

Operating Manual

Temperature Sensor TS 45i SH



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1 Safety Information and Caution

1. 1. General

The device, connected and used in accordance with following instructions, is safe to use. All electrical parts are protected against water, dust and dirt by the relevant IP class. Housing prevents direct contact with any parts under voltage. Connection of the device must be done in accordance with local standards. Prior to commission control measurements must be preformed to ensure safe and correct operation.



! CAUTION: For any injury resulting from improper use, the user takes full responsibility.

BEFORE MOUNTING AND CONNECTION READ THIS MANUAL CAREFULLY!

THE CONNECTION OF DEVICE MUST BE DONE BY QUALIFIED PERSONNEL!

PRIOR TO CONNECTION, UNPLUG ELECTRICAL POWER!

DO NOT BLOCK ACCESS TO ELECTRICAL PARTS USED FOR EMERGENCY STOP, CLEANING AND MAINTENANCE!

METAL PARTS OF THE HOUSING MUST BE GROUNDED!

MAKE SURE NO WATER GETS IN TOUCH WITH PARTS UNDER VOLTAGE!

Fire-extinguishing Gear

In case of fire use CO₂ based fire extinguisher and other equipment following procedures in accordance with fire-safety regulations.

1. 2. Safety Precautions

Safety precautions provide personal safety and long service life of the device. Any person taking part in mounting, connecting or maintaining the device must follow this manual and local safety regulation.

Before starting:

- Disconnect circuit breakers at input and output of the device and make sure there is no voltage present.
- Make sure power stays disconnected during the time of mounting and connecting.
- Take special care when working on a device installed in areas with high-voltage present.
- Check grounding connection.
- Provide protection against touching the parts under voltage.

Technical Support



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In case of malfunction please provide us with following information:

- type of the device,
- serial number,
- errors detected,
- overall time of operation,
- environmental conditions and
- application information.

We take no responsibility for proper operation and any consequence resulting from use in discordance with this manual. Safety measures must be provided by user working with the device.

Declaration of Conformity

The device complies with relevant European directives (CE declaration of conformity):

– **Electromagnetic compatibility (ULRS, no. 132/2006)**

Directive 2004/108/EC and its amendments

– **Low voltage Directive (ULRS, no. 27/04)**

Directive 2006/95/EC and its amendments

2 Guideline for Connection and Use

2.1. Field of Use

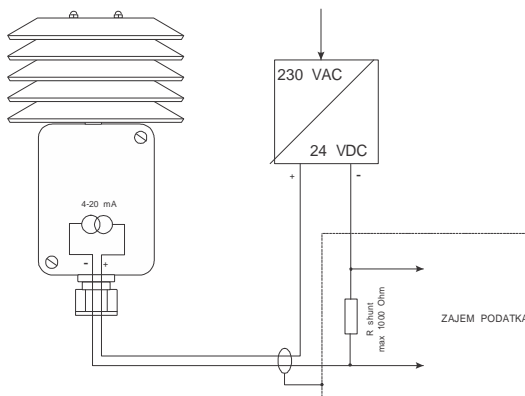
High accuracy temperature sensor TS 45i SH is used for control of accommodation temperature outdoors or in an environment with direct sunlight present. It is suitable for use in systems with automatic control and regulation, or SCADA environments. Robust design allows the use of the device for meteorological purposes outdoors or in chemically aggressive environments (e.g. industrial environments, tunnels, warehouses, swimming pools).

2.2. Mounting the Sensor

Sensor with a supporting structure is intended for mounting on a wall. It is mounted sideways, so that the sensor element and cable outlet are in a horizontal position. Place it on a dry place where there is good air convection (> 0.1 m/s). The sensor should not be installed near direct sources of heat, which could cause measurement errors.

2.3. Connecting the Sensor

Connection of the sensor is done by connecting two wires to the power supply and data collection units. It is recommended to use a cable with a protective shield. Cable length from the sensor to the sampling point should not exceed 50 m. Method of connection is shown in *Picture 1*



Picture 1: Connecting the temperature sensor

CAUTION!

