V200-18-E1B

Snap-in I/O Module

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
- 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.	
<u> </u>	Warning The identified danger can cau 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

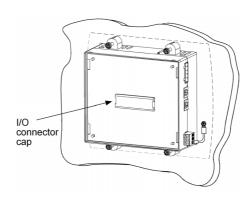
You can install a Snap-in I/O Module both before and after mounting the controller.

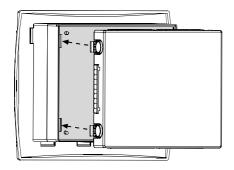


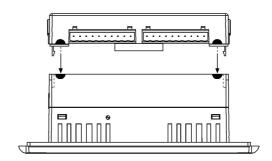
■ Turn off the power before installing I/O modules.

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.
- 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.
- $2. \hspace{0.5cm} \hbox{Gently rock the module from side to side, easing the module from the controller}.$
- 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 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

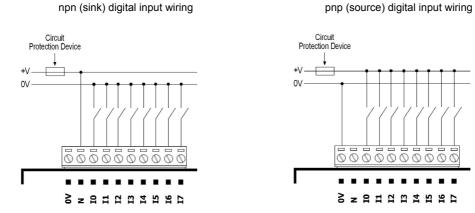
- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

Digital Inputs

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

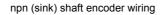
Inputs I0 and I2 can be used as normal digital inputs, high-speed counters, or as part of a shaft encoder. Inputs I1 and I3 can be used as normal digital inputs, high-speed counter resets, or as part of a shaft encoder.

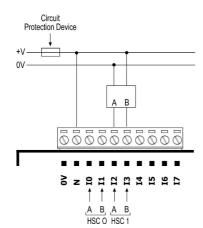
- The 0V signal of the inputs is isolated from the controller's 0V signal.
- Each group of inputs has its own 0V signal.
- The inputs' 0V and N signals are internally shorted on each connector.



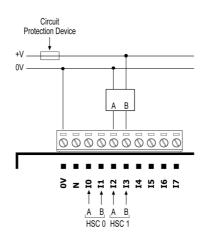
npn (sink) high-speed counter pnp (source) high-speed counter Circuit Circuit Protection Device Protection Device +V 0V 0٧ High-speed Counter High-speed Counter 000000000000 2 2 E 13 z 2 1 13 High-speed Counter 0 Reset 0

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





pnp (source) shaft encoder wiring



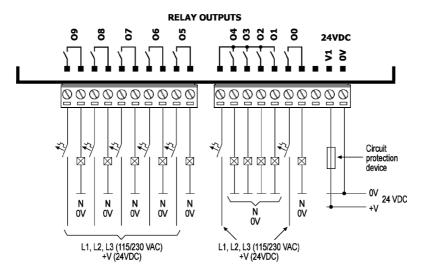
Digital Outputs

Wiring Power Supplies

- 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

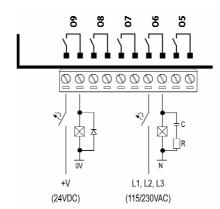
■ The 0V signal of the relay outputs is isolated from the controller's 0V signal.



Increasing Contact Life Span

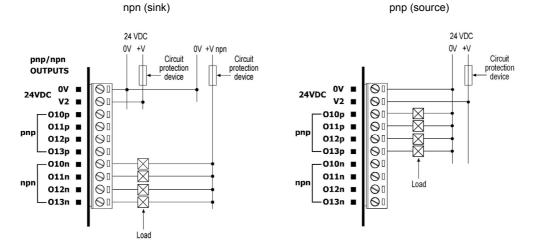
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

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



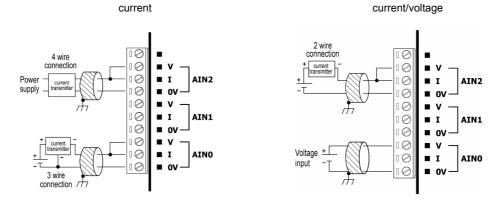
Transistor Outputs

- 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:

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.

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 6.

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

4. Each can be individually wired as pnp (source) or npn (sink). Number of outputs

pnp: P-MOSFET (open drain) Output type

npn: open collector

Galvanic isolation

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 pnp: 2kHz frequency (resistive load) 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 nominal operating voltage 20.4 to 28.8VDC

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 Ω —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%)

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 222g (7.8 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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5410-1032-4

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.
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- Only qualified service personnel should open this device or carry out repairs.

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Symbol	Meaning	Description
<u>\$</u>	Danger	The identified danger causes physical and property damage.
<u> </u>	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

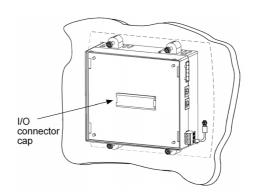
You can install a Snap-in I/O Module both before and after mounting the controller.

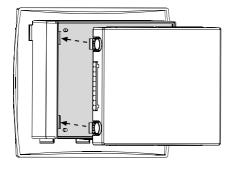


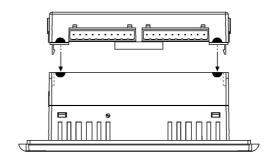
Turn off the power before installing I/O modules.

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.
- 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.
- /\
- 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 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.
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

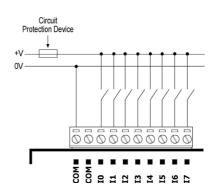
Digital Inputs

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.

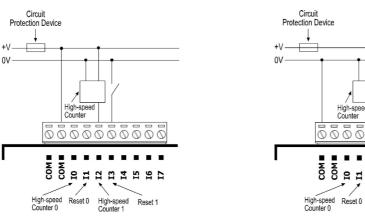
Inputs I0 and I2 can be used as normal digital inputs, as high-speed counters, or as part of a shaft encoder. Inputs I1 and I3 can be used as normal digital inputs, as high-speed counter resets, or as part of a shaft encoder.

■ The common signals of each group are internally shorted on each connector.

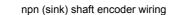
pnp (source) digital input wiring



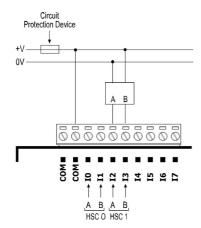
pnp (source) high-speed counter

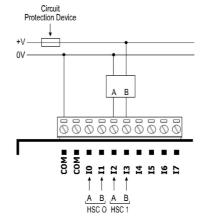


Inputs I0, I1, and I2, I3 can be used as shaft encoders as shown below.



pnp (source) shaft encoder wiring





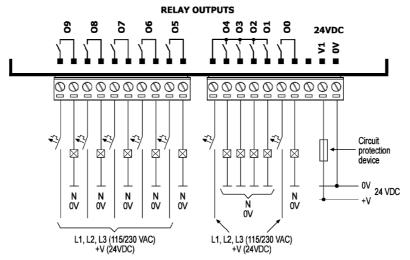
Digital Outputs

Wiring Power Supplies

- 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

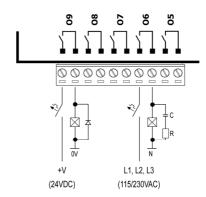
■ The 0V signal of the relay outputs is isolated from the controller's 0V signal.



