



A measured step forward™

TOPAX L - O&M Manual



Total | Metering
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Table of Contents

1 Safety	3
1.1 Electrical Safety	3
1.2 Operating Environment	3
2 Intended Use	4
2.1 Notes on Product Warranty	4
2.2 Intended Purpose	4
2.3 Foreseeable Misuse	4
2.3.1 Incorrect Assembly	4
2.3.2 Incorrect Start-Up	4
2.3.3 Incorrect Operation	4
2.3.4 Incorrect Maintenance	5
3 Product Description	5
3.1 Scope of Delivery	5
3.2 Functions of the Device	5
3.3 Main Features	5
3.4 Control Panel	6
3.5 Standard View	6
4 Technical Data	7
4.1 Mechanical Specifications	7
4.2 Environmental Conditions	7
4.3 Electrical Specifications	7
5 Dimensions	9
5.1 Outer Dimensions	9
5.2 Drillhole Dimensions	9
6 Installation	10
6.1 Principles	10
6.2 Mounting the Device on the Wall	10
6.3 Connecting the Power Supply	10
6.4 RC Protection for Relays	11
6.5 Terminal Block	11
6.6 Connection Examples	13
6.6.1 Power Supply	13
6.6.2 Frequency Outputs SSR1 and SSR2	13
6.6.3 Relay Outputs 1, 2, 3 and 4	14
6.6.4 Current Outputs mA 1 and 2	14
6.6.5 RS485 Communication Port	14
6.6.6 Reed Sensor Input	15
6.6.7 Input for Temperature Measurement	15

1 Safety

1.1 Electrical Safety

All of the control unit's connections are isolated from the grounding system (non-insulated grounding conductor). Do not connect any of these connections to the grounding connector.

To guarantee maximum conditions of safety for the operator, it is recommended to follow all of the instructions listed in this guide:

- Only power the device using a mains power supply that complies with the device's specifications (85 – 265 V AC 50/60Hz or 24 – 48 V DC (24 V AC±20%)).
- Replace any damaged parts immediately. Any cables, connectors, accessories or other parts of the device that are damaged or not functioning properly must be replaced immediately. In such cases, contact your nearest authorised technical assistance centre.
- Only use certified accessories and accessories recommended by the supplier. The use of accessories and materials from other manufacturers or not specifically recommended by the supplier will not guarantee the safety and correct operation of the equipment.

1.2 Operating Environment

The device must be protected against drips, sprays and/or immersion and should not be used in environments where such risks are present. Any devices into which liquids may have accidentally penetrated must be immediately shut off, cleaned and inspected by authorised and qualified personnel.

The transparent panel should be closed once the device has been programmed.

Protection:

- IP65 Complete
- EMI /RFI CEI EN 55011 – 05/99 Class A

The device must be used within the specified environmental temperature, humidity and pressure limits. The instrument is designed to operate under the following environmental conditions:



- Temperature of the operating environment 14 °F to +122 °F
- Storage and transport temperature -13 °F to +149 °F
- Relative humidity 0 – 100% condensing

The device must be properly integrated into the system. The system must be operated in full compliance with the foreseen safety regulations. The parameters set on the analyser's control unit must comply with the current regulations.

The control unit's malfunction signals must be located in an area that is constantly supervised by the system's maintenance personnel or operators. Failure to respect even just one of these conditions could cause the control unit's logic to operate in a potentially dangerous manner for users.

In order to avoid any potentially dangerous situations, therefore, the system's service and/or maintenance personnel are advised to work with the utmost care and to signal any alterations in the safety parameters in a timely manner.

As the above issues cannot be monitored by the product in question, the manufacturer shall bear no responsibility for any property damage or personal injury that may result from such malfunctions.

2 Intended Use

2.1 Notes on Product Warranty

Any non-designated use of the device can impair its function and the protection provided.

This leads to invalidation of any warranty claims!

Please note that liability is on the side of the user in the following cases:

- The device is operated in a manner that is not consistent with these operating instructions, particularly safety instructions, handling instructions and intended use.
- Information on usage and environment is not adhered to.
- If people operate the device who are not adequately qualified to carry out their respective activities.
- Unauthorized changes are made to the device.

2.2 Intended Purpose

As a single-channel controller, the TOPAX L monitors water parameters during water preparation and waste-water treatment and controls a connected dosing system for water treatment in real time. In this way, it ensures constant water parameters in various applications – taking into account the given standards and directives. Different models of the TOPAX L are available, which differ purely in the measuring and controller inputs. All models measure temperature.

