

The V200-18-E1B plugs directly into the back of compatible Unitronics OPLCs, creating a self-contained PLC unit with a local I/O configuration.

### Features

- 16 isolated digital inputs, including 2 high-speed counter inputs, type pnp/npn (source/sink)
- 10 isolated relay outputs
- 4 isolated pnp/npn (source/sink) transistor outputs, including 2 high-speed outputs
- 3 analog inputs

## General Description

The Snap-in I/O plugs directly into the back of compatible Unitronics PLCs, creating a self-contained PLC unit with a local I/O configuration. Detailed Installation Guides containing the I/O wiring diagrams for these models, technical specifications, and additional documentation are located in the Technical Library in the Unitronics website: <https://unitronicsplc.com/support-technical-library/>

## Alert Symbols and General Restrictions

When any of the following symbols appear, read the associated information carefully.

Symbol	Meaning	Description
	Danger	The identified danger causes physical and property damage.
	Warning	The identified danger could cause physical and property damage.
<i>Caution</i>	Caution	Use caution.

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- Before using this product, the user must read and understand this document.
- All examples and diagrams 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 according to local and national standards and regulations.
- Only qualified service personnel should open this device or carry out repairs.

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	▪ Failure to comply with appropriate safety guidelines can cause severe injury or property damage.
	▪ Do not attempt to use this device with parameters that exceed permissible levels. ▪ To avoid damaging the system, do not connect/disconnect the device when power is on.

## Environmental Considerations

	<ul style="list-style-type: none"> <li>▪ 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, in accordance with the standards given in the product's technical specification sheet.</li> <li>▪ Do not place in water or let water leak onto the unit.</li> <li>▪ Do not allow debris to fall inside the unit during installation.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Ventilation: 10mm space required between controller's top/bottom edges &amp; enclosure walls.</li> <li>▪ Install at maximum distance from high-voltage cables and power equipment.</li> </ul>

## UL Compliance

The following section is relevant to Unitronics' products that are listed with the UL.

The following models: V200-18-E1B, V200-18-E2B, V200-18-E6B, V200-18-E6BL are UL listed for Hazardous Locations.

The following models: V200-18-E1B, V200-18-E2B, V200-18-E3B, V200-18-E3XB, V200-18-E46B, V200-18-E46BL, V200-18-E4B, V200-18-E4XB, V200-18-E5B, V200-18-E6B, V200-18-E6BL,

V200-18-ECB, V200-18-ECXB, V200-18-ESB are UL listed for Ordinary Location.

## UL Ratings, Programmable Controllers for Use in Hazardous Locations,

### Class I, Division 2, Groups A, B, C and D

These Release Notes relate to all Unitronics products that bear the UL symbols used to mark products that have been approved for use in hazardous locations, Class I, Division 2, Groups A, B, C and D.

<i>Caution</i>	▪ This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, or Non-hazardous locations only.
	▪ Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.
	<ul style="list-style-type: none"> <li>▪ WARNING—Explosion Hazard—substitution of components may impair suitability for Class I, Division 2.</li> <li>▪ WARNING – EXPLOSION HAZARD – Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.</li> <li>▪ WARNING – Exposure to some chemicals may degrade the sealing properties of material used in Relays.</li> <li>▪ This equipment must be installed using wiring methods as required for Class I, Division 2 as per the NEC and/or CEC.</li> </ul>

## Relay Output Resistance Ratings

The products listed below contain relay outputs: V200-18-E1B, V200-18-E2B.

- When these specific products are used in hazardous locations, they are rated at 3A res, when these specific products are used in non-hazardous environmental conditions, they are rated at 5A res, as given in the product's specifications.

## **Certification UL des automates programmables, pour une utilisation en environnement à risques, Class I, Division 2, Groups A, B, C et D.**

Cette note fait référence à tous les produits Unitronics portant le symbole UL - produits qui ont été certifiés pour une utilisation dans des endroits dangereux, Classe I, Division 2, Groupes A, B, C et D.

