

T4111 TRANSDUCER

**Programmable temperature transducer
from Pt1000 sensor to current loop 4-20 mA**

Instruction Manual

Instruction manual for use of T4111 transducer

Transducer is designed for temperature measurement at °C or °F by means of an external temperature probe with Pt1000 sensor. Measured temperature is converted to linearized unified signal 4-20 mA. Measured values are displayed on LCD display. It is possible to switch OFF the LCD at all. Current loop has two-wire connection and requires power from evaluation device.

All transducer setting is performed by means of the PC connected via the optional SP003 communication cable (not included in delivery). Program *Tsensor* for transducer setting is available to download free at www.cometsystem.cz. Program enables to assign temperature measuring range. It supports make the adjustment of the device too. This procedure is described at file „*Calibration manual.pdf*“ which is installed commonly with the software.

Transducer version TxxxxL with watertight male connector instead of a cable gland is designed for easy connection/disconnection of the output cable. The protection of male Lumberg connector RSFM4 is IP67.

Models marked TxxxxZ are non-standard versions of the transducers. Description is not included in this manual.

Please read instruction manual before the first device connection.

Device setting from the manufacturer

Transducer is set from the manufacturer to the following parameters:

value at output II: 4 – 20 mA corresponds -200 to +600 °C

display: switched ON

Modification of the setting is possible to do by means of the PC using procedure described at the end of this document.

Installation of the transducer

Transducer is designed for wall mounting. There are two mounting holes at the sides of the case. Interconnection terminals of T4111 are accessible after unscrewing four screws and removing the 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 with inserted packing after cables connecting. It is necessary for warranting of protection IP65. Connect complementary female connector for T4111L transmitter in accordance with the table in Appendix A of this manual.

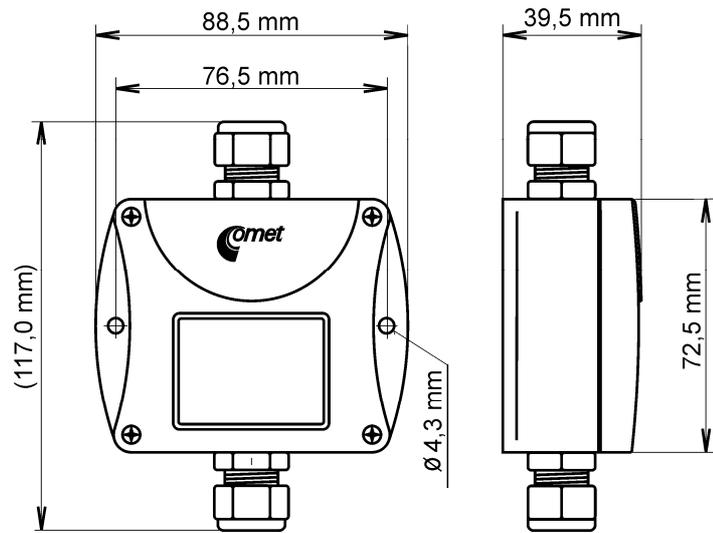
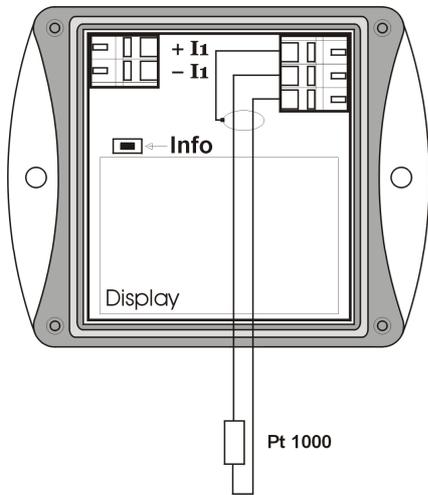
It is recommended to use shielded twisted copper cable, maximal length 1200m. The cable must be located at indoor rooms. The cable should not be led in parallel along power cabling. Safety distance is up to 0.5 m, otherwise undesirable induction of interference signals can appear. Outside diameter of the cable for T4111 device must be from 3,5 to 8 mm (e.g. SYKFY), for device T4111L with respect to the female connector. Do NOT connect shielding at connector side.

