



APPLICATION

- For remote measurement of temperature of water up to nominal pressure PN 63 and temperature 200°C
- As a pressure equipment of category III pursuant to the Decree of the Government 26/2003 Coll. (compliance assessment module B+D), EC-Type Examination Certificate **E-31-00175-03 SZÚ Brno**
- As a rated gauge **TCM 321/94-1824** in the systems of for measurement of flow of heat transferred by water (in transferring and return piping), e.g. in combination with assessments units INMAT 51, INMAT 66 etc.

The sensors are rated products pursuant to the Act No. 22/1997 Coll. and the Declaration of Conformity **EC-112390** is issued for them.

DESCRIPTION

The sensor consists of a replaceable measuring insert and protective armature. The measuring insert consists of a stem tube, into which measuring resistor with internal wiring is placed; it is closed with a flange with a terminal board. Measuring resistor with internal wiring is electrically insulated from the jacket of the stem tube of the measuring insert. The protective armature consists of the heat sink with an adapter and a head. The heat sink with the adapter is provided with a connecting screw joint for the connection of the sensor into the weld-on piece of the piping or the technological equipment. The head is provided with a cover and sealing outlet for the connection wiring.

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 61140 ed. 2 as an electrical device of protection class III for the application in networks with category of overvoltage in installation II and pollution grade 2 pursuant to ČSN EN 61010-1; the follow-up (assessment) device shall comply with Article 6.3 of the said standard.

- Measuring range:** 0 to 200 °C
- Electrical strength** pursuant to ČSN EN 61010-1 Article 6.8.4: 500 V eff
- Electrical insulation resistance** pursuant to ČSN IEC 751, Article 4.2.1: min. 100 MΩ, at 15 to 35°C, max. 80 % of relative humidity
- Nominal pressure of heat sink** pursuant to ČSN 13 0010: PN 63
- Ingress protection** pursuant to ČSN EN 60529: IP 65
- Operation position:** discretionary, the outlet shall not be situated upwards

- Type of operation:** continuous
- Sensor weight:** with nominal length of heat sink L = 100 mm approx. 0.90 kg
 L = 160 mm approx. 0.95 kg
 L = 250 mm approx. 1.00 kg

- Applied materials:** stem tube of measuring insert steel 1.4541
 heat sink with adapter steel 12 022, galvanized
 connecting screw joint steel 11 425, galvanized
 head chromated aluminium alloy and painted with aluminium paint
 head clamps of the terminal board brass with Ni surface

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 at cable output from the sensor:
 continuous -50 to 180 °C

Relative ambient humidity:

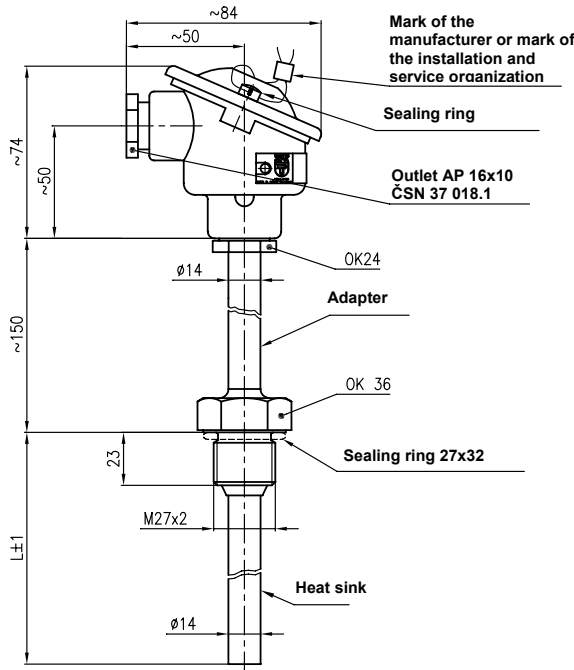
10 to 100 % with condensation, with upper limit of water content 29 g H₂O/kg of dry air

Atmospheric pressure: 70 to 106 kPa

Maximum speed of water flow: 3.5 m/s

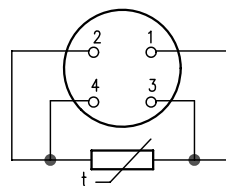
Vibrations:

- Frequency range: 10 to 500 Hz
- Drift amplitude: 0.15 mm
- Acceleration amplitude: 19.6 ms⁻²
- Drift amplitude 0.35 is permitted to frequency 35 Hz.

