



FOR DESIGN WITH CONVERTER A MANUAL IS ENCLOSED TO THE RELEVANT CONVERTER

APPLICATION

- For remote measurement of temperature of steady and running liquids (gases and fluids), for which properties of the heat sink of the sensor are suitable, measurement may be realized up to the temperature determined by heat sink resistance (max. 400 °C) and nominal pressure PN 63
- For explosive environment pursuant to ČSN EN 60079-10
 - o The heat sink of the sensor may be installed in zone 0, in zone 1 or zone 2
 - o Other parts of the sensor (screw joint, adapter, connecting head) may be located in zone 1 or zone 2
 - o In case of using converter Ex ia or connection to Ex ia circuit, the sensor may be used in zone 0
- As pressure equipment of category III pursuant to the Decree of the Government 26/2003 Coll. (compliance assessment module B+D)
- For environment requiring seismic resistance from 1 Hz to 33 Hz, acceleration 3g, protocol ČKD Blansko (design without converter)
- Uncertified unpaired design for general temperature measurement
- Certified unpaired design for business measurement as elements of gauges of heat transferred by water steam or as a part of rated gauges for business measurement of flow (consumed quantity) of technical fluids (gases, technical liquids) or as an element of a combined gas conversion device
- Certified paired design for business measurement as elements of gauges of heat (transferred or consumed)
- The application of certified sensors is possible e.g. in combination with evaluation units INMAT 51, INMAT 66 etc.
- In design with converter to convert signal of the resistance sensor to unified output signal 4 to 20mA or digital signal (converter with HART protocol)

The sensors are rated products pursuant to the Act No. 22/1997 Coll. and the following Declaration of Conformity is issued for them: **EC-112690** for sensors without converter and **EC-11269P** for sensors with converter.

DESCRIPTION

The sensor consists of a replaceable measuring insert with a flange and terminal board or installed two-wire converter (insulated or non-insulated, even in design Ex i) and protective armature. The protective armature consisting of a head and a heat sink provided with an adapter and connecting screw joint forms the fixed closure Ex d. The head is provided with a cover and sealing outlet for the connection wiring. On the adapter of the sensor, there is an external clamp for grounding wire or wire for mutual interconnection. The measuring insert consists of a stem tube, into which a measuring resistor with internal wiring is inserted and it is electrically insulated from the jacket of the stem tube.

The sensor with converter is supplied from an external source. The installed converter is set-up to the required range at the sensor manufacturer.

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

TECHNICAL DATA

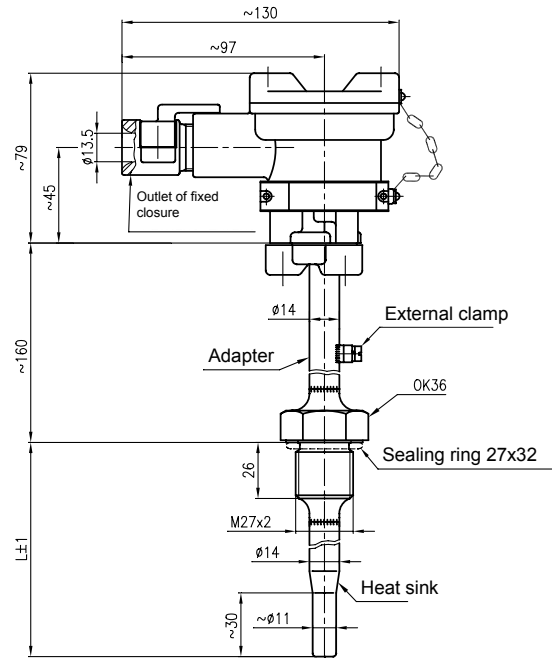
The sensor is designed pursuant to ČSN EN 61140 ed. 2 as an electrical equipment of protection class III for the application in networks with the category of overvoltage in the installation II and pollution grade 2 pursuant to ČSN EN

61010-1, the follow-up (evaluation) device shall comply with Article 6.3 thereof.

Fixed closure pursuant to ČSN EN 60079-0 ed. 2 and ČSN EN 60079-1: II 1/2 G Ex d IIC T1 ÷ T6

Nominal pressure of heat sink pursuant to ČSN 13 0010: PN 63

Ingress protection pursuant to ČSN EN 60529: IP 54



Measuring range:

-40 to 400 °C	unpaired uncertified sensor
-20 to 195 °C	paired certified sensor
-50 to 50 °C	unpaired certified sensor (measurement of flow of gases, technical liquids)
0 to 100 °C	unpaired certified sensor (measurement of flow of gases, technical liquids)
0 to 400 °C	unpaired certified sensor (measurement of heat transferred by water steam)

Measuring range of the sensor with converter is given by the range of the selected converter.