Increasing Contact Life Span

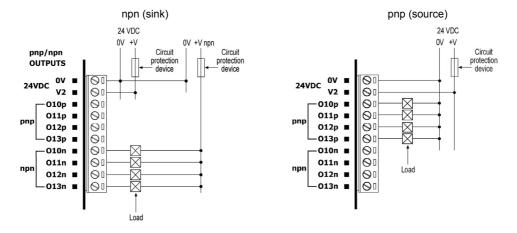
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

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



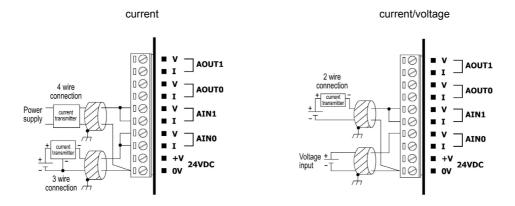
Transistor Outputs

- 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.

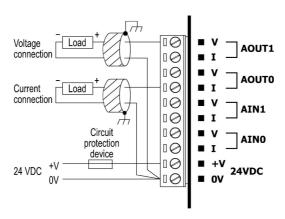


The 24VDC power supply must be turned on and off simultaneously with the controller's power supply.

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:

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.

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 pnp: 2kHz frequency (resistive load). pnp: 50kHz

ON voltage drop pnp: 0.5VDC maximum

npn: 0.85VDC maximum See Note 4

Yes (pnp only)

Short circuit protection Ye

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 >100K Ω —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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5410-1042-7

V200-18-E3XB Snap-in I/O Module

The V200-18-E3XB plugs directly into the back of compatible Unitronics OPLCs, creating a self-contained PLC unit with a local I/O configuration.

Features

- 18 isolated digital inputs, includes 2 H.S.C inputs, type pnp/npn (source/sink)
- 15 isolated relay outputs
- 2 isolated pnp/npn (source/sink) transistor outputs, includes 2 H.S. outputs
- 4 isolated analog/PT100/TC inputs
- 4 isolated 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
1	Danger The identified danger caus and property damage.	
<u>^</u>	Warning The identified danger of physical and property	
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 shortcircuiting 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.

Wiring



- Do not touch live wires.
- <u>^</u>!\
- 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·cm).
- 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

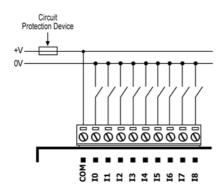
- Input or output cables should not be run through the same multi-core cable or share the same
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

Digital Inputs

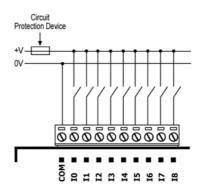
Each group of 9 inputs has a common signal. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.

Inputs I0 and I2 can be used as normal digital inputs, 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.

npn (sink) digital input wiring

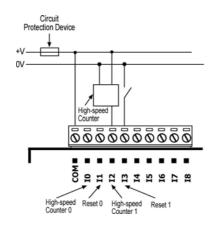


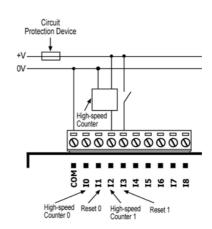
pnp (source) digital input wiring



npn (sink) high-speed counter

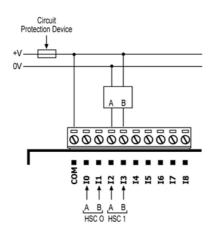
pnp (source) high-speed counter



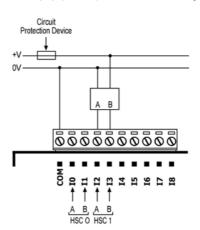


Inputs I0, I1, and I2, I3 can be used as shaft encoders as shown below.

npn (sink) shaft encoder wiring



pnp (source) shaft encoder wiring

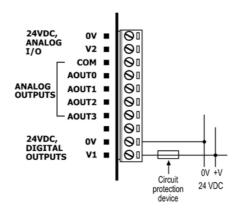


Digital Outputs

Wiring Power Supplies

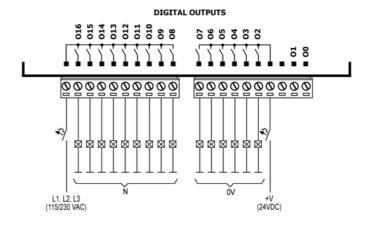
Use a 24VDC power supply for both relay and transistor outputs.

- Connect the "positive" lead to the "V1" terminal, and the "negative" lead to the "0V" terminal.
- In the event of voltage fluctuations or nonconformity to voltage power supply specifications, connect the device to a regulated power supply



Relay Outputs

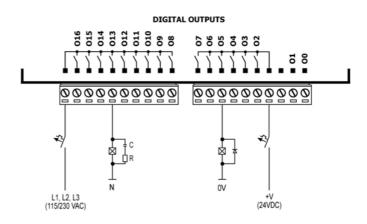
- Each output can be wired separately to either AC or DC as show below.
- The 0V signal of the relay outputs is isolated from the controller's 0V signal.



Increasing Contact Life Span

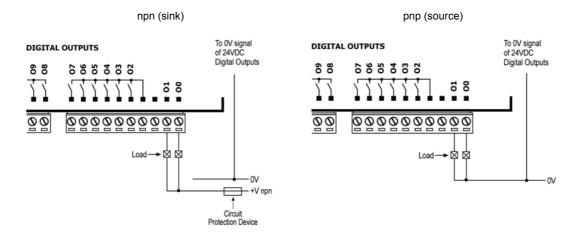
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- 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 function as either npn or pnp, in accordance with jumper settings and wiring. Open the device and set the jumpers according to the instructions beginning on page 8.
- The 0V signal of the transistor outputs is isolated from the controller's 0V signal.



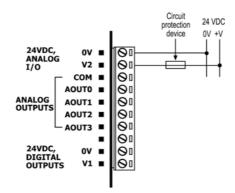
Analog I/O Power Supplies

Use a 24VDC power supply for all analog input and output modes.

- 1. Connect the "positive" cable to the "V2" terminal, and the "negative" to the "0V" terminal.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Since the analog I/O power supply is isolated, the controller's 24VDC power supply may also be used to power the analog I/Os.



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

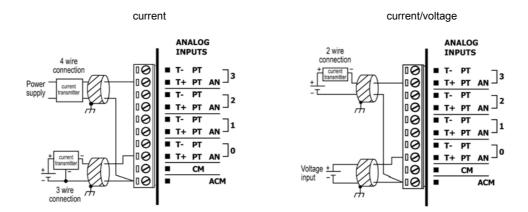


Analog / PT100 / TC Inputs

- Each input may be set as either analog, RTD, or thermocouple. To set an input:
 - Use the appropriate wiring as shown below.
 - Open the device and set the jumpers according to the instructions beginning on page 8.
- Shields should be connected at the signal source.
- In order to function correctly, the analog power supplies must be wired as shown on page 5.
- To ensure proper performance, a warm-up period of a half an hour is recommended.

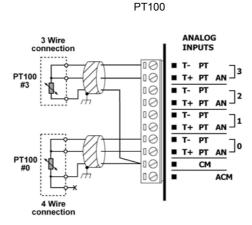
Analog Inputs

- Inputs may be wired to work with either current or voltage.
- When set to current/voltage, all inputs share a common ACM signal.