Powering the device must be carried out with low voltage up to max. 42 V and should correspond to SELV norm. Potential of the supply voltage to earth must not exceed 60 V. The power source device must comply with standard EN60742 or a reasonable equivalent. CE Declaration of Conformity relates only to the environment, where the installation is carried out in accordance with these regulations.

The sensor element is very sensitive to mechanical damage. Avoid touching and any contact with other objects. Mechanical damage to the element may cause deviations of measurements.

Avoid also any contact with water. A wet element will show an incorrect measurement - condition is reversible.

2. 4. Indications and Management

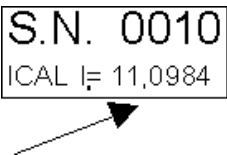
The output current of the sensor is linearly dependent on the temperature. Powering is done via the same current loop. The power supply of 230 V AC / 24 V DC is located at the point where the mains voltage and the acquisition of data on the temperature are present.

The temperature is calculated using the following equation:

$$T = (I - I_o) / I_{df}$$

- T = temperature in ° C
- I = present current in mA
- I_o = 11.1110 or individual calibration constants
- I_{df} = 0.17778

Information about individual calibration constants is shown on the rating plate, which is affixed to a visible place on the device.



2. 5. Guidance on Precise Measurements

- for measurement in areas with poor air movement and direct exposure to sunlight light, it is necessary to add a shadow cap with a fan;
- place the sensor in an area with maximum air flow;
- select the supply voltage U_n following the equation: $R_z * 0.02 + 10 \text{ V}$;
- place the sensor in an area with no interfering sources of heat or radiation.

3 Maintenance

3. 1. Checking and Maintenance

The device should be regularly visually inspected. Having identified any defects do not use the device and call service.

It is recommended to:

- Occasionally clean the housing,
- recalibrate (3 year interval).

Note!

The device requires regular checks and maintenance. Keep your maintenance and service log up to date. Shorten check intervals if required.

- Maintenance personnel must be qualified for the job;
- Maintenance contractor company must provide education and training;
- Regular testing and checking must be exercised as described in this manual and local standards;
- Any maintenance activity must be noted in the log.

3. 2. Servicing

- Servicing can only be done by authorised qualified personnel;
- Keep a servicing log.

Servicing for the time of warranty is provided by manufacturer exclusively. After that time it can be done by an approved maintenance contractor.

3. 3. Troubleshooting

Error	Possible cause	Action
There is no electrical current through the sensor	Fault in power connection	Check power connection
	Defective sensor	Call service
The sensor constantly shows the maximum temperature.	Loss of jumper on PCB	Install coupling
	Defective sensor	Call service

3. 4. Spare Parts

Parts that need to be changed must be replaced with original or functional equivalent parts approved by the manufacturer.

4 Technical Specifications

Basic data is shown on the plate affixed on a visible place on the device.

Nominal voltage U_n	DC 8 to 30 V
Maximum loop resistance R_z	1000 Ω
Temperature sensor	RTD Pt100
Measuring principle	Resistance thermometer
Temperature range	-40 °C do +50 °C
Display error	< $\pm 0,3$ °C (0,1 °C individually calibrated) at 0 °C / $v_z > 0,1$ m/s / $U_n = 15$ V / $R_z = 250$ Ω
Accuracy standard	EN 60751 class B (class B/3 – individually calibrated)
Time constant t_{90}	800 s at air movement 0 m/s 300 s at air movement 1 m/s
EM compatibility	EN 61000-3-2/3 , 61000-6-1/3 / CE
Cable gland	PG7
Housing	ABS / INOX
IP protection	IP 65
Dimensions (W x H x D)	100 x 50 x 35 mm (without bracket)
Weight	350 g (without bracket)

4. 1. Environmental Conditions

Maximum environmental temperature is +50 °C; 24 hour average temperature must not exceed +35 °C. Ventilation must be ensured to allow the extraction of the resulting heat. Lowest environmental temperature is -20 °C. Relative air humidity must not exceed 50 % at maximum temperature +50 °C. Higher humidity is allowed at lower temperature (e.g. 95 % at +20 °C).