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

(only measuring insert without converter or design with insulated converter)

Electric insulation resistance pursuant to ČSN IEC 751, Article 4.2.1:

min. 100 M Ω , at 15 to 35°C, max. 80 % of relative humidity

Power supply of converter:

DC 24 V from source SELV, e.g. INAP 16, INAP 901

Other data of converter: refer to enclosed manual

Operation position:

discretionary; the outlet shall not be situated upwards

Type of operation:

continuous

Sensor weight:

L 160	approx.	1.3 kg
L 250		1.4 kg
L 400		1.5 kg
L 630		1.7 kg

Applied materials:

Stem tube of measuring insert	steel 1.4541
Heat sink with connecting screw joint	steel 1.4541
Adapter	steel class 11 painted with black synthetic semi-glazing baking enamel

Head	chromated aluminium alloy and painted with grey synthetic semi-glazing baking enamel
Internal wiring	Ag or special alloy
Head clamps of 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.

Ambient temperature for sensor head and outlet:

-40 to 70 °C
for design with converter pursuant to the converter type (refer to enclosed converter manual)

Maximum surface temperature of the sensor:

It shall correspond to the maximum temperature of the measured medium

Maximum surface temperature for the equipment operating in the conditions with a threat of explosion of gases, steam and mist pursuant to ČSN EN 60079-0 and temperature class of the sensor shall be identified in dependence on the temperature of the measured medium pursuant to the table:

Temperature class	Maximum surface temperature	Maximum temperature of the measured medium
T6	80°C	80°C
T5	95°C	95°C
T4	130°C	130°C
T3	195°C	195°C
T2	290°C	290°C
T1	400°C	400°C



WARNING



The user warrants that maximum surface temperature of any part of the sensor does not exceed the ignition temperatures of any gas or steam that may be present due to an influence of external thermal sources.

Orientation values of surface temperatures of the sensor – refer to Figure 3.

Vibrations:

Nominal length [mm]	100	160	250	400	630
Frequency range [Hz]	10 to 500				
Drift amplitude [mm]	0.2	0.2	0.15	0.15	0.15
Acceleration amplitude [ms ⁻²]	29.4	29.4	19.6	19.6	19.6

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 [mm]				
	100	160	250	400	630
Water steam and air	50	25	8	2.5	1
Water	5	3	3	1.5	0.2

METROLOGICAL DATA

Sensing unit: measuring resistor Pt 100 single or double in the connection pursuant to the scheme and table of designs, α = 0.00385 [K⁻¹], tolerance class B or A (only for 4-wire) pursuant to ČSN IEC 751

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

for maximum difference of output signal of both temperature sensors arranged in a pair and located in the test medium at the same temperature:

class 4	max. difference 0.05 °C
class 5	max. difference 0.1 °C

Internal wiring resistance at 20 °C:

Ag	0.053 /m ± 10 %
spec. alloy	2.45 /m ± 5 %

The measured resistance value of internal wiring is specified on the label of the measuring insert for the design without converter.

Maximum current load of measuring resistor: 5 mA

Recommended measuring current: 1 mA

Output signal of the converter (linear with measured temperature): 4 to 20 mA (+ digital for HART protocol)

Calibration depth of immersion: 200 mm


Calibration depth of immersion:	L ≥ 200	200 mm
	L = 160	160 mm
	L = 100	100 mm

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

0.5	29 s
0.9	95 s

DESIGNATION :

Data on head label

- Trademark of the manufacturer
- Made in Czech Republic
- Type of resistance sensor, nominal value R₀ / tolerance class / configuration of wires of internal wiring *)
- Measuring range or pre-set converter range
- Product ordering number
- Ingress protection
- Mark and number of gauge type approval decision in ČMI (for certified design)
- Production time code (for uncertified design)
- Manufacturing number (for certified unpaired design) manufacturing number/1 and /2 (for certified paired design)
- Output signal 4 to 20 mA (design with converter)
- Designation of non-explosiveness  II 1/2 G Ex d IIC T1+T6 (temperature class pursuant to the measuring range) and number of the EC-Type Examination Certificate
- Designation of non-explosiveness and number of the EC-Type Examination Certificate (design with converter Ex i)
- *) Configuration of wires of internal wiring is not specified for the converter

Data on measuring insert label

- Trademark
- Type of sensor, nominal value R₀ / tolerance class / configuration of wires of internal wiring *)
- Production time code (for uncertified design)
- Manufacturing number (for certified unpaired design) manufacturing number/1 and /2 (for certified paired design)
- Resistance value of internal wiring (for design without converter)
- *) Configuration of wires of internal wiring is not specified for the converter

Data on stripe connected to the terminal board of the measuring insert (for certified design)

- Official certification mark

Data on converter label

- Type of sensor
- Pre-set temperature range

Data on connecting screw joint of the heat sink

- Material of immersion part of the heat sink
- Nominal pressure
- Control mark about performed pressure test

Data on sensor head


- Mark CE 1015
- Mark CE 1026
- Mark CE with identification number of the notified person (for design with converter Ex i)
- Type and size of thread for outlet

Data on sensor head and cover

- Control mark about performed pressure test.

