V200-18-E2B   Snap-in I/O Module

The V200-18-E2B 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
- 2 analog inputs
- 2 analog outputs

- 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
⚡	Danger	The identified danger causes physical and property damage.
⚠	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.

Caution
- Ascertain that terminal blocks are properly secured in place.

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.

- ⚠ Provide proper ventilation by leaving at least 10mm of space 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.

Installing / Removing the Snap-in I/O Module
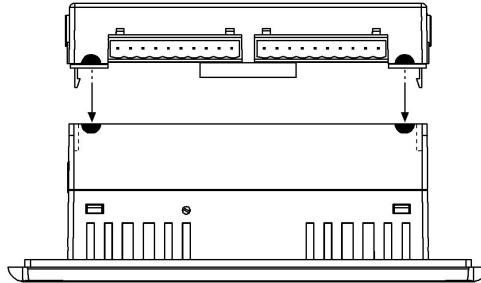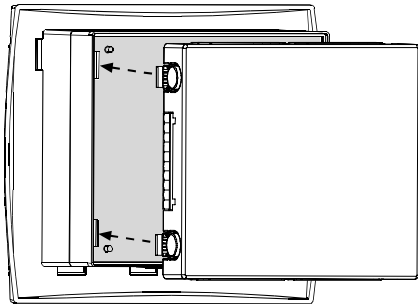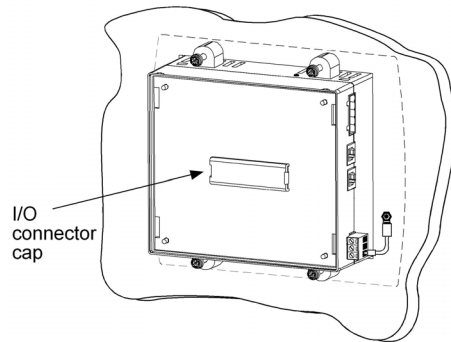
Installing a Snap-in I/O Module

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'.

I/O connector cap

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.
	■ Unused pins should not be connected. Ignoring this directive may damage the device. ■ Do not connect the 'Neutral' or 'Line' signal of the 110/220VAC to the device's 0V pin. ■ Double-check all wiring before turning on the power supply.

Wiring Procedures

Use crimp terminals for wiring; use 26-12 AWG wire (0.13 mm^2–3.31 mm^2) 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.
■ Allow for voltage drop and noise interference with input lines used over an extended distance.
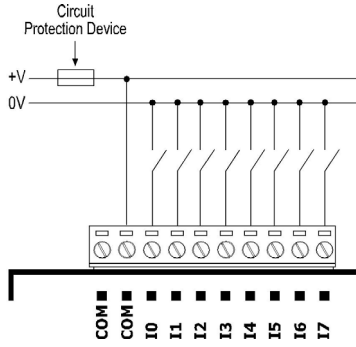Use wire that is properly sized for the load.

Digital Inputs

Each group of 8 inputs has two common signals. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.
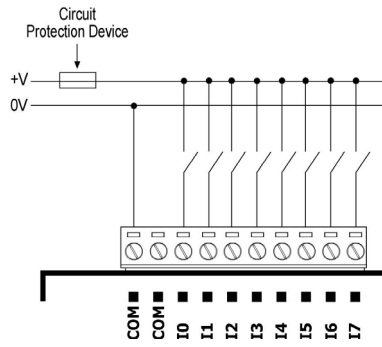
Inputs I0 and I2 can be used as normal digital inputs, as high-speed counters, or as part of a shaft encoder. Inputs I1 and I3 can be used as normal digital inputs, as high-speed counter resets, or as part of a shaft encoder.

■ The common signals of each group are internally shorted on each connector.
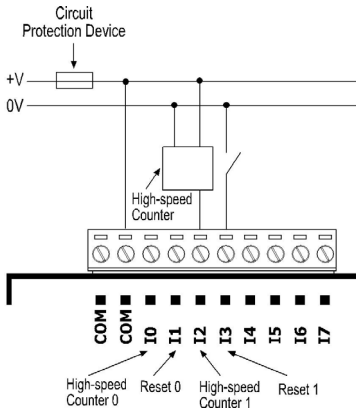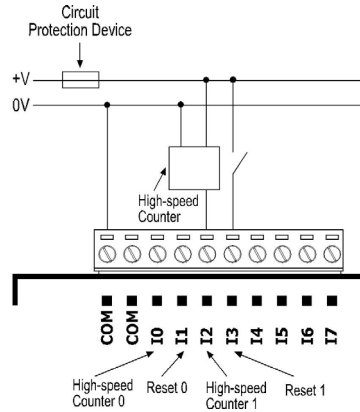
npn (sink) digital input wiring