### **Attention**



- Cet équipement est adapté pour une utilisation en Classe I, Division 2, Groupes A, B, C et D, ou dans Non-dangereux endroits seulement.
- Le câblage des entrées/sorties doit être en accord avec les méthodes de câblage selon la Classe I, Division 2 et en accord avec l'autorité compétente.
- **AVERTISSEMENT: Risque d'Explosion** – Le remplacement de certains composants rend caduque la certification du produit selon la Classe I, Division 2.
- **AVERTISSEMENT - DANGER D'EXPLOSION** - Ne connecter pas ou ne débranche pas l'équipement sans avoir préalablement coupé l'alimentation électrique ou la zone est reconnue pour être non dangereuse.
- **AVERTISSEMENT** - L'exposition à certains produits chimiques peut dégrader les propriétés des matériaux utilisés pour l'étanchéité dans les relais.
- Cet équipement doit être installé utilisant des méthodes de câblage suivant la norme Class I, Division 2 NEC et /ou CEC.

### **Certification de la résistance des sorties relais**

Les produits énumérés ci-dessous contiennent des sorties relais:

- V200-18-E1B, V200-18-E2B.
- Lorsque ces produits spécifiques sont utilisés dans des endroits dangereux, ils supportent un courant de 3A charge résistive, lorsque ces produits spécifiques sont utilisés dans un environnement non dangereux, ils sont évalués à 5A res, comme indiqué dans les spécifications du produit Plages de températures

## **Installing / Removing the Snap-in I/O Module**

### **Installing a Snap-in I/O Module**

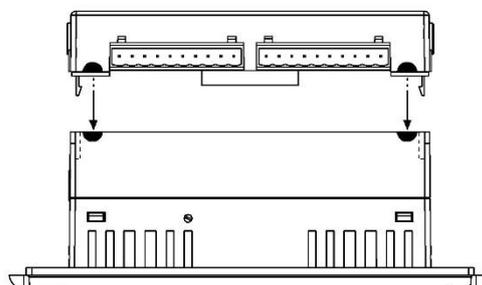
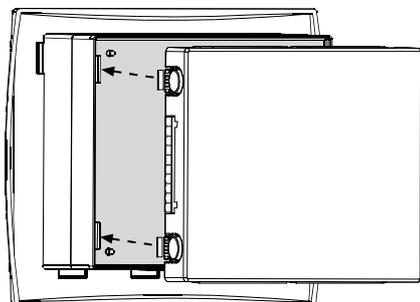
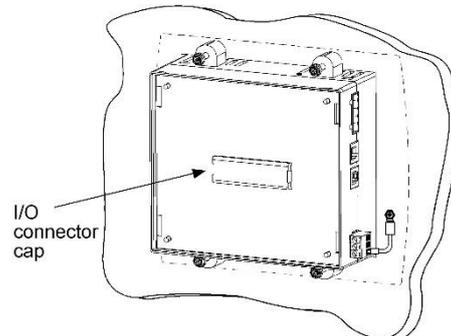
You can install a Snap-in I/O Module both before and after mounting the controller.



- Turn off the power before installing I/O modules.

Note the protective cap covering the I/O connector shown in the accompanying figure. This cap must cover the connector whenever a Snap-in I/O Module is not attached to the controller. You must remove this cap before installing a module.

1. Pry the cap off using the blade of a screwdriver.
2. Line the circular guidelines on the controller up with the guidelines on the module as shown below.
3. Apply even pressure on all 4 corners until you hear a distinct 'click'.



The module is now installed. Check that all sides and corners are correctly aligned.

### **Removing a Snap-in I/O Module**

1. Press the buttons on the sides of the module and hold them down to open the locking mechanism.
2. Gently rock the module from side to side, easing the module from the controller.
3. Replace the protective cap on the connector.

## Wiring

- ⚡ Do not touch live wires.
- 
- This equipment is designed to operate only in SELV/PELV/Class 2/Limited Power environments.
  - All power supplies in the system must include double insulation. Power supply outputs must be rated as SELV/PELV/Class 2/Limited Power.
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- ⚠ Do not connect either the 'Neutral or 'Line' signal of the 110/220VAC to device's 0V pin.
  - All wiring activities should be performed while power is OFF.
  - Use over-current protection, such as a fuse or circuit breaker, to avoid excessive currents into the power supply connection point.
  - Unused points should not be connected (unless otherwise specified). Ignoring this directive may damage the device.
  - Double-check all wiring before turning on the power supply.
- 
- Caution*
- To avoid damaging the wire, do not exceed a maximum torque of:
    - Controllers offering a terminal block with pitch of 5mm: 0.5 N·m (5 kgf·cm).
    - Controllers offering a terminal block with pitch of 3.81mm f 0.2 N·m (2 kgf·cm).
  - Do not use tin, solder, or any substance on stripped wire that might cause the wire strand to break.
  - Install at maximum distance from high-voltage cables and power equipment.