CERTIFICATION

112 69

- Pressure equipment pursuant to the Decree of the Government 26/2003 Coll., EC-Type Examination Certificate SZÚ Brno
- Non-explosiveness  II 1/2 G Ex d IIC T1+T6, EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. FTZÚ 02 ATEX 0222X, Annex No. 2
- Type approval of rated gauge TCS 321/92-1171

112 69/P

- Pressure equipment pursuant to the Decree of the Government 26/2003 Coll., EC-Type Examination Certificate SZÚ Brno

- Non-explosiveness Ex II 1/2 G Ex d IIC T1÷T6, EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. FTZÚ 02 ATEX 0222X, Annex No. 2
- Non-explosiveness Ex i, EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. (pursuant to the converter type)

DELIVERY

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

- Delivery note
- Sensor pursuant to the purchase order
- Sealing ring Cu 27x32x1.5 (ČSN 02 9310.02)
- Rubber sealing ring \varnothing 8 to 10 mm (after an agreement with the manufacturer, sealing ring \varnothing 6 to 8 mm) and corresponding two metal washers for cable outlet of the head, in which rubber sealing ring \varnothing 10 to 12 mm is installed;
- Suitable weld-on pieces ordered independently from the catalogue of accessories, type 991;
- Optional accessories to the sensor with programmable converter
 - o Configuration (parameterization) programme pursuant to the required converter
 - o Communication modem (for serial port RS 232C) pursuant to the required converter
- Accompanying technical documentation in Czech
 - o Product quality and completeness certificate, which also serves as the warranty certificate
 - o EC Declaration of Conformity
 - o Calibration sheet (for uncertified 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

- Copy of the Inspection Certificate 3.1 for the stem tube and heat sink material with the casting number
- Copy of EC-Type Examination Certificate pursuant to the Decree of the Government 26/2003 Coll.
- Copy of EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. For fixed closure
- Copy of EC-Type Examination Certificate pursuant to the Decree of the Government 23/2003 Coll. for design with converter Ex i
- Copy of protocol of test results for certification of seismic capability pursuant to ČSN IEC 980 for design without converter
- for certified design
 - o Confirmation about rated gauge certification
 - o Copy of gauge type approval decision in ČMI

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 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 conditions of the environment specified herein

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

ORDERING TEMPERATURE SENSORS

The purchase order shall specify

- Name
- Product ordering number
- Measuring range and relevant temperature class
- If calibration is required and in what temperature points
- If certification in temperatures below zero (negative temperatures) is required
- If the delivery of weld-on piece pursuant to the type 991 is required for the sensor as accessories
- If optional accessories to the sensor with programmable converter are required
- Other (special) requirements
- Number of pieces or pairs

PURCHASE ORDER EXAMPLE

Standard design:

Resistance temperature sensor Ex d with heat sink, with high mechanical resistance
112 695 632, range - 30 to 70 °C, T6
We request a confirmation about rated gauge certification
6 pcs

Special request:

Resistance temperature sensor Ex d with heat sink, with high mechanical resistance
112 690 639, range - 30 to 50 °C, T6
Tolerance class A, nominal length L = 800 mm - 6 pcs

ORDERING HEAT SINKS

The purchase order shall specify:

- Name
- Weld-on piece ordering number
- Number of pieces

ORDERING NUMBERS OF WELD-ON PIECES, type 991

Weld-on piece, direct - 991 NVP4 M27 13 (material 11 353.0)
- 991 NVP4 M27 72 (material 1.4541)
Weld-on piece, angular- 991 NVS4 M27 13 (material 11 353.0)
- 991 NVS4 M27 72 (material 1.4541)

TABLE 1 - DESIGN OF TEMPERATURE SENSORS Ex d WITH HEAT SINK TYPE 112 69

SPECIFICATIONS					ORDERING NUMBER				
					112 69	x	x	3	x
Sensors	Measuring range	Temperature class pursuant to EC Certificate	Internal wiring	Measuring resistor pursuant to ČSN IEC 751, tolerance class B or A *)					
Uncertified unpaired	-40°C ÷ 400°C	T1 ÷ T6 -40 ÷ 400°C	Special alloy	Pt 100/ /4 **)	5	6			
			Ag	Pt 100/B/2 2 x Pt 100/B/2					
Certified unpaired	-50°C ÷ 50°C	T6 -40 ÷ 80°C	Special alloy	Pt 100/ /4 *)	0	6			
	0°C ÷ 400°C	T1 *****) -40 ÷ 400°C			1	6			
	0°C ÷ 100°C	T4 *****) -40 ÷ 130°C			2	6			
Certified paired	-20°C ÷ 195°C	T3 *****) -40 ÷ 195°C		Pt 100/ /4, Compliance class 5 or 4 *)	3	6			
Design of measuring end	Nominal length L [mm]		100 *) *****)						1
			160						2
			250						3
			400						4
			630 *)						5
			Other, max. 3000 mm *) *****)						9