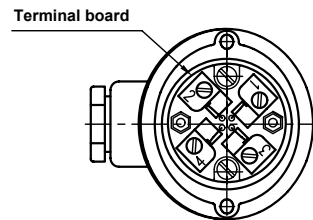


Connection scheme

with simple measuring resistor in four-wire connection (Pt 100/ I4)



View into the head



METROLOGICAL DATA

Sensor: measuring resistor Pt 100 in connection pursuant to the connection scheme, α = 0.00385 [K⁻¹], tolerance class B (or A) pursuant to ČSN IEC 751

Tolerance class of accuracy (compliance) of pair pursuant to TPM 3721-93

for maximum difference of output signal of both temperature sensors assigned to pair and located in the test medium at equal temperature:

class 5 max. difference 0.1 °C

Internal wiring resistance of two Cu wires at 20°C: 2 × 0.088 m

Maximum current load of measuring resistor: 2 mA
Recommended measuring current: 1 mA

Output signal: from measuring resistor

Calibration depth of immersion: 100 mm

Temperature response time pursuant to ČSN IEC 751 in whirling water (characteristic value):

separate measuring insert	with heat sink
0.5	8.0 s
0.5	50 s

0.9 21.5 s 0.9 155 s

DESIGNATION

Data on head label

- Trade mark of the manufacturer
- Made in Czech Republic
- Type of resistance sensor, nominal value R₀ / tolerance class / configuration of internal wiring wires
- Measuring range
- Product ordering number
- Ingress protection
- Mark and decision number about gauge type approval in CMI
- Production number/1 and /2 (the same for both sensors in the pair)

Data on the measuring insert label

- Trade mark of the manufacturer
- Sensor type, nominal value R₀ / tolerance class / configuration of internal wiring wires
- Production number/1 and /2 (the same for both sensors in the pair)

Data on stripe connected on the terminal board of the measuring insert

- Official mark of certification

Data on sensor head

- Mark CE 1015

DESIGN OF TEMPERATURE SENSORS

SPECIFICATION		ORDERING NUMBER				
		112 39	5	x	x	x
Measuring resistor Pt 100/B/ 4, pursuant to ČSN IEC 751				7		
Heat sink material	12 022, galvanized				1	
	Other *)				9	
Nominal length L [mm]	100					1
	160					2
	250					3
	Other *)					9

*) Only as a special requirement on the basis of an agreement with the manufacturer

DELIVERY

Paired sensors are delivered in a shared packaging. Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Sensor pursuant to the purchase order
- Sealing ring Cu 27x32x1.5 (ČSN 02 9310.2)
- Suitable weld-on piece ordered separately from the catalogue of accessories, type 991
- Accompanying technical documentation in Czech:
 - o Product quality and completeness certificate, which also serves as the warranty certificate
 - o EC Declaration of Conformity
 - o Product manual

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

- o Copy of EC-Type Examination Certificate pursuant to the Decree of the Government 26/2003 Coll.
- o Copy of decision about gauge type approval (only for certified design)
- o Confirmation about rated gauge certification (only for certified design)
- o Copy of the Inspection Certificate 3.1 for the heat sink and stem tube material with the casting number

PLACING AN ORDER

The purchase order shall include

- Name
- Product ordering number
- If delivery of weld-on pieces pursuant to type 991 is required for the sensor as accessories
- Other (special) requests
- Number of pairs

PURCHASE ORDER EXAMPLE

Standard design

Resistance temperature sensor, paired, with heat sink
112 395 712- 6 pairs

We require the delivery of the confirmation about rated gauge certification for the sensors

Special requirement

Resistance temperature sensor, paired, with heat sink
112 395 A13- 6 pairs

ORDERING WELD-ON PIECES

The purchase order shall include

- Name
- Ordering number of weld-on piece
- Number of pieces

ORDERING NUMBERS OF WELD-ON PIECES type 991

Direct weld-on piece - 991 NVP4 M27 13 (material 11 353.0)
- 991 NVP4 M27 72 (material 1.4541)

Angular weld-on piece - 991 NVS4 M27 13 (material 11 353.0)
- 991 NVS4 M27 72 (material 1.4541)

PACKING

Both the 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.)