RTD Inputs

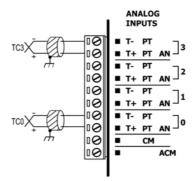
- 1. Wire one lead of each RTD input to the common signal (CM) as shown below.
- 4 wire PT100 can be used by leaving one of the sensor leads unconnected.



Thermocouple Inputs

- Supported thermocouple types include B, E, J, K, N, R, S, and T, in accordance with software and jumper settings. See table Thermocouple Input Ranges, on page 15.
- Inputs may be set to mV by software settings (Hardware Configuration); note that in order to set mV inputs, thermocouple jumper settings are used.

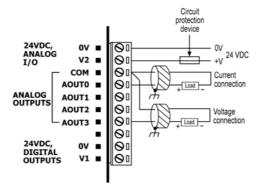
Thermocouple



Analog Outputs

- Shields should be earthed, connected to the earth of the cabinet.
- An output can be wired to either current or voltage.
 - Use the appropriate wiring as shown below.
 - Open the device and set the jumpers according to the instructions beginning on page 8.
- To ensure proper performance, a warm-up period of a half an hour is recommended.

current/voltage



Changing Jumper Settings

To access the jumpers, you must remove the snap-in I/O module from the controller, and then remove the module's PCB board. Before you begin, turn off the power supply, disconnect and dismount the controller.

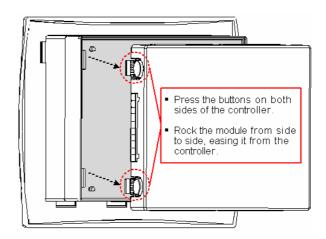


- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly by holding the PCB board by its connectors.

Accessing the Jumpers

First, remove the snap-in module.

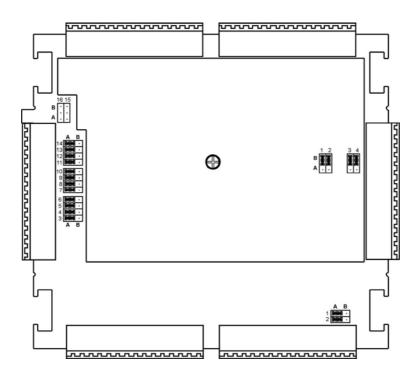
- Locate the 4 buttons on the sides of the module, two on either side. Press the 2 buttons on either side of the module as shown, and hold them down to open the locking mechanism.
- Gently rock the module from side to side, easing the module from the controller.



- Using a Philips screwdriver, remove the center screw, shown in the figure below, from the module's upper PCB board. Do not remove any other screws.
- Holding the PCB board by its edges, gently lift it out of the module.



Select the desired function by changing the jumper settings according to the figure and tables shown below.



Analog Input Jumpers

Analog Input Jumpers						
		Jumper #	Voltage*	Current	T/C or mV	PT100
	Analog input 3	14	Α	В	В	Α
		13	Α	В	В	Α
		12	Α	Α	В	В
	Analog input 2	11	Α	В	В	Α
		10	Α	В	В	Α
		9	Α	Α	В	В
Bottom PCB board	Analog input 1	8	Α	В	В	Α
		7	Α	В	В	Α
		6	Α	Α	В	В
	Analog input 0	5	Α	В	В	Α
		4	Α	В	В	Α
		3	Α	Α	В	В
	Digital Output Jumpers					
		Jumper #	PNP*	NPN	1	
Note that Jumpers #15 & 16 are not used	Digital Output 0	1	Α	В	1	
TO are Hot used	Digital Output 1	2	Α	В	=	

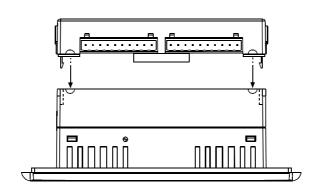
Δna	nol	Oi	itnut	.lun	npers

	7 thaisg Sutput Sumpore			
		Jumper #	Current	Voltage*
Tan BOD has and	Analog Output 0	1	Α	В
Top PCB board	Analog Output 1	2	Α	В
	Analog Output 2	3	Α	В
	Analog Output 3	4	Α	В

^{*} Default factory setting

Reassembling the controller

- 1. Return the PCB board to the module and secure the center screw.
- 2. Next, reinstall the module. Line the circular guidelines on the controller up with the guidelines on the Snap-in I/O Module as shown below.
- 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.



V200-18-E3XB Technical Specifications

Digital Inputs

Number of inputs 18 (in two groups) Input type pnp (source) or npn (sink)

Galvanic isolation

Digital inputs to bus Yes Digital inputs to digital inputs No

in same group

Group to group, digital inputs Yes Nominal input voltage 24VDC

Input voltage

npn (sink)

0-5VDC for Logic '0' pnp (source)

17-28.8VDC for Logic '1' 17-28.8VDC for Logic '0' 0-5VDC for Logic '1'

Input current 6mA@24VDC for inputs #4 to #17

8.8mA@24VDC for inputs #0 to #3

Response time 10mSec typical

High speed inputs Specifications below apply when these inputs are wired for use as a high-

speed counter input/shaft encoder. See Notes 1 and 2.

Resolution 32-bit

Frequency 10kHz maximum

Minimum pulse width 40µs

Notes:

- 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.
- 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.

Digital Outputs

Digital Output's Power Supply

Nominal operating voltage 24VDC

20.4 to 28.8VDC Operating voltage 20mA@24VDC. Quiescent current

85mA@24VDC. See Note 3. Max. current consumption

Galvanic isolation

Digital power supply to Yes

Digital power supply to

relay outputs

Yes

Digital power supply to

transistor outputs

No

Notes:

Maximum current consumption does not provide for PNP output requirements. The additional current requirement of PNP outputs must be added.

Relay Outputs

Number of outputs 15 relays (in two groups). See Note 4.

Output type SPST-NO (Form A)

Isolation By relay

Tyco PCN-124D3MHZ or compatible Type of relay Outputs' power supply See Digital Output's Power Supply above

Galvanic isolation

Yes Relay outputs to bus Group to group, relay Yes

outputs

Relay to transistor outputs Yes

Output current 3A maximum per output (resistive load)

8A maximum total for common (resistive load)

Rate voltage 250VAC / 30VDC Minimun load 1mA@5VDC

Life expectancy 100k operations at maximum load

Response time 10mS (typical)

Contact protection External precautions required (see Increasing Contact Life Span, p.4)

Notes:

Outputs #2,3,4,5,6 and 7 share a common signal. Outputs #8,9,10,11,12,13,14,15 and 16 share a common signal

Transistor Outputs

Number of outputs 2, high-speed. Each can be individually set as pnp (source) or npn (sink) via

wiring and jumper settings. See Note 5.

pnp: P-MOSFET (open drain) Output type

npn: N-MOSFET (open drain)

Galvanic isolation

Transistor outputs to bus Yes Transistor outputs to No

transistor outputs

Transistor outputs to relay

outputs

Output current pnp: 0.5A maximum per output

Yes

npn: 50mA maximum per output

Maximum frequency Resistive load

pnp: 2kHz npn: 50kHz Inductive load 0.5Hz

pnp: 0.5VDC maximum ON voltage drop

npn: 0.4VDC maximum

Short circuit protection Yes (pnp only)

pnp (source) power supply See Digital Output's Power Supply above

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:

Both transistor outputs may be used as high-speed outputs.