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

**) tolerance class A only in four-wire connection

***) for certified design max. 1000 mm

*****) for certified design only with tolerance class B

******) pursuant to the requirement of the customer, the temperature class of the sensor may become stricter, but always with a modification (reduction) of the measurement range in compliance with the table on page 2/8

TABLE 2 - DESIGN OF TEMPERATURE SENSORS Ex d WITH HEAT SINK WITH CONVERTER TYPE 112 69/P

SPECIFICATIONS				ORDERING NUMBER				
				112 69	9	x	x	/xxxx
Measuring resistor pursuant to ČSN IEC 751, tolerance class B or A *)		Pt 100/B			B			
		Pt 100/A *)			A			
Nominal length L [mm]		100 *)				1		
		160				2		
		250				3		
		400				4		
		630				5		
		Other, max. 3000 mm*)				9		
Type of converter		Galvanic separation	Ex ia	Range [°C]				
Analogue	INPAL 420			-50 to 50			/07	
				-30 to 70			/55	
				0 to 50			/15	
				0 to 100			/18	
				0 to 150			/19	
				0 to 200			/20	
				0 to 250			/21	
				0 to 400			/23	
	APAQ-HRF			Adjustable range			/HRF	
	APAQ-HRFX		•				/HRFX	
Programmable	TH 100						/TH100	
	TH 100-ex		•				/TH100X	
	TH 200	•					/TH200	
	TH 200-ex	•	•				/TH200X	
	IPAQ-H	•					/IPAQH	
	IPAQ-HX	•	•				/IPAQHx	
HART protocol	MINIPAQ-HLP						MINIPAQ	
	TH 300	•					/TH300	
	TH 300-ex	•	•				/TH300X	
	MESO-H	•					/MESOH	
	MESO-HX	•	•				/MESOHX	
Other *)							/99	
Without converter (for installation of the converter by the customer)							/00	

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

Note: As a default, the sensors are delivered with converter INPAL 420 and specified default ranges. When another range is required, converter APAQ-HRF is used as a default. Specify the required measuring range for converters APAQ and programmable converters in the purchase order in wording. Minimum range of measured temperature shall be entered pursuant to the parameters of the converter. The lower limit of the temperature range is -40 C, the upper limit of the range is 400 C.

CERTIFICATION PURSUANT TO THE ACT 505/1990 Coll.

Paired sensors are certified pursuant to TPM 3722-93, unpaired sensors pursuant to TPM 3342-94 and sensors for gas quantity conversion devices pursuant to TPM 6891-95.

Certified sensors are provided with a label with an official certification mark. 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 *)
- Production time code, manufacturing number / classification in pair *)

*) Data can be found 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.

CALIBRATION

The calibration may be realized for sensors, which are not used as parts of rated gauges (i.e. they are not certified). 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

SENSOR INSTALLATION

Install the sensors by screwing into the relevant weld-on piece on the piping (technological equipment). Before the installation, put on the enclosed sealing ring in advance. During the installation, torque of 150 Nm is recommended.

A proposal of securing the heat sink of temperature sensors Ex d for nominal lengths exceeding 630 m is in Figure 1, examples of installation of direct and angular weld-on pieces are in Figure 2.

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), etc. Recommended distance of the temperature sensor from the installation flange of the flow meter is min. 1m.



WARNING



The distance of the fixed closure $\text{Ex II 1/2G Ex d IIC T1}\div\text{T6}$ from close structures or between closings shall be at least 40 mm.

CABLE OUTLET INSTALLATION

The cable outlet shall ensure the relevant ingress protection and, at the same time, secure the cable from turning over. As a default, it is designed for cables with external diameter from 8 to 12 mm, depending on the selected type of the rubber sealing ring. It shall be sealed properly. After tightening the body (screw joint) of the outlet at least to 5 threads, fix the cable with a yoke (shim) against turning over and spontaneous releasing of the outlet.



WARNING



Do not use other sealing rings in the outlet than those original ones delivered by the manufacturer. Do not change the external diameter of the cable artificially e.g. by additional taping of electrical insulating tapes.

ELECTRICAL CONNECTION

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

Sensor installation in the conditions with explosive gaseous atmosphere shall comply with the requirements of ČSN EN 60079-14 ed. 2.

The terminal board of the sensor (converter) is accessible after the removal of the cover of the head, which is connected with four screws.

Connect the evaluation devices to the sensor with a cable with double insulation (internal wires with Cu core with cross section 0.5 to 2.5 mm²). Seal the cable in the outlet with required tightening of the cap nut pursuant to the instruction sheet of the outlet. Then secure it with a clamp against pulling out.