2.3 Foreseeable Misuse

2.3.1 Incorrect Assembly

- Connecting the mains voltage without a protective earth
- Non-fused or non-standard mains voltage
- Not possible to immediately or easily disconnect the power supply
- Wrong connecting cables for mains voltage
- Sensors and actors connected to the incorrect terminals or incorrectly configured
- Protective earth removed

2.3.2 Incorrect Start-Up

- Commissioning with damaged or obsolete sensors
- Commissioning without the establishment of all protective measures, fastenings, etc.

2.3.3 Incorrect Operation

- Protective equipment not functioning correctly or dismantled
- Unauthorized modification of the controller
- Ignoring of alarm or error messages
- Elimination of alarm or error messages by insufficiently-qualified personnel
- Bridging the external fuse
- Difficult operation due to insufficient lighting or poor access to the device
- Operation not possible due to dirty or illegible display

2.3.4 Incorrect Maintenance

- Carrying out maintenance during ongoing operation
- No adequate or regular inspection of correct functioning
- No replacement of damaged parts or cables
- No securing against reactivation during maintenance work
- Using the wrong spare parts

3 Product Description

3.1 Scope of Delivery

The following items are part of the scope of delivery:

- TOPAX® L single-channel controller
- Quick Guide
- Mounting set

3.2 Functions of the Device

The device measures the water parameters using sensors. Controlling actuators, such as dosing pumps, control the water parameters to the required setpoint.

3.3 Main Features

The device has the following main features:

- Input for one measurement:

Model	Measurement	Part Number
TOPAX® L CH/CD	Chlorine, chlorine dioxide	40700003
TOPAX® L PH/RD	pH value / Redox	40700001
TOPAX® L LF	Conductivity	40700002
TOPAX® L MA	Optical measuring cells: turbidity, dissolved oxygen	40700002
	Membrane-covered measuring cells: bromine, hydrogen peroxide, chlorite, peracetic acid, total chlorine, chlorine, chlorine dioxide	

- Temperature measurement with Pt100 / Pt1000 probe
- Automatic temperature compensation
- Control panel with 5 buttons
- Graphic display (128x128 pixels) with three-colour backlight (white, green and red)
- Communication port RS485 MODBUS RTU/ASCII
- 2 analogue outputs
- 2 digital outputs (SSR)
- 4 relay outputs for switching loads and transmitting alarms
- 1 reed input for alarm function (sample water missing)

3.4 Control Panel

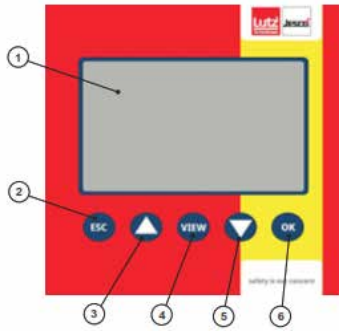


Fig. 1: Control Panel

Item	Description
1	LCD display
2	Cancel action or exit menu
3	Move up or increase the value (▲)
4	Select view
5	Move down or decrease the value (▼)
6	Confirm action or open the menu

Tab. 1: Legend for the Control Panel

3.5 Standard View

The standard view of the device is split into two sections:

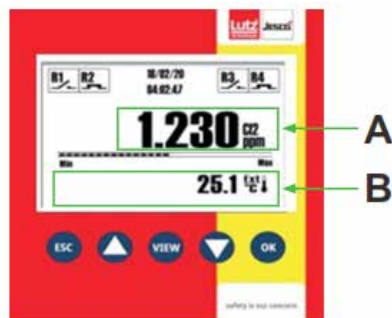


Fig. 2: Standard View

- A: The measured value along with the configured parameters such as the measurement type, unit, etc.
- B: Temperature value from an external sensor (ext) or a manually set value (man), as well as alarms and operational information (such as a service notification).

