

APPLICATION

- For remote measurement of temperature of steady and running liquids in conditions with a threat of explosion, however especially temperature of bearings (bearing oil), temperature of technical liquids or other similar applications up to the nominal pressure of heat sink PN 40
- In explosive environment Zone 1 and Zone 2 pursuant to ČSN EN 60079-10
- As pressure equipment of category III pursuant to the Decree of the Government 26/2003 Coll. (compliance assessment module B+D)

The sensors are rated products pursuant to the Act No. 22/1997 Coll. and the following Compliance Certificate is issued for them: **EC-112700**.


DESCRIPTION

Measuring resistor with internal wiring is inserted into a heat sink that is welded with connecting screw-joint of the sensor. The screw-joint is ended with a sealing outlet with permanently connected connecting cable. The heat sink together with the screw-joint and outlet form a fixed closure EExd. On the connecting screw-joint, the sensor is provided with a terminal for the connecting wire or wire for mutual interconnection. The sensor cannot be dismantled; the cable in the outlet is secured against pulling out.

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:** -70 to 180 °C
- Fixed closure** pursuant to ČSN EN 50014 and ČSN EN 50018 ed.3:  IIG EEx d IIC T3 to T6
- 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
- Nominal pressure** pursuant to ČSN 13 0010: PN 40
- Ingress protection** pursuant to ČSN EN 60529: IP 67
- Operation position:** discretionary

- Weight of sensor without cable:**
- | | |
|-------------|---------------------|
| for L = 63 | approximately 285 g |
| for L = 100 | approximately 290 g |
| for L = 160 | approximately 300 g |
| for L = 250 | approximately 320 g |
- only cable:** approximately 75 g/m continuous
- Type of operation:** continuous

- Used materials:**
- | | |
|------------------------------|--|
| Heat sink | steel 1.4541 |
| Sensor body with screw-joint | steel class 11, galvanic plating (or steel 1.4541 as a special request after an agreement with the manufacturer) |
| Outlet with lock | Aluminium alloy, chromated and painted with synthetic enamel |
| Internal wiring | Cu |
| Cable outlet | Cu cores with silicone isolation |

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.

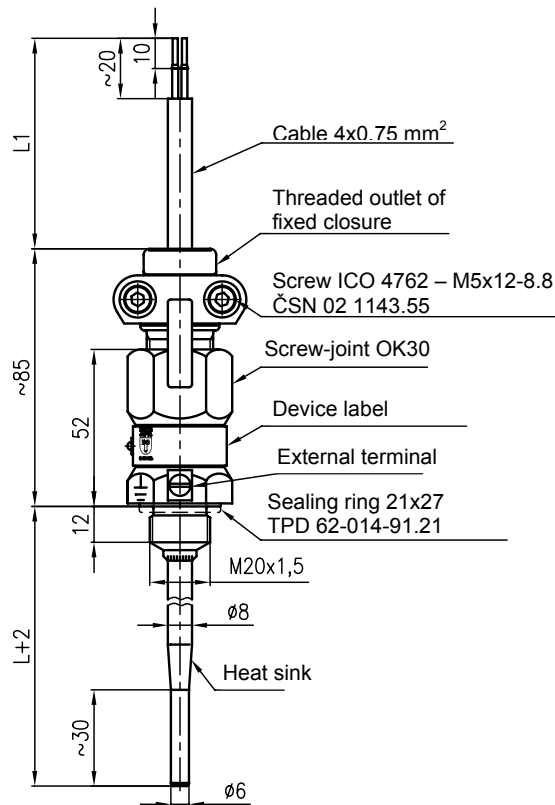
Ambient temperature: - 20 to + 40 °C



WARNING

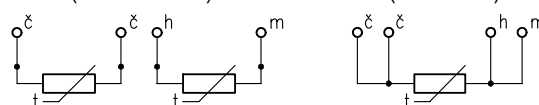
The user warrants that maximum surface temperature of the sensor does not reach the ignition temperature of any gas or steam that may be present.

Orientation values of surface temperatures of the sensor – refer to Figure 2.



Connection scheme

with double measuring resistor with single measuring resistor
in two wire connection (2x Pt 100/B/2) in four wire connection (Pt 100/ I4)



Measurement range (medium temperature):

Measurement range (medium temperature)	Temperature class
-70 to 80 C	T6
-70 to 95 C	T5
-70 to 130 C	T4
-70 to 180 C	T3

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 flow of liquids:

Maximum speed of flow [m/s]	Nominal length L [mm]			
	63	100	160	250
Water steam and air	100	40	15	6
Water	15	6	2.5	1

Vibrations:

Nominal length L 63 and 100 mm 160 and 250 mm
Frequency range 10 to 150 Hz
Drift amplitude 0.35 mm 0.15 mm
Acceleration amplitude 39.2 ms⁻² 19.6 mm

METROLOGICAL DATA

Sensing probe: measuring resistor Pt 100 single in connection pursuant to the scheme of connection 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 two cores at 20 °C: 0.052 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):

for L = 63 mm	$\tau_{0.5}$	9.9 s
	$\tau_{0.9}$	29.7 s
for L = 100, 160, 250 mm	$\tau_{0.5}$	3.4 s
	$\tau_{0.9}$	10.8 s