External temperature probe should be of „shielded two-wire“ type. For leading of the cable same recommendations are valid as for current loop cable, i.e. cable should be located as far as possible from potential interference sources. Maximum probe cable length is 10 m. Connect probe cable shielding to proper terminal and do not connect it to any other circuitry and do not ground it. If connected probe is equipped with metal stem, we recommend using probes with metal stem not connected to cable shielding. Or else it is necessary to arrange metal stem is not connected to any other circuitry.

Electrical system (wiring) may do only worker with required qualification by rules in operation.

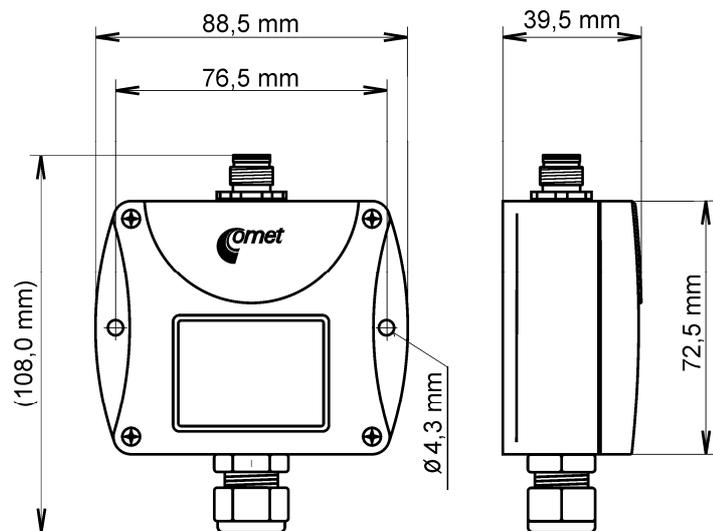
Dimensions – T4111

Connection:



Dimensions – T4111L

Connection: see Appendix A



Typical application wiring

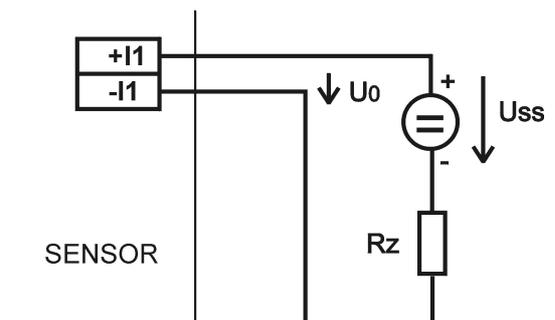
Calculation of minimum power voltage U_{ss} for proper operation:

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

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

I_{\max} ... approximately 20 mA

R_z ... sensing resistor (shunt)



LCD Info mode

Several settings of installed transducer is possible to verify without a use of the computer. It is necessary to connect at least power of current loop II.

Unscrew the transducer lid and shortly press button between display and interconnection terminals by means of a tool (e.g. screwdriver).



Range and type of value for output 1 (current loop II = symbol „1“ on display). Type of value, assigned to output 1, is indicated by displayed unit (here °C). Upper line displays current value corresponding to measured value (lower line). Here 4 mA corresponds to -30 °C.



Press button again to get value for upper point (same output, same value) similarly as at previous point. Here 20 mA corresponds to 80 °C.
Press button again to end info mode and display actual measured values.

Notice: during info mode no measurement and no output current generation proceed. The transducer stays at info mode 15 s, then automatically goes back to measuring cycle.

Readings on LCD display

°C, °F

Reading next to this symbol is measured temperature or error state of value.