Analog I/O's Power Supply

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC
Quiescent current 70mA@24VDC
Max. current consumption 130mA@24VDC

Galvanic isolation

Analog power supply to bus Yes
Analog power supply to Yes
analog inputs

Analog power supply to Yes analog outputs

Analog/ PT100/ TC Inputs

Number of inputs 4

Type of input Set via appropriate wiring and jumper settings.

Analog Inputs Power Supply

Galvanic isolation

Analog/PT/TC inputs to bus Yes
Analog/PT/TC inputs to Yes
analog outputs

Analog /PT/TC inputs to Analog /PT/TC inputs

Analog inputs

Input range 0-10V, 0-20mA, 4-20mA

Power supply See Analog I/O's Power Supply above

No

Conversion method Succesive approximation
Resolution at 0-10V, 14-bit (16384 units). See Note 6.
0-20mA

Resolution at 4-20mA 3277 to 16384 (13107 units). See Note 6.

Conversion time Synchronized to cycle time Input impedance >1M Ω —voltage

±40mA—current

Full-scale error $\pm 0.4\%$ Linearity error $\pm 0.04\%$

Status indication Yes. See Note 7.

Notes:

6. 12 or 14-bit resolution may be selected via software.

7. The analog value can indicate faults as shown below:

ValuePossible Cause16384Input value deviates slightly above the input range32767-Input value deviates greatly above or below the input range

-Power supply disconnected

PT100 inputs

Input range -200 to 600° C/-328 to 1100° F. 1 to 320Ω . See Note 8.

Conversion method Voltage to frequency

Resolution 0.1°C/0.1°F

Conversion time 200mS minimum per channel, depending on software filter type

 $\begin{array}{lll} \text{Input impedance} & > 10 \text{M}\Omega \\ \text{Auxillary current for PT100} & 150 \mu \text{A typical} \\ \text{Full-scale error} & \pm 0.4 \% \\ \text{Linearity error} & \pm 0.04 \% \end{array}$

Status indication Yes. See Note 9.

Notes:

8. The device can also measure resistance with the range of 1-320 Ω at a resolution of 0.1 Ω .

9. The analog value can indicate faults as shown below:

Value Possible Cause

32767 - Sensor is not connected to input
- Value exceeds permissible range
- Power supply disconnected

-32767 Sensor is short-circuited

Thermocouple inputs

Input range As shown in the table on page 15. See Note 10.

Conversion method Voltage to frequency
Resolution 0.1°C/0.1°F maximum

Conversion time 100mS minimum per channel, depending on software filter type

Input impedance $>10M\Omega$

Cold junction compensation Local, automatic

Cold junction compensation $\pm 1.5^{\circ}\text{C}$ / $\pm 2.7^{\circ}\text{F}$ maximum

error

Absolute maximum rating ±0.6VDC Full-scale error ±0.4% Linearity error ±0.04%

Warm-up time ½ hour typically, ±1°C/±1.8°F repeatability

Status indication Yes. See Note 11.

Notes:

The device can also measure voltage within the range of -5 to 56mV, at a resolution of 0.01mV.
 The device can also measure raw value frequency at a resolution of 14-bits(16384)

11. The analog value can indicate faults as shown below:

Value Possible Cause

32767 - Sensor is not connected to input

- Sensor value exceeds the maximum value

- Power supply disconnected

-32767 Sensor value is under the minimum value

Table 1: Thermocouple input ranges

Туре	Temperature range	Wire Color		
	•	ANSI (USA)	BS 1843 (UK)	
mV	-5 to 56mV	-	-	
В	200 to 1820°C	+Grey	+None	
	(300 to 3276°F)	-Red	-Blue	
Е	-200 to 750°C	+Violet	+Brown	
	(-328 to 1382°F)	-Red	-Blue	
J	-200 to 760°C	+White	+Yellow	
	(-328 to 1400°F)	-Red	-Blue	
K	-200 to 1250°C	+Yellow	+Brown	
	(-328 to 2282°F)	-Red	-Blue	
N	-200 to 1300°C	+Orange	+Orange	
	(-328 to 2372°F)	-Red	-Blue	
R	0 to 1768°C	+Black	+White	
	(32 to 3214°F)	-Red	-Blue	
S	0 to 1768°C	+Black	+White	
	(32 to 3214°F)	-Red	-Blue	
Т	-200 to 400°C	+Blue	+White	
	(-328 to 752°F)	-Red	-Blue	

Analog Outputs

Number of outputs 4 (single-ended)

Output range 0-10V, 4-20mA. See Note 12.

Resolution 12-bit (4096 units)

 $\begin{array}{lll} \text{Conversion time} & & \text{Synchronized to scan time.} \\ \text{Load impedance} & & 1 k \Omega \text{ minimum-voltage} \\ & & 500\Omega \text{ maximum-current} \end{array}$

Galvanic isolation

Analog outputs to bus Yes
Analog outputs to Yes
Analog/PT/TC inputs

Analog outputs to analog No outputs

Linearity error $\pm 0.1\%$ Operational error limits $\pm 0.2\%$

Notes:

12. Note that the range of each I/O is defined by wiring, jumper settings, and within the controller's software.

Environmental IP20 / NEMA1

Operating temperature 0° to 45°C (32° to 113°F)
Storage temperature -20° to 60° C (-4° to 140°F)
Relative Humidity (RH) 5% to 90% (non-condensing)
Dimensions (WxHxD) 138x23x123mm (5.43x0.9x4.84")

Weight 279g (9.87 oz)

About Unitronics

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5410-1082-9

V200-18-E4XB Snap-in I/O Module

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Features

- 18 isolated digital inputs, includes 2 H.S.C inputs, type pnp/npn (source/sink)
- 15 isolated pnp (source) outputs
- 2 isolated pnp/npn (source/sink) transistor outputs, includes 2 H.S. outputs
- 4 isolated analog/PT100/TC inputs
- 4 isolated 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
1	Danger	The identified danger causes physical and property damage.
<u>^</u>	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 shortcircuiting 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.

Wiring



- Do not touch live wires.
- <u>^</u>!\
- 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·cm).
- 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

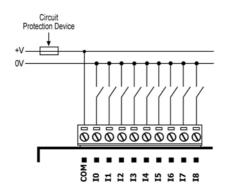
- Input or output cables should not be run through the same multi-core cable or share the same
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

Digital Inputs

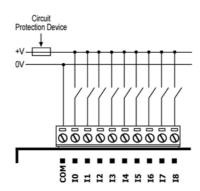
Each group of 9 inputs has a common signal. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.

