



TxBlock-USB Transmitter

TEMPERATURE TRANSMITTER – USER MANUAL – V1.0x O

1. INTRODUCTION

TxBLOCK-USB is a 4-20 mA 2-wire head-mounted temperature transmitter powered by the current loop. The output current represents the signal applied to the input of the linearized transmitter according to the configured input type.

It is configured by connecting the transmitter directly to the computer USB port. To configure it, it is not necessary that the equipment be powered.

2. MECHANICAL INSTALLATION

The **TxBLOCK-USB** transmitter is suitable to be installed in heads. Vibrations, moisture and extreme temperatures, electro-magnetic interference, high voltage, and other interferences can permanently damage the unit and could cause error in the measured value.

2.1 DIMENSIONS

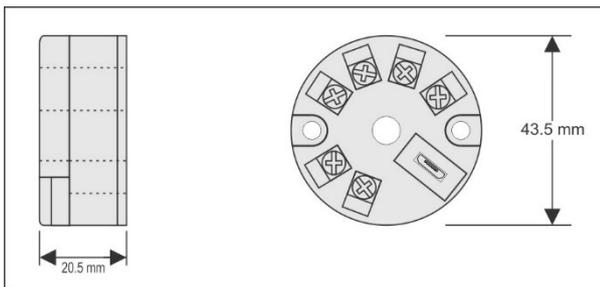


Figure 1 – Transmitter dimensions

3. ELECTRICAL INSTALLATION

- Section of the cable used: 0.14 to 1.5 mm².
- Recommended torque in the terminal: 0.8 Nm.

3.1 INSTALLATION RECOMMENDATIONS

- Sensor signals conductors must go through the plant system separate from power leads (loop). If possible, in grounded conduits.
- The instruments must be powered from the instrumentation power supply circuit.
- In control and monitoring applications is essential to consider what can happen when any part of the system fails.
- It is recommended the use of suppressors in contact coils, solenoids, and any inductive load.

3.2 ELECTRICAL CONNECTIONS

The figures below show the electrical connections required. The terminals 3, 4, 5 and 6 are dedicated to the sensor connection. **LOAD** represents the 4-20 mA current measuring device (indicator, controller, data logger, etc.).

3.2.1 PT100 2-WIRE

Note: When the Pt100 2-wire is selected, the terminals 3 and 4 must be interconnected, according to the figure below.

The Pt100 wire length **should be less than 30 cm** to maintain the measurement error within specifications (electrical resistance).

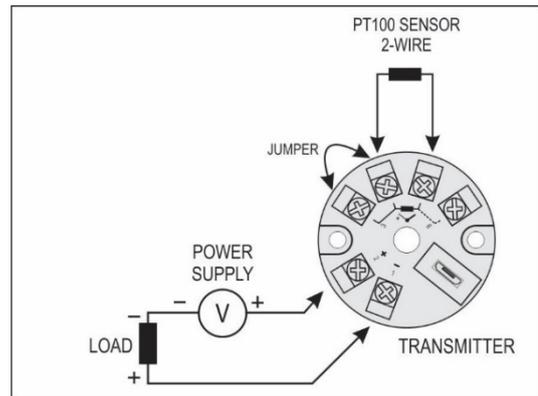


Figure 2 – Transmitter electrical connections (Pt100 2-wire)

3.2.2 PT100 3-WIRE

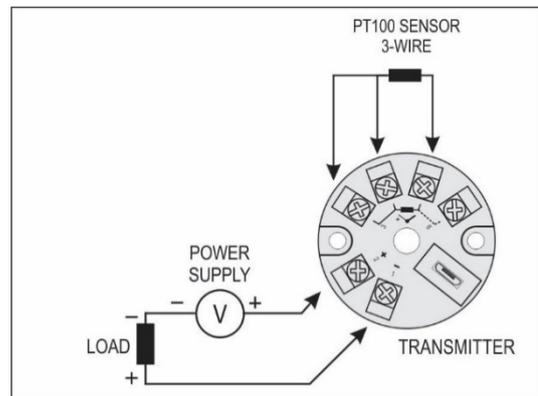


Figure 3 – Transmitter electrical connections (Pt100 3-wire)

