Operating Manual

TxIsoPack Temperature Transmitter

0555 0034-10

V1.1x E

B+B Thermo-Technik GmbH
Heinrich-Hertz-Str. 4 | D-78166 Donaueschingen

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CONTENTS

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1. FOREWORD

Dear customer,

We thank you for having purchased the **TxIsoPack-USB** Temperature Transmitter and are very glad that you decided in favour of a product of B+B Thermo-Technik GmbH. We hope this product will fully satisfy you and will assist you effectively in your work.
This Device has been developed to be technically highly up-to date. This product has been designed in accordance with the regnant European and German national directives and rules. For a proper and effective usage of the product the customer shall observe the following Operating Instructions. In the case that against one's expectations any troubles occur which you cannot resolve yourself, please contact our service centers or your salesperson. We go after giving you rapid and competent help to minimize the risk of long-time outfalls.

The following operating Instruction is an indispensable part of this Product. It contains important advices for the starting up and further use of the device

2. GENERAL ADVICE

This documentation contains information which must be paid in attention to assure a highly effective and secure use of the supplied product Please read through the following instructions and make yourself familiar with the handling of the product before you insert it in your processes. Keep this document always readily to hand so you can consult it by need.

2.1. Labels

Symbol	Meaning	Descripton
	Advice	It is necessary to read the following advice before beginning the operations. The used symbols in the manual acts first as eye catcher for security risks. The symbols do not replace the security advice. The text must be read to the end
	Necessary to observe	This symbol designates important advice and tips that are necessary for the success a work step. They must be followed to get good results

2.1. Warning Advice

Symbol	Meaning	Symbol	Meaning
	This symbol advises the user of danger for persons, material, or environment. The text gives information that must be necessarily followed to avoid any risks		Caution against electromagnetic fields (BGV A8, GUV-V A8/W12)
	Caution against hot surfaces (BGV A8, GUV-V A8/W26) and hot liquids or substances		Caution against severe cold (BGV A8, GUV-V A8/W17)
	Caution against liquids and hot substances		Caution against dangerous high electrical voltage (BGV A8, GUV-V A8/W08)
	Caution against dangerous ex-plosive substances (BGV A8, GUV-V A8/W02)		Caution against dangerous ex-plosive atmosphere (BGV A8, GUV-V A8/W21)
	Caution against mobile engines (W29) Caution against moving parts		Electronic waste

2.2. Security Advices

B+B Thermo-Technik GmbH assume no liability for damages occurred through failure to observe these security advices. A usage non conform to the instructions given in this manual can damage the device

BODY AND PROPERTY DAMAGES

The national and local standards for electrical installations must be se strictly observed.
The use of the device is strictly reserved / restricted to properly schooled / qualified operators.

The system is not adequate for use in atmosphere with explosion danger.

Do not use the system in a high electric or magnetic field area

ENSURING OF PRODUCT SECURITY

The system must be operated only within the limits given in the technical Data
Exposing the system to hot temperatures (higher than the operating temperature) will cause damages in the electronic circuits and also damage the housing

USAGE ACCORDING TO PURPOSE

Please use the product only for the purposes for which it is conceived. In case of doubt, please first contact B+B Thermo-Technik GmbH

DISOPOSAL

Please return the device to B+B Thermo-Technik GmbH after expiration of its lifetime

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3. INTRODUCTION

The TxIsoPack ist ein 2-Draht Temperaturmessumformer für DIN Kopf B Montage mit Stromausgang 4-20 mA. Eingang und Ausgang sind voneinander galvanisch isoliert. Die Konfiguration des TxIsoPack erfolgt durch den direkten Anschluss des Transmitters an die USB-Schnittstelle des PC. Powered by the current loop, its configuration is accomplished by connecting the transmitter directly to the PC USB interface, not requiring installation of additional drivers.

