

Instruction manual

**Temperature transducer P6181
for Pt100 with (4-20) mA output**

Instruction manual for temperature transducer P6181

P6181 transducer without own temperature sensors are designed for signal conversion from RTD sensor Pt100 (3850ppm/°C) to current 4 to 20mA.

Connection of Pt100 sensor: two-wire, three-wire and two-wire with compensation loop.

Transducer is connected to other circuitry by means of current loop (two-wire connection, power from current loop).

Installation:

Transducer is supplied from external power source by a cable. The cable is used for transmission of measurement temperature to sensing device too. It is recommended to use shielded copper cable (e.g. SYKIFY) and the shielding connect to ground terminal of sensing side. Outside diameter of the cable must be from 3.5 to 8 mm, maximal cross-section area 2.5 mm² and maximal length 1200m. The cable must be located at indoor rooms (probe is not protected for outdoor use). The cable should not be led in parallel along power cabling. Safety distance is up to 0.5 m otherwise undesirable induction of interference signals can appear.

Transducer is designed for wall mounting. It is equipped with a pair of holes at the bottom part of the case. For connection of the cable is necessary to unscrew four screws at case corners and remove lid. Lace the cable through a gland at the case wall. Connect the cable to terminals with respecting the signal polarity (see figure). Terminals are self-clamping and can be opened by a suitable screwdriver. For the opening, insert the screwdriver to upper terminal hole and lever by him.

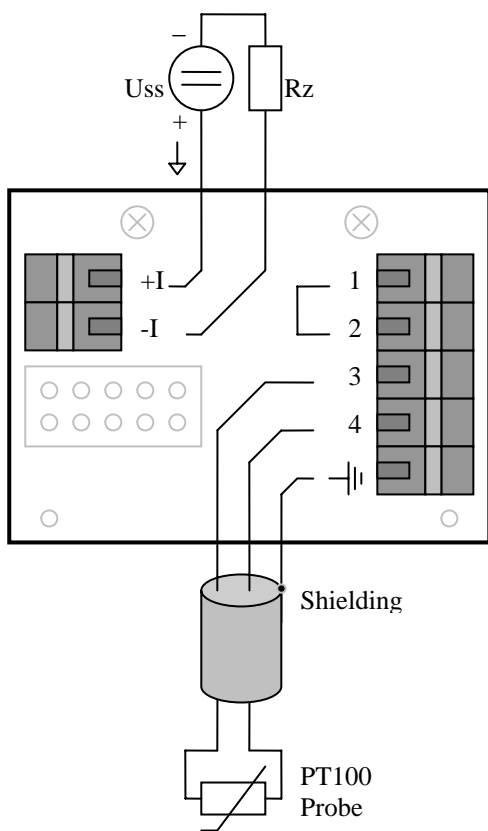
Do not remember to tighten glands and case lid after cables are connected. It is necessary for warranting of protection IP65.

Connection of external temperature probe is enabled by three ways:

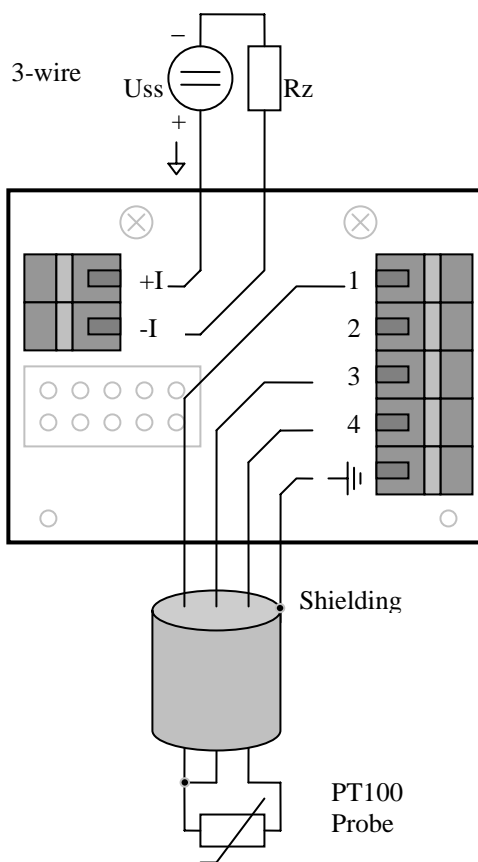
1. Two-wire connection – suitable for short probes (approximately to 1m). With longer probes measurement error increases essentially caused by non-zero resistance of probe leads probes. Optionally temperature dependence of parasite lead resistance can appear.
2. Two-wire connection – used for longer probe leads. This wiring compensates parasite resistance of connected probe leads and its temperature dependence. Necessary condition is - parameters of all three leads are identical. It is necessary to use multi-wire (three-wire) cable.
3. Two-wire connection with compensation loop – similar to two-wire connection but there are 4 wires connected to the cable. Two of them are connected to sensor and other two are connected to each other and are not connected to the sensor. In case both branches have the same parasite resistance, its effect is compensated and also effect of temperature dependence. Necessary condition is - parameters of all four leads are identical. It is necessary to use multi-wire (four-wire) cable.
4. The cable should not be led in parallel along power cabling. Safety distance is up to 0.5 m otherwise undesirable induction of interference signals can appear. Shielding of the probe cable is connected to proper terminal and should not be connected to any other circuitry or earthing. If connected probes are equipped with a metal part, it is recommended to use probes, where metal part is not electrically connected to shielding of the cable. In other cases it is necessary to ensure metal part is not electrically connected to any other circuitry.