3.2.3 PT100 4-WIRE

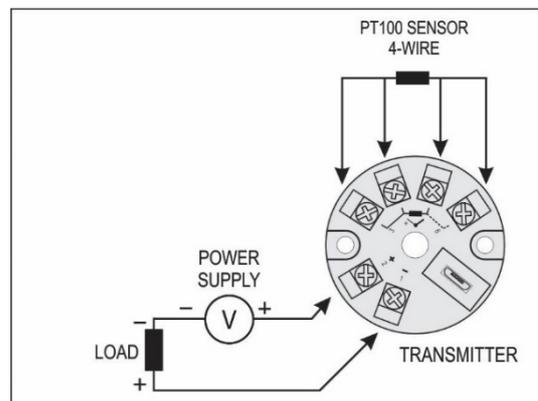


Figure 4 – Transmitter electrical connections (Pt100 4-wire)

Pt1000 3-wire / Pt100 3-wire and 4-wire: To properly compensate for the RTD cable resistances, they must be equal on all terminals and must not exceed 25Ω per cable. To ensure these conditions, it is recommended to use a 3 or 4 wire cable with the same length and gauge.

3.2.4 NTC 2-WIRE

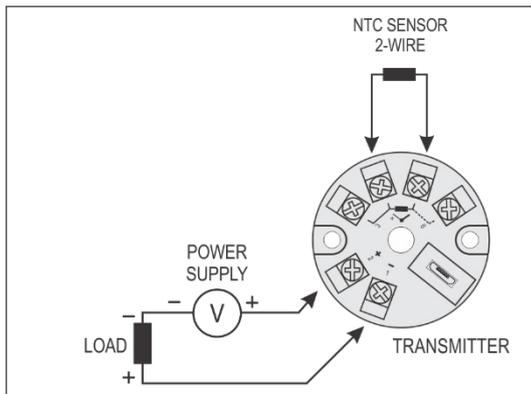


Figure 5 – Transmitter electrical connections (NTC 2-wire)

3.2.5 THERMOCOUPLES

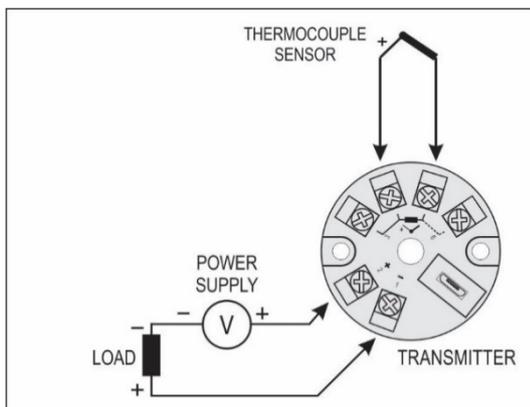


Figure 6 – Transmitter electrical connections (Thermocouple)

3.2.6 VOLTAGE (0-50 mV)

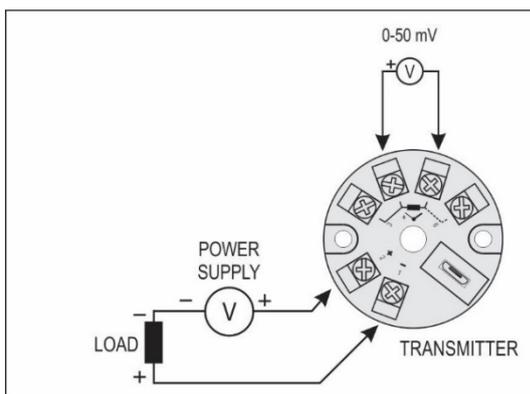


Figure 7 – Transmitter electrical connections (0-50 mV)

4. CONFIGURATION

When the transmitter is used with the factory setting, no further action is required, and the transmitter is ready to be installed.