## Wiring Procedure

Use crimp terminals for wiring;

- Controllers offering a terminal block with pitch of 5mm: 26-12 AWG wire (0.13 mm<sup>2</sup> –3.31 mm<sup>2</sup>).
  - Controllers offering a terminal block with pitch of 3.81mm: 26-16 AWG wire (0.13 mm<sup>2</sup> – 1.31 mm<sup>2</sup>).
1. Strip the wire to a length of 7±0.5mm (0.270–0.300").
  2. Unscrew the terminal to its widest position before inserting a wire.
  3. Insert the wire completely into the terminal to ensure a proper connection.
  4. Tighten enough to keep the wire from pulling free.

## Wiring Guidelines

- Use separate wiring ducts for each of the following groups:
    - Group 1: Low voltage I/O and supply lines, communication lines.
    - Group 2: High voltage Lines, Low voltage noisy lines like motor driver outputs.

Separate these groups by at least 10cm (4"). If this is not possible, cross the ducts at a 90° angle.
  - For proper system operation, all 0V points in the system should be connected to the system 0V supply rail.
  - Product-specific documentation must be fully read and understood before performing any wiring.
- Allow for voltage drop and noise interference with input lines used over an extended distance.  
Use wire that is properly sized for the load.

## Earthing the product

To maximize system performance, avoid electromagnetic interference as follows:

- Use a metal cabinet.
- Connect the 0V and functional ground points (if exist) directly to the earth ground of the system.
- Use the shortest, less than 1m (3.3 ft.) and thickest, 2.08mm<sup>2</sup> (14AWG) min, wires possible.