RELIABILITY

Reliability indicators in operation conditions and in conditions of the environment specified herein

- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years

CERTIFICATION PURSUANT TO THE ACT 505/1990 Coll.

The paired sensors are certified pursuant to TPM 3722-93.

Certified sensors are provided with a label with the official mark of the certification. The label is attached to the ceramic terminal board of the measuring insert.

Upon request of the customer, a confirmation about rated gauge certification may be issued for a certified sensor later on.

The purchase order shall specify:

- Product ordering number *)
- Manufacturing number / belongness to the pair *)

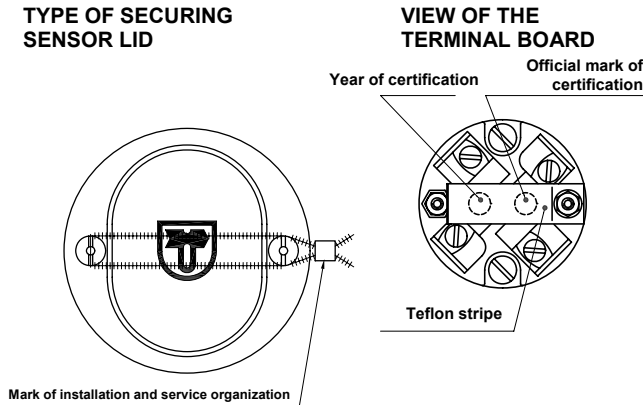
*) Data provided on the device label

The manufacturer performs follow-up certification pursuant to the Act 505/1990 Coll. on metrology, as amended. Follow-up

certification shall be ordered with the AMS department of ZPA N. Paka a.s.

You shall always send the whole pair tied up together for the follow-up certification.

TYPE OF SECURING SENSOR LID



INSTALLATION AND CONNECTION

SENSOR INSTALLATION

Put on the enclosed sealing ring on the heat sink of the sensor and connect the sensor by screwing into the weld-on piece on the piping (technological equipment). The operation position of the sensors is discretionary; the outlet shall not be situated upwards. During the installation, torque of 100 Nm is recommended.

Recommended applications of weld-on pieces:

- Direct weld-on piece for piping DN 65 to DN 250 (perpendicular installation)
- Angular weld-on piece for piping \leq DN 50 (angular installation or installation in bend)

Examples of application of weld-on pieces are in Figure 1



WARNING for paired sensors

- **Before the installation, check belongness to the pair pursuant to the code on the tag (numbers of one pair are equal - xxx/1 and xxx/2) and time of official certification**
- **Use the same accessories (weld-on pieces) for both sensors in the pair**
- **Realize the installation and placement of both sensors in the same way**
- **In case of a failure, replace the whole pair**

With respect to maintaining metrological properties and the longest possible service life, it is not recommended to install the sensors in places with high turbulence of the medium, which is caused e.g. by a rapid transition from a small diameter of the piping to a larger one (when failing to comply with the required shape and dimensions of diffuser behind the flow meter). Recommended distance of the temperature sensor from the installation flange of the flow meter is min. 1 m.

ELECTRICAL CONNECTION

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

The terminal board of the sensor is accessible after the removal of the lid of the head that is connected with two screws.

Connect the evaluation devices to the sensor with a cable with a double insulation with outer diameter 5 to 12 mm (internal wires with Cu core with the cross section 0.5 to 2.5 mm²). Seal the cable outlet of the sensor properly. In the environment with interfering signals, use shielded cables in the supply circuit. If it is not possible to exclude influencing the measurement, ground the wiring.

INSTALLATION OF RATED GAUGE

The installation, commissioning and service maintenance of rated gauges pursuant to the Act 505/1990 Coll., on metrology, may only be realized by a person, who is a bearer of a valid

Authorization for installation and maintenance of rated gauges issued e.g. in ZPA Nová Paka a.s.

After the installation, the certified sensors shall be provided with a mark of the installation and service organization by an authorized worker of the installation and service organization.