When you need to change the configuration, you should use **SigNow** software, **TxConfig II** software, or the **SigNow** application.

On the **NOVUS** website, you can download any of the configuration software for free. For installation, simply run the **SigNowSetup.exe** or **TxConfigIISetup.exe** file and follow the installer instructions.

To configure the device through the software, you must use the transmitter configuration interface (USB cable), which can be purchased from the manufacturer or its authorized representatives:

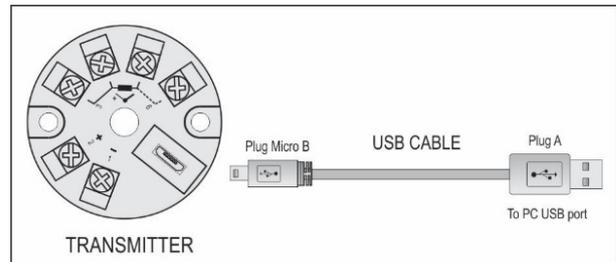


Figure 8 – USB cable connection

During the setup, the transmitter is powered by the USB, not requiring an external power supply.

The transmitter setup can also be made by connecting it to the loop, using the loop power supply. There is no electrical isolation between the transmitter and the communication port (interface). It is not recommended to configure it with the sensor connected to the process. See **Figure 9**.

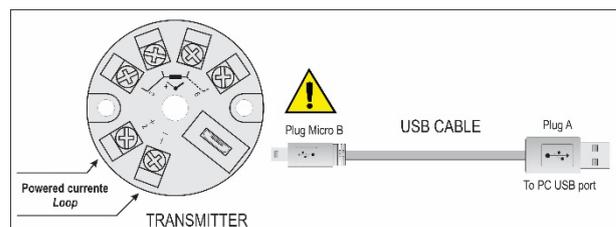


Figure 9 – USB cable connections – Loop powered

After connecting the device and the PC, simply run **SigNow** or **TxConfig II**.

SigNow application can be downloaded for free from *Google Play Store*.

To configure the device via the application, you must use an On The Go (OTG) adapter. The procedure for using this adapter will be explained in the [SMARTPHONE CONNECTIONS](#) section.

There you will also find more information on how to connect the **TxBLOCK-USB** to the smartphone itself and set up the device.



The USB communication port (interface) of the TxBLOCK-USB is not electrically isolated from the transmitter input.

4.1 SOFTWARE AND APPLICATION

4.1.1 SIGNOW SOFTWARE

When running the **SigNow** software and connecting to the device, the following screen will appear:

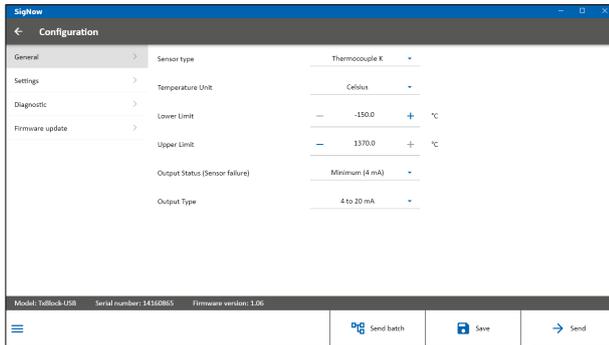


Figure 10 – SigNow configuration screen

The bottom part of the screen displays information about the model, serial number, and firmware version.

The configuration screen is divided into 4 sections: General, Settings, Diagnostics, and Firmware Update.

In the General (see above) and Settings screens, you can configure the device by setting values and information for the following parameters:

1. **Sensor Type:** Allows you to select the sensor to be used. See [Table 1](#).
2. **Temperature Unit:** Allows you to select the temperature unit to be used.
3. **Lower Limit:** Allows you to select the minimum desired temperature for the configured output type.
4. **Upper Limit:** Allows you to select the maximum desired temperature for the configured output type.
5. **Output Status (Sensor Failure):** Allows you to establish the output behavior when the transmitter indicates a failure:
 - Minimum:** Output current goes to < 3.6 mA (down-scale), typically used for refrigeration.
 - Maximum:** Output current goes to > 22.0 mA (up-scale), typically used for heating.
6. **Output Type:** Allows you to select the output type to be used.
7. **Offset (Zero Adjustment):** Allows you to correct small deviations presented in the transmitter output, such as when a sensor is replaced.

