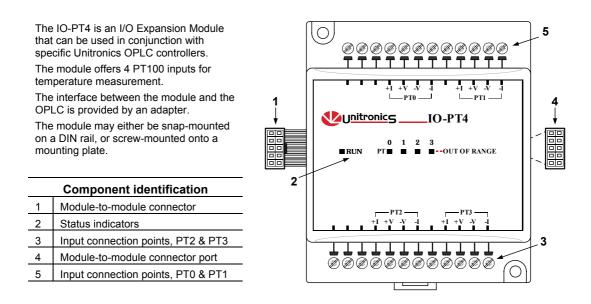
IO-PT4 I/O Expansion Module

4 PT100 Inputs (-50 to 460°C)



- Before using this product, it is the responsibility of the user to read and understand this document and any accompanying documentation.
- All examples and diagrams shown herein are intended to aid understanding, and do not guarantee operation. Unitronics accepts no responsibility for actual use of this product based on these examples.
- Please dispose of this product in accordance with local and national standards and regulations.
- Only qualified service personnel should open this device or carry out repairs.

User safety and equipment protection guidelines

This document is intended to aid trained and competent personnel in the installation of this equipment as defined by the European directives for machinery, low voltage, and EMC. Only a technician or engineer trained in the local and national electrical standards should perform tasks associated with the device's electrical wiring.

Symbols are used to highlight information relating to the user's personal safety and equipment protection throughout this document. When these symbols appear, the associated information must be read carefully and understood fully.

| Symbol | Meaning | Description |
|----------|---------|---|
| <u>I</u> | Danger | The identified danger causes physical and property damage. |
| Â | Warning | The identified danger can cause physical and property damage. |
| Caution | Caution | Use caution. |

Failure to comply with appropriate safety guidelines can result in severe personal injury or property damage. Always exercise proper caution when working with electrical equipment.

- Check the user program before running it.
- Do not attempt to use this device with parameters that exceed permissible levels.
- Install an external circuit breaker and take appropriate safety measures against short-circuiting in external wiring.
 - To avoid damaging the system, do not connect / disconnect the device when the power is on.

Environmental Considerations



Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks or excessive vibration.

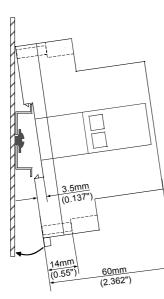
Leave a minimum of 10mm space for ventilation between the top and bottom edges of the device and the enclosure walls.

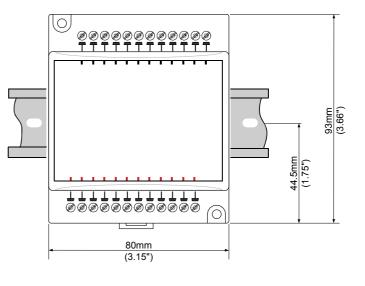
- Do not place in water or let water leak onto the unit.
- Do not allow debris to fall inside the unit during installation.

Mounting the Module

DIN-rail mounting

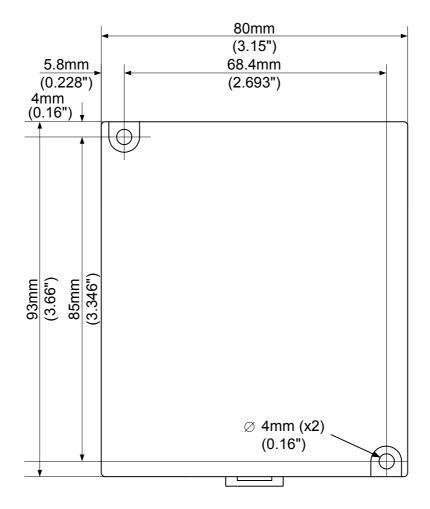
Snap the device onto the DIN rail as shown below; the module will be squarely situated on the DIN rail.





Screw-Mounting

The figure on the next page is drawn to scale. It may be used as a guide for screw-mounting the module. Mounting screw type: either M3 or NC6-32.



Unitronics Industrial Automation

Connecting Expansion Modules

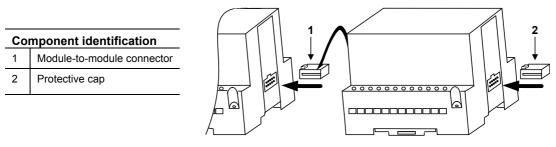
An adapter provides the interface between the OPLC and an expansion module. To connect the I/O module to the adapter or to another module:

1. Push the module-to-module connector into the port located on the right side of the device.

Note that there is a protective cap provided with the adapter. This cap covers the port of the **final** I/O module in the system.



