

Installation and Operating Instructions

Universal Temperature Sensors

CST-6x60 Type PT 100/500/1000

DE-15-MI004-PTB003

DE-15-M-PTB-0022

1 Application and Function

Universal temperature sensor pairs for heat / cooling meters CST-6x60 have EU type examination certification (DE-15-MI004-PTB003) and German national PTB approval (DE-15-M-PTB-0022) and are designed for connection to calculators of heat / cooling meters.

2 Content of the Package

- Universal temperature sensors CST-6x60
- Installation kit
- Installation and Operating Instructions

3 General Information

- Valid statutory provisions and standards for the application of temperature sensor pairs for the measurement of the forward and return flow temperatures of a heat exchange system:
 - EN 1434:2007, parts 1 + 6,
 - Directive 2014/32/EU (MID), annexes I and MI-004,
 - TR-K7.1 / 7.2 / 8 and 9,
 - German verification regulation (MessEG) BGBl. 31.07.2013 S.2723.
- The regulations for electrical installations must be adhered to.
- The temperature sensors left the factory in conformance with all applicable safety regulations.
- Installation and all maintenance work may only be carried out by qualified and authorized technical personnel.
- All details and specifications listed in the temperature sensor data sheet or in these installation and operating instructions must be adhered to.
- Verification seals and sensor identification must not be damaged or removed – otherwise the guarantee and verification of the sensors no longer apply!
- Sensor cables must be laid at a **minimum distance of 20 cm** to sources of electromagnetic interference (switches, controllers, pumps etc.)
- Sensor cables must be laid at a **minimum distance of 5 cm** to other current-carrying wires.
- To protect against damage and dirt the temperature sensors should only be removed from the packaging directly before installation.
- The applicable verification regulations in the country in which the sensors are to be installed must be observed.
- The forward flow sensor (forward flow identification label on the cable) must always be installed in the forward flow.
- The return flow sensor (return flow identification label on the cable) must always be installed in the return flow.
- When possible, the temperature sensors should always be mounted against the direction of flow.
- The temperature sensors are not to be installed within the influence of other sources of heat.
- Do not kink, lengthen or shorten the temperature sensor cables.
- Cables that are too long should not be coiled.
- Always connect the temperature sensors to the calculator before connecting the flow meter.

4 Mounting the Temperature Sensors

4.1 Direct Mounting in T-piece

- Screw the connecting T-piece with a gasket into the measuring point.
- Pull the O-ring over the protective sheath and position it in the middle groove.
- Insert the sensor into the T-piece and tighten the screw nut firmly until the mechanical stop (metal-to metal).

4.2 Mounting in Temperature Pockets

- The temperature sensors should be mounted in curve or inclined in the opposite direction of the flow. They should reach the middle of the pipe.
- Insert the sensor into the temperature pocket until it stops. The installation kit is supplied separately!
- Use the screw (pocket) to fasten the sensor (adaptor).

5 Sealing the Temperature Sensor

After a function test, but before starting up operation, the sensors and connection pieces must be properly sealed.

Important note:

The seals may not be damaged or removed, otherwise the guarantee and verification of the sensors no longer apply!

6 Connection of Temperature Sensors to the Calculator

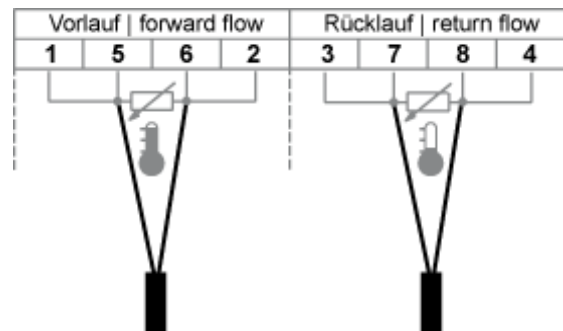
Note: The illustrated connection diagrams are only examples. The actual order of the connections can vary depending on the calculator used.

- Follow the specifications and installation instructions of the calculator to which the temperature sensors are being connected!
- The numbering of the terminal connectors corresponds to the standard (EN1434-2) and must be adhered to.