In the **SigNow** manual, available on **NOVUS** website, you can get more specific information about the buttons and the process of diagnostics and firmware update.

4.1.2 TXCONFIG II SOFTWARE

When running the **TxConfig II** software and connecting to the device, the following screen will appear:

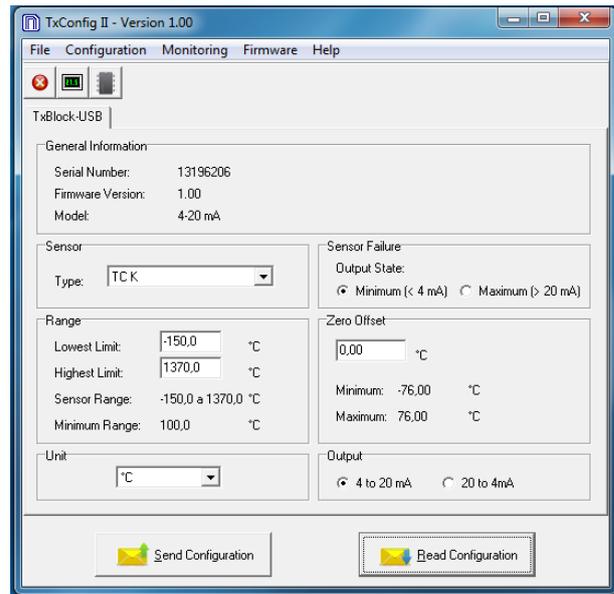


Figure 11 – TxConfig II main screen

The fields in the screen mean:

1. **General Information:** This field contains the data that identifies the transmitter. During requests for technical assistance, this information should be presented to the manufacturer.
2. **Sensor:** Allows you to select the sensor to be used. See [Table 1](#).
3. **Measuring Range:** Allows you to define the transmitter measurement range.
4. **Lower Range Limit:** Equivalent temperature for a 4-mA current.
5. **Upper Range Limit:** Equivalent temperature for a 20-mA current.
6. **Sensor Range**
The values chosen cannot exceed the **sensor range** shown in this field. See [Table 1](#).
7. **Minimum Range**
Do not set a lower band (span) that the **Minimum Range** indicated below in this same field. See [Table 1](#).
8. **Sensor Failure:** Allows you to establish the output behavior when the transmitter indicates a failure:
 - Minimum:** Output current goes to < 3.6 mA (down-scale), typically used for refrigeration.
 - Maximum:** Output current goes to > 22.0 mA (up-scale), typically used for heating.
9. **Zero Correction:** Allows you to correct small deviations presented in the transmitter output, such as when a sensor is replaced.
10. **Send Configuration:** It applies the new setup. Once sent, the setup will be immediately adopted by the transmitter.
11. **Read Configuration:** It reads the current setup in the transmitter connected. The screen now presents the current setup that may be changed by the user.

4.1.3 SIGNOW APP

When running the **SigNow** application and connecting to the device, the following screen will appear:

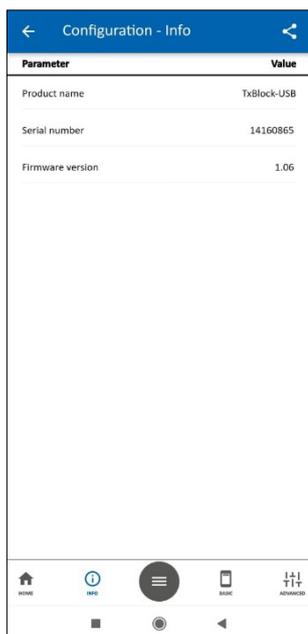


Figure 12 – Information screen

Here you can see information about the product, such as name, serial number, and firmware version.