To avoid damaging the system, do not connect or disconnect the device when the power is on.



| Wiring | |
|----------|--|
| ß | Do not touch live wires. |
| \wedge | Unused pins should not be connected. Ignoring this directive may damage the device. |
| ∠•́ \ | Double-check all wiring before turning on the power supply. |
| | The power supply of both adapter and outputs' must be connected to the same 0V signal. |

Wiring Procedures

Use crimp terminals for wiring; use 26-12 AWG wire (0.13 mm²–3.31 mm²) for all wiring purposes.

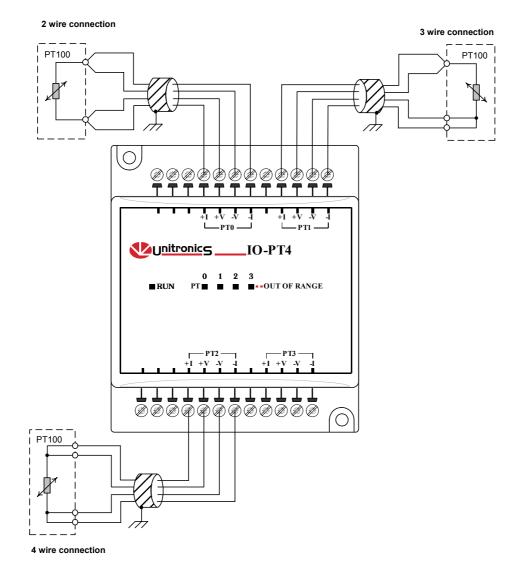
- 1. Strip the wire to a length of 7±0.5mm (0.250–0.300 inches).
- 2. Unscrew the terminal to its widest position before inserting a wire.
- 3. Insert the wire completely into the terminal to ensure that a proper connection can be made.
- 4. Tighten enough to keep the wire from pulling free.
- To avoid damaging the wire, do not exceed a maximum torque of 0.5 N·m (5 kgf·m).
- Do not use tin, solder, or any other substance on stripped wire that might cause the wire strand to break.
- Install at maximum distance from high-voltage cables and power equipment.

I/O Wiring—General

Input or output cables should not be run through the same multi-core cable or share the same wire.

Analog Inputs

■ Shields should be connected at the signal source.