Inputs I0 and I2 can be used as normal digital inputs, 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.

npn (sink) digital input wiring

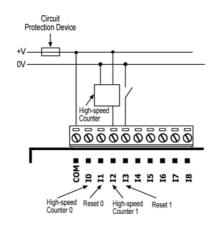


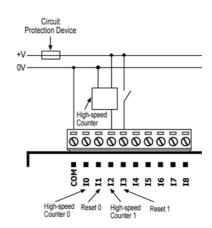
pnp (source) digital input wiring



npn (sink) high-speed counter

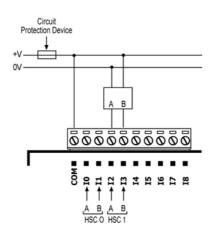
pnp (source) high-speed counter



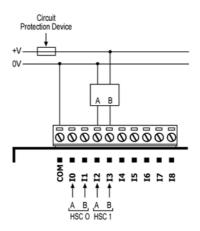


Inputs I0, I1, and I2, I3 can be used as shaft encoders as shown below.

npn (sink) shaft encoder wiring



pnp (source) shaft encoder wiring

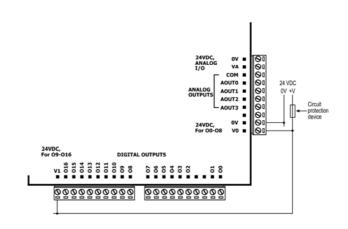


Digital Outputs

Wiring Power Supplies

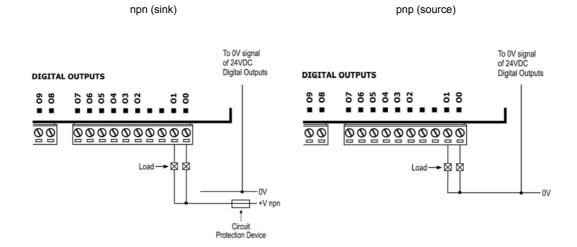
Use a 24VDC power supply for all digital outputs.

- Connect the "positive" lead to the "V0" and "V1" terminal, and the "negative" lead to the common "0V" terminal.
- V0 provides the power supply for Outputs #0, 1, 2, 3, 4, 5, 6, 7, and 8
- V1 provides the power supply for Outputs #9, 10, 11, 12, 13, 14, 15, and 16.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.

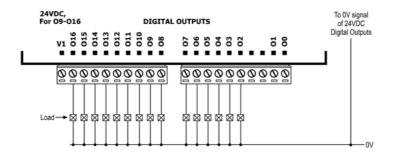


Transistor Outputs

- Outputs 0 and 1 can function as either npn or pnp, in accordance with jumper settings and wiring. Open
 the device and set the jumpers according to the instructions beginning on page 8.
- Outputs 2 to 16 function as pnp only.
- The 0V signal of the transistor outputs is isolated from the controller's 0V signal.



pnp (source)



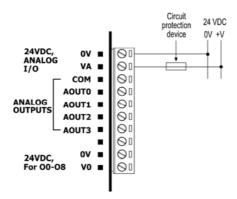
Analog I/O Power Supplies

Use a 24VDC power supply for all analog input and output modes.

- 1. Connect the "positive" cable to the "VA" terminal, and the "negative" to the "0V" terminal.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Since the analog I/O power supply is isolated, the controller's 24VDC power supply may also be used to power the analog I/Os.



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

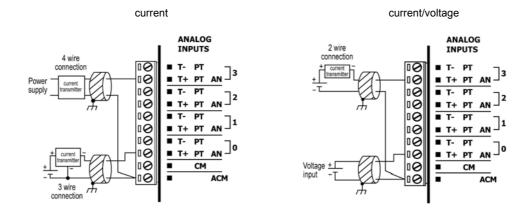


Analog / PT100 / TC Inputs

- Each input may be set as either analog, RTD, or thermocouple. To set an input:
 - Use the appropriate wiring as shown below.
 - Open the device and set the jumpers according to the instructions beginning on page 8.
- Shields should be connected at the signal source.
- In order to function correctly, the analog power supplies must be wired as shown on page 5.
- To ensure proper performance, a warm-up period of a half an hour is recommended.

Analog Inputs

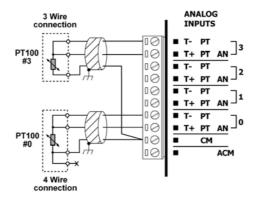
- Inputs may be wired to work with either current or voltage.
- When set to current/voltage, all inputs share a common ACM signal.



RTD Inputs

- 1. Wire one lead of each RTD input to the common signal (CM) as shown below.
- 4 wire PT100 can be used by leaving one of the sensor leads unconnected.

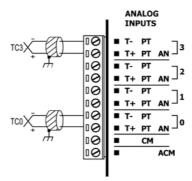




Thermocouple Inputs

- Supported thermocouple types include B, E, J, K, N, R, S, and T, in accordance with software and jumper settings. See table Thermocouple Input Ranges, on page 15.
- Inputs may be set to mV by software settings (Hardware Configuration); note that in order to set mV inputs, thermocouple jumper settings are used.

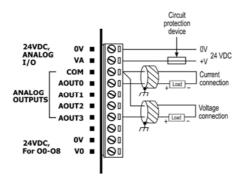
Thermocouple



Analog Outputs

- Shields should be earthed, connected to the earth of the cabinet.
- An output can be wired to either current or voltage.
 - Use the appropriate wiring as shown below.
 - Open the device and set the jumpers according to the instructions beginning on page 8.
- To ensure proper performance, a warm-up period of a half an hour is recommended.

current/voltage



Changing Jumper Settings

To access the jumpers, you must remove the snap-in I/O module from the controller, and then remove the module's PCB board. Before you begin, turn off the power supply, disconnect and dismount the controller.

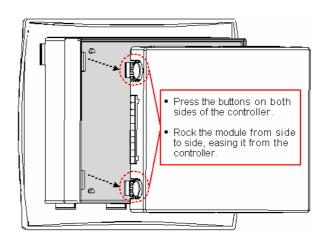


- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly by holding the PCB board by its connectors.

Accessing the Jumpers

First, remove the snap-in module.

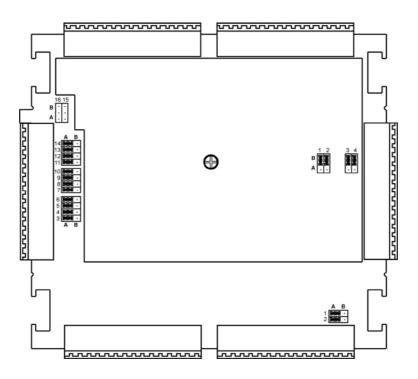
- Locate the 4 buttons on the sides of the module, two on either side. Press the 2 buttons on either side of the module as shown, and hold them down to open the locking mechanism.
- Gently rock the module from side to side, easing the module from the controller.



- 3. Using a Philips screwdriver, remove the center screw, shown in the figure below, from the module's upper PCB board. Do not remove any other screws.
- Holding the PCB board by its edges, gently lift it out of the module.



Select the desired function by changing the jumper settings according to the figure and tables shown below.



Analog Input Jumpers

Analog Input Jumpers							
		Jumper #	Voltage*	Current	T/C or mV	PT100	
		14	Α	В	В	Α	
	Analog input 3	13	Α	В	В	Α	
		12	Α	Α	В	В	
		11	Α	В	В	Α	
	Analog input 2	10	Α	В	В	Α	
		9	Α	Α	В	В	
Bottom PCB board	Analog input 1	8	Α	В	В	Α	
		7	Α	В	В	Α	
		6	Α	Α	В	В	
	Analog input 0	5	Α	В	В	Α	
		4	Α	В	В	Α	
		3	Α	Α	В	В	
	Digital Output Jumpers						
		Jumper #	PNP*	NPN	•		
Note that Jumpers #15 & 16 are not used	Digital Output 0	1	Α	В	<u> </u>		
ro are not used	Digital Output 1	2	Α	В	<u>-</u> '		

6/05

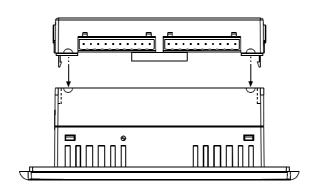
Δna	oa	Output	Jumpers

	7 (ilaiog Gatpat Gampore			
		Jumper #	Current	Voltage*
Tau DOD haand	Analog Output 0	1	Α	В
Top PCB board	Analog Output 1	2	Α	В
	Analog Output 2	3	Α	В
	Analog Output 3	4	Α	В

^{*} Default factory setting

Reassembling the controller

- 1. Return the PCB board to the module and secure the center screw.
- 2. Next, reinstall the module. Line the circular guidelines on the controller up with the guidelines on the Snap-in I/O Module as shown below.
- 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.