4. TECHNICAL SPECIFICATIONS

Sensor Input		User defined. The supported sensors are listed in Table 1, along with their maximum ranges. **Maximal Voltage on the Sensor terminals 3 V**
	Thermocouples	Type J, K, R, S, T, N, E and B, according to DIN EN 60584 (ITS-90). Impedance >> 1 MΩ
	Pt100	Types: 2, 3 and 4 wires, Excitation 0.17 mA, α= 0.00385, According to DIN EN60751 (ITS-90).
	Voltage	0 … 50 m VDC. Impedance >> 1 MΩ

Sensor type	Maximal Range	Minimal Linearisation span
Spannung	0 … 50 mV	5 mV
Thermoelement K	-150 … 1370 °C	100 °C
Thermoelement J	-100 … 760 °C	100 °C
Thermoelement R	-50 … 1760 °C	400 °C
Thermoelement S	-50 … 1760 °C	400 °C
Thermoelement T	-160 ... 400 °C	100 °C
Thermoelement N	-270 ... 1300 °C	100 °C
Thermoelement E	-90 ... 720 °C	100 °C
Thermoelement B	500 … 1820 °C	400 °C
Pt100	-200 ... 650 °C	40 °C

TABLE 1

Response time		≤ 500 ms
Galv. Isolation		1000 Vac for 1 minute between input and output
Accuracy	**Pt100 and 0-50 mV**	0,2 % FS
	Thermocouples	0,3 % FS
Output	**4-20 mA**	4-20 mA or 20-4 mA, 2-wire, linear, proportional to the configured range
Resolution	**4-20 mA**	4 µA (12 bit)
Power supply		12 ... 35 VDC
Maximal Load		RL (max.) = (VDC – 10) / 0,02 [Ω] where VDC= Power supply (12-35V)
Operating Temp.		-20…75 °C
Humidity		0...90 % RH
EM Compatibility		EN 61326-1:2006
		Internal protection against polarity inversion
		Cold junction compensation for thermocouples
Wires		0,14 …1,5 mm²
Screw Tightening		0,8 Nm (empfohlen)
Housing		ABS UL94-HB
Dimensions		44 x 24 mm
Interface connection		5-pin USB mini-B 5 connection cable

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5. Mechanical Installation

The TxIsoPack 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

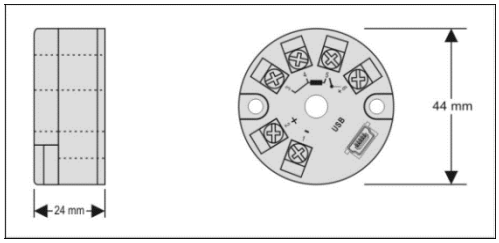


Figure 1

6. Electrical Installation

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

6.1. Recommendations for Installation

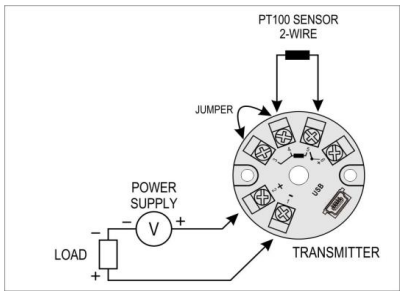
- Sensor signals conductors must go through the plant system separate from power leads (loop), if possible in grounded conduits.
- The instruments must be powered from the instrumentation power supply circuit.
- In control and monitoring applications is essential to consider what can happen when any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

6.2. Electrical Connections

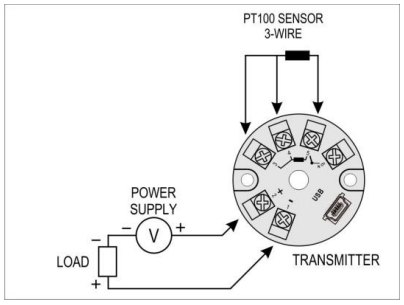
The figures below show the electrical connections required. The terminals 3, 4, 5 and 6 are dedicated to the sensor connection. LOAD represents the 4-20 mA current measuring device (indicator, controller, recorder, etc.)

