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PROGRAMMABLE TEMPERATURE TRANSMITTER

TEHM-27

USER'S GUIDE

Contens

1. Introduction

The transmitter TEH is designed to converting resistance of RTD temperature sensor or voltage of thermocouple sensor to standard current signal 4...20 mA.

The output signal can be a linear function of a sensor temperature or its resistance or voltage.

The sensor and output circuits are not galvanically insulated.

Transmitter derives power from the current loop.

The user can modify many parameters accordingly to his application. There are following user-defined parameters:

- type of sensor
- measuring range
- temperature correction offset
- rising or falling characteristics: 4...20 mA or 20...4 mA
- digital filter time constant
- sensor failure indication: 3,5 mA or 23 mA)
- resistance correction of two wires connecting RTD
- thermocouple cold junction compensation method: internal (automatic) or external (user-defined constant value)
- user-defined temperature value of thermocouple cold junction

2. Description

The TEHM-27 transducers are designneded for mounting in the MA sensor head. The electronic system is flooded with a hard polyurethane resin that also acts as a transmitter housing.

On the upper wall (Fig.2.1) there are cable clamps:

- two marked with thermocouple and resistor symbols used to connect the sensor
- two marked "OUT" to connect the current loop 4 ... 20mA and an interface that allows communication with a computer.

The transducer is mounted in the head using two M-2.5 screws through the holes marked (1) in figure. The spacing of mounting holes is 19 mm.

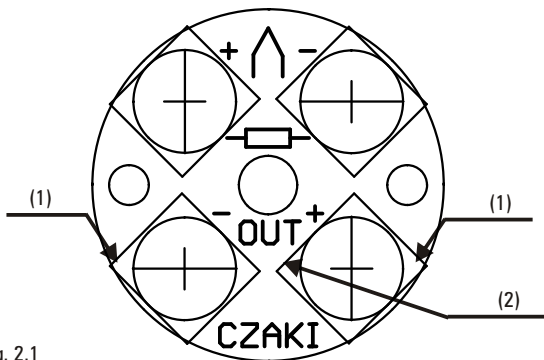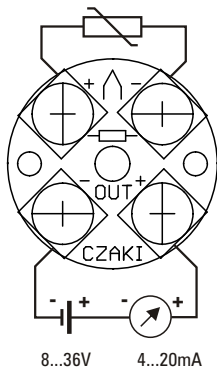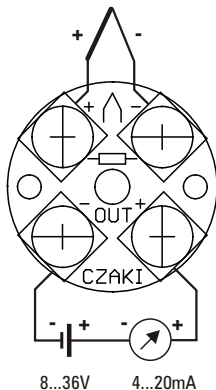The sensor cables are passed through a hole (2) with a diameter of 4 mm.
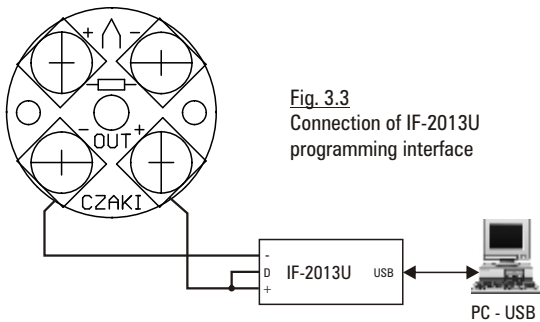

Fig. 2.1

3. Connection diagrams

Fig. 3.1
RTD
(Pt100, Ni100)
sensor connection

8...36V   4...20mA

Fig. 3.2
Thermocouple
connection

8...36V   4...20mA

Fig. 3.3
Connection of IF-2013U
programming interface

IF-2013U   USB

PC - USB

4. Programming

For transmitter programming are needed:

• Computer with USB port and Windows® system installed.

• **IF-2013U** interface offered by CZAKI THERMO-PRODUCT with dedicated software:
  USB drivers and Windows® application **E-config**.

The interface is being linked with the computer USB socket with the USB cable A-B,
and with the transmitter with 2-wire cable (Fig. 3.3), in addition terminals + and D
of the interface should be shorted.

An appropriate cables are being delivered in the set with the interface.

During the programming the transmitter is powered from the interface with the
20VDC voltage.

No sensor is needed during the configuration.

Description of software installation and using the application E-config is in IF-2013U
interface User's Guide.

5. Technical data

• Sensor type, measuring range *****	see Table 5.1
• Minimal range, accuracy, thermal drift	see Table 5.1
• Pt100 or Ni100 sensor connection	2-wire
• Maximal 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
• Maximal error of thermocouple cold junction internal compensation	±1 ℃
• Temperature range of thermocouple cold junction external compensation	-50,0...+100,0 ℃
• Range of temperature offset	±10,0 ℃
• Output signal *****	4...20 mA or 20...4 mA

- Linear region of output signal   3,8...20,5 mA
- Output signal delay after power on   ca. 5 s
- Digital filter time constant (1st order filter) *   0,2; 1; 2; 4; 8; 16; 32 s
- Sensor failure indication *   23mA or 3,5 mA
- Power supply (V_s)   8...36 VDC (from current loop)
- Load resistance (R_L) $R_L[\Omega] < (V_s[V] - 8) / 0,023$
- Operating ambient temperature   -20...+70 °C
- Ambient temperature during programming   0...+50 °C
- Dimensions (diameter x heigh)   25 x 14 mm
- Spacing of mounting holes   19 mm
- Weight   ca. 12 g

  * User programmable parameters

6. Contens of package

- TEHM transmitter
- User's guide

Table 5.1. Summary of sensor types, input signal ranges and accuracy.

Sensor type	Measuring range [°C]	Minimal measuring range [°C] [1]	Accuracy- larger of values [2],[3]	Thermal drift / 10°C - larger of values [2],[4]
B PtRh30-PtRh6	400 ... 1800	200	0,2% or ±5°C	0,07% or ±1,5°C
J Fe-CuNi	-100 ... 1000	50	0,2% lor ±1°C	0,07% or ±0,7°C
K NiCr-NiAl	-100 ... 1200	50		
N NiCrSi-NiSi	-100 ... 1300	100		
R PtRh13-Pt	0 ... 1600	200	0,2% or ±2°C	0,07% lor ±1,5°C
S PtRh10-Pt	0 ... 1600	200	0,2% or ±1°C	0,07% or ±0,7°C
T Cu-CuNi	-100 ... 400	50		
Pt100	-100 ... 800	30	0,15% or ±0,2°C	0,05% or ±0,1°C
Ni100	-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

[1] Minimal difference between upper and lower range value.
[2] Error values in [%] are relative to user-defined range.
[3] The ambient temperature = 23 °C.
[4] Thermal drift means that the error may change with the ambient temperature.