pnp (source) digital input wiring
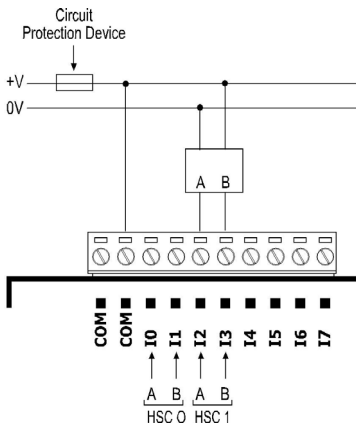
npn (sink) high-speed counter
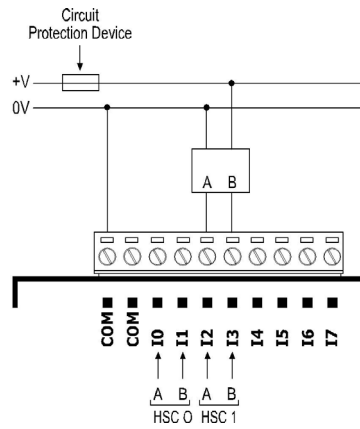
pnp (source) high-speed counter

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

npn (sink) shaft encoder wiring
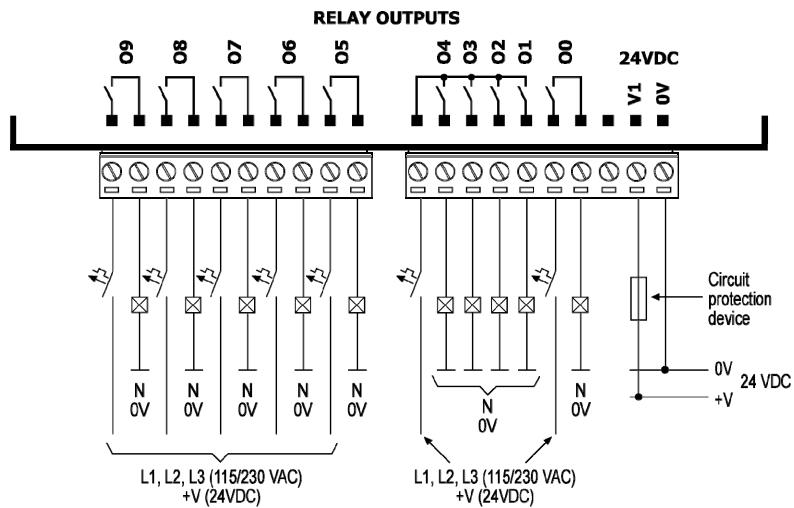
pnp (source) shaft encoder wiring

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.
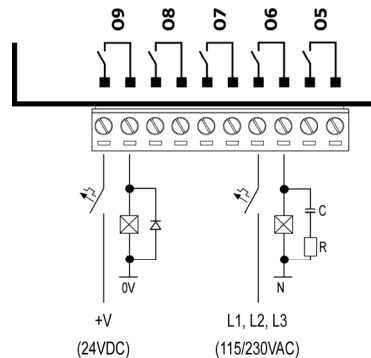
Relay Outputs

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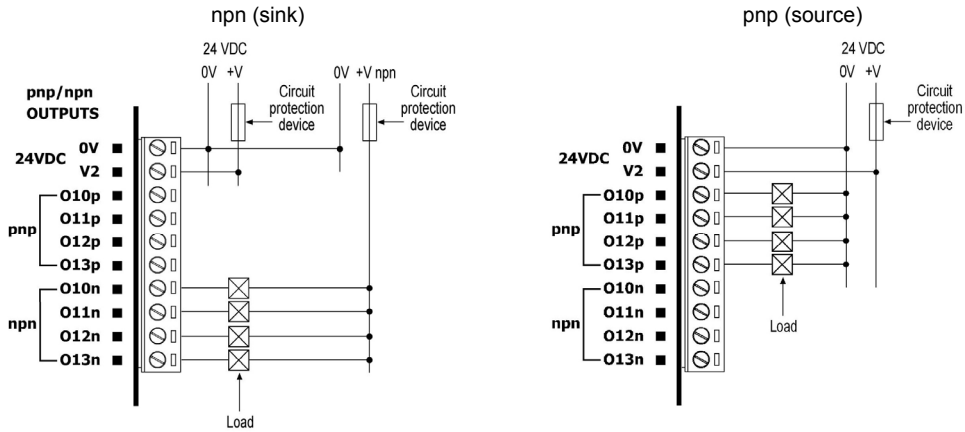

Increasing Contact Life Span

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.