PT100

Pt100 2 - wires



Pt100 3-Wires



Pt100 4-Wires

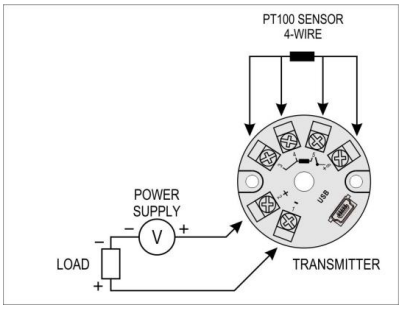


Figure 2 Connections for Pt100 Sensors

Pt100 3 and 4-wire: For appropriate cable resistance compensation they should be equal for all legs. Maximum wire resistance is 25 Ω per wire leg. Usage of a 3 or 4 wire with conductors of equal length and gauge is recommended

Thermocouples / 0 – 50 mV

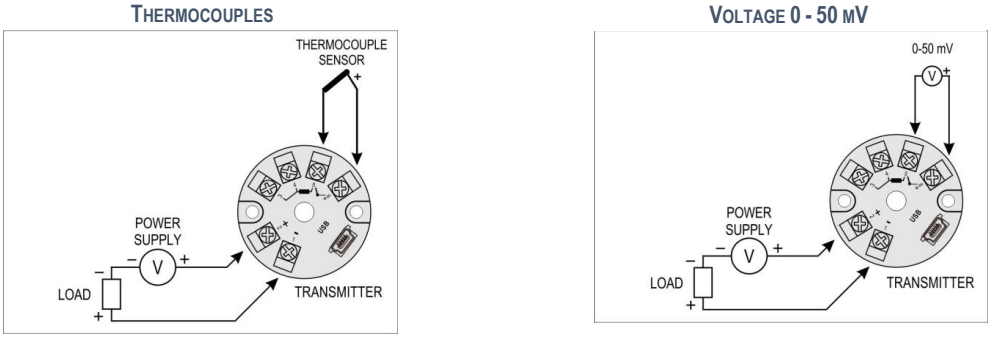


FIGURE 3 Connections for Thermocouples and voltage sensors

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7. CONFIGURATION

When the trasmitter is used with the factory setting, no further action is required and the transmitter is ready to be installed.
Changes to the configuration are possible through the TxConfig II software provided free of charge.
The transmitter configuration interface (USB cable) can be purchased from the manufacturer or its authorized sales representatives.
The software is continuously updated and new versions can be downloaded at no charge from the manufacturer's website. To install, execute the TxConfigIISetup.exe file and follow the instructions.

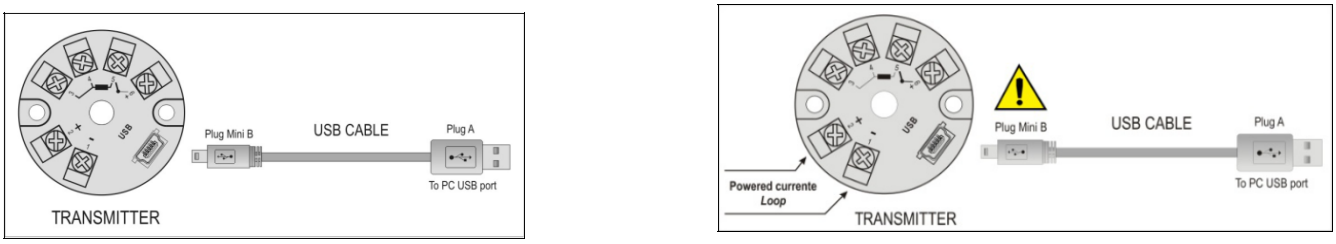

FIGURE 4 USB Connection

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 insulation between the transmitter and the communication port (interface), therefore it is not recommended to configure it with the sensor inlet connected to the process.
After these connections, the user must run the TxConfig software and, if necessary, consult the *Help* topic to help using the software