By opening the **Basic** section or the **Advanced** section, you can configure the parameters displayed in the [SIGNOW SOFTWARE](#) section.

In the **SigNow** manual, available on the **NOVUS** website, you can get more specific information about the buttons and the process of diagnostics and firmware update.

4.2 FACTORY SETTING

- Sensor: Pt100 3-wire, range: 0 to 100 °C.
- Sensor failure: Upscale (maximum).
- 0 °C zero correction.
- Unit: °C.
- Output: 4-20 mA.

Upon purchase order, you can define a specific setup.

5. SMARTPHONE CONNECTIONS

Smartphones with On the Go (OTG) technology can be directly connected to the device via the Micro-USB input. This allows the smartphone to recognize and configure the **TxBLOCK-USB** when running the **SigNow** application.

As can be seen in **Figure 13**, it is necessary to observe how the On the Go cable is connected to the device:

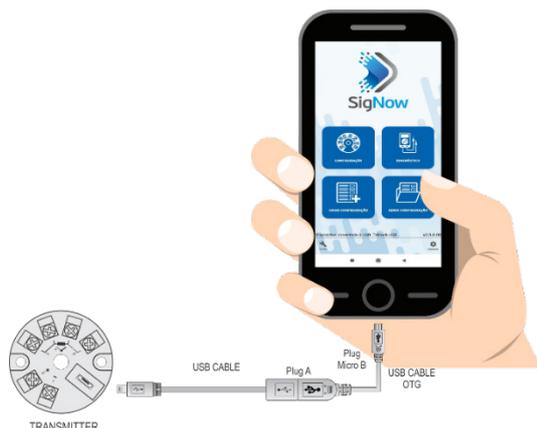
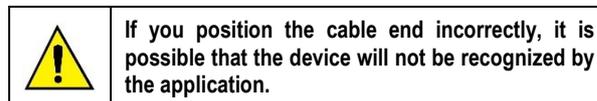


Figure 13 – On the Go connection cable



If you position the cable end incorrectly, it is possible that the device will not be recognized by the application.

5.1 CONFIGURING TXBLOCK-USB WITH SIGNOW APPLICATION

Once the connection between the smartphone and the **TxBLOCK-USB** is made, the device will send the following message:

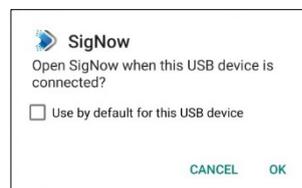


Figure 14 – USB device connected

For the correct operation of the application, you must check the option "Use by default for this USB device" and then click the **OK** button.

After that, it will automatically run the **SigNow** application, which has already been previously installed on the smartphone, and will display the following message:



Figure 15 – SigNow home screen

When you click on the **Configuration** option, the application will connect to the device and allow you to configure the **TxBLOCK-USB**.

6. OPERATION

You can change the sensor offset through the **SigNow** or **TxConfig II** software or the **SigNow** app.

The USB cable may be connected to the transmitter without causing any measurement errors (see information about the **Offset (Zero Adjustment)** parameter in the [CONFIGURATION](#) chapter).

You must choose the most suitable sensor and range to the process. The chosen range must not exceed the maximum range of measurement defined for the sensor and should not be smaller than the minimum range for the same sensor.

It is important to note that the transmitter accuracy is based on the maximum range of the sensor used, even when a narrower range is programmed.

Example:

- If the Pt100 sensor is in the range 0 to 100 °C and the accuracy is 0.12 %, there is a maximum error of up to 1.02 °C (0.12 % of 850 °C).
- If the Pt100 sensor is in the range 500 to 600 °C and the accuracy is 0.19 %, there is a maximum error of up to 1.61 °C (0.19 % of 850 °C).

Note: When measurements are made at the transmitter, make sure that the excitation current of Pt100 required by the calibrator used is

compatible with the excitation current of Pt100 used in the transmitter: 0.8 mA.