WARNING



Do not use independent wires without a jacket for electrical connection. To ensure the ingress protection grade in the outlet, the connecting cable shall have round cross-section. Temperature resistance of the cable shall comply with ambient temperature!

The cable insulation shall have chemical and mechanical resistances in compliance with the conditions, in which the cable will be installed. It is recommended supporting the cable along its length between the sensor and the follow-up device. In the conditions with interference signals, use a shielded cable in the supply circuit. Ground (earth) the shielding in one place only. Do not place the cable together with power cables. As for the sensor with converter - HART protocol, the maximum length of wiring is given by the arrangement of wires of the connecting cable. The total length of wiring may be up to 1500 m. It requires a twisted two-wire with shared shielding with the cross-section of the core min. 0.5 mm².

HART communicator shall be connected to the supply loop of the sensor with converter pursuant to Figure 4. To ensure reliable communication, the total load resistance in the circuit of the output loop shall be min. 250 .



WARNING



Programmable converter may not be connected to a computer or a HART communicator, if the converter is located in explosive environment.



WARNING for the sensor with converter Ex i



Ex i parameters shall be complied with pursuant to the enclosed converter manual.

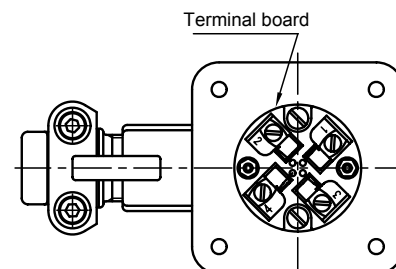
To ensure safety, an intrinsically safe source shall be always used pursuant to the converter manual, e.g. INAP 901, ordering number 901 000 101.

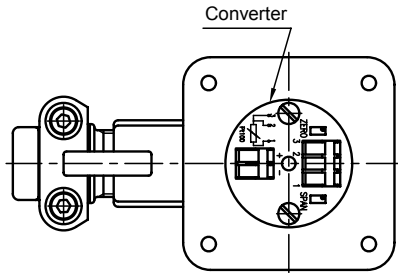
Surface temperature of the converter may not exceed maximum surface temperature for that particular temperature class.

As for the installation in a dangerous area, interconnection (bringing to the same potential) is required. To achieve it, you can use external clamp on the adapter of the sensor, which enables connecting the protective wire (wire for mutual interconnection) with the cross-section 4 mm².

The sensor need not be connected independently to the system of interconnection if it is firmly attached and has metal interconnection with structural parts or the piping that is connected to the interconnection system.

VIEW INTO SENSOR HEAD

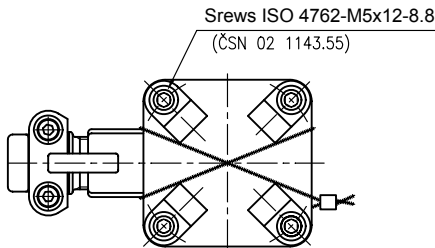
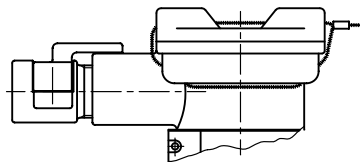




CLOSING THE HEAD OF FIXED CLOSURE Ex d

After the electrical connection, close the sensor head with four screws. Fan-shaped washers shall be installed under all screws both on the head and the outlet. Stop areas of the cover and the head may not be polluted or treated with solidifying paints (save for non-solidifying greases). All screws on the sensor and the outlet, which ensure the connection of parts of the fixed closure, shall be tightened properly, so that the joint between the cover and the head is max. 0.2 mm. The sensors may be provided with a mark (seal) of the installation and service organization by a worker of the installation and service organization.

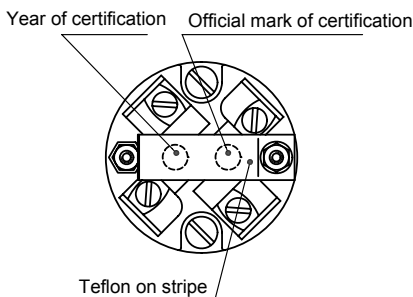
TYPE OF SECURING THE SENSOR COVER



INSTALLATION OF RATED GAUGE

The installation, commissioning and service maintenance of rated gauges pursuant to the Act No. 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, certified sensors shall be provided with a mark of the installation and service organization by an authorized worker of the installation and service organization.

VIEW OF THE TERMINAL BOARD



COMMISSIONING

After the installation of the sensor, including closing the fixed closure and connecting the follow-up (evaluation) device to the supply voltage (and the settlement period of the converter), 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!

In case of rated gauges, the prescribed period for follow-up certification shall be complied with within the intervals specified by the Decree of the Ministry of Industry and Trade No. 345/2002 Coll. Replacement and connection of the certified sensors shall be realized 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 expires.

SENSOR UNINSTALLATION

Only a worker of the installation and service organization may violate the installation seal.