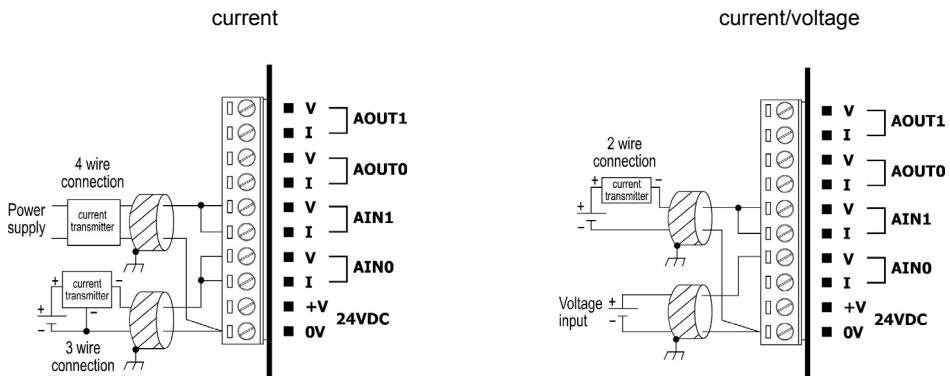### Transistor Outputs

- 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.

Analog Outputs

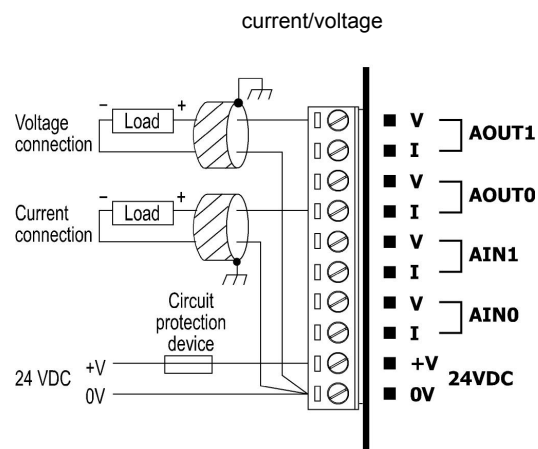#### Wiring the Analog Outputs' Power Supply

1.   Connect the "positive" cable to the "+V" terminal, and the "negative" to the "0V" terminal.

- ■   The analog 0V signal must be the same 0V used by the controller's power supply.

- ■   A non-isolated power supply can be used provided that a 0V signal is connected to the chassis.

- ■   Do not connect the 'Neutral' or 'Line' signal of the 110/220VAC to the device's 0V pin.

- ■   In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.

⚠   The 24VDC power supply must be turned on and off simultaneously with the controller's power supply.

Output Wiring

- ■   Shields should be earthed, connected to the earth of the cabinet.

- ■   An output can be wired to either current or voltage.

- ■   Do not use current and voltage from the same source channel.

current/voltage

V200-18-E2B 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
ON voltage drop	pnp: 0.5VDC maximum npn: 0.85VDC maximum See Note 4
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 the 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	2 (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	>100KΩ—voltage
	500Ω—current
Galvanic isolation	None
Absolute maximum rating	±15V—voltage
	±30mA—current
Full-scale error	±2 LSB (0.2%)
Linearity error	±2 LSB (0.2%)

Analog Outputs

Number of outputs	2 (single-ended)
Output range	0-10V, 0-20mA, 4-20mA. See Note 5.
Resolution (except at 4-20mA)	12-bit (4096 units)
Resolution at 4-20mA	819 to 4095 (3277 units)
Conversion time	Synchronized to scan time.
Load impedance	1kΩ minimum—voltage
	500Ω maximum—current
Galvanic isolation	None
Linearity error	±0.1%
Operational error limits	±0.2%

Notes:

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

Environmental	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	231g (8.13 oz)

About Unitronics

Unitronics 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.

Unitronics supports a global network of distributors and sales representatives, as well as a U.S. subsidiary.

For more information regarding Unitronics products, contact your distributor or Unitronics headquarters via email: export@unitronics.com.

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