



# TxMiniBlock

## TEMPERATURE TRANSMITTER – OPERATING MANUAL V1.0x B

### 1 INTRODUCTION

TxMiniBlock is a 4-20 mA 2-WIRE Pt100 temperature transmitter to be assembled in heads. The desired temperature measurement range as well as other transmitter features can be easily configured through the TxConfig software and the TxConfig-USB interface.

The output current has a linear behavior relative to the temperature measured by the sensor.

### 2 SPECIFICATIONS

Sensor input: Pt100.

- Maximum Range: -200 to 650 °C
- Minimum Span: 40 °C
- 3-wires, Excitation of 0.20 mA,  $\alpha= 0.00385$ , according NBR 13773.
- To use 2-wires Pt100, connect together terminals 2 and 3.

**Total accuracy (Tamb 25 °C):** Maximum error 0.2 % of the maximum range for Pt100;

**Response time:** < 100 ms

**Output:** Current of 4-20 mA or 20-4 mA, 2-wires; linear relative to the temperature measured by the sensor.

**Output resolution:** 0.004 mA (12 bit)

**Power supply:** 12 to 35 Vdc across the transmitter

**Maximum load (RL):**  $RL (max.) = (Vdc - 12) / 0.02 [\Omega]$   
Where: Vdc= Power supply voltage (12 to 35 Vdc)

**Operating temperature:** -40 to 50 °C

**Humidity:** 0 to 90 % RH

**Calibration thermal drift:**  $\pm 40$  ppm / °C full range

**Electromagnetic compatibility:** EN 50081-2, EN 50082-2

**No electrical isolation between the sensor and the 4-20 mA loop.**

**Internal protection against supply voltage polarity inversion.**

**Housing in ABS, 34 mm diameter and maximum height of 18 mm.**

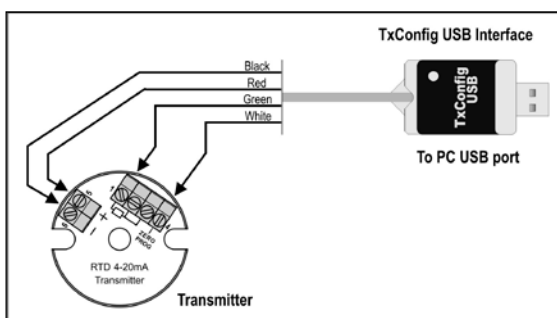
### 3 CONFIGURATION

If the Pt100 sensor is already configured, no intervention is necessary; installation can be immediately performed. When a configuration change is required, it can be made with the TxConfig software; it is then sent to the transmitter using the TxConfig Interface.

The TxConfig interface has a complex electronic circuit. Do not use any other interface or cable connection to USB; the product will be damaged and this damage is not covered under warranty.

TxConfig interface and software are comprised in the Transmitter Setup Kit that can be purchased from the manufacturer or from authorized dealers. The software can be upgraded for free at the manufacturer's website. To install, run Tx\_setup.exe and follow the instructions.

The interface connects the transmitter to the computer, as show in Figure 01.



During setup, the transmitter must be powered electrically. The TxConfig interface itself supplies the power, but this depends on the computer used.

Another way is to run the setup with the transmitter connected to this process, using the energy from the same source that feeds this process (loop). See Figure 02.

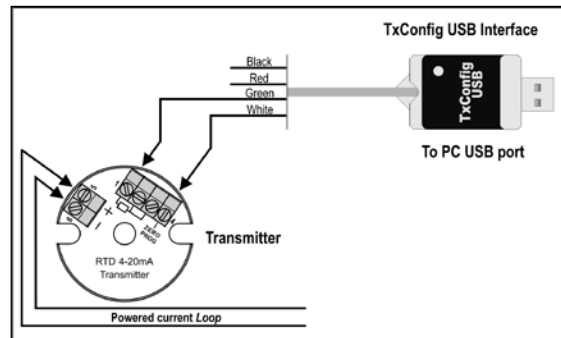


Figure 02 – TxConfig Interface connections – Loop powered

After the connections are made, the user must run the TxConfig software and, if necessary, use the Help topic to configure the transmitter.

Figure 03 shows the main screen of the TxConfig software.

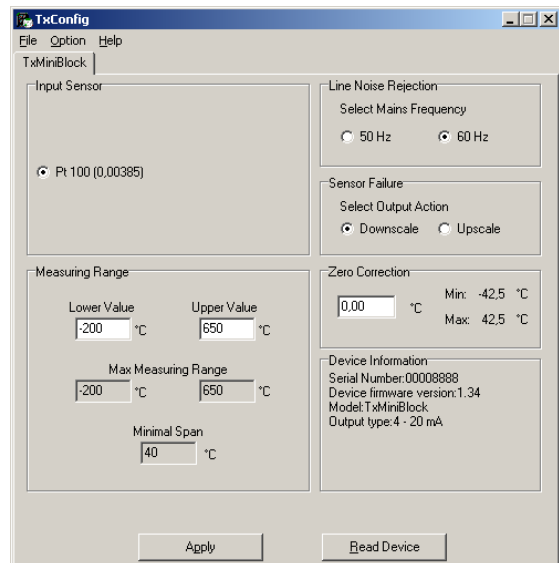


Figure 03 – Main screen of the TxConfig software

The fields in this screen have the following purposes:

1. **Input Sensor:** Pt100 (0.00385).
2. **Measurement Range:** Defines the transmitter measurement range.
  - Lower range limit** corresponds to the desired temperature for a current of 4 mA.
  - Upper range limit** corresponds to the desired temperature for a current of 20 mA.
  - When the Lower Limit is set with a value higher than the Upper Limit value, the output current operates between 20 and 4 mA.
  - The chosen values cannot exceed the **Sensor Range** shown in this field and cannot establish a band with width (span) lower than the **Minimum Range** value indicated below in this field. See table below.