4 Technical Data

4.1 Mechanical Specifications

Dimensions of housing (W x H x D)	6 x 6 x 5 in
Front frame (W x H)	6 x 6 in
Weight	2.31 lbs. (1.05 kg)
Material	ABS/polycarbonate
Protection	IP65
Relative humidity	0 to 100 % condensing

4.2 Environmental Conditions

Storage temperature	-13 to 149 °F
Ambient temperature during operation	14 to 122 °F
Emissions	According to EN 55011 Class A specifications

4.3 Electrical Specifications

Power Supply (Version 100 – 240 V AC)	
Electrical requirements	100 – 240 V AC \pm 10 %, 8 W
Frequency	50 to 60 Hz
Power supply fuse	Fuse glass body 5 x 20 mm T1.25AL250V
Short circuit protection	Active
Power Supply (Version 24 – 48 V DC)	
Electrical requirements	24 – 48 V DC, or 24 V AC \pm 20 %, 8 W
Power supply fuse	Fuse glass body 5 x 20 mm T1.25AL250V
Short circuit protection	Active
Reverse polarity protection	Active
Relay Outputs	
RL1, RL2, RL3 and RL4	2-SPST mechanical 250 V AC/ 5 A, 30 V DC/3 A
Relay RL1, RL2 configuration	Load activation
Relay RL3, RL4 configuration	Load activation, probe cleaning (RL3 only), alarm repetition
Cycle time	1 – 3600 s
Delay time	1 – 3600 s
Test mode	ON, OFF

SSR Outputs (Solid State Relays)	
SSR1 and SSR2	2-SPST 60 V, max 100 mA, bidirectional, NPN, PNP
Resistance in ON state	max. 5 Ω
Leakage current in OFF state	max. 1 μ A
SSR1 and SSR2 configuration	Pulse output
Frequency range	0 – 400 imp/min.
Pulse duration	100 ms
Test mode	0 – 400 imp/min.
Outputs 4 – 20 mA	
Analogue output signals	2 outputs 4 – 20 mA, galvanically isolated from each other and from the power supply.
Measurement error	+/- 0.01 mA
Load	max. 800 Ω
Error condition	NAMUR: OFF, 3.6 mA, 22 mA
Test mode	3 – 23 mA
Digital Inputs	
REED digital input	Input for dry contact 5 V DC, max. 6 mA
Communication Ports	
RS485 digital communication port	Modbus Server ASCII/RTU standard protocol
Output 24 V DC	
Volt	¹ 24 V DC \pm 5 %, max. 250 mA
Short circuit protection	Self-resettable fuse

User Interface	
Connection terminals	Removable screw terminals AWG 14 < 2.5 mm
Machine cycle time	ca. 1 s
Control panel	5 tactile feedback keys
Display	Graphic LCD 128x128 pixels, FSTN, transfective
Refresh display	500 ms
Backlight	White, green and red with energy saving function

*To prevent damage to the device, DO NOT exceed the maximum permissible current.

5 Dimensions

All dimensions in inches.

