



# Thermoelectric temperature sensor with cable outlet with high mechanical resistance for diesel engines type 113 73

## PRODUCT MANUAL

### APPLICATION

- For remote measurement of temperature in exhaust and suction piping of diesel engines and for other similar applications

### DESCRIPTION

The temperature sensor consists of a jacket thermoelectric couple  $\varnothing$  6 mm with connected compensation wiring. The sensor is reinforced with a tube with a cap nut for the connection of the sensor.

To measure temperature, a defined change of 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 EN 61140 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 EN 61010-1. The follow-up (evaluation) device shall comply with Article 6.3 of the said standard.

**Measuring range:** -40 to 700°C

**Nominal pressure** pursuant to ČSN 13 0010: PN 25

**Electric strength** pursuant to EN 61010-1, Article 6.8.3:  
500 V eff

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

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

**Operation position:** discretionary

**Type of operation:** continuous

**Sensor weight:**

L [mm]	65 mm	approx. 0.23 kg
	130 mm	approx. 0.27 kg
	Compensation wiring	approx. 0.05 kg/m

**Applied materials:**

Jacket of thermocouple	INCONEL 600
Reinforcement tube	steel class 15, nickel-coated and partially painted with aluminium
Screw union	steel class 11, nickel-coated
Compensation wiring	insulation from glass fibres, external braid from galvanized steel wire

### OPERATION CONDITIONS

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

**Temperature of stem of the sensor in the place of connection of the compensation wiring:**

continually	max. 180 °C
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**Relative ambient humidity:**

10 to 95 % without condensation, with upper limit of water content of 29 g H<sub>2</sub>O/kg of dry air

**Atmospheric pressure:** 70 to 106 kPa

<b>Vibrations:</b>	Frequency range	10 to 500 Hz
	Drift amplitude	0.75 mm
	Acceleration amplitude	98.0 ms <sup>-2</sup>

### METROLOGICAL DATA

**Sensing probe:** measuring thermocouple J (Fe-CuNi) or K (NiCr-NiAl) pursuant to EN 60584-1,  $\varnothing$  6 mm, tolerance class 2, single with insulated measuring connection

**Calibration depth of immersion:** 60 mm

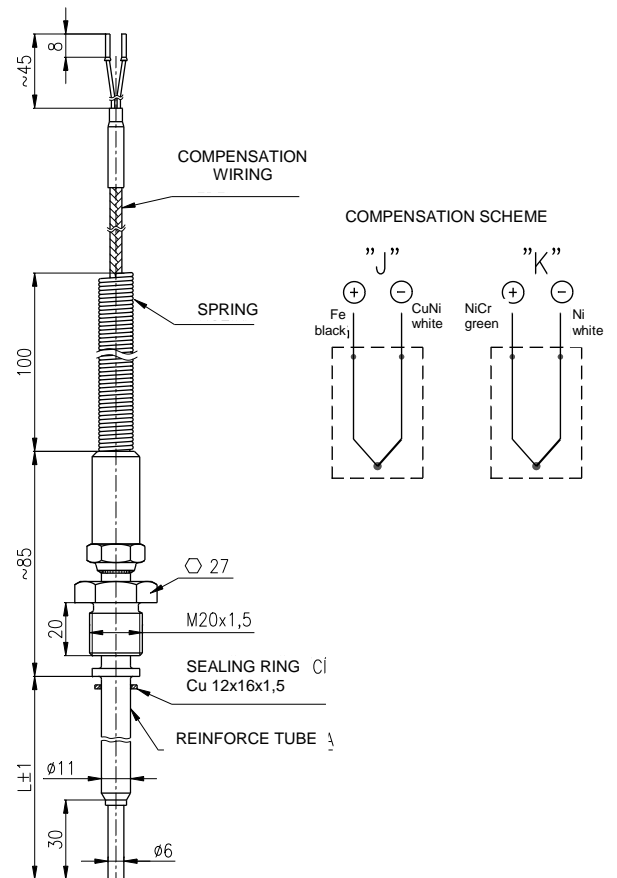
**Temperature response time** pursuant to EN 60751 in whirling water (characteristic value)

$\tau_{0,5}$	2.7 s
$\tau_{0,9}$	6.8 s

### RELIABILITY

Indicators of reliability in operation conditions and conditions of the environment specified herein

- Mean time of operation between failures 96 000 hours
- Expected service life 10 years



### DESIGNATION

#### Data on sensor

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

### DELIVERY

Unless agreed otherwise with the customer, each delivery includes:

- Delivery note
- Sensor pursuant to the purchase order
- Sealing ring Cu 12x16x1.5 (ČSN 02 9310.2)
- Accompanying technical documentation in Czech
  - o Product manual
  - o Product quality and completeness certificate, which also serves as the warranty certificate
  - o Calibration sheet (for calibrated design)

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

- Declaration of Conformity of the supplier pursuant to EN ISO/IEC 17050-1

### ORDERING 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 with high mechanical resistance for diesel engines  
113 730 712 - 6 pcs

**Special requirement:**

Thermoelectric temperature sensor with cable outlet with high mechanical resistance for diesel engines  
113 730 899 - 6 pcs  
Thermocouple "K", nominal length 160 mm,  
Length of compensation wiring 2.5 m

**CALIBRATION**

It is performed pursuant to TPM 3322-94 and in compliance with EN 60584-1, usually in three temperature points evenly distributed within the operation range of the sensor or in the points pursuant to the requirement of the customer. A calibration sheet with measured data is issued for calibrated sensors.

**TABLE 1 - DESIGN OF TEMPERATURE SENSORS**

SPECIFICATIONS		ORDERING NUMBER				
		113 73	0	x	x	x
Jacketed thermoelectric couple Ø6 mm single with insulated measuring connection pursuant to EN 60584-1, tolerance class 2	J (Fe-CuNi)			7		
	K (NiCr-NiAl) *)			8		
Nominal length [mm]	65				1	
	130				2	
	Other *)				9	
Length of compensation wiring [m]	5					1
	10					2
	15					3
	18					4
	20					5
	25					6
	30					7
	35					8
	Other *)					9

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

**TABLE 2 - OVERVIEW OF SEALING RINGS, TYPE 991, SUPPLIED FOR TEMPERATURE SENSORS WITH THERMOWELL**

EXTERNAL FIXING THREAD OF THERMOWELL	SEALING RING			
	DIMENSION [mm]Ød × ØD × t	MATERIAL	NUMBER	ORDERING NUMBER
M12	12 × 16 × 1.5	copper	1 pcs	991 TK 12

The sealing ring is supplied to each sensor by default. The sealing ring can also be ordered separately using ordering number.

**INSTALLATION AND CONNECTION**

The sensors are connected by screwing into the nipples in the exhaust or suction piping of diesel engines.

The operation position of the sensors is discretionary. The compensation wiring shall be supported.

The sensor is connected to the evaluation devices 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 connections) and further by connecting 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.

**REPAIRS**

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

**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 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 EN 60721-3-1 (i.e. in places with uninterrupted 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).

**WARRANTY**

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.

**DISABLING AND LIQUIDATION**

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, may be disposed of to the 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 shall be disposed of in accordance with applicable legislation.

March 2019

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