CERTIFICATION

- Non-explosiveness Ex II2G EEx d IIC T3 +T6 EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. FTZÚ 02 ATEX 0221X
- Pressure equipment pursuant to the Decree of the Government 26/2003 Coll., EC-Type Examination Certificate SZÚ Brno

DESIGNATION

Data on sensor label

- Trademark of the manufacturer
- Type of resistance sensing probe, nominal value R_0 / tolerance class / configuration of wires of internal wiring
- Product ordering number
- Ingress protection
- Production time code
- Measuring range
- Designation of non-explosiveness Ex II2G EEx d IIC T3 to T6 (temperature class pursuant to the measuring range) and number of EC-Type Examination Certificate

Data on sensor

- Mark CE 1015 and CE 1026

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Sensor pursuant to the purchase order, output wires are reeled in a bunch and secured against unreeling
- Sealing ring 21x27 TPD 62-014-91.21
- 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 EC Declaration of Conformity
 - o Product manual

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

- Copy of the EC-Type Examination Certificate pursuant to the Decree of the Government 26/2003 Coll.
- Copy of the EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. (for fixed closure)
- Copy of the Inspection Certificate 3.1 for the heat sink and sensor body material with the casting number

ORDERING

The purchase order shall specify

- Name
- Product ordering number
- If calibration is required and in what temperature points
- If the delivery of weld-on pieces pursuant to the type 991 is required for the sensor as accessories
- Other (special) requirements
- Number of pieces

PURCHASE ORDER EXAMPLE

Standard design

Resistance temperature sensor EExd with cable outlet, with high mechanical resistance
 112 705 803 - 15 pcs

Special request:

Resistance temperature sensor EExd with cable outlet, with high mechanical resistance
 112 705 799 - 6 pcs
 four-wire connection, tolerance class A, nominal length L = 200 mm, cable length $L_1 = 12$ m, material of sensor body with screw-joint steel 1.4541

ORDERING WELD-ON PIECES

The purchase order shall specify

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

ORDERING NUMBERS OF WELD-ON PIECES, TYPE 991

- Weld-on piece, direct - 991 NVP3 M20 13 (material 11 353.0)
- Weld-on piece, angular- 991 NVS3 M20 13 (material 11 353.0)

DESIGN OF TEMPERATURE SENSORS

SPECIFICATIONS		ORDERING NUMBER			
		112 70	5	x	x
Measuring resistor pursuant to ČSN IEC 751 tolerance class B or A **)	Pt 100/ /4 *)			7	
	Pt 100/B/2			8	
Measuring resistor	Other *)			9	
Nominal length L [mm]	63			0	
	100			1	
	160			2	
	250			3	
	Other *)			9	
Cable length L_1 [m]	2.5				3
	4				4
	6.3				5
	10				6
	16				7
	Other *)				9

*) Only as a special request after an agreement with the manufacturer; to be specified in wording.

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

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 control 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

Put the enclosed sealing ring on the heat sink of the sensor in advance. Install the sensor by screwing it into the weld-on piece on the piping on the wall of the tank (technological equipment) etc. It is recommended supporting the connecting cable. The operation position is discretionary; the outlet shall not be situated upwards. During the installation, torque of 50 Nm is recommended.



WARNING



The distance of the fixed closure  II2G EExd IIC T3 to T6 from close structures or between closings shall be at least 40 mm. The sensor installation in the environment with explosive gas atmosphere shall be in compliance with the requirements of ČSN EN 60079-14.

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

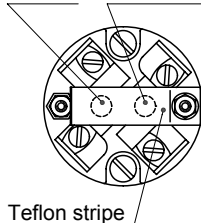
A protective wire (wire for mutual interconnection) with cross-section at least 2.5 mm² shall be connected to the external terminal on the sensor adapter if it is protected against mechanical damage or at least 4 mm² if it is not protected against mechanical damage (pursuant to Article 543.1.3 of the standard ČSN 33 2000-5-54).



WARNING

The cable outlet of the sensor shall be protected against the impact of oil products and organic solvents! It is resistant to temperatures up to 180°C; its surface temperature shall comply with the temperature class of the sensor. Further on, the cable is resistant to ozone, UV radiation, fungi, diluted acids and alkali.

Year of certification Official mark of certification



COMMISSIONING

After the installation of the sensor and connecting 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.



WARNING



Any intervention into the sensor and its design will cause a change of properties and can result in an explosion! All screws on the sensor and the outlet, which ensure connection of parts of the fixed closure, shall be tightened properly.

SPARE PARTS

The design of the sensor 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 specify 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

Repairs of the sensors by the users themselves are not permitted. The sensors shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package.