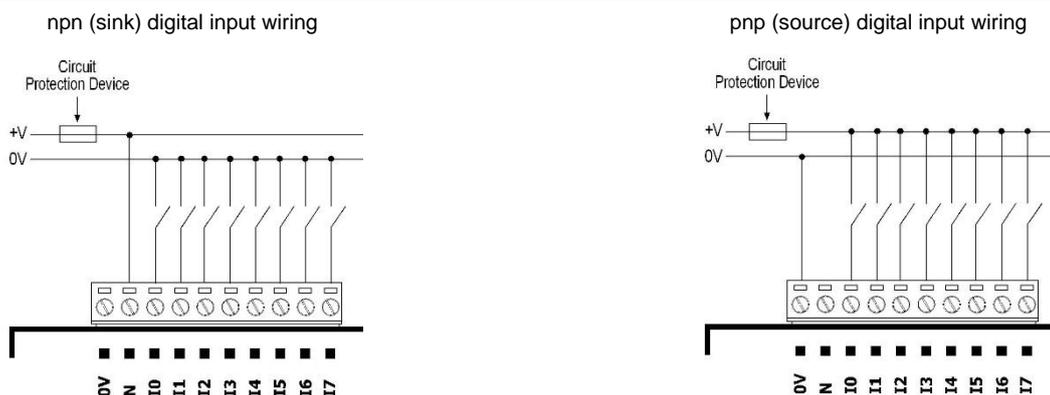
## Digital Inputs

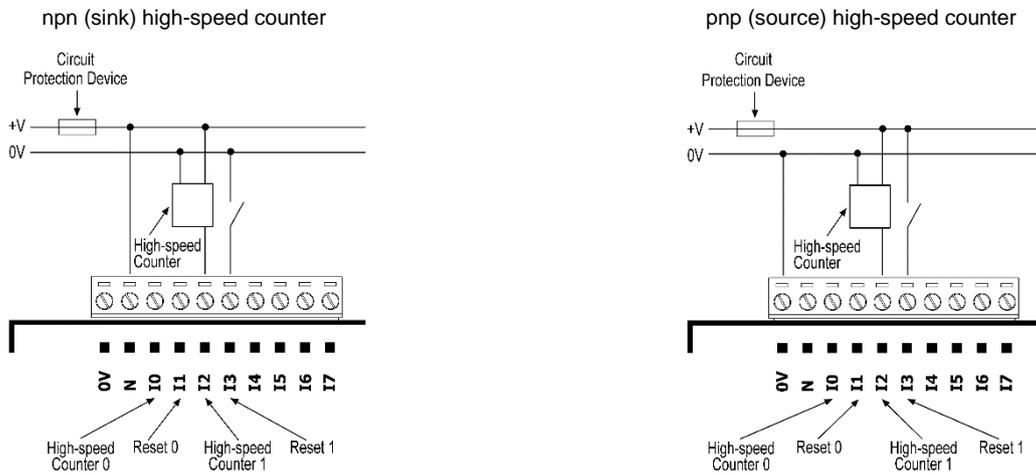
Each group of 8 inputs has a common signal. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.

Inputs I0 and I2 can be used as normal digital inputs, high-speed counters, or as part of a shaft encoder.

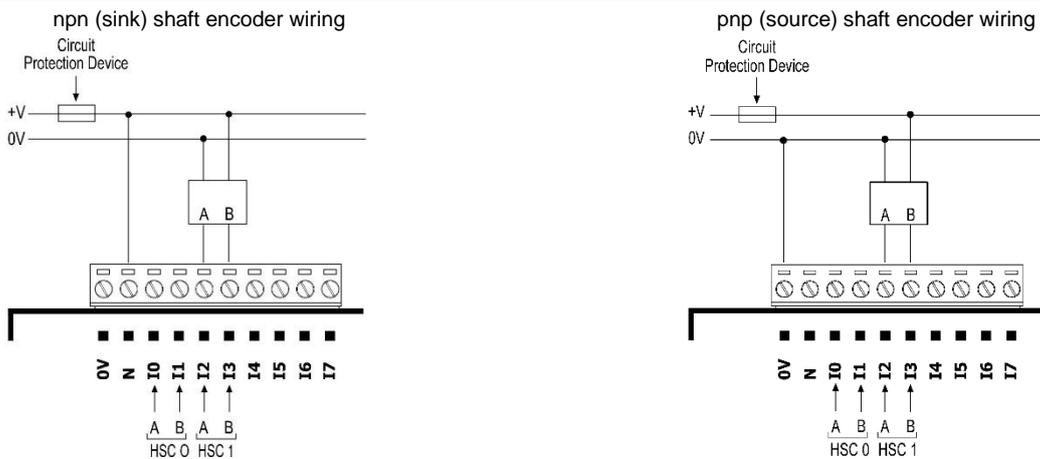
Inputs I1 and I3 can be used as normal digital inputs, high-speed counter resets, or as part of a shaft encoder.

- The 0V signal of the inputs is isolated from the controller's 0V signal.
- Each group of inputs has its own 0V signal.
- The inputs' 0V and N signals are internally shorted on each connector.





Inputs I0, I1, and I2, I3 can be used as shaft encoders as shown below.



## Digital Outputs

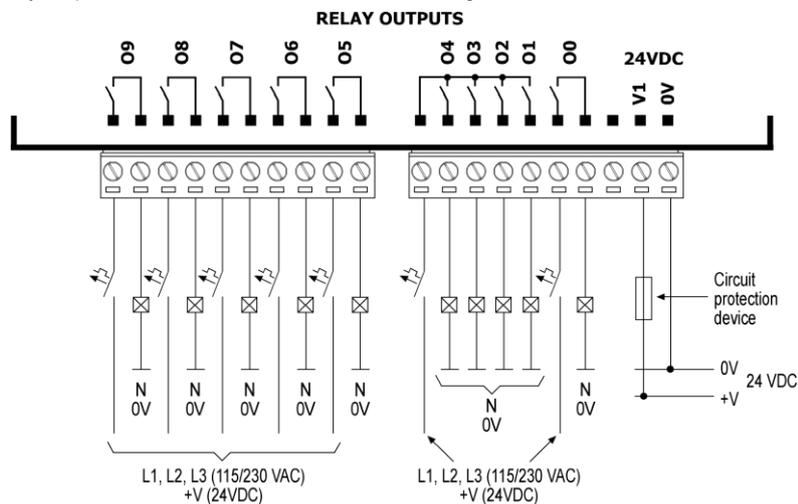
### Wiring Power Supplies

1. Connect the "positive" lead to the "V1" terminal for the relay outputs, to the "V2" terminal for the transistor outputs.
2. In both cases, connect the "negative" lead to the "0V" terminal of each output group.

- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Do not connect the 'Neutral' or 'Line' signal of the 110/220VAC to the device's 0V pin.

### Relay Outputs

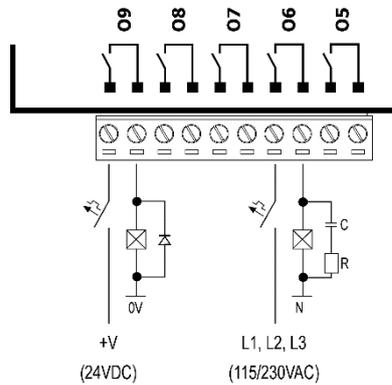
- The 0V signal of the relay outputs is isolated from the controller's 0V signal.



### Increasing Contact Life Span

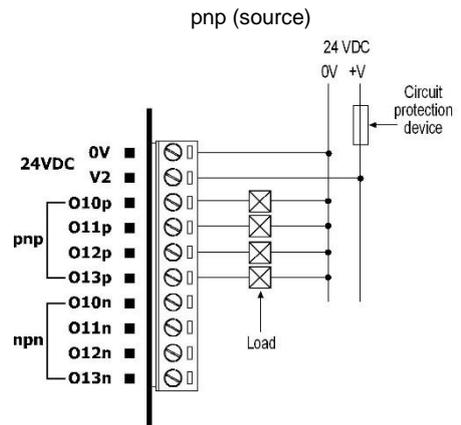
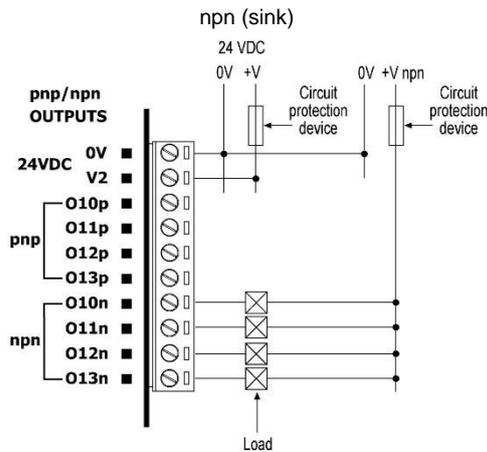
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- a clamping diode in parallel with each inductive DC load,
- an RC snubber circuit in parallel with each inductive AC load.



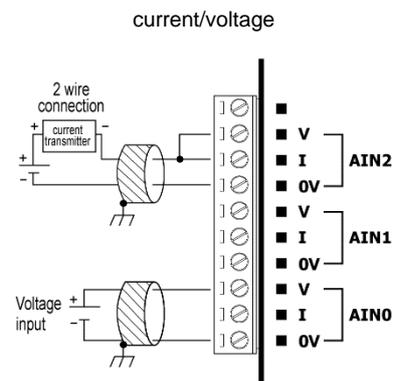
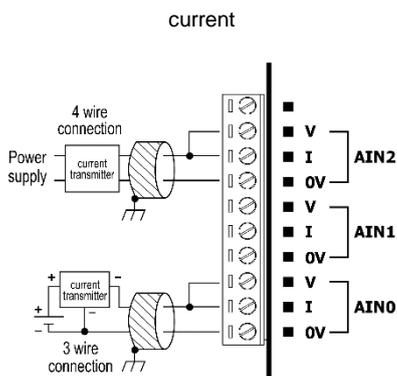
### Transistor Outputs

- Each output can be wired separately as either npn or pnp.
- The 0V signal of the transistor outputs is isolated from the controller's 0V signal.