Typical application circuitry:

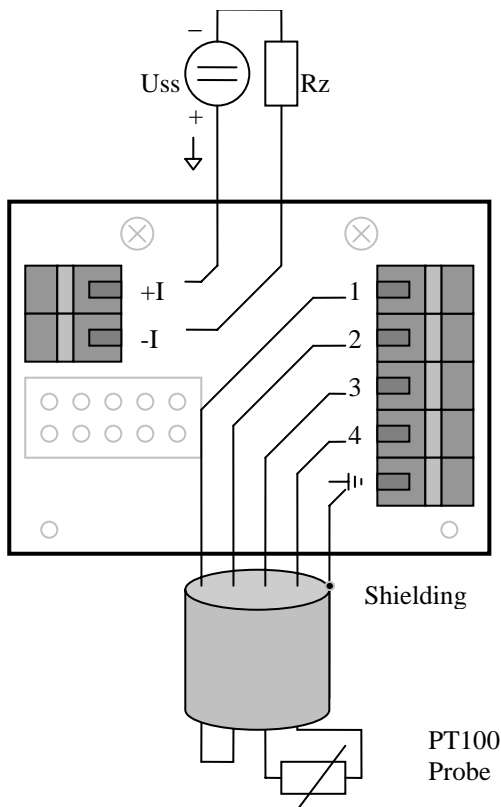
2-wire probe connection



3-wire probe connection



2-wire probe connection with closed loop



Minimum voltage of power supply Uss:

$$U_{ss \text{ min}} > U_{0 \text{ min}} + I_{\text{max}} * R_z,$$

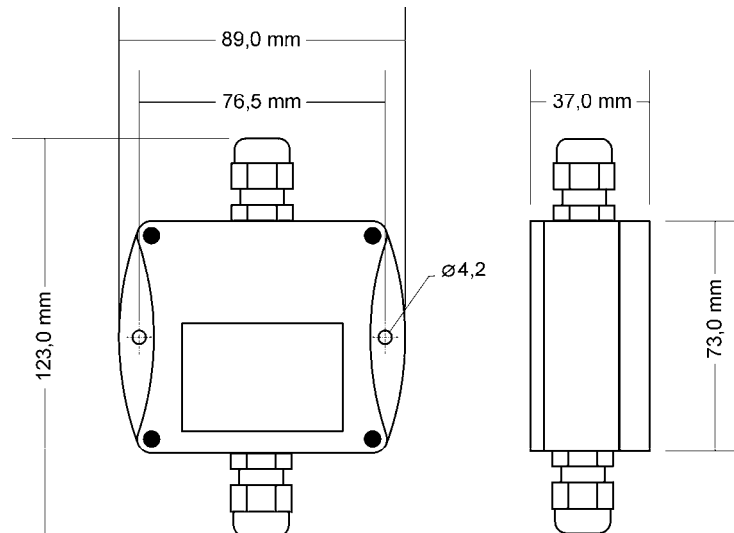
where

$$U_{0 \text{ min}} = 9 \text{ V}$$

I_{max} ... approximately 20 mA

R_z ... sensing resistor (shunt)

Dimensions:



Technical parameters:

Measuring temperature range: -100°C to $+200^{\circ}\text{C}$

Temperature probe: Pt100/3850 ppm, connected by shielded cable

Accuracy without probes: $\pm 0.3^{\circ}\text{C}$ up to $+100^{\circ}\text{C}$, $\pm 0.4^{\circ}\text{C}$ over $+100^{\circ}\text{C}$ (at ambient temperature 23°C)

Output range: 4 to 20 mA

Current output in case of error: < 3.5 mA or > 24 mA

Parasite resistance of probe leads: possible to compensate resistance up to $15\ \Omega$ for each cable wire (each wire should have identical resistance)

Power: 9 to 30 V dc, maximum ripple 0.5 %

Operating temperature and humidity range:

Temperature of case -30 to 80°C with humidity from 0 to 100 %RH without condensation

Operational position: arbitrary

Outer characteristics in accordance with EN 33-2000-3:

Normal environment with the specifications: AM1, BE1, CB1

Protection of electronic:

IP65 (tighten glands, tighten case lid with inserted packing of lid)

Storing conditions:

Temperature from -30 to $+80^{\circ}\text{C}$, humidity from 0 to 100 %RH without condensation

Not allowed manipulations:

It is not allowed to operate the device under other than specified conditions in technical parameters. Devices are not designed for locations where mechanical vibrations can appear and for locations with chemically aggressive environment.

Recalibration:

Interval of metrological verification depends on concrete application. Recommended period is about 2 years.

Material of the case:

ABS

Dimensions: 123 x 89 x 37 mm (including cable glands)

Weight: approximately 150 g

Liquidation:

Device itself (after its life) is necessary to liquidate ecologically!