5.1 Outer Dimensions

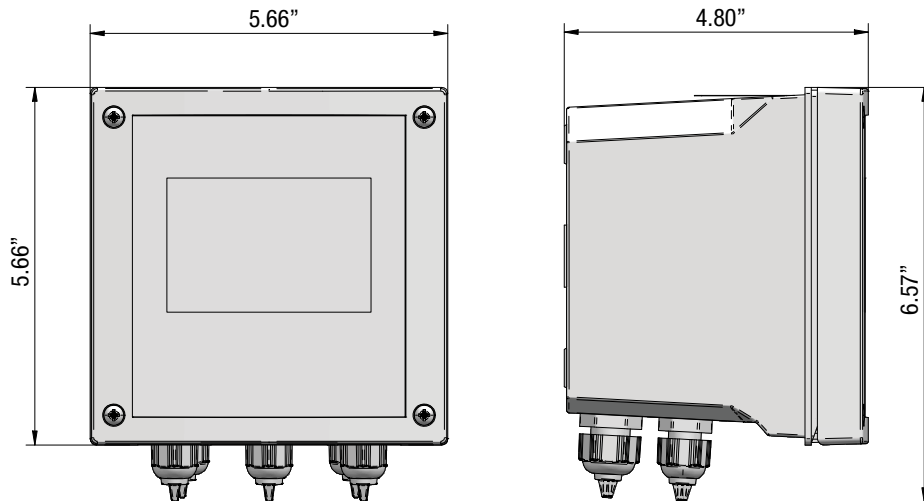


Fig. 3: Outer Dimensions

5.2 Drillhole Dimensions

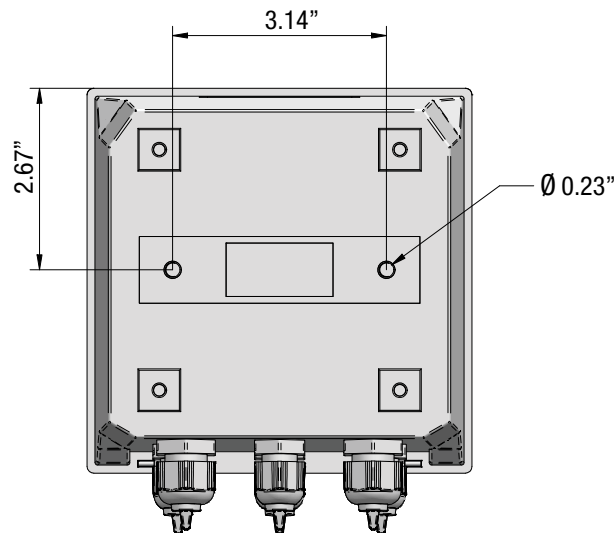


Fig. 4: Drillhole Dimensions

6 Installation




6.1 Principles

Make sure that the installation location complies with the following requirements:

- The display is easily accessible and is visible.
- Leave enough space for installing cables underneath the device. You must be able to install cables without kinking or damaging them.
- Various lines (e.g. voltage supply, data cable and sensitive lines for measuring purposes) must be installed separately. The different lines should only cross at an angle of 90° to prevent interference.
- Electrical, magnetic and electromagnetic fields affect signal transmission and can destroy electronic components.
- Compliance with the permissible environmental temperatures.

6.2 Mounting the Device on the Wall

Resources required:

-  Assembly kit
-  Drill
-  Screwdriver

Perform the following work steps:

1. Drill the two holes for mounting the device on the wall (see Fig. 4).
2. Remove the four screws on the front side of the device.
 - ▶ You can now open the front panel.
3. Open the device and use the screws provided to secure the device to the wall.
4. Attach the screw caps provided.
5. Close the device and tighten the four screws on the front side of the device.




The cable glands for the electrical connections are located on the lower part of the control unit. To facilitate the connections, any other devices must be positioned at least 6 in. apart. Protect the device against any drips and/or sprays of water from adjacent areas during the programming and calibration phases.

- ✓ **Device mounted on wall.**

6.3 Connecting the Power Supply

If possible, keep any live signal and control cables at a distance and lay them separately (these could cause inductive disturbances, especially for the analogical part of the system).

Absolutely avoid connecting the device to a power supply that has been modified (for example, using transformers) and where the same power supply is also used to power other systems (e.g. of inductive type); this could lead to high voltage spikes, which are difficult to block and/or eliminate once emitted.

	DANGER
<p>Mortal danger from electric shock! Improperly installed or damaged components in the electronics installation can cause injury.</p> <ul style="list-style-type: none"> ➢ The electrical line must be equipped with an appropriate circuit breaker, in compliance with the proper installation standards. ➢ The power supply and the quality of the grounding connector must be checked to avoid electrical interference. 	

6.4 RC Protection for Relays

When connecting to the relays, note that inductive loads must be suppressed. If this is not possible, the relay contact on the device terminal must be protected by an RC protective circuit/interference suppression element.

If devices with inductive loads from a nominal current of 1 A are connected to a relay, the contacts in the relay may become bonded. Thus, the device will operate in an uncontrolled manner. To prevent bonding if the load circuit suffers a short-circuit, the relays must be protected separately on the maximum relay switching current.


Pre-conditions for actions:

- ✓ You want to connect an inductive load to the relay.

Perform the following work steps:

1. Switch off the device.
2. Clamp the interference suppression element parallel to the inductive load.
3. If you cannot perform step 2, clamp the interference suppression element parallel to the relay output.

- ✓ **RC protection for relay connected.**

	PLEASE NOTE
<p>Warning Failure to observe this note may lead to risk to the device and its function.</p> <ul style="list-style-type: none"> ➢ When a relay output is used to drive a third-party device with an inductive/capacitive load input (such as contactors, motors, etc.), a transient protection is highly recommended. 	

