

# PROGRAMMABLE HEAD-MOUNT TRANSMITTER

## TEH series

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- output signal 4 ... 20 mA (TEH-27, TEH-28)  
0 ... 10 V (TEH-37, TEH-38)
- input - output galvanic insulation (TEH-28, TEH-38)
- programmable input signal range
- programmable sensor type: Pt100, Ni100, J, K, N, S, R, B, T
- RTD sensor can be connected in 2, 3 or 4-wire system
- internal or external compensation of thermocouple cold junction
- for mounting in type B connection heads

The transmitter TEH is designed to convert resistance of temperature sensor or voltage of thermocouple sensor to standard current signal 4...20 mA (TEH-27, TEH-28) or voltage 0...10V (TEH-37, TEH-38).

Transmitters TEH-28 and TEH-38 provide galvanic insulation between input and output terminals.

Most parameters such as: sensor type, input signal range or mode of cold junction compensation, may be adapted by user for specific requirements of his measuring system.

The transmitter is programmed using a personal computer with USB port via **IF-2013U** interface which is also offered.

The housing is dedicated to mounting in type B connection heads.

## TECHNICAL DATA

Sensor type, measuring range		programmable, see Table 1
Maximum range, accuracy, thermal drift		see Table 1
Pt100 or Ni100 sensor connection		2, 3 or 4-wire, programmable
Pt100 or Ni100 connection resistance (2 and 3-wire)		< 10 Ω (each wire)
Maximum resistance for 2-wire connection which can be corrected with software		0,00 ... 20,00 Ω (sum of both wires)
Bias current of Pt100 or Ni100 sensors		< 0,25mA
Compensation of thermocouple cold junction		internal or external, programmable
Maximum error of thermocouple cold junction internal compensation		± 1 °C
Temperature range of thermocouple cold junction external compensation		-50,0 ... 100,0 °C
Range of temperature offset		-10,0 ... 10,0 °C
Galvanic insulation between input and output terminals (TEH-28 and TEH-38)		500 V AC
Output signal	TEH-2x	4 ... 20 mA or 20 ... 4 mA, programmable
	TEH-3x	0 ... 10 V or 10 ... 0 V, programmable
Linear region of output signal	TEH-2x	3,8 ... 20,5 mA
	TEH-3x	0,0 ... 10,3 V
Output signal delay after power on		ca. 5 s
Digital filter time constant (1st order filter)		selected: 0,2; 1; 2; 4; 8; 16; 32 s
Sensor failure indication	TEH-2x	3,5 or 23 mA, programmable
	TEH-3x	0 or 11,5 V, programmable
Power supply	TEH-2x	8 ... 36 V DC / 24 mA (from current loop)
	TEH-3x	14 ... 36 V DC / 18 mA
Ambient temperature		-20 ... +70 °C
Dimensions (diameter x height) / weight		44 x 21 mm / ca. 50 g

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**Table 1.** Summary of sensor types, input signal ranges and accuracy.

Sensor type	Measuring range [°C]	Minimal measuring range [°C] <sup>(1)</sup>	Accuracy- largest value <sup>(2),(3)</sup>	Thermal drift / 10°C - largest value <sup>(2),(4)</sup>
<b>B</b> PtRh30-PtRh6	400 ... 1800	200	0,2% or ±5°C	0,07% or ±1,5°C
<b>J</b> Fe-CuNi	-100 ... 1000	50	0,2% or ±1°C	0,07% or ±0,7°C
<b>K</b> NiCr-NiAl	-100 ... 1200	50		
<b>N</b> NiCrSi-NiSi	-100 ... 1300	100		
<b>R</b> PtRh13-Pt	0 ... 1600	200	0,2% or ±2°C	0,07% or ±1,5°C
<b>S</b> PtRh10-Pt	0 ... 1600	200		
<b>T</b> Cu-CuNi	-100 ... 400	50	0,2% or ±1°C	0,07% or ±0,7°C
<b>Pt100</b>	-100 ... 800	30	0,15% or ±0,2°C	0,05% or ±0,1°C
<b>Ni100</b>	-60 ... 180	30		
Voltage [mV]	-10 ... 65 mV	2 mV	0,2% or ±0,05mV	0,07% or ±0,03mV
Resistance [Ω]	60 ... 370 Ω	20 Ω	0,15% or ±0,1 Ω	0,05% or ±0,05 Ω

<sup>(1)</sup> Minimum difference between upper and lower range value.

<sup>(2)</sup> Error values in [%] are relative to user-defined range.

<sup>(3)</sup> The ambient temperature = 23 °C.

<sup>(4)</sup> Thermal drift means that the error may change with the ambient temperature.

**ORDERING CODE**

(1)
(2)
(3)
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(7)
(8)

TEH — 
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| (1) Model of transmitter   | <b>27</b> output 4 ... 20 mA, without insulation<br><b>37</b> output 0 ... 10 V, without insulation<br><b>28</b> output 4 ... 20 mA, with insulation<br><b>38</b> output 0 ... 10 V, with insulation |
| (2) Sensor type  | <b>Pt100, Ni100, J, K, N, S, R, T, mV, Ohm</b>   |
| (3) Lower range value  | value in [°C], [mV] or [Ω] (default lowest value for selected sensor type)   |
| (4) Upper range value  | value in [°C], [mV] or [Ω] (default highest value for selected sensor type)  |
| (5) Connecting Pt100, Ni100 or thermocouple cold junction compensation | <b>2(...)<sup>(*)</sup>, 3, 4</b> - wires<br><b>I</b> - internal (automatic), <b>E(...)<sup>(**)</sup></b> - external (user defined)   |
| (6) Converting characteristic  | <b>N</b> - normal (4 ...20 mA, 0 ... 10 V), <b>R</b> - reverse (20 ... 4 mA, 10 ... 0 V)   |
| (7) Time constant of digital filter [s], selected                      | <b>0, 1, 2, 4, 8, 16, 32</b> (0 really means 0,2 s)  |
| (8) Alarm output signal  | <b>H</b> - high level (23 mA or 11,5 V), <b>L</b> - low level (3,5 mA or 0 V)  |

<sup>(\*)</sup> Sum of resistances of wires can be given in brackets.

<sup>(\*\*)</sup> Thermocouple cold junction temperature must be given in brackets.

Default values marked by under-scoring. Factory programmed in case of incomplete ordering code.  
 The specification of the model, i.e. point (1) is compulsory.

**Example for order:** TEH-27-Pt100-0-150-2(0,8)-N-2-L denotes Pt100 temperature transmitter for range 0 ... 150°C with 4 ... 20 mA signal output. The sensor is connected with two wires (sum of resistances of wires = 0,8 Ω); time constant = 0,5 s; in the case of sensor failure, output current is 3,5 mA.  
 TEH-38-K-0-600-I-N-1-H denotes thermocouple K temperature transmitter for range 0 ... 600 °C with 0 ...10V signal output galvanically insulated from sensor. Internal cold junction compensation; time constant = 1 s; in the case of sensor failure, output voltage is 11,5 V.