IO-PT4 Technical Specifications

| Max. current consumption 35mA maximum from the adapter's 5VDC Typical power consumption 0.09W @ 5VDC Status indicator Green LED: (RUN) Green LED: —Lit when a communication link is established between module and OPLC. —Blinks when the communication link fails. Analog Inputs Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MQ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | | |
|--|---------------------------|--|
| Status indicator (RUN) Green LED: Lit when a communication link is established between module and OPLC. Blinks when the communication link fails. Analog Inputs 4 Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input gerror ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental Operating temperature IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Max. current consumption | 35mA maximum from the adapter's 5VDC |
| (RUN) Green LED: Lit when a communication link is established between module and OPLC. Blinks when the communication link fails. Analog Inputs 4 Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.2°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Typical power consumption | 0.09W @ 5VDC |
| —Lit when a communication link is established between module and OPLC. —Blinks when the communication link fails. Analog Inputs Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Status indicator | |
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| Analog Inputs 4 Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | | -Lit when a communication link is established between module and OPLC. |
| Number of inputs 4 Input type PT100 Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | | Blinks when the communication link fails. |
| Input typePT100Input range-50° to 460°CIsolationNoneResolution12-bit (4096 units)Measurement resolution±0.1°C. See Note 1.Conversion methodSuccessive approximationConversion time40msecInput impedance10MΩ minimumAuxiliary current for PT1001.9mALinearity error±0.25°C (±0.05%)Temperature accuracy±0.4°CStatus indicators(OUT OF RANGE)Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2.Connection options2,3 or 4 wiresEnvironmental Operating temperatureIP20 / NEMA1 0° to 50°C (32 to 122° F) | Analog Inputs | |
| Input range -50° to 460°C Isolation None Resolution 12-bit (4096 units) Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Number of inputs | 4 |
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| Resolution12-bit (4096 units)Measurement resolution±0.1°C. See Note 1.Conversion methodSuccessive approximationConversion time40msecInput impedance10MΩ minimumAuxiliary current for PT1001.9mALinearity error±0.25°C (±0.05%)Temperature accuracy±0.4°CStatus indicatorsRed LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2.Connection options2,3 or 4 wiresEnvironmental Operating temperatureIP20 / NEMA1 0° to 50°C (32 to 122° F) | Input range | -50° to 460°C |
| Measurement resolution ±0.1°C. See Note 1. Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Isolation | None |
| Conversion method Successive approximation Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Resolution | 12-bit (4096 units) |
| Conversion time 40msec Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Measurement resolution | ±0.1°C. See Note 1. |
| Input impedance 10MΩ minimum Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Conversion method | Successive approximation |
| Auxiliary current for PT100 1.9mA Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Conversion time | 40msec |
| Linearity error ±0.25°C (±0.05%) Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | Input impedance | 10MΩ minimum |
| Temperature accuracy ±0.4°C Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | 3 | 1.9mA |
| Status indicators (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental Operating temperature IP20 / NEMA1 0° to 50°C (32 to 122° F) | Linearity error | ±0.25°C (±0.05%) |
| (OUT OF RANGE) Red LEDs—Lit when the corresponding input measures an analog value (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | , , | ±0.4°C |
| (temperature) outside of the permissible range. See Note 2. Connection options 2,3 or 4 wires Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | | |
| Connection options 2,3 or 4 wires Environmental Operating temperature IP20 / NEMA1 0° to 50°C (32 to 122° F) | (OUT OF RANGE) | |
| Environmental IP20 / NEMA1 Operating temperature 0° to 50°C (32 to 122° F) | 2 | |
| Operating temperature 0° to 50°C (32 to 122° F) | Connection options | 2,3 or 4 wires |
| | <u>Environmental</u> | IP20 / NEMA1 |
| Storage temperature -20° to 60°C (-4 to 140° F) | | |
| | Storage temperature | -20° to 60°C (-4 to 140° F) |
| Relative Humidity (RH) 5% to 95% (non-condensing) | Relative Humidity (RH) | 5% to 95% (non-condensing) |
| Dimensions (WxHxD) 80 x 93 x 60mm (3.15 x 3.66 x 2.362") | Dimensions (WxHxD) | 80 x 93 x 60mm (3.15 x 3.66 x 2.362") |
| Weight 140.3g (4.94oz.) | | |
| Mounting Either onto a 35mm DIN-rail or screw-mounted. | Mounting | Either onto a 35mm DIN-rail or screw-mounted. |
| Notes: | Notes: | |
| The input analog value represents the temperature value as follows: | 1. The input analog val | ue represents the temperature value as follows: |

1. The input analog value represents the temperature value as follows Analog value-262 Actual measured temperature: 26.2°C

2. The temperature values can also indicate certain faults as shown in the table below.

| Value | Possible Cause |
|-------|---|
| -1000 | * Input temperature is out of the permissible range (under -50°C) |
| | * -I signal is not connected |
| | * Sensor is short-circuited |
| 1000 | * Input temperature is out of the permissible range (over 460°C) |
| | * Sensor is not connected to input |
| | * +I or +V signals are not connected |
| | + I and –V signals are not connected |

Addressing I/Os on Expansion Modules

Inputs and outputs located on I/O expansion modules that are connected to an OPLC are assigned addresses that comprise a letter and a number. The letter indicates whether the I/O is an input (I) or an output (O). The number indicates the I/O's location in the system. This number relates to both the position of the expansion module in the system, and to the position of the I/O on that module.

Expansion modules are numbered from 0-7 as shown in the figure below.



The formula below is used to assign addresses for I/O modules used in conjunction with the OPLC. X is the number representing a specific module's location (0-7). Y is the number of the input or output on that specific module (0-15).

The number that represents the I/O's location is equal to:

$$32 + x \cdot 16 + y$$

Examples

- Input #3, located on expansion module #2 in the system, will be addressed as I 67, 67 = 32 + 2 • 16 + 3
- Output #4, located on expansion module #3 in the system, will be addressed as O 84, 84 = 32 + 3 • 16 + 4.

EX90-DI8-RO8 is a stand-alone I/O module. Even if it is the only module in the configuration, the EX90-DI8-RO8 is always assigned the number 7.

Its I/Os are addressed accordingly.

Example

Input #5, located on an EX90-DI8-RO8 connected to an OPLC will be addressed as I 149, 149 = 32 + 7 • 16 + 5

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IO-PT4 I/O Expansion Module

About Unitronics

Unitronics Industrial Automation Systems has been producing PLCs, automation software and accessory devices since 1989.

Unitronics' OPLC controllers combine full-function PLCs and HMI operating panels into single, compact units. These HMI + PLC devices are programmed in a single, user-friendly environment. Our clients save I/O points, wiring, space, and programming time; elements that translate directly into cost-efficiency.

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