WARNING



Temperature sensor is of design Ex d and shall be disconnected from the supply source before opening the cover of the head and releasing the cable outlet!

After removing the cover of the head, which is connected with four screws, disconnect the connecting cable.

The measuring insert of the sensor can be replaced and it is removed from the head after disconnecting the cable by releasing two screws.

Before a complete uninstallation of the sensor, it is necessary to release the wire for mutual interconnection from the external clamp on the sensor. The sensor shall be screwed out from the weld-on piece; torque for releasing is approx. 150 Nm.

OUTLET REPLACEMENT

The cable outlet may only be replaced with a similar type (with securing against pulling out and connecting thread Pg 16) certified for the fixed closure Ex d IIC. When replacing the outlet, it is necessary to tighten the body of the new outlet with torque 30 – 35 Nm. The cable installation in the outlet, its sealing and securing against pulling out shall be realized pursuant to the instruction sheet of the outlet supplier and in compliance with the Article *Cable outlet installation*.

SPARE PARTS

Spare parts shall be delivered by the manufacturer. Relevant measuring inserts can be ordered pursuant to the offered price list of spare parts. Inserts in the tolerance class A are only delivered upon a special request. Certified measuring inserts are provided with a label with the official mark. The label with the mark is located on the terminal board of the measuring inset. Paired measuring insets are delivered as certified and in a shared packing.

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 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 (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.

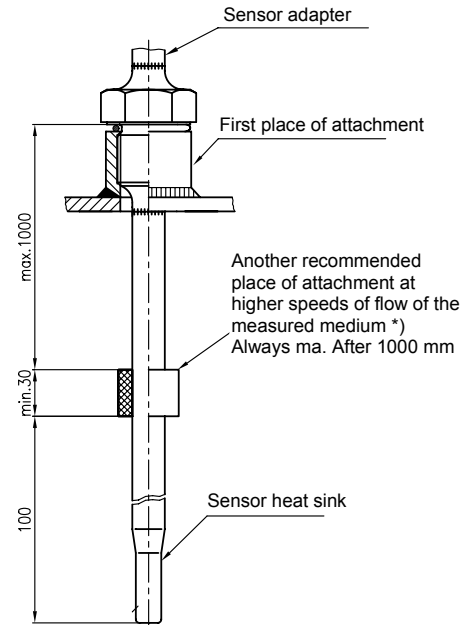
FIGURE 1 - PROPOSAL OF SECURING HEAT SINK OF TEMPERATURE SENSORS Ex d

(for nominal lengths exceeding 630 mm)

With respect to complying with the volume below the non-explosive closure (max. 100 cm³ pursuant to ČSN EN 60079-1), the maximum nominal length of temperature sensor may be 3000 mm.

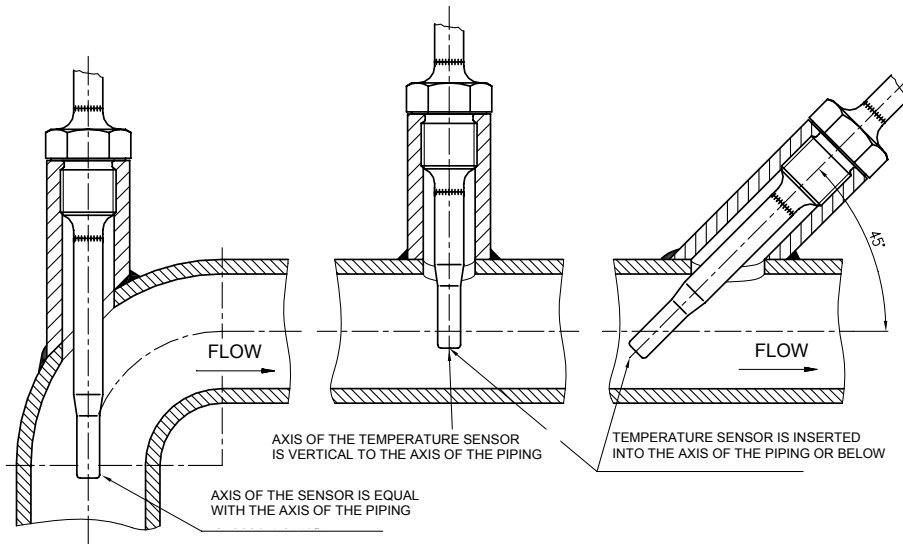
(The value is found out with the diameter of measuring insert 8 mm and heat sink with internal diameter 9 mm).

Prescribed heat sink, type 991 shall be used (pursuant to ON 02 7210, ON 02 7212, ON 02 7215 or ON 02 7217).



*) In case of flow of the measured medium, heat sinks are stressed with dynamic effects of the flowing medium and this load depends on the speed of flow, physical properties of the measured medium and immersion length of the heat sink. If such dynamic effects could occur, it is recommended performing another attachment of the sensor heat sink pursuant to the above mentioned proposal.

