



# MMG Műszerszerviz Kft.

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## APPLICATION

- for remote measurement of temperature, especially for measurement of temperature of plasticizing cylinders of machines for processing plastic materials and for other similar applications, where the sensor is installed in the bore of the measured equipment
- up to overpressure 100 kPa

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

## DESCRIPTION

A measuring resistor with internal wiring is inserted into a stem tube, which is ended with a case with a screw-joint and a spring. The measuring resistor with internal wiring is isolated from the jacket of the stem tube and output wires are sealed with insulation material. Output wires are protected with a metal hose. The stem tube of the sensor is spring-loaded. The sensor cannot be dismantled.

To measure temperature, a defined change of sensor resistance in dependence on the change of temperature of the measured environment is used.

## TECHNICAL DATA

The sensor is designed pursuant to ČSN EN 61010-1 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; the follow-up (evaluation) device shall comply with Article 6.3 thereof.

**Measuring range:** 0 to 350 °C

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

**Electric insulation resistance** pursuant to ČSN IEC 751, Article 4.2.1:  
min. 100 MΩ, at 15 to 35°C, max. 80 % relative humidity

**Ingress protection** pursuant to ČSN EN 60529: IP 65

**Operation position:** discretionary

**Sensor weight without wire:**

for L = 63	approx. 0.08 kg
for L = 80	approx. 0.10 kg
for L = 100	approx. 0.12 kg
for L = 120	approx. 0.14 kg
pair of wires incl. hose	approx. 0.1 kg/m

continuous

**Type of operation:**

**Applied materials:**

Stem tube of measuring insert	steel 1.4541
Case with screw-joint	steel class 11, galvanic zinc coating
Internal wiring	Cu
Output wires	Cu cores with isolation silicone isolation
Protective hose	brass

## 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 sensor case and output wires:**  
continually 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 150 Hz  
Drift amplitude 0.2 mm  
Acceleration amplitude 29.4 ms<sup>-2</sup>

## METROLOGICAL DATA

**Sensing unit:** measuring resistor Pt 100 single in the connection pursuant to the scheme and table of

designs,

$\alpha = 0.00385 [K^{-1}]$ , tolerance class B or A (only for 4-wire) pursuant to ČSN IEC 751

**Internal wiring resistance** of both cores at 20 °C: 0.07 Ω/m

**Maximum current load of measuring resistor:** 5 mA

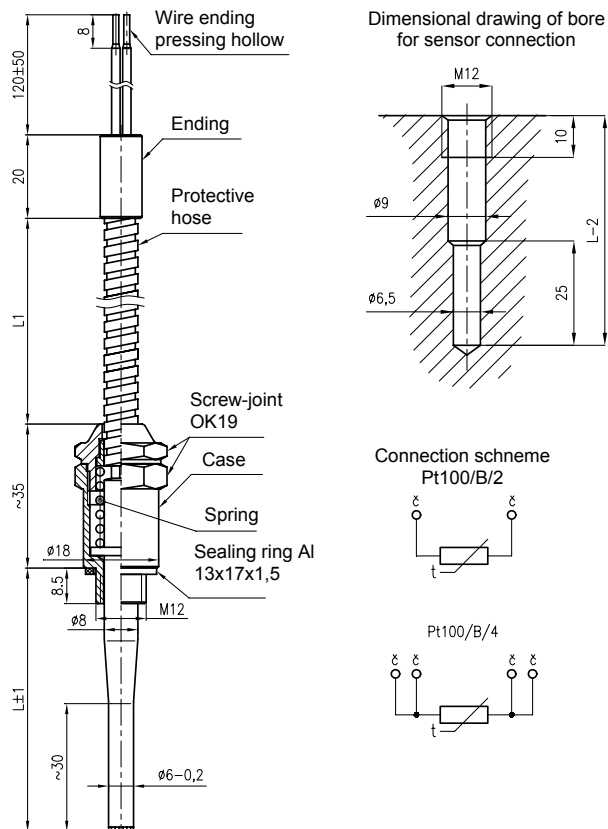
**Recommended measuring current:** 1 mA

**Calibration depth of immersion:** 100 mm

**Temperature response time** pursuant to ČSN IEC 751 in

whirling water (characteristic value):  $\tau_{0.5}$  5 s

$\tau_{0.9}$  12 s



## DESIGNATION

**Data on sensor case**

- Trademark of the manufacturer
- Type of resistance sensor, nominal value  $R_0$  / tolerance class / configuration of wires of internal wiring
- Product ordering number
- Ingress protection
- Production time code
- Maximum operation temperature

## DELIVERY

Unless agreed otherwise with the customer, each delivery includes:

- Delivery note
- Sensor pursuant to the purchase order, output wires with protective hose are wound in a bundle and secured against unreeling
- Sealing ring Al 13x17x1.5 (ČSN 02 9310.3)
- Accompanying technical documentation in Czech:
  - o Product quality and completeness certificate, which also serves as the warranty certificate
  - o Calibration sheet (for calibrated design)
  - o Product manual

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

- o Copy of the Inspection Certificate 3.1 for the stem tube material with the casting number

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

## ORDERING

The purchase order shall specify:

- Name

## DESIGN OF TEMPERATURE SENSORS

SPECIFICATION		ORDERING NUMBER				
		112 66	5	x	x	x
Measuring resistor pursuant to ČSN IEC 751 tolerance class B or A **)	Pt 100/ /4 *)			6		
	Pt 100/B/2			7		
Measuring resistor	Other *)			9		
Nominal length L [mm]	63				1	
	80				2	
	100				3	
	120				4	
	Other *)				9	
Length of output wires L <sub>1</sub> (protective hose) [m]	2.5					3
	4					4
	6.3					5
	Other *)					9

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

\*\*\*) Measuring resistor in tolerance class A only in four-wire connection

## PURCHASE ORDER EXAMPLE

### Standard design

Resistance temperature sensor for plastic applications with cable outlet, with high mechanical resistance  
112 665 713 - 15 pcs

### Special requirement:

Resistance temperature sensor for plastic applications with cable outlet, with high mechanical resistance  
112 665 699

four-wire connection, nominal length L = 160 mm, length of output wires L<sub>1</sub> = 10 m - 6 pcs

## 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 pursuant to ČSN EN 60721-3-1 (i.e. in places with continuous temperature regulation from 5 to 40 °C and humidity from 5 to 85%, 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)

## CALIBRATION

It is realized pursuant to TPM 3342-94 and in compliance with ČSN IEC 751, usually in three temperature points evenly distributed 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 installed by screwing into the bore pursuant to Figure 1.

Operation position of the sensors is discretionary; the outlet shall not be situated upwards.

Support output wires with the protective hose. The smallest radius of hose bent is 30 mm.

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

## COMMISSIONING

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

## WARRANTY

Pursuant to § 429 of the Commercial Code and the provisions of § 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 sensor cannot be dismantled and, therefore, it is not repaired.

**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 (with the exception of products marked as electrical equipment for the purposes of return withdrawal and separate salvage of electrical waste), may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The manufacturer realizes free return withdrawal of marked electrical equipment (from 13.8.2005) from the consumer and points out the danger connected with their illegal disposal.

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.

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