6.5 Terminal Block

L/+	N/-	RL1 COM	RL1 NO	RL2 COM	RL2 NO	RL3 COM	RL3 NO	RL4 COM	RL4 NO																
1	2	3	4	5	6	7	8	9	10																
		<table border="1"> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> <tr> <td>NC</td><td>NC</td><td>RS485 B+</td><td>RS485 A+</td><td>RS485 BND</td><td>NC</td><td>NC</td><td>NC</td> </tr> </table>								11	12	13	14	15	16	17	18	NC	NC	RS485 B+	RS485 A+	RS485 BND	NC	NC	NC
11	12	13	14	15	16	17	18																		
NC	NC	RS485 B+	RS485 A+	RS485 BND	NC	NC	NC																		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34										
OUT 24V DC	0ND	RTO OUT+	RTO IN+	RTO IN-	RTO OUT-	REED	REED	SSR1+	SSR1-	SSR2+	SSR2-	OUT mA1+	OUT mA1-	OUT mA2+	OUT mA2-										
SLOT A		SLOT B		SLOT C		SLOT D		SLOT E		SLOT F															

Fig. 5: Terminal Block

Terminal	Terminal Designation		Description
1	L/ +		Power Supply
2	N/ -		
3	RL 1	COM	Relay 1 contact
4		NO	
5	RL 2	COM	Relay 2 contact
6		NO	
7	RL 3	COM	Relay 3 contact
8		NO	
9	RL 4	COM	Relay 4 contact
10		NO	
11 - 12	Not used		Not used
13	RS485	B+	Communication port RS485 MODBUS RTU/ASCII ¹ RS485 GND pin is isolated from GND (pin 20)
14		A-	
15		RS485 GND ¹	
16 - 18	Not used		Not used
19	OUT 24 V DC	+	24 V DC power supply for sensors with 4 - 20 mA output
20		GND	
21	RTD	OUT+	
22		IN+	Pt100 or Pt1000 temperature probe input
23		IN-	
24		OUT-	
25	REED	+	REED sensor input
26		-	
27	SSR1	+	Frequency output 1
28		-	
29	SSR2	+	Frequency output 2
30		-	
31	OUT mA1	+	4 - 20 mA current output 1
32		-	
33	OUT mA2	+	4 - 20 mA current output 2
34		-	

¹RS485 GND pin is isolated from GND (pin 20)

6.6 Connection Examples

6.6.1 Power Supply

- ✓ 24 – 48 V DC or 100 – 240 V AC; check the product label
- ✓ Observe the polarity.
- ✓ Observe the maximum power consumption (see „Electrical Specifications“ on page 7).

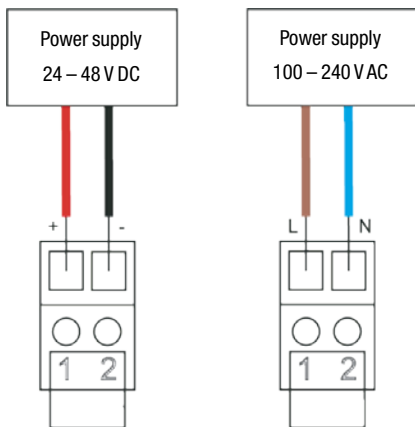


Fig. 6: Connection Example for Power Supply

6.6.2 Frequency Outputs SSR1 and SSR2

- ✓ Contact closed 5 Ω.

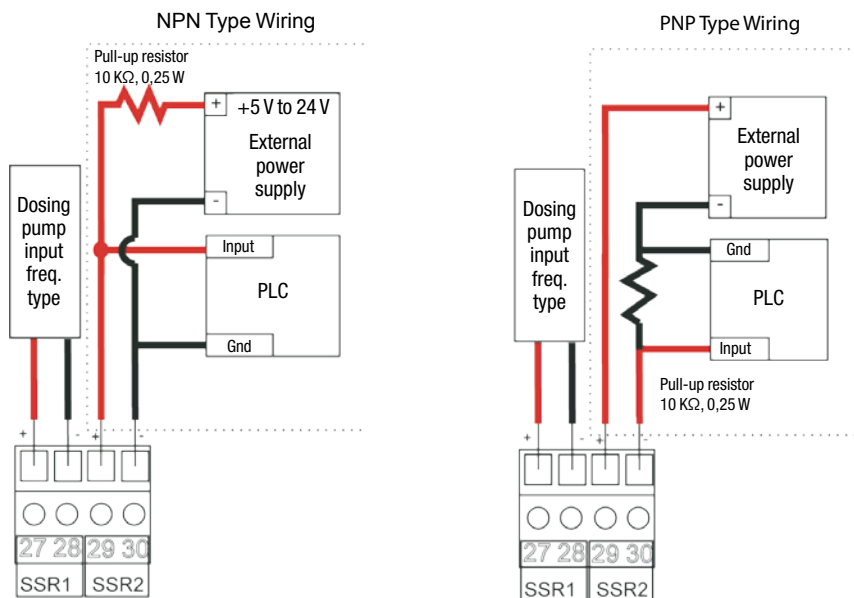


Fig. 7: Connection Example for Frequency Outputs SSR1 and SSR2

6.6.3 Relay Outputs 1, 2, 3 and 4

✓ Maximum load 5 A resistive.