Sea-level elevation must not exceed 2000 metres. When using above 1000 metres consider lower air dielectricity and different cooling conditions.

4. 2. Transport and Stocking

Transport the device in original packing if possible. When that is not available use protective air bubble foil and protect exposed areas with Styrofoam.

Temperature while transporting and stocking should be between -25 °C and +55 °C.

Avoid stocking for longer periods of time. After transporting and mounting allow the device at least 1 hour time to settle down before commission. In case that the device is not to be used for a longer period of time, store it in a dry, well ventilated place at room temperature!

4. 3. Disposal

Lifetime of the device significantly depends on the way of use, installation, maintenance and working conditions. Production year is visible on the sticker on the back side. Dispose a deteriorated or ruined device to a place for industry electronic-components disposal according to local regulation.

Components particularly dangerous for the environment (batteries, chemicals, etc.) should be disposed to special places.

5 CE Declaration of Conformity

CE declaration of conformity ensures that the device is safe to use and has been checked and tested to the specified standards. CE statement is enclosed.

ES - IZJAVA O SKLADNOSTI
CE DECLARATION OF CONFORMITY

Manufacturer (name, address):*Proizvajalec (naziv, naslov):*

ITAIA d.o.o.
Litostrojska 44/d
1000 Ljubljana

We declare under our sole responsibility that
s polno odgovornostjo izjavljamo, da

product: Air temperature sensor
proizvod: Senzor temperature zraka

(type, model):*(tip, model):*

TS-45 i __xx
TS-45 i Fs __xx

is in conformity with the provisions of the following regulations:*ustreza zahtevam naslednjih predpisov:*

- **Odredba o električni opremi, ki je namenjena za uporabo znotraj določenih napetostnih mej (Uradni list RS, št. 27/04)**
Directive 2006/95/EC and its amendments
- **Pravilnik o elektromagnetni združljivosti (Uradni list RS, št. 132/06)**
Directive 2004/108/EC and its amendments

and complies with the requirements of the following standards:*in izpolnjuje zahteve naslednjih standardov:*SIST EN 61000-3-2:2002SIST EN 61000-3-3:1997 +A1:2002SIST EN 61000-6-1:2002SIST EN 61000-6-3:2002

EMC – Limits for harmonic current emissions (≤ 16A per phase)
EMC – Limitation of voltage fluctuations and flicker in low-voltage supply systems; for equipment with rotated current (≤ 16A per phase)
EMC – Generic standards - Immunity for residential, commercial and light-industrial environments
EMC – Generic standards - Immunity for residential, commercial and light-industrial environments

Year of affixing of CE mark:*Leto, ko je bil CE znak nameščen na proizvod: 2007*
Ljubljana, Slovenija

Peter Strmčnik, direktor
Ime in priimek, funkcija
Name, surname, position

Limited Warranty Conditions

Our products are workmanship and materials fault free and will work according to specification for a minimum time of warranty (1 year). We provide spare parts and servicing for at least 5 additional years. We will respond to failure notice immediately (7 days at maximum) and fix it within 48 working days.

During the warranty period we take full responsibility and costs (transport not included) for removal of any malfunction due to faulty materials or workmanship. After this period we charge servicing according to used time and replaced parts.

Warranty related obligations come in power with full payment.

Warranty obligations cease to exist:

- in case of improper use or use in discordance to this manual;
- in case of mechanical damage;
- in case of consequential damage due to failure or damage of other devices,
- in case of natural or environmental cause (e.g. lightning discharge, flooding, fire, etc.),
- if the device has been repaired by unauthorized personnel,
- if there are unapproved spare parts built in the device,
- if there are changes made to the device or their parts without written approval of the manufacturer.

Servicing obligations cease to exist:

- if the device has been ruined,
- if the device has been repaired by unauthorized personnel,
- if there are unapproved spare parts built in the device,
- if there are changes made to the device or their parts without written approval of the manufacturer,
- for the time of overdue payment for previous services.

Sale Data: _____

Serial number: _____

NOTES:



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