Compact temperature transmitter

Overview

The NPT4 is a universal temperature transmitter in a housing for DIN rail mounting with 6.1 mm width. The device converts the input signal from a TC or RTD (2-, 3-, 4-wire) sensor into a 0(4)-20 mA or 0(2)-10 V standard signal. The transmitter detects an input sensor failure in the event of sensor break or short circuit. The inputs are protected against sensor break and short circuit. The power supply circuit is protected against reverse polarity. Wide variety of RTD and TC sensors are accepted (see Table 6). The configuration is performed via the USB interface. No programming adapter is needed. The transmitter is delivered with the Pt100 default configuration. The latest version of the configuration software is available for download on www.akytec.de.

⚠ **DANGER** | *Do not use the device where it is subjected to flammable or explosive gas.*

⚠ **WARNING** | *Before starting any commissioning or repair work make sure that the device is fully disconnected from power.*

⚠ **CAUTION** | *Connect the power supply only after the wiring has been completed.*

Design and wiring

- Housing – plastic, grey
- 8 screw terminals
- Connection to PC over microUSB interface protected with rubber cap

Table 1. LED indicators

| Indicator	Description
Green	Power supply is on
Red	Sensor failure
Red, blinking	Data exchange over USB is in progress
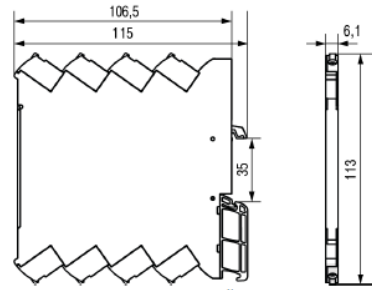
Fig. 1. Dimensions
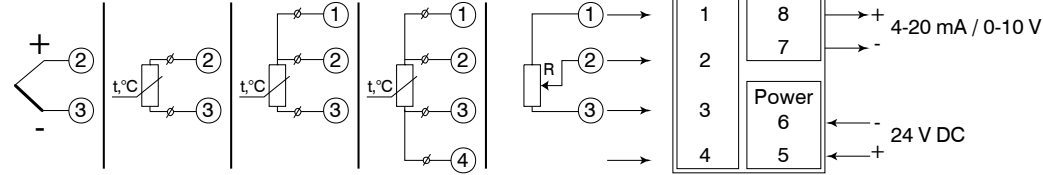
Fig. 2. Electrical connections

Specifications

Table 2. General specification

Power supply	24 (10…36) V DC
Power consumption, max.	1.5 W
Galvanic isolation	1500 V
PC interface	microUSB (USB2.0 Full Speed)
Protection class	III
IP code	IP20
Ambient temperature	-40...+70 °C
Humidity	up to 95% (non-condensing)
Dimensions	6,1 x 113 x 115 mm
Weight	approx. 200 g

Table 3. Inputs

Analog inputs		1
Accuracy	TC	0.5%
	RTD	0.25%
Resolution ADC	TC	15 bit
	RTD	15 bit
Galvanic isolation		1500 V

Table 4. Outputs

Analog outputs	1			
Galvanic isolation	1500 V			
Measuring range	0…23 mA	Output safe state	0-5 mA	5…6 mA
	0…11 V		0(4)-20 mA	20…23 mA
Input signal	0-5 mA, 0(4)-20 mA		0-5 V	5…5.5 V
	0-5 V, 0(2)-10 V		0-10 V	10…11 V
Input resistance	0-5 mA, 0(4)-20 mA	≤ 480 ohm	2-10 V	0…2 / 10…11 V
	0-5 V, 0(2)-10 V	≥ 1000 ohm		
Resolution DAC	12 bit			
Output ripple	0.12 mA			
Output signal setting time after an input signal jump, max.	2 s			

Table 5. Sensor lines

Sensor type	Cable length, max.	Resistance, max.	Additional requirements
RTD	100 m	30 ohm (each wire)	Use wires of the same length and the same cross-section for 2- and 3-wire sensors. For 4-wire sensors. For 4-wire sensors it is not essential. It is recommended to use the 3-wire connection for 2-wire sensors to compensate the influence of the lead resistance (see Fig. 2).
TC	20 m	100 ohm	Use thermocouple cable

Table 6. Sensor types

Sensor	Measuring range, °C	Temperature coefficient, °C⁻¹	Conversion range, min., °C	Sensor	Measuring range, °C	Temperature coefficient, °C⁻¹	Conversion range, min., °C
RTD according to IEC 60751:2008				**TC according to IEC 60584-1:2013**			
Pt50	-200…+850	0.00385	100	J	-200…+1200	-	400
Pt100	-200…+850		100	N	-200…+1300	-	500
RTD according to GOST 6651				K	-200…+1300	-	500
50P	–200…+850	0.00391	100	S	0…+1750	-	600
50M	–180…+200	0.00428	50	R	0…+1750	-	600
Cu50	–50…+200	0.00426	50	B	+200…+1800	-	1200
100P	–200…+850	0.00391	100	A	0…+2500	-	600
100M	–180…+200	0.00428	50	T	-200…+400	-	400
Cu100	–50…+200	0.00426	50	**TC according to DIN 43710**			
Ni100	–60…+180	0.00617	50	L	-200…+900	-	400
Position encoders				**TC according to GOST 8.585**			
Potentiometer (3-wire, ≤ 1000 ohm)	0…100 %	-	10%	L	-200…+800	-	400
				A-2	0…+1800	-	600
Resistance sensor (2-wire)	0…1000 Ohm	-	100 Ohm	A-3	0…+1800	-	600

Configuration

The configuration software „NPT Configurator" runs under Windows XP/Vista/7/8/10.

The software enables to configure the following parameters:

- Sensor type
- Measuring span [1]
- RTD connection circuit 2-, 3- or 4-wire
- Settings of the input filter (damping, bandwidth)
- Output signal at sensor failure (sensor break or short circuit) (see table 4, Output safe state)

The software enables also calibration of the transmitter output.

[1]) It is not recommended to set the measuring span less than 1/8 of the measuring range (see table 6), otherwise the measuring accuracy will be reduced.

The NPT4 is a „Plug-qand-play" device. It can be connected to PC over a USB-microUSB shielded cable with a maximum length of 3 m (not included). The driver will be installed after establishing the connection. Wait until the installation is completed and the entry „USB Serial Port" with the port number appears in Device Manager. In the configuration mode the power supply is provided via USB interface.

⚠ **WARNING** | *The device may only be disconnected from the PC when the configuration is completed.*

▶ **NOTICE** | *Before connecting the transmitter to the PC, the 24 V power supply must be switched off, otherwise the device will not be recognized by the system.*

Maintenance

The maintenance includes:

- Cleaning the enclosure and the terminals from dust, dirt and debris
- Checking the fastening of the device
- Checking the wiring and contact reliability

The device should be cleaned with a damp cloth only. No abrasives or solvent-containing cleaners may be used. All safety precautions must be observed when carrying out maintenance.

Transportation and storage

Pack the device in such a way as to protect it reliably against impact for storage and transportation. The original packaging provides optimum protection. If the device is not taken immediately after delivery into operation, it must be carefully stored at a protected location. The device should not be stored in an atmosphere with chemically active substances.

Permitted storage temperature: -25…+55 °C

▶ **NOTICE** | *The device may have been damaged during transportation. Check the device for transport damage and completeness. Report the transport damage immediately to the shipper and akYtec GmbH!*

Scope of delivery

- NPT4   1
- User guide   1