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PROGRAMMABLE TEMPERATURE TRANSMITTER

TED series

USER'S GUIDE

Contens

1. Introduction

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

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

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

Transmitters TED-27 and TED-28 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 (TED-27, TED-28)
  0...10 V or 10...0 V (TED-37, TED-38)
- digital filter time constant
- sensor failure indication: 3,5 mA or 23 mA (TED-27, TED-28)
  11,5 V or 0 V (TED-37, TED-38)

- type of RTD connection: 2, 3 or 4-wire
- 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 TED transmitter contains a single PCB and it has plastic enclosure dedicated to mounting on 35 mm wide rail, accordingly to DIN EN 50022-35. There are screw terminals at the front side of the transmitter. Terminals signed 1, 3, 4 and 6 at the top are for sensor connection. Terminals 10 and 12 at the bottom are for 4...20mA current loop connection (TED-27, TED-28) or 24VDC power supply (TED-37, TED-38) or IF-2013U programming interface connection.

Terminal number 11 is for voltage output signal connection (TED-37 and TED-38).

A LED lamp **FAULT** in the front panel indicating the sensor failure or damage.

There are 2 latches **(1)** and **(2)** at the rear side of the enclosure, which is used to mount at the rail. To remove, use a screwdriver to pull the latch **(1)** up or pull the latch **(2)** down until it allows the case to be lifted.

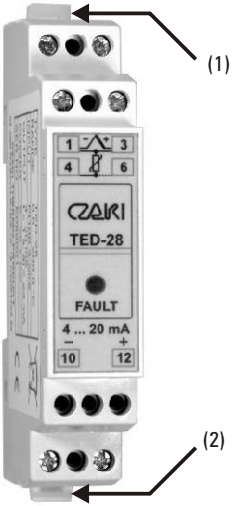

Fig. 2.1

3. Connection diagrams

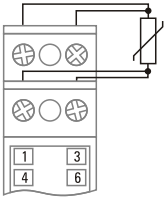

Fig. 3.1
4-wire RTD
(Pt100, Ni100)
sensor connection

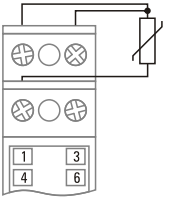

Fig. 3.2
3-wire RTD
(Pt100, Ni100)
sensor connection

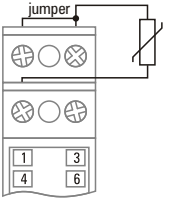

Fig. 3.3
2-wire RTD
(Pt100, Ni100)
sensor connection

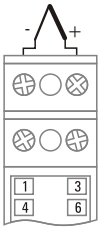

Fig. 3.4
Thermocouple
connection

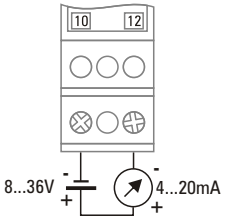

Fig. 3.5
4...20 mA output
signal connection
(TED-27, TED-28)

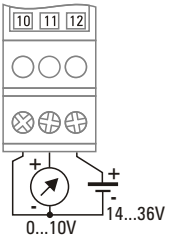

Fig. 3.6
0...10 V output
signal connection
(TED-37, TED-38)

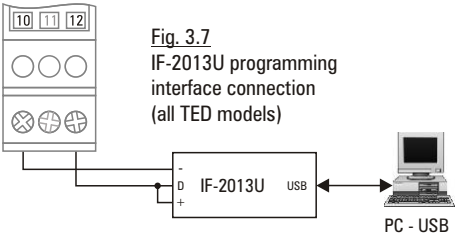

Fig. 3.7
IF-2013U programming
interface connection
(all TED models)

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. 3.7), 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, 3 or 4-wire
• Pt100 or Ni100 connection resistance (2 and 3-wire)	< 10 Ω (each 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 °C
• Temperature range of thermocouple cold junction external compensation	-50,0...+100,0 °C

• Range of temperature offset		±10,0 °C
• Galvanic insulation between input and output terminals (TED-28 and TED-38)		500 V AC
• Output signal *	TED-2x	4...20 mA or 20...4 mA
	TED-3x	0...10 V or 10...0 V
• Linear region of output signal	TED-2x	3,8...20,5 mA
	TED-3x	0,0...10,3 V
• 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 *	TED-2x	(23mA + LED) or (3,5 mA)
	TED-3x	(11,5V + LED) or (0 V + LED)
• Power supply (V_s)	TED-2x	8...36 VDC (from current loop)
	TED-3x	14...36 VDC
• Load resistance (R_L)	TED-2x	$R_L[\Omega] < (V_s[V] - 8) / 0,023$
	TED-3x	$R_L > 5\ k\Omega$
• Operating ambient temperature		-20...+70 °C
• Ambient temperature during programming		0...+50 °C
• Dimensions (heigh x width x depth)		98 x 17,5 x 56,4 mm
• Weight		ca. 50 g

* User programmable parameters

6. Contens of package

- TED 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		
T Cu-CuNi	-100 ... 400	50	0,2% or ±1°C	0,07% or ±0,7°C
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.