V200-18-E4XB Technical Specifications

Digital Inputs

Number of inputs 18 (in two groups)

Input type pnp (source) or npn (sink)

Galvanic isolation

Digital inputs to bus Yes Digital inputs to digital inputs in No

same group

Group to group, digital inputs Yes 24VDC Nominal input voltage

Input voltage

High speed inputs

0-5VDC for Logic '0' pnp (source)

17-28.8VDC for Logic '1' 17-28.8VDC for Logic '0'

npn (sink)

0-5VDC for Logic '1'

8.8mA@24VDC for inputs #0 to #3 Input current

> 6mA@24VDC for inputs #4 to #17 10mSec typical for outputs #0 to #3

Response time 2mSec typical for outputs #4 to #17

Specifications below apply when these inputs are wired for use as a high-

speed counter input/shaft encoder. See Notes 1 and 2.

Resolution

Frequency 10kHz maximum

Minimum pulse width 40µs

Notes:

- 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.
- 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.

Digital Outputs

Digital Output's Power Supply See Note 3. Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC Quiescent current 20mA@24VDC.

Max. current consumption 80mA@24VDC. See Note 4.

Galvanic isolation

Digital power supply to bus Yes Digital power supply to No

transistor outputs

Notes:

V0 provides the power supply for Outputs #0, 1, 2, 3, 4, 5, 6, 7 and 8. V1 provides the power supply for Outputs #9, 10, 11,12, 13, 14, 15 and 16.

V0 and V1 share a common 0V signal.

Maximum current consumption does not provide for pnp output requirements. The additional current requirement of pnp outputs must be added.

Transistor Outputs

Number of outputs 17 (in two groups). See Note 5.

Output type

Outputs #0 and #1 pnp: P-MOSFET (open drain) npn: N-MOSFET (open drain)

Each can be individually set as pnp (source) or npn (sink) via wiring and

jumper settings

Outputs #2 to #16 pnp: P-MOSFET (open drain)

Galvanic isolation

Transistor outputs to bus Yes Transistor outputs to No transistor outputs

Group to group No

Output current pnp: 0.5A maximum per output, total maximum current for each group: 3A.

npn: 50mA maximum per output

Maximum frequency Resistive load

20Hz

Inductive load 0.5Hz pnp: 2kHz npn: 50kHz

High-speed output maximum frequency (resistive load).

See Note 6

ON voltage drop pnp: 0.5VDC maximum npn: 0.4VDC maximum

Short circuit protection Yes (pnp only)

pnp (source) power supply See Digital Output's Power Supply above

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:

Outputs #0, 1, 2, 3, 4, 5, 6, 7 and 8 share a common power signal. Outputs #8,9,10,11,12,13,14,15 and 16 share a common power signal. All outputs share a common 0V

Output #0 and 1 may be used as high-speed outputs.

Analog I/O's Power Supply

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC Quiescent current 70mA@24VDC Max. current consumption 130mA@24VDC

Galvanic isolation

Yes Analog power supply to bus Analog power supply to Yes

analog inputs

Analog power supply to

analog outputs

Yes

V200-18-E4XB Snap-in I/O Module

Analog/ PT100/ TC Inputs

Number of inputs

Type of input Set via appropriate wiring and jumper settings.

Analog Inputs Power Supply

Galvanic isolation

Analog/PT/TC inputs to bus Yes Analog/PT/TC inputs to Yes

analog outputs

Analog /PT/TC inputs to No Analog /PT/TC inputs

Analog inputs

0-10V, 0-20mA, 4-20mA Input range

Power supply See Analog I/O's Power Supply above

Conversion method Succesive approximation Resolution at 0-10V. 14-bit (16384 units). See Note 7.

0-20mA

3277 to 16383 (13107 units). See Note 7. Resolution at 4-20mA

Conversion time Synchronized to cycle time

Input impedance >1MΩ—voltage

> 121.5Ω —current ±20V-voltage

Absolute maximum rating ±40mA—current

±0.4%

Full-scale error Linearity error ±0.04%

Status indication Yes. See Note 8

Notes:

7. 12 or 14-bit resolution may be selected via software.

The analog value can indicate faults as shown below:

Value Possible Cause

16384 Input value deviates slightly above the input range

32767 -Input value deviates greatly above or below the input range

-Power supply disconnected

PT100 inputs

-200 to 600°C/-328 to 1100°F. 1 to 320Ω. See Note 9.

Conversion method Voltage to frequency

Resolution 0.1°C/0.1°F

Conversion time 200mS minimum per channel, depending on software filter type

 $\begin{array}{lll} \text{Input impedance} & > 10 \text{M}\Omega \\ \text{Auxillary current for PT100} & 150 \text{µA typical} \\ \text{Full-scale error} & \pm 0.4\% \\ \text{Linearity error} & \pm 0.04\% \end{array}$

Status indication Yes. See Note 10.

Notes:

9. The device can also measure resistance with the range of 1-320 Ω at a resolution of 0.1 Ω .

10. The analog value can indicate faults as shown below:

Value Possible Cause

32767 - Sensor is not connected to input - Value exceeds permissible range

- Power supply disconnected

-32767 Sensor is short-circuited

Thermocouple inputs

Input range As shown in the table on page 15. See Note 11.

Conversion method Voltage to frequency
Resolution 0.1°C/0.1°F maximum

Conversion time 100mS minimum per channel, depending on software filter type

Input impedance $>10M\Omega$

Cold junction compensation Local, automatic

Cold junction compensation $\pm 1.5^{\circ}\text{C}$ / $\pm 2.7^{\circ}\text{F}$ maximum

error

Absolute maximum rating ±0.6VDC Full-scale error ±0.4% Linearity error ±0.04%

Warm-up time ½ hour typically, ±1°C/±1.8°F repeatability

Status indication Yes. See Note 12.