6.1 2-wire connection

Forward flow temperature sensor (forward flow identification label on the cable):
clamp **5** and clamp **6**

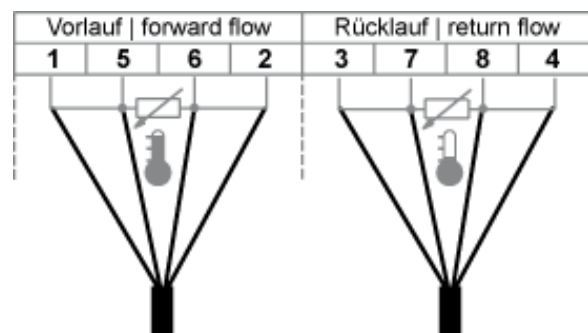
Return flow temperature sensor (return flow identification label on the cable):
clamp **7** and clamp **8**



6.2 4-wire connection

Forward flow temperature sensor (forward flow identification label on the cable):
clamp **1 (brown)** and clamp **5 (yellow)**,
clamp **6 (green)** and clamp **2 (white)**

Return flow temperature sensor (return flow identification label on the cable):
clamp **3 (brown)** and clamp **7 (yellow)**,
clamp **8 (green)** and clamp **4 (white)**



7 Technical Data

General	
Type	platinum precision resistor (DIN EN 60751)
Ambient temperature	5 - 55 °C
Nominal value	PT500, optional PT100 and PT1000
Operating pressure	PN16
Diameter	6.0 mm
Nominal length	60 mm
Cable lengths	up to 3 m in 2-wire technique (PT100)
	up to 10 m in 2-wire technique (PT500, PT1000)
	up to 10 m in 4-wire technique (PT100, PT500, PT1000)
Largest effective value of sensor current	PT100: 1.78 mA PT500: 0.618 mA PT1000: 0.437 mA
Total resistance (2-wire cable)	0.14 Ohm/m for 0.25 mm ² wire cross-section
Maximum electrical measurement power	0.3 mW (average value for pulsed measurement currents)
Installation	direct-mounted in T-piece
	temperature pockets (in conformity with EN1434): 85 mm, 100 mm, 120 mm, 150 mm, 210 mm
Minimum immersion depth	direct-mounted: 18 mm
Max. flow speed for 210 mm temp.	2.2 m/s
Output signal	Resistance characteristic curve as per DIN IEC 751 for PT100/ PT500/ PT1000
Response time	$\tau_{0,5} \leq 6$ s (direct-mounted) $\tau_{0,5} \leq 12$ s (in temperature pocket)
Measurement stability	10 years (upon observance of maintenance specifications)
Environmental class	class E1, M1 as per EN 1434:2007
Protection rating	IP65

Details type CST-6x60 PT100/500/1000	
Temperature measurement range heat	Θ 0 ... 150 °C
Temperature difference heat	$\Delta\Theta$: minimal 3K $\Delta\Theta$: maximal 150K
Temperature measurement range cooling	Θ : 0 ... 150 °C
Temperature difference cooling	$-\Delta\Theta$: minimal 3K $-\Delta\Theta$: maximal 150K
Upper temperature limit	150 °C

8 Maintenance

To ensure measurement stability, after expiration of the national statutory verification period an examination of the temperature sensors must be carried out to check adherence to the maximum permitted error (MPE) according to EN 1434:2007.

9 MID Declaration of Conformity

For the product described in this document we confirm, as the manufacturer, that it meets the fundamental requirements according to the

- Council Directive 2014/32/EC of 26 February 2014 on the approximation of the laws of the member states relating to measurement instruments, in particular those in annex I and MI-004, as well as
- the requirements relating to emissions in the European Council Directive on EMC 2014/30/EC, and the requirements according to the Council Low Voltage Directive 2014/35/EC, as well as
- the requirements according to German verification regulation (MessEG) BGBl. 31.07.2013 S.2723.

The complete signed declaration can be found at www.engelmann.de.

10 Contact

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Subject to technical change!