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.

In case of rated gauges, the prescribed time for follow-up certification shall be complied with within the intervals identified by the Decree of the Ministry of Industry and Trade 345/2002 Coll.

The replacement and connection of sensors to be certified shall be performed by an authorized worker of the installation or service organization, who shall seal the sensors again.

The official mark on the measuring insert may only be violated by a worker of AMS. If the official mark has been damaged or removed, validity of the gauge certification is terminated.

SPARE PARTS

Spare parts shall be delivered by the manufacturer.

Relevant measuring inserts, heat sinks or weld-on pieces can be ordered pursuant to the offered price list of spare parts.

Inserts in the tolerance class A are only delivered on the basis of a special requirement.

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. The 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.

Both 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 selected salvage of electrical waste), can be disposed of to the 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.

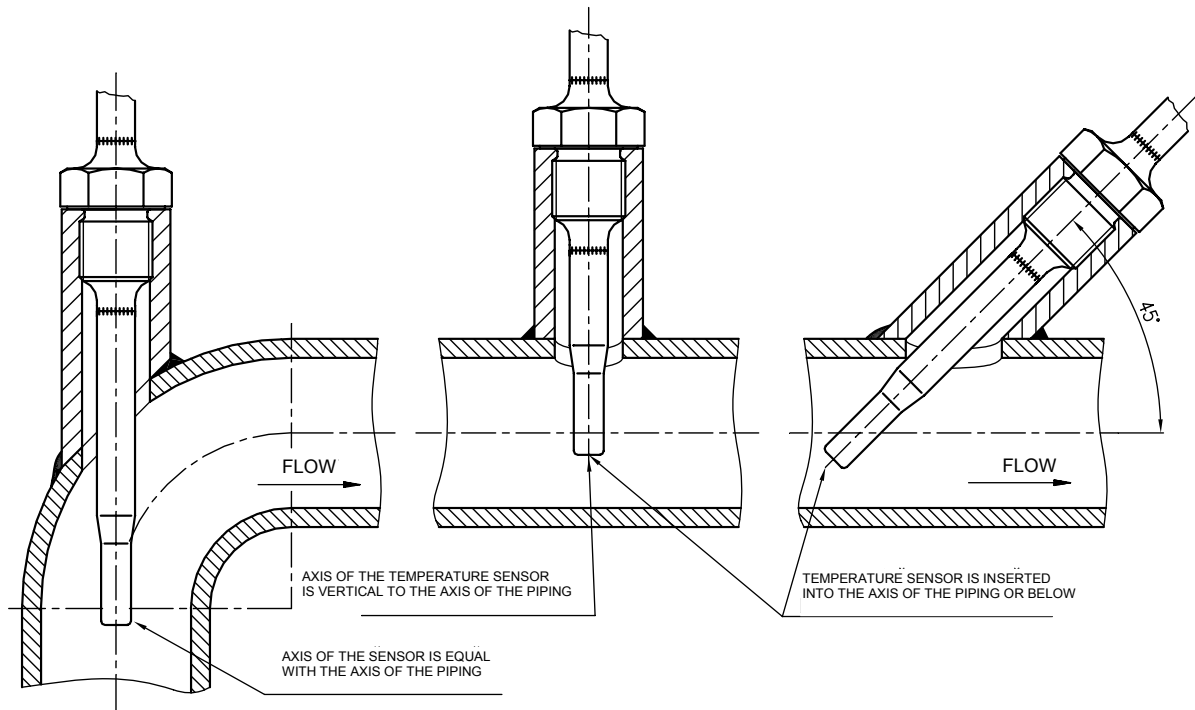
The package of the sensor can be recycled completely.

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

Figure 1 - EXAMPLES OF INSTALLATION OF DIRECT AND ANGULAR WELD-ON PIECES PURSUANT TO ČSN EN 1434-2

**WARNING**

- When using the sensor with an angular weld-on piece, locate the sensor with heat sink at an angle against the direction of flow
- The sensor may not touch the opposite side of the piping
- It is also advantageous to use the temperature sensors in the piping elbow. In such a case, locate the sensor with the heat sink against the direction of flow so that the measured medium flows around evenly



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