Type of Sensor	Maximum Measurement Range	Minimum Measurement Range
Pt100	-200 a 650 °C	40 °C

Table 01 – Transmitter input sensor

3. **Filtration Optimization:** Filters the measurements made by the transmitter eliminating interferences from the electrical system that feeds the process.
4. **Sensor Failure:** Establishes the behavior of the output when problems are presented by the sensor. When **Minimum** is selected, the output current shifts to < 4 mA (down-scale), typically used in refrigeration. When **Maximum** is selected, it shifts to > 20 mA (up-scale), typically used for heating.
5. **Zero Correction:** Corrects minor errors presented by the transmitter, for example, when the sensor is changed. See item Operation in this manual.
6. **Transmitter Information:** In this field, there are data that identify the transmitter. This information must be informed in any consultation with the manufacturer.
7. **Read Configuration:** When pressed, this allows one to read the configuration on the transmitter connected.
8. **Send Configuration:** When pressed, this allows one to send the configuration to the transmitter connected.

**Note:** If, on the purchase order, the user does not define a specific configuration, the following configuration will be set:

- Pt100 sensor, range 0 to 100 °C, 0 °C zero correction.
- Filter to 60 Hz and maximum output for sensor failures.

## 4 MECHANICAL INSTALLATION

The TxMiniBlock transmitter is suitable to be installed on heads.

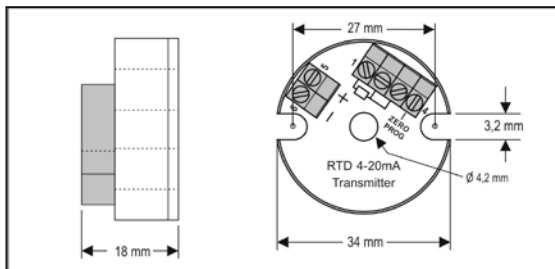


Figure 04 – Transmitter dimensions

## 5 ELECTRICAL INSTALLATION

Polyamide housing for the terminals.

Section of the wire: 0.14 a 1.0 mm<sup>2</sup>.

Recommended Torque: 0.8 Nm.

### RECOMMENDATIONS FOR INSTALLATION

- Input signal conductors should run away from power and contactor wires, if possible, in grounded conduits.
- The instruments must be powered by a suitable network for instrumentation.
- System failure should always be taken into account when designing a system to avoid irreversible damage to equipment or people. Installing RC filters (47 Ω and 100 nF, in series) is strongly recommended at contactor coils or any other inductors.

### ELECTRICAL CONNECTIONS

Figure 05 below shows the transmitter wiring. Terminals 1, 2 and 3 are used for sensor input. For 2-wire Pt100, terminals 2 and 3 shall be connected together. The **LOAD** represents the input shunt of an instrument measuring the 4-20 mA current loop.

The figure below shows the electrical connections required. Terminals 1, 2 and 3 are used for the Pt100 input. For 2-wire Pt100, terminals 2 and 3 must be interconnected.

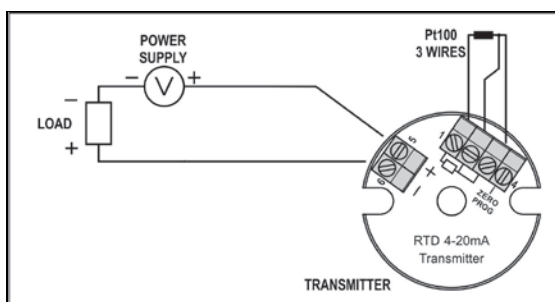


Figure 05 – Transmitter electrical connections – Pt100

The **LOAD** represents the input shunt of an instrument measuring the 4-20 mA current loop (indicator, controller, recorder, etc).

## 6 OPERATION

The sensor input is factory calibrated. Recalibration in the field is not recommended, but it can be accomplished through the TxConfig software. Contact the factory for the calibration procedure.

When necessary, fine adjustments to the transmitter output current can be accomplished directly at the transmitter. To do so, short circuit transmitter terminals 1 and 4. After 2 seconds, the output current starts to increase gradually until it reaches 0.8 mA above the initial value. After reaching that value, it drops to 0.8 mA below the initial value, increasing gradually again. The user must monitor the output current and open the circuit when the current reaches the desired value.

The offset correction can also be accomplished through the TxConfig software. The TxConfig interface can be connected to the transmitter while it is operating in the process. See in Figure 03 the **Zero Correction** field in the main screen of the TxConfig software.

The user must choose the sensor span most suitable to the application. The maximum and minimum sensor spans are limited in the TxMiniBlock and in the TxConfig software. The user can configure any value within those two limits.

It is important to note that the accuracy of the transmitter is always based on the maximum range of the Pt100 sensor, regardless of the configured span. . Example:

- Pt100 maximum span = 850 °C; 0.2% accuracy.
- Maximum error = 1.7 °C (0.2 % de 850 °C)

The error is the same no matter if total span is used (-200 to 650 °C) or a narrower user-defined span is used, like 0 to 100 °C.

**Note:** When using a Pt100 simulator, make sure the TxMiniBlock's Pt100 excitation current (0.20 mA) is compatible with the simulator specification.

## 7 SAFETY INFORMATION

Any control system design should take into account that any part of the system has the potential to fail. This product is not a protection or safety device and its alarms are not intended to protect against product failures. Independent safety devices should be always provided if personnel or property are at risk.

Product performance and specifications may be affected by its environment and installation. It's user's responsibility to assure proper grounding, shielding, cable routing and electrical noise filtering, in accordance with local regulations, EMC standards and good installation practices.