developing solutions

FISCHER MESS- UND REGELTECHNIK

Data sheet

TE46

Digital temperature transmitter

09015417 • DB_EN_TE46 • Rev. ST4-A • 05/24

1 Product and functional description

1.1 Performance characteristics

Typical applications

- Food industry
- Heating, air conditioning and ventilation engineering
- Environmental technology
- Procedural technology
- Petrochemical industry

Main features

- 2-wire technology 4-20 mA
- Resistance thermometer according to IEC 60751
- HF-insensitive
- EMC-resistant
- High measuring accuracy
- Very low temperature drift
- Programmable via PC
- With moisture protection
- Notification of sensor errors

1.2 Intended use

The TE46 is a universal and configurable temperature transmitter with a sensor input for resistance thermometers and a 4 to 20 mA analogue output. It can be used for temperature detection in liquid and gaseous media.

The device is designed for mounting in various connection heads of the B, BUS, BUSH, S79 and BBK types.

The device may only be used for the purpose stipulated by the manufacturer. The manufacturer will not be liable for damage arising from incorrect or improper use.

1.3 Function diagram

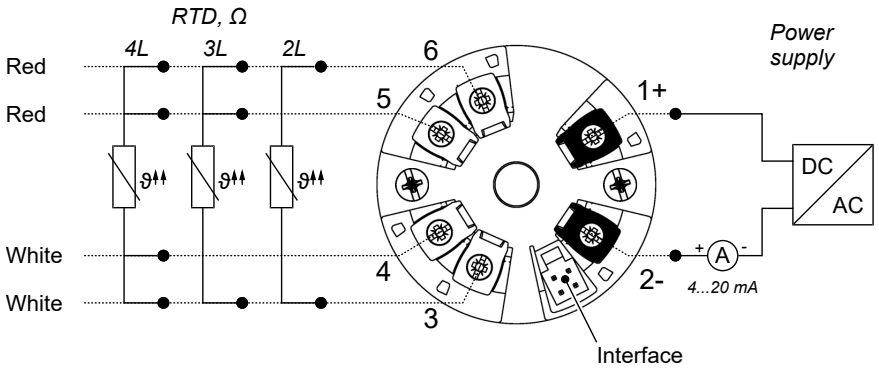


Fig. 1: Function and connection diagram

1.4 Design and mode of operation

The temperature transmitter is a 2-wire device with one measuring input and one analogue output. The device transmits signals from resistance thermometers via a 4...20 mA current signal.

Resistor input

For Pt100/200/500/1000 with temperature ranges according to IEC 60751. Measuring lead compensation up to max. 50Ω possible.

Power supply/analogue output

The 4 ... 20 mA output signal can be inverted to a 20 ... 4 mA signal. The signal limits can be configured in accordance with NAMUR recommendation NE43 for failure detection.

The device has reverse polarity protection for the power supply.

Interface

The TZ45 configuration kit is connected to this interface. The configuration set consists of the programming software, the adapter and the serial connection cable. The adapter has galvanic isolation.

Data is exchanged between the transmitter and PC in both directions, so that the configuration and serial number of the transmitter can be accessed from any PC with the configuration set.

2 Technical data

2.1 General

General information	
Type designation	TE46
Measuring variable	Temperature (temperature-linear transfer behaviour)
Type of protection	IP00
Weight	45 g

Reference conditions	
Calibration temperature	+25 °C ±3 K
Supply voltage	24 V DC
Resistance calibration	4-conductor circuit

2.2 Input variables

2.2.1 Resistance thermometer (RTD)

Measuring current at the sensor	< 0.3 mA
Max. sensor cable resistance	50 Ω per conductor
Line compensation (2-wire)	0 ... 30 Ω
Standard	IEC 60751

		Measuring range limits			
No.	**Type**	**Measuring range**	**Min. range**	**Max. measurement deviation**	**Measured value specific**
1	Pt100	-200 … 850 °C	10 K	≤ 0.15 °C	0.07 % of the range
2	Pt100	-50 … 250 °C	10 K	≤ 0.10 °C	
3	Pt1000	-200 … 250 °C	10 K	≤ 0.15 °C	
4	Pt1000	-50 … 250 °C	10 K	≤ 0.10 °C	

2.3 Output variables

Analogue output	4 ... 20 mA 20 ... 4 mA (inverted)
Linearisation/ Transmission behaviour	temperature linear, resistance linear, voltage linear
Start delay	≤ 5 s (during which I_a ≤ 3.8 mA)
Jump response	≤ 0.5 s
Filter (1st order digital filter)	0 … 120 s

Failure information according to NAMUR NE43:

Under measured value range	Linear drop from 4.0 ... 3.8 mA
Measuring range exceeded	Linear increase from 20.0 ... 20.5 mA
Failure (sensor break, short circuit)	≤ 3.6 mA (low) ≥ 21 mA (high)

2.4 Measuring accuracy

Measurement deviation		See table of input variables The information includes non-linearities and repeatability.
Long-term stability	after 1 year	±0.05 K or ±0.03 % of the measuring range
	after 3 years	±0.06 K or ±0.04 % of the measuring range
	after 5 years	±0.07 K or ±0.05 % of the measuring range
Influence of the ambient temperature per 1 °C change		max. ±0.04 °C in the entire range max. ±0.02°C in the range 0...200°C
Influence of the supply voltage per 1 V change		max. ±0.02 °C in the entire range max. ±0.01°C in the range 0...200°C