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

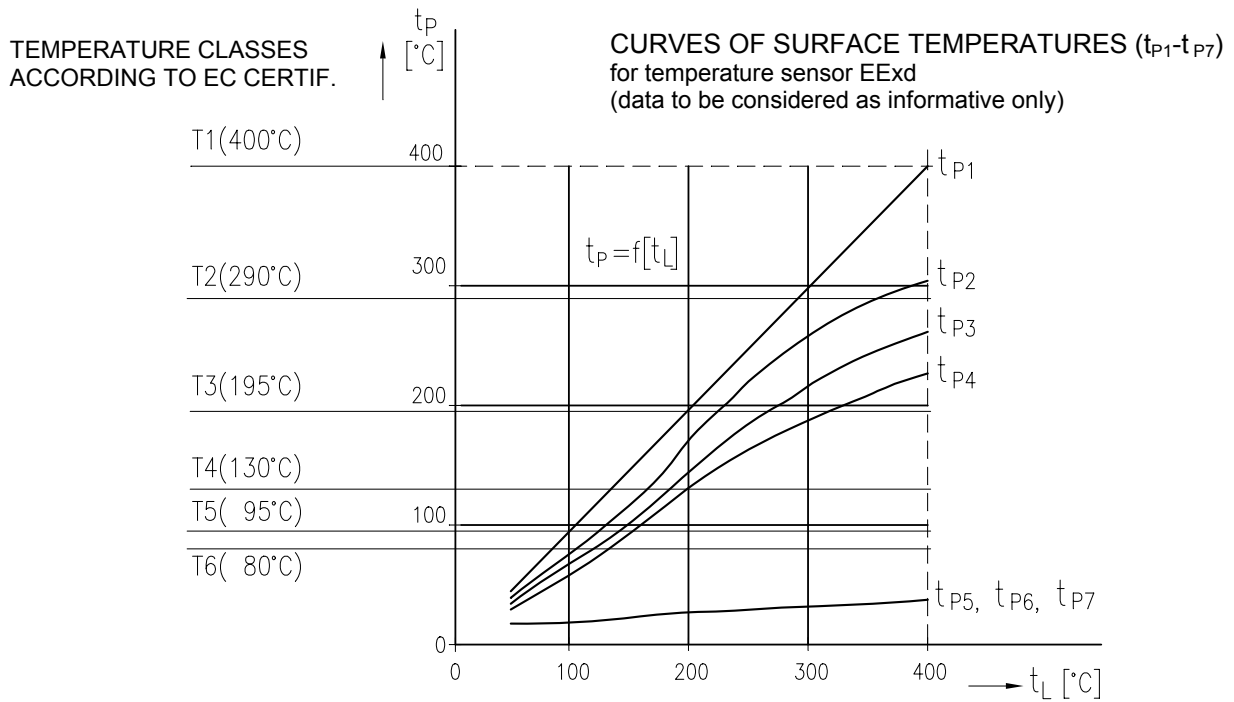
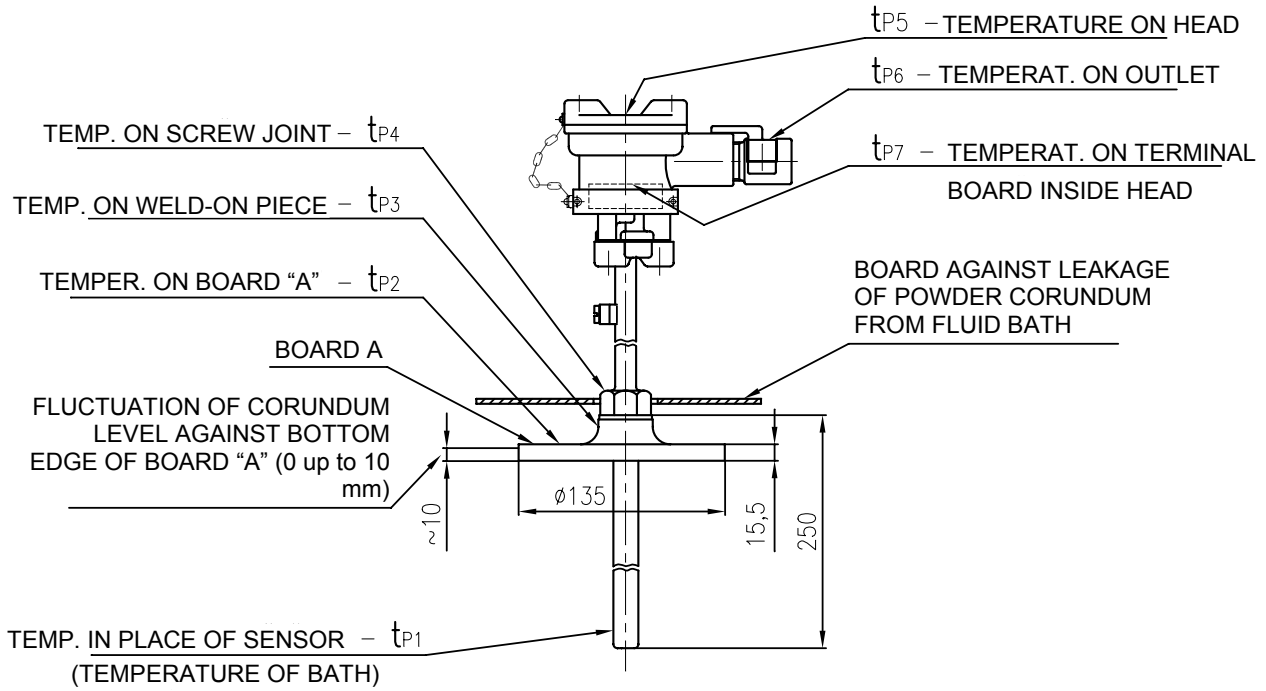