The USB communication port (interface) of the TxIsoPack is not electrically insulated from the transmitter's input

7.1. Software Configuration

The fields in the screen mean:

1. **Input Sensor**: Select the sensor to be used. See Table 1.
2. **Measuring Range**: Define the transmitter measurement range
    a. **Range Lower** Limit: temperature desired for a 4 mA current.
    b. **Range Upper Limit**: temperature desired for a 20 mA current.
    When the Lower Limit is set with a value greater than the Upper Limit value of the output current operates from 20 to 4 mA (the current decreases as the temperature increases).

⚠	**Note**: The values chosen can not exceed the Sensor Range shown in this same field, and also may not establish a range with width (span) smaller than the Min. Range indicated later in this same field. See Table 1 of this guideline

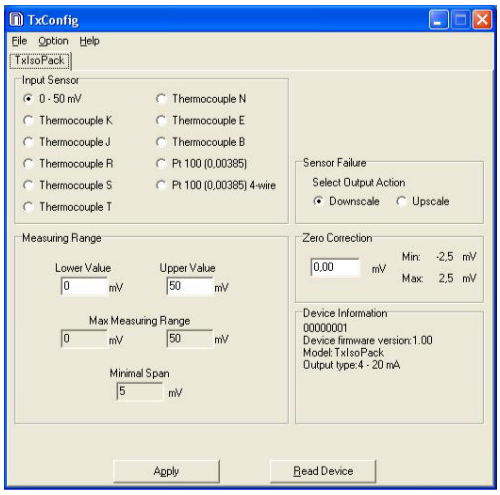

FIGURE 5 Software Configuration

3. **Sensor Failure**: It establishes the output behavior, when the transmitter indicates a failure
    a. **Downscale**: output current goes to 3.8 mA (down-scale), typically used for refrigeration.
    b. **Maximum**: output current goes to 20.5 mA (up-scale), typically used for heating.
4. **Device Information**: This field contains the data identifying the transmitter. This information must be submitted to the manufacturer for any queries.
5. **Zero Correction**: It corrects small deviations presented in the transmitter outlet, for example, when the sensor is replaced.
6. **Send Configuration**: It applies the new setup. Once sent, the setup will be immediately adopted by the transmitter.
7. **Read Configuration**: Reads the current setup in the transmitter connected. The screen now presents the current setup that may be changed by the user.

The factory default configuration is:

- Sensor Pt100, range 0 to 100 °C, 0 °C of zero correction.
- Output at maximum for the sensor failures.

Upon purchase order, the user can define a specific setup.

7.2. Factory Setting

- Sensor: Pt100 3-wire, Messbereich 0...100 °C
- Sensor failure: upscale (maximum).
- 0 °C zero correction.
- Unit: °C;
- Output: 4-20 mA.

8. OPERATION

The transmitter is perfectly factory-calibrated with standardized sensors, not requiring any adjustment by the user.
The sensor offset can be also changed through the TxConfig software. The USB connection can be made even with the transmitter connected to the process and operating without causing errors in the measurement. See item *Zero Correction* in the chapter **CONFIGURATION** of this guideline.
The user 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 accuracy of the transmitter is always based on the maximum range of the sensor used, even when a mid-range was set. Example:

The sensor Pt100 has a max. range of –200 to +650 °C and total accuracy of 0.2 %, thus we can have an absolute error up to 1.7 °C (0.2 % of 850 °C).
The absolute error is the same for a wide range as the maximum (-200 to 650 ° C), to a narrower band User-defined. (For example: 0 to 100 °C.)
Note: When measurements are made with the transmitter, see if the Pt100 excitation current required by the calibrator is compatible with the Pt100 excitation current used in the transmitter: 0.17 mA

9. QUESTIONS?

For further information about this or other products of B+B Thermo-Technik GmbH please do not hesitate to contact us at:

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