the sensor stem in the place of connection of the compensation wiring:** permanently max. 180 °C

**Relative ambient humidity:**

10 to 100 % with condensation, with upper limit of water content 29 g H<sub>2</sub>O/kg of dry air

**Atmospheric pressure:** 70 to 106 kPa

**Vibrations:** Frequency range 10 to 500 Hz

Drift amplitude 0.15 mm

Acceleration amplitude 19.6 ms<sup>-2</sup>

### METROLOGICAL DATA

**Sensing unit:** measuring thermocouple J (Fe-CuNi) or K (NiCr-NiAl) pursuant to ČSN EN 60584-1,  $\varnothing$  4.5 mm, tolerance class 2 pursuant to ČSN IEC 584-2, single with insulated or grounded measuring connection

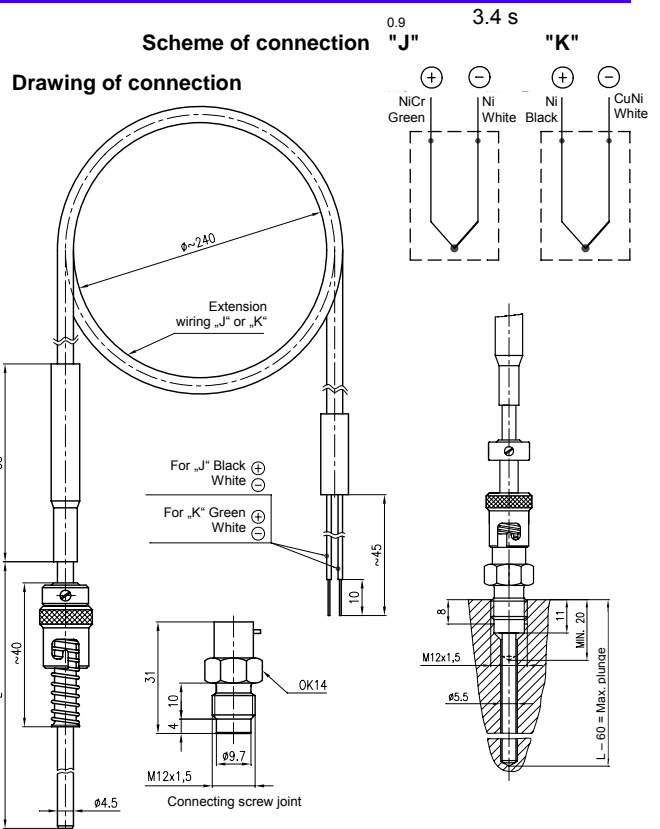
**Calibration depth of immersion:** 100 mm

**Temperature response time** pursuant to ČSN IEC 751 in whirling water (characteristic value) without heat sink (independent measuring insert):

Grounded design 1.0 s

0.9 2.5 s

Insulated design 1.5 s



### DESIGNATION

#### Data on sensor

- Trademark of the manufacturer
- Made in Czech Republic
- Type of thermoelectric couple / tolerance class
- Measuring range
- Product number
- Product ordering number
- Ingress protection

### DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Sensor pursuant to the purchase order
- Accompanying technical documentation in Czech
  - o Product quality and completeness certificate, which is also the warranty certificate
  - o Calibration sheet (for calibrated design)
  - o Product manual

If it is established in the purchase contract or agreed otherwise, other documentation can be also delivered with the product

### PACKING

Both sensors and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

### TRANSPORT

The sensors may be transported on conditions corresponding to the set of combinations of classes IE 21 pursuant to ČSN EN 60721-3-2 (i.e. by airplanes and trucks, in premises that are ventilated and protected against atmospheric conditions).

### STORAGE

The sensors may be stored on conditions corresponding to the set of combinations of classes IE 11/1K3 pursuant to ČSN EN

60721-3-1 (i.e. in places with temperature from -5 to 45 °C and with humidity from 5 to 95%, without a special threat of an attack with biological agents, with vibrations of small

significance and not situated close to sources of dust and sand.)