WARNING

- 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 measured medium flows around evenly

FIGURE 3 - CHART OF DEPENDENCY OF SURFACE TEMPERATURES ON TEMPERATURE OF MEASURED MEDIUM

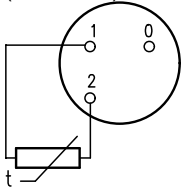
Laboratory measurement in a fluid bath FB-08, immersion at least to the bottom edge of the board "A" at ambient temperature approximately 22 °C.



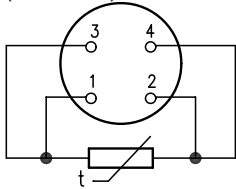
t_p - temperature of surfaces on the sensor in points $t_{p2} - t_{p7}$
 t_L - temperature of measured medium in fluid bath
 t_{p1} - temperature of heat sink in the place of sensor

FIGURE 4 - SCHEME C
without converter

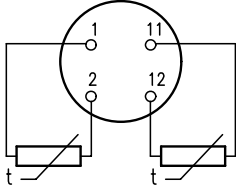
with single measuring resistor
in two-wire connection
(Pt 100/B/2)



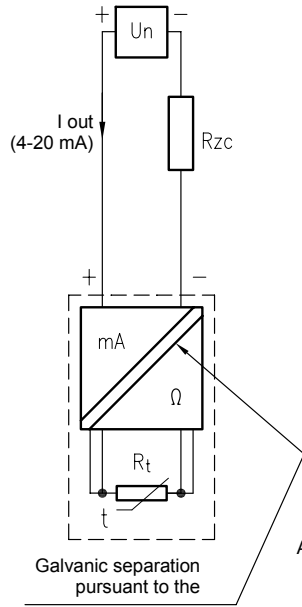
with single measuring resistor
in four-wire connection
(Pt 100/ /4)



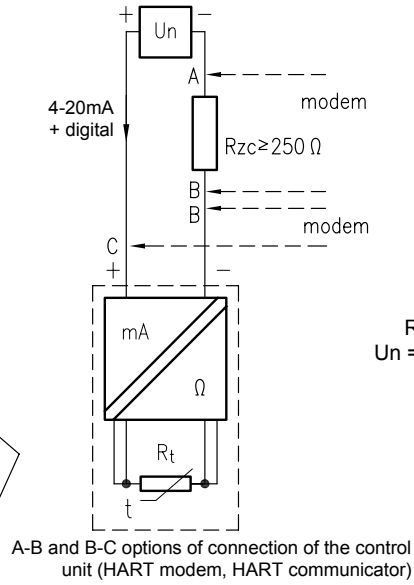
with double measuring resistor
in two-wire connection
(2 × Pt 100/B/2)



SensorION OF TEMPERATURE SENSORS
with converter

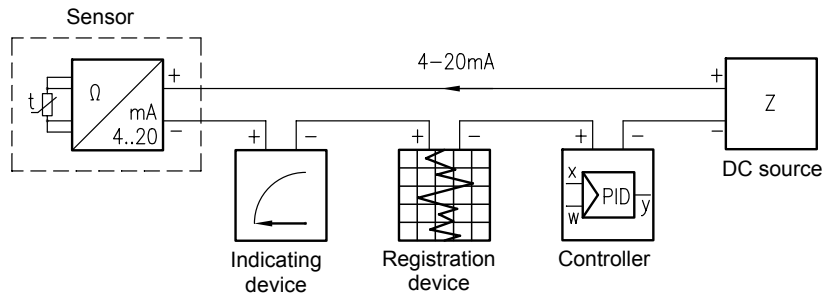


with converter
with HART protocol



Rzc = total load resistance
Un = supply voltage of source

FIGURE 5 - EXAMPLE OF OPERATION CONNECTION
OF TEMPERATURE SENSOR WITH CONVERTER IN LOOP 4 - 20 MA



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