Calculation of the maximum measurement deviation

MD := *Maximum measurement deviation*
ϑ_A := *Measurement deviation*
ϑ_{amb} := *Impact of ambient temperature*
ϑ_U := *Impact of the supply voltage*

$$MD = \sqrt{\vartheta_A^2 + \vartheta_{amb}^2 + \vartheta_U^2}$$

2.5 Auxiliary energy

Rated voltage	24 V DC
Permitted op. voltage	10 V ≤ U_b ≤ 36 V
Power consumption	3.5 to 22.5 mA

2.6 Operating conditions

Ambient temperature range	-40...+85 °C
Storage temperature range	-50 … +100 °C
IP protection class	IP 00 (when installed, depends on the connection head or field housing used).
Humidity (according to IEC 60068-2-30)	Max. rel. humidity: 95 % Condensation permitted
Climate class (according to EN 60654-1)	C1
Shock and vibration resistance (in accordance with DIN EN 60068-2-27)	8.6 ... 150 Hz at 3g

Conformity

Guideline	Applied standard
Low-Voltage Directive 2014/35/EU	EN 61010-1
EMC Directive 2014/30/EU	IEC/EN 61326
RoHS Directive 2011/65/EU	EN IEC 63000
REACH Regulation (EC) No 1907/2006	The article TE46 does not contain any SVHC substances.

2.7 Construction design

Electrical connection	Screw terminals
Cable design	Rigid or flexible
Cable cross-section	≤ 1.5 mm² (16 AWG)
Installation position	User-defined
Dimensions	Ø 44 x 24.1 mm
Weight	45 g

2.7.1 Materials

Casing	Polycarbonate
Connection terminals	Nickel-plated brass
Casting compound	SIL Gel

2.7.2 Dimension drawings

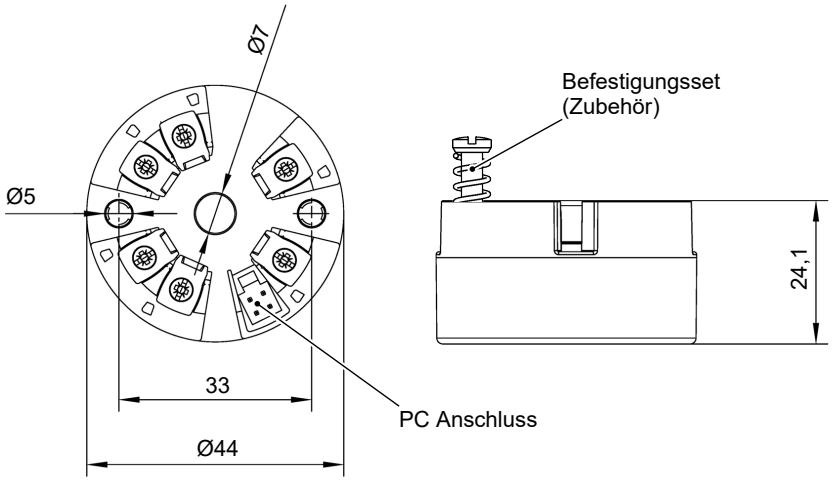
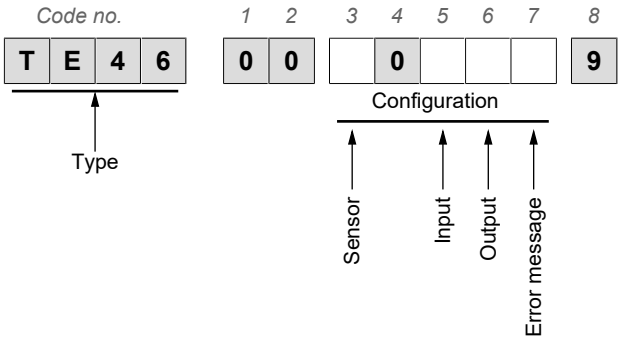


Fig. 2: Dimension drawing

3 Order codes

Please specify the desired measuring range with every order.



	Configuration	3	4	5	6	7
	None	0	0	0	0	0

[3]	Sensor
	Resistance thermometer (RTD)
1	Pt100
5	Pt1000

[5]	Input	
1	Pt100/Pt1000	2-conductor *)
2	Pt100/Pt1000	3-conductor
3	Pt100/Pt1000	4-conductor

*) please specify cable resistance (max. 30Ω)

[6]	Output
1	4 … 20 mA
2	20 to 4 mA

[7]	Error message (NAMUR)	
2	Low	≤ 3.6 mA
3	High	≥ 21 mA

Add as plain text

Measuring range

[ ] to [ ] [°C]

Start *End*

3.1 Accessories

Order No.	Designation	
TZ45	Configuration set incl. USB interface cable	
04002156	Top-hat rail adapter	
06402741	Fastening set	
	2	Screws with spring
	4	Lock washers
	1	Cover cap for the PC connection

3.2 Information about the document

This document contains all technical data about the device. Great care was taken when compiling the texts and illustrations. nevertheless, errors cannot be ruled out.

Subject to technical amendments.

Notes

Notes

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