Notes:

11. The device can also measure voltage within the range of -5 to 56mV, at a resolution of 0.01mV. The device can also measure raw value frequency at a resolution of 14-bits(16384)

12. The analog value can indicate faults as shown below:

Value Possible Cause

32767 - Sensor is not connected to input

- Sensor value exceeds the maximum value

- Power supply disconnected

-32767 Sensor value is under the minimum value

Table 1:	Thermocoup	le inı	out ranges
----------	------------	--------	------------

Type	Temperature range	Wire Color ANSI (USA) BS 1843 (UK)	
mV	-5 to 56mV	-	-
В	200 to 1820°C	+Grey	+None
	(300 to 3276°F)	-Red	-Blue
E	-200 to 750°C	+Violet	+Brown
	(-328 to 1382°F)	-Red	-Blue
J	-200 to 760°C	+White	+Yellow
	(-328 to 1400°F)	-Red	-Blue
K	-200 to 1250°C	+Yellow	+Brown
	(-328 to 2282°F)	-Red	-Blue
N	-200 to 1300°C	+Orange	+Orange
	(-328 to 2372°F)	-Red	-Blue
R	0 to 1768°C	+Black	+White
	(32 to 3214°F)	-Red	-Blue
S	0 to 1768°C	+Black	+White
	(32 to 3214°F)	-Red	-Blue
Т	-200 to 400°C	+Blue	+White
	(-328 to 752°F)	-Red	-Blue

Analog Outputs

Number of outputs 4 (single-ended)

Output range 0-10V, 4-20mA. See Note 13.

Resolution 12-bit (4096 units)

 $\begin{array}{ll} \text{Conversion time} & \text{Synchronized to scan time.} \\ \text{Load impedance} & \text{1k}\Omega \text{ minimum-voltage} \end{array}$

500Ω maximum—current

Galvanic isolation

Analog outputs to bus Yes
Analog outputs to Yes
Analog/PT/TC inputs
Analog outputs to analog No

outputs
Linearity error ±0.1%
Operational error limits ±0.2%

Notes:

13. Note that the range of each I/O is defined by wiring, jumper settings, and within the controller's software.

Environmental IP20 / NEMA1

Operating temperature 0° to 45°C (32° to 113°F)
Storage temperature -20° to 60°C (-4° to 140°F)
Relative Humidity (RH) 5% to 90% (non-condensing)
Dimensions (WxHxD) 138x23x123mm (5.43x0.9x4.84")

Weight 262g (9.25 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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5410-1091-5

V200-18-E5B Snap-in I/O Module

The V200-18-E5B plugs directly into the back of compatible Unitronics OPLCs, creating a self-contained PLC unit with a local I/O configuration.

Features

- 18 isolated digital inputs, includes 2 H.S.C inputs, type pnp/npn (source/sink)
- 15 isolated pnp (source) outputs
- 2 isolated pnp/npn (source/sink) transistor outputs, includes 2 H.S. outputs
- 3 analog inputs
- 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

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<u> </u>	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 shortcircuiting 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.

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 mm²) for all wiring purposes.

- 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.
- 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·cm).
- 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

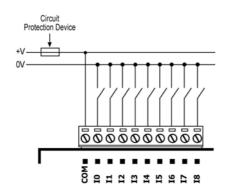
- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

Digital Inputs

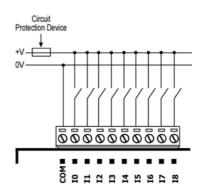
Each group of 9 inputs has a common signal. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.

Inputs I0 and I2 can be used as normal digital inputs, 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.

npn (sink) digital input wiring

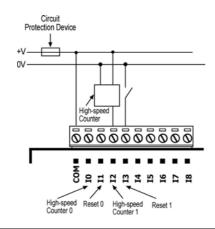


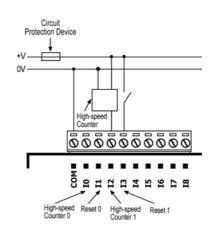
pnp (source) digital input wiring



npn (sink) high-speed counter

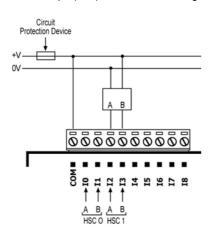
pnp (source) high-speed counter



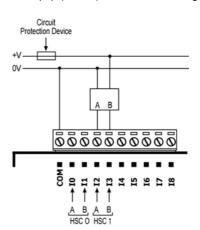


Inputs I0, I1, and I2, I3 can be used as shaft encoders as shown below.

npn (sink) shaft encoder wiring



pnp (source) shaft encoder wiring

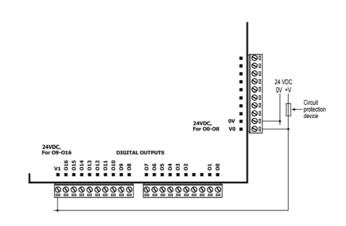


Digital Outputs

Wiring Power Supplies

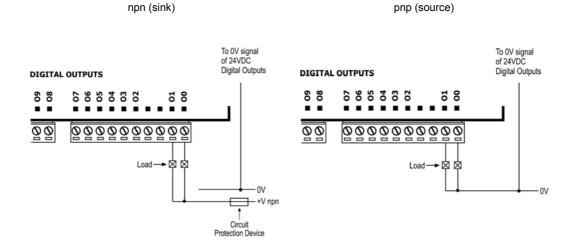
Use a 24VDC power supply for all digital outputs.

- Connect the "positive" lead to the "V0" and "V1" terminal, and the "negative" lead to the common "0V" terminal.
- V0 provides the power supply for Outputs #0, 1, 2, 3, 4, 5, 6, 7, and 8
- V1 provides the power supply for Outputs #9, 10, 11, 12, 13, 14, 15, and 16.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.

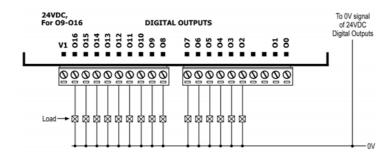


Transistor Outputs

- Outputs 0 and 1 can function as either npn or pnp, in accordance with jumper settings and wiring. Open
 the device and set the jumpers according to the instructions beginning on page 6.
- Outputs 2 to 16 function as pnp only.
- The 0V signal of the transistor outputs is isolated from the controller's 0V signal.



pnp (source)



Analog Inputs

- Shields should be connected at the signal source.
- To set the inputs:
 - Use the appropriate wiring as shown below.
 - Open the device and set the jumpers according to the instructions beginning on page 6.
- Inputs may be wired to work with either current or voltage.
- All inputs share a common COM signal.

current current/voltage ANALOG INPUTS ANALOG INPUTS 2 wire 100 00 connection 4 wire 10 00 connection 10 100 10 00 000 ■ AN1 00 10 000 000 ■ ANO ■ COM

Changing Jumper Settings

To access the jumpers, you must remove the snap-in I/O module from the controller, and then remove the module's PCB board. Before you begin, turn off the power supply, disconnect and dismount the controller.

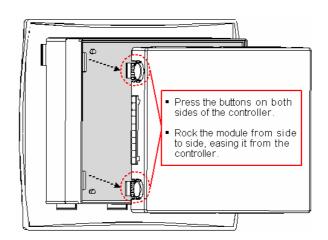


- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly by holding the PCB board by its connectors.

Accessing the Jumpers

First, remove the snap-in module.

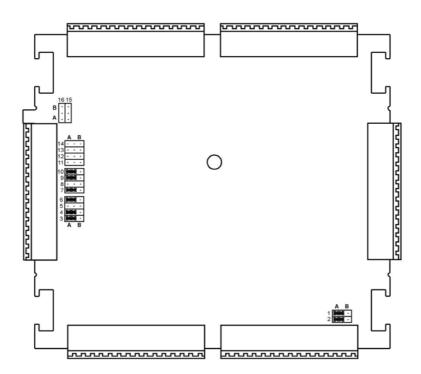
- Locate the 4 buttons on the sides of the module, two on either side. Press the 2 buttons on either side of the module as shown, and hold them down to open the locking mechanism.
- Gently rock the module from side to side, easing the module from the controller.