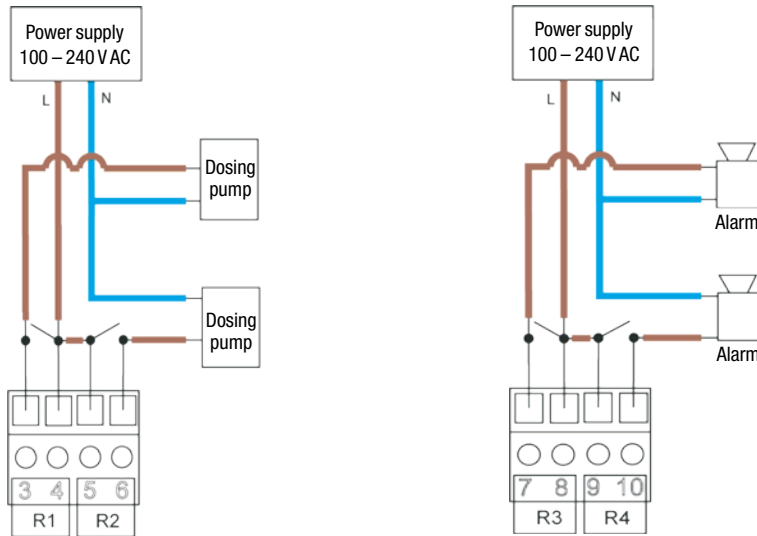


Fig. 8: Connection Example for Relay Outputs 1, 2, 3 and 4

6.6.4 Current Outputs mA 1 and 2

✓ 4 – 20 mA with a maximum load of 800 K Ω .

✓ Observe the polarity of the cables.

6.6.5 RS485 Communication Port

✓ Communication protocol ModBus RTU/ASCII.

✓ Add 120 Ω termination resistor between A and B.

✓ Observe the polarity of the cables.

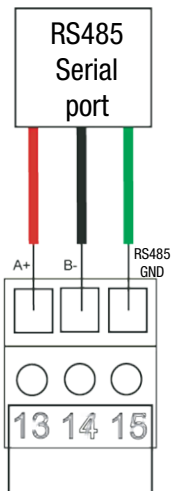


Fig. 9: Connection Example for RS485 Communication

6.6.6 Reed Sensor Input

- ✓ Input for dry contact or semi-conductor (open collector) 5 V DC, max. 6 mA.
- ✓ Observe the maximum cable length (65 ft.) for the reed sensor.

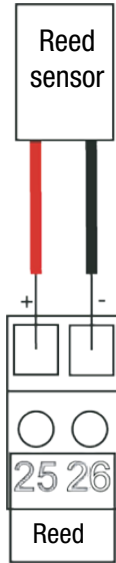


Fig. 10: Connection Example for Reed Sensor

6.6.7 Input for Temperature Measurement

- ✓ Connect the probes to the terminals.
- ✓ Observe the polarity.
- ✓ Observe the maximum cable length (65 ft.) for the Pt100/Pt1000 sensor.
- ✓ Observe the wiring for the sensor (2, 3 or 4 wires).
- ✓ Select 2/4 or 3 wires in sub-menu 2C1.

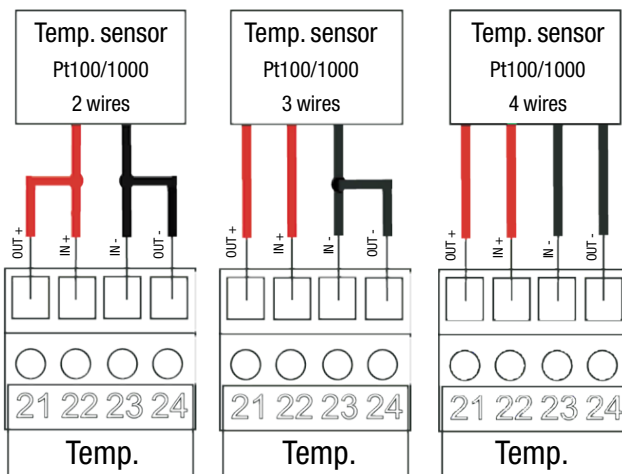


Fig. 11: Connection Example for Temperature Sensor Input



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