### Analog Inputs

- Shields should be connected at the signal source.
- Inputs may be wired to work with either current or voltage.
- Note that the analog input's 0V signal must be the same 0V used by the controller's power supply.



## V200-18-E1B Technical Specifications

### **Digital Inputs**

Number of inputs	16 (in two groups)
Input type	pnp (source) or npn (sink), set by wiring.
Galvanic isolation	Yes
Nominal input voltage	24VDC
Input voltage	
pnp (source)	0-5VDC for Logic '0' 17-28.8VDC for Logic '1'
npn (sink)	17-28.8VDC for Logic '0' 0-5VDC for Logic '1'
Input current	6mA@24VDC for inputs #4 to #15 8.8mA@24VDC for inputs #0 to #3
Response time	10mSec typical
High speed inputs	Specifications below apply. See Notes 1 and 2.
Resolution	32-bit
Frequency	10kHz maximum
Minimum pulse width	40µs

### **Notes:**

1. Inputs #0 and #2 can each function as either high-speed counter or as part of a shaft encoder. In each case, high-speed input specifications apply. When used as a normal digital input, normal input specifications apply.
2. Inputs #1 and #3 can each function as either counter reset, or as a normal digital input; in either case, its specifications are those of a normal digital input. These inputs may also be used as part of a shaft encoder. In this case, high-speed input specifications apply.

### **Relay Outputs**

Number of outputs	10. See Note 3.
Output type	SPST-NO relay (Form A)
Isolation	By relay
Type of relay	Panasonic JQ1AP-24V, or compatible
Output current	5A maximum (resistive load). 8A maximum for common signal. See Note 3.
Rated voltage	250VAC / 30VDC
Minimum load	1mA@5VDC
Life expectancy	50k operations at maximum load
Reponse time	10mS (typical)
Contact protection	External precautions required. See Increasing Contact Life Span, page 5.
Outputs' power supply	
Nominal operating voltage	24VDC
Operating voltage	20.4 to 28.8VDC
Max. current consumption	90mA@24VDC

### **Notes:**

3. Outputs #1, #2, #3, and #4 share a common signal. All other outputs have individual contacts.

**Transistor Outputs**

Number of outputs	4. Each can be individually wired as pnp (source) or npn (sink).
Output type	pnp: P-MOSFET (open drain) npn: open collector
Galvanic isolation	Yes
Output current	pnp: 0.5A maximum (per output) Total current: 2A maximum (per group) npn: 50mA maximum (per output) Total current: 150mA maximum (per group)
Maximum frequency	20Hz (resistive load) 0.5Hz (inductive load)
High speed output maximum frequency (resistive load)	pnp: 2kHz npn: 50kHz See Note 4
ON voltage drop	pnp: 0.5VDC maximum npn: 0.85VDC maximum
Short circuit protection	Yes (pnp only)
Power supply	
operating voltage	20.4 to 28.8VDC
nominal operating voltage	24VDC
npn (sink) power supply	
operating voltage	3.5V to 28.8VDC, unrelated to voltage of either the I/O module or the controller

**Notes:**

4. Outputs #12 and Output #13 may be used as high-speed outputs

**Analog Inputs**

Number of inputs	3 (single-ended)
Input range	0-10V, 0-20mA, 4-20mA. See Note 5.
Conversion method	Successive approximation
Resolution (except at 4-20mA)	10-bit (1024 units)
Resolution at 4-20mA	204 to 1023 (820 units)
Conversion time	Synchronized to scan time
Input impedance	>100K $\Omega$ —voltage 500 $\Omega$ —current
Galvanic isolation	None
Absolute maximum rating	$\pm$ 15V—voltage $\pm$ 30mA—current
Full-scale error	$\pm$ 2 LSB (0.2%)
Linearity error	$\pm$ 2 LSB (0.2%)

**Notes:**

5. Note that the range of each I/O is defined both by wiring and within the controller's software.

<b>Environmental</b>	IP20 / NEMA1
Operating temperature	0° to 50°C (32° to 122°F)
Storage temperature	-20° to 60° C (-4° to 140°F)
Relative Humidity (RH)	5% to 95% (non-condensing)

**Dimensions**

Size (WxHxD)	138x23x123mm (5.43x0.9x4.84")
Weight	222g (7.8 oz)

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