DISABLING AND LIQUIDATION

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

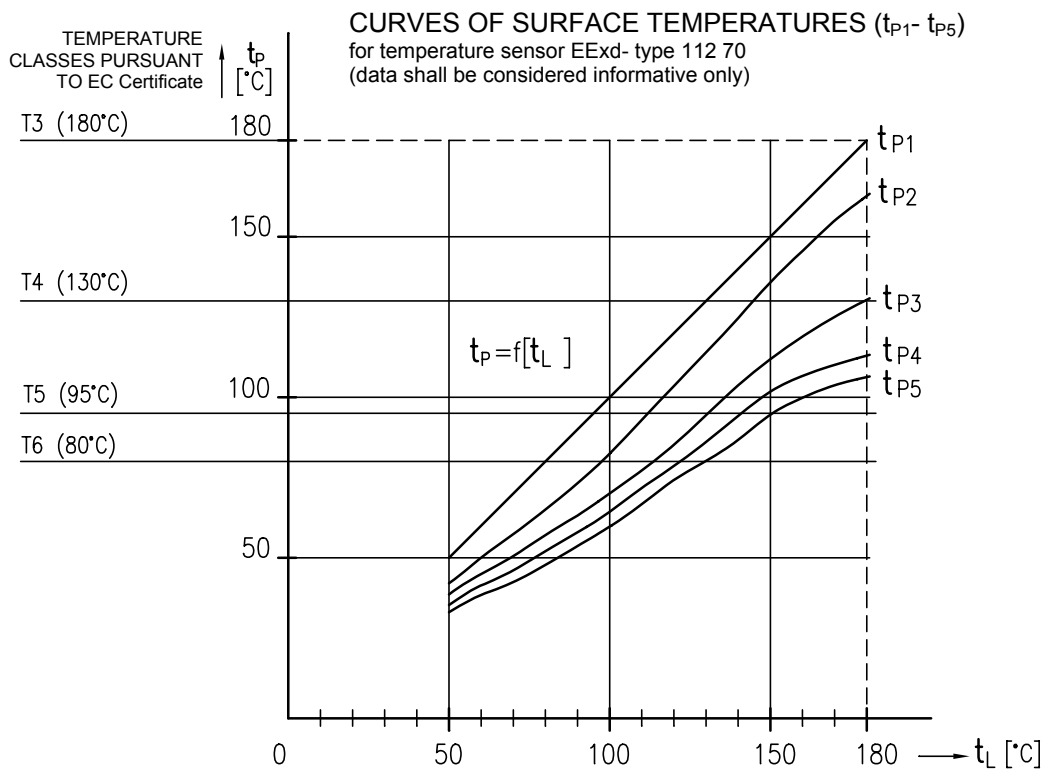
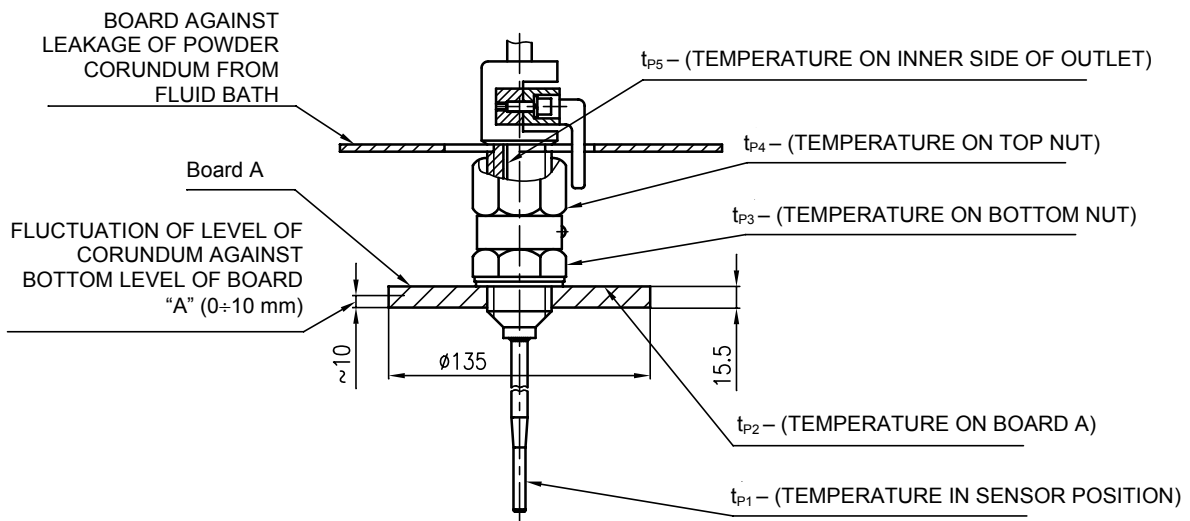
The product and its package do not include any parts that could impact the environment.

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.

FIGURE 1 - CHART OF DEPENDENCY OF SURFACE TEMPERATURES ON TEMPERATURE OF MEASURED MEDIUM

Laboratory measurement in a fluid bath FB-08, immersion at least to the bottom edge of the board "A" at ambient temperature approximately 22 °C.



t_P – temperature of surfaces on sensor in points t_{P2} – t_{P5}
 t_L – temperature of measured medium in fluid bath
 t_{P1} – temperature of heat sink in the sensor position

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