- Using a Philips screwdriver, remove the center screw, shown in the figure below, from the module's upper PCB board. Do not remove any other screws.
- Holding the PCB board by its edges, gently lift it out of the module.



Select the desired function by changing the jumper settings according to the figure and tables shown below.



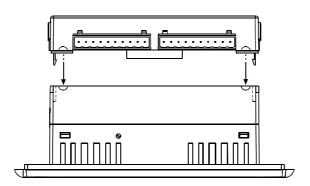
Ana	loa	Inp	ut J	lum	pers
, vii	. ~ ~	6		MIII	P V . V

	Ana	liog input s	umpers	
		Jumper #	Voltage*	Current
	Analog input 2	10	Α	В
	Analog input 2	9	Α	Α
	Analog input 4	7	Α	В
	Analog input 1	6	Α	Α
	A	4	Α	В
	Analog input 0	3	Α	Α
Note that Jumpers #5, 8,	Digit	tal Output	Jumpers	
		Jumper #	PNP*	NPN
11, 12, 13, 14, 15 & 16	Digital Output 0	1	Α	В
are not used	Digital Output 1	2	Α	В

^{*} Default factory setting

Reassembling the controller

- 1. Return the PCB board to the module and secure the center screw.
- 2. Next, reinstall the module. Line the circular guidelines on the controller up with the guidelines on the Snap-in I/O 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.



V200-18-E5B Technical Specifications

Digital Inputs

Number of inputs 18 (in two groups)
Input type pnp (source) or npn (sink)

Galvanic isolation

Digital inputs to bus Yes
Digital inputs to digital inputs in No

same group

Group to group, digital inputs Yes
Nominal input voltage 24VDC

Input voltage

Input current

npn (sink)

High speed inputs

pnp (source) 0-5VDC for Logic '0'

17-28.8VDC for Logic '1' 17-28.8VDC for Logic '0'

0-5VDC for Logic '1'

8.8mA@24VDC for inputs #0 to #3

6mA@24VDC for inputs #4 to #17 10mSec typical for outputs #0 to #3

Response time 10mSec typical for outputs #0 to #3 2mSec typical for outputs #4 to #17

Specifications below apply when these inputs are wired for use as a

high-speed counter input/shaft encoder. See Notes 1 and 2.

Resolution 32-bit

Frequency 10kHz maximum

Minimum pulse width 40µs

Notes:

- 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.
- 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.

Digital Outputs

Digital Output's Power Supply See Note 3.

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC Quiescent current 20mA@24VDC.

Max. current consumption 80mA@24VDC. See Note 4.

Galvanic isolation

Digital power supply to bus Yes
Digital power supply to No
transistor outputs

Notes:

3. V0 provides the power supply for Outputs #0, 1, 2, 3, 4, 5, 6, 7 and 8. V1 provides the power supply for Outputs #9, 10, 11,12, 13, 14, 15 and 16. V0 and V1 share a common 0V signal.

Maximum current consumption does not provide for pnp output requirements.
 The additional current requirement of pnp outputs must be added.

Transistor Outputs

Number of outputs 17 (in two groups). See Note 5.

Output type

Outputs #0 and #1 pnp: P-MOSFET (open drain) npn: N-MOSFET (open drain)

Each can be individually set as pnp (source) or npn (sink) via wiring and

jumper settings

Outputs #2 to #16 pnp: P-MOSFET (open drain)

Galvanic isolation

Transistor outputs to bus Yes Transistor outputs to No transistor outputs

Group to group

Output current pnp: 0.5A maximum per output, total maximum current for each group: 3A.

npn: 50mA maximum per output

Maximum frequency Resistive load

20Hz

Inductive load 0.5Hz pnp: 2kHz npn: 50kHz

High-speed output maximum

frequency (resistive load).

See Note 6

ON voltage drop pnp: 0.5VDC maximum

npn: 0.4VDC maximum

Short circuit protection Yes (pnp only)

pnp (source) power supply

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:

Outputs #0, 1, 2, 3, 4, 5, 6, 7 and 8 share a common power signal. Outputs #8,9,10,11,12,13,14,15 and 16 share a common power signal. All outputs share a common 0V

See Digital Output's Power Supply above

Output #0 and 1 may be used as high-speed outputs.

Analog Inputs

Number of inputs 3 (single-ended)

Set via appropriate wiring and jumper settings. Type of input

Galvanic isolation None

Input range 0-10V, 0-20mA, 4-20mA Conversion method Succesive approximation Resolution at 0-10V, 10-bit (1024 units)

0-20mA

204 to 1023 (820 units) Resolution at 4-20mA Conversion time Synchronized to cycle time

Input impedance >100kΩ—voltage 500Ω —current

±15V-voltage

Absolute maximum rating ±30mA—current

Full-scale error ±2 LSB (0.2%) Linearity error ±2 LSB (0.2%)

IP20 / NEMA1 **Environmental**

Operating temperature 0° to 45°C (32° to 113°F) Storage temperature -20° to 60°C (-4° to 140°F) Relative Humidity (RH) 5% to 90% (non-condensing) Dimensions (WxHxD) 138x23x123mm (5.43x0.9x4.84")

Weight 186.3g (6.57 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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5410-1110-5

V200-18-E6B

Snap-in I/O Module

The V200-18-E6B plugs directly into the back of compatible Unitronics OPLCs, creating a self-contained PLC unit with a local I/O configuration.

Features

- 18 isolated digital inputs configurable to type pnp/npn (source/sink), includes 2 shaft encoder inputs.
- 15 isolated relay outputs.
- 2 isolated pnp/npn (source/sink) transistor outputs, includes 2 high-speed outputs.
- 5 analog inputs, includes 2 inputs configurable to RTD or thermocouple.
- 2 isolated 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.
\bigcirc	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 shortcircuiting in external wiring.
- To avoid damaging the system, do not connect / disconnect the device when the power is

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.

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 (0.13mm ²–3.31mm²) 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·cm).
- 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.

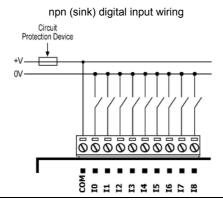
I/O Wiring—General

- 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.

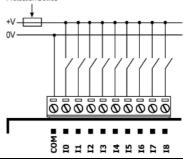
Digital Inputs

Each group of 9 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, 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.

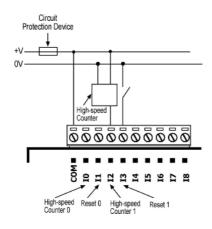


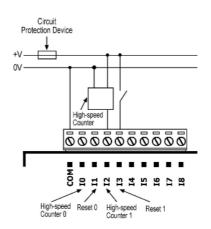
pnp (source) digital input wiring Circuit Protection Device



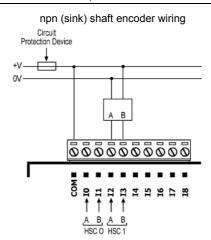
npn (sink) high-speed counter

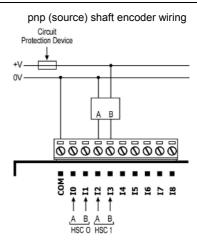
pnp (source) high-