**DESIGN OF TEMPERATURE SENSORS**

SPECIFICATION		ORDERING NUMBER						
		302	x	x	5	7	x	x
Length of stem L [mm]	120 (min. immersion 20 mm, max. immersion 60 mm)		1					
	170 (min. immersion 20 mm, max. immersion 110 mm)		2					
	Other *)		9					
Jacketed thermoelectric thermocouple 4.5 mm	<b>J</b> (Fe-CuNi)	pursuant to ČSN EN 60584-1		0	1			
	<b>K</b> (NiCr-NiAl)	tol. class 2 (pursuant to ČSN IEC 584-2)		0	2			
	With insulated end					1		
	With grounded end					2		
Length of compensation wiring L <sub>1</sub> [m]	1.5						0	1
	3.0						0	2
	Other *)						0	9

\*) Only as a special requirement after an agreement with the manufacturer

**ORDERING OF TEMPERATURE SENSORS**

The purchase order shall specify

- Name
- Product ordering number
- If calibration is required and in what temperature points
- Other (special) requirements
- Number of pieces

**PURCHASE ORDER EXAMPLE**

**Standard design:**

Thermoelectric temperature sensor with cable outlet, plasticizing  
302 101 101 - 6 pcs

**Special requirement:**

Thermoelectric temperature sensor with cable outlet, plasticizing  
302 901 109 - 6 pcs  
Length of compensation wiring 5m  
Length of stem 200 mm

**CALIBRATION**

It is realized pursuant to TPM 3322-94 and in compliance with ČSN EN 584, usually in three temperature points spread evenly within the operation range of the sensor or in the points according to the requirement of the customer. Calibration sheets with measured data are issued for calibrated sensors.

**INSTALLATION AND CONNECTION**

The sensors are connected into the bores of plasticizing machines with the use of a bayonet connection. The required nominal length shall be adjusted with the use of two adjustment screws on the adjustable bayonet connection. During the adjustment, the condition of spring-loaded stem of the sensor in the bore shall be complied with.

The operation position of the sensors is discretionary.

During the installation of the connecting screw joint, torque of 10 Nm is recommended.

The electrical connection may be only realized by qualified workers pursuant to § 5 of the Decree 50/1978 Coll.

The sensor is connected to the evaluation device either directly by the connection of the compensation wiring to the applicable terminals of the device with inner compensation or to the terminals of the compensation box (or thermostat of comparison ends) and further with the interconnection wiring to the terminals of devices without inner compensation.

**COMMISSIONING**

After the sensor installation and connection of the follow-up (evaluation) device to the supply voltage, the equipment is prepared for operation.

**OPERATION AND MAINTENANCE**

The sensor does not require any operation and maintenance,

**SPARE PARTS**

The design of the sensor does not require any delivery of spare parts.

**WARRANTY**

Pursuant to Section 429 of the Commercial Code and the provisions of Section 620 (2) of the Civil Code, the manufacturer warrants for technical and operation parameters of the product specified in the manual. The warranty period is 24 months from the receiving of the product by the customer, unless established otherwise in the contract. Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

**REPAIRS**

The sensors shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

**DISABLING AND LIQUIDATION**

They shall be realized in compliance with the Waste Act No. 106/2005 Coll.

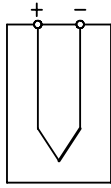
The product and its package do not include any parts that could impact the environment.

Products that are withdrawn from operation, including their packages, may be disposed of to sorted or unsorted waste pursuant to the type of waste.

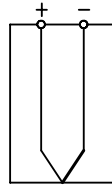
The package of the sensor can be recycled completely. Metal parts of the products are recycled, non-recyclable plastic materials and electrical waste shall be disposed of in compliance with the aforesaid Act.

Figure 1 – Design of measuring ends of jacketed thermocouples (schematic illustration)

INSULATED END



GROUNDED END



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