7. SPECIFICATIONS

Sensor input: User defined. The supported sensors are listed in Table 1, along with their maximum ranges.

Thermocouples: Types J, K, R, S, T, N, E, and B, according to IEC 60584 (ITS-90). Impedance $\gg 1 \text{ M}\Omega$

Pt100: 3-wire type, Excitation 0.8 mA, $\alpha = 0.00385$, according to IEC 60751 (ITS-90).

For 2-wire sensors, tie terminals 3 and 4 together.

Pt1000: 3-wire type, Excitation 0.65 mA, $\alpha = 0.00385$, according to IEC 60751 (ITS-90).

For 2-wire sensors, tie terminals 3 and 4 together.

NTC $R_{25^{\circ}\text{C}}$: $10 \text{ k}\Omega \pm 1 \%$, $B_{25/85} = 3435$

Voltage: 0 to 50 mVdc. Impedance $\gg 1 \text{ M}\Omega$

SENSOR TYPE	MAXIMUM MEASUREMENT RANGE	MINIMUM MEASUREMENT RANGE
Voltage	0 to 50 mV	5 mV
Thermocouple K	-150 to 1370 °C	100 °C
Thermocouple J	-100 to 760 °C	100 °C
Thermocouple R	-50 to 1760 °C	400 °C
Thermocouple S	-50 to 1760 °C	400 °C
Thermocouple T	-160 to 400 °C	100 °C
Thermocouple N	-270 to 1300 °C	100 °C
Thermocouple E	-90 to 720 °C	100 °C
Thermocouple B	500 to 1820 °C	400 °C
Pt100	-200 to 650 °C	40 °C
Pt1000	-200 to 650 °C	40 °C
NTC	-30 to 120 °C	40 °C

Table 1 – Sensors accepted by the transmitter

Switch-on delay: $< 2.5 \text{ s}$. The accuracy is only guaranteed after 15 minutes.

Reference terms: Ambient: 25°C ; voltage: 24 Vdc, load: 250Ω ; settling time: 15 minutes.

Temperature Effect: $< \pm 0.16 \%$ / 25°C

Response time: Typical 1.6 s

Maximum voltage allowed at sensor input terminals: 3 V

RTD current: $800 \mu\text{A}$

RTD cable resistance effect: $0.005^{\circ}\text{C} / \Omega$

Maximum allowable cable resistance for RTD: 25Ω

SENSOR TYPE	TYPICAL ACCURACY	MINIMUM ACCURACY
Pt100 / Pt1000 (-150 to 400 °C)	0.10 %	0.12 %
Pt100 / Pt1000 (-200 to 650 °C)	0.13 %	0.19 %
mV, K, J, T, E, N, R, S, B	0.1 % (*)	0.15 % (*)
NTC	0.3 °C	0.7 °C

Table 2 – Calibration error, percentage of the full measurement range

(*) Add cold junction compensation: $< \pm 1^{\circ}\text{C}$

Power supply influence: 0.006% / V typical (percentage of the full measure range).

Output: 4-20 mA or 20-4 mA current, 2-wired; linear in relation to the temperature measurement by the selected sensor.

Output resolution: $2 \mu\text{A}$

Power supply: 10 to 35 Vdc, across the transmitter

Maximum load (RL): $RL (\text{max.}) = (V_{\text{dc}} - 10) / 0.02 [\Omega]$

Where: V_{dc} = Power supply voltage (10-35 Vdc)

Operating temperature: -40 to 85°C

Humidity: 0 to 90 % RH

Electromagnetic compatibility: EN 61326-1:2006

No electrical isolation between input and output.

Internal protection against polarity inversion.

Cold junction compensation for thermocouples.

Dimensions: 43.5 mm (diameter) x 20.5 mm (height)

Connection wire cross section: 0.14 to 1.5 mm²

Screw tightening: 0.8 Nm

Housing: ABS UL94-HB

Certifications: CE and UKCA

8. WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.