Technical parameters:

Analog output:

Current loop with range from 4 to 20 mA

Current output in case of error: <3.8 mA or >24 mA

Measuring parameters:

Temperature probe: Pt1000/3850 ppm connected by shielded cable of maximum length 10m

Measuring temperature range: -200 to +600 °C (can be limited by applied temperature probe model)

Resolution: 0.1 °C

Accuracy without probe: current output $\pm (0,15 + 0,1\% \text{ FS})$ °C, $\pm 0,2$ °C for value on LCD display

Recommended interval of calibration: 2 years

Measuring interval and LCD display refresh: 0.5 s

Communication with computer: via USB port by means of USB communication cable SP003

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

Protection: IP65

Operating conditions:

Operating temperature range: -30 to +80 °C, over +70°C switch LCD display OFF
external probe - depends on probe model.

Operating humidity range: 0 to 100 %RH

Outer characteristics in accordance with Czech National Standard 33-2000-3:
normal environment with the specifications: AE1, AN1, BE1

Working position: arbitrary

Electromagnetic compatibility: complies EN 61326-1

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 with chemically aggressive environment.

Storing conditions: temperature -30 to +80 °C

humidity 0 to 100 %RH without condensation

Dimensions: see dimensional drawings

Weight: approximately 145 g

Material of the case: ABS

Procedure of modification of transducer adjustment:

- Device adjustment is performed by means of the optional SP003 communication cable, connected to USB port of the PC.
- It is necessary to have installed configuration program Tsensor on the PC. It is free to download at www.cometsystem.cz. During installation please take care about installation of driver for USB communication cable.
- Connect SP003 communication cable to the PC. Installed USB driver detect connected cable and create virtual COM port inside the PC.
- Unscrew four screws of the device lid a remove the lid. If device is already installed to measuring system, disconnect leads from terminals.
- Connect SP003 communication cable to the device. Display must light up, or at least must light up all symbols for one second (if LCD was switched OFF by program before).
- Run installed Tsensor program and select corresponding communication COM port (as described above).
- When new setting is saved and finished, disconnect the cable from the device, connect leads into its terminals and place the lid back to the device.

Error States of the device

Device continuously checks its state during operation. In case error is found LCD displays corresponding error code:

Error 0

First line displays „Err0“.

Check sum error of stored setting inside device's memory. Output value is < 3.8 mA. This error appears if incorrect writing procedure to device's memory occurred or if damage of calibration data appeared. At this state device does not measure and calculate values. It is the serious error, contact distributor of the instrument to fix.

Error 1

Measured value is over upper limit of allowed full scale range. There is a reading „Err1“ on LCD display. Output value is about 24.5 mA. This state appears if measured temperature is higher than approximately 600°C (i.e. high non-measurable resistance of temperature probe, probably opened circuit).

Error 2

There is a reading „Err2“ on LCD display. Output value is about 3.8 mA. Measured value is below lower limit of allowed full scale range. This state appears if measured temperature is lower than approximately -210°C (i.e. low resistance of temperature probe, probably short circuit).

Error 3

There is a reading „Err3“ on LCD display upper line.

Error of internal A/D converter appeared (converter does not respond, probably damage of A/D converter). No measurement of values is proceeded. Output value is about 3.8 mA. It is a serious error, contact distributor of the instrument.

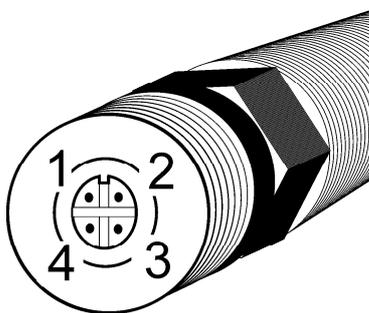
End of operation

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

Technical support and device service

Technical support and service is provided by distributor. For contact see warranty certificate.

Appendix A



Female Lumberg connector	Transmitter Tx1xxL with 4-20mA outputs	Transmitter Tx2xxL with 0-10V outputs	Transmitter Tx3xxL with RS232 output	Transmitter Tx4xxL with RS485 output
1	+I1	Udd	RTS	+U
2	+I2	Uout1	Rx	A
3	-I2	Uout2	Tx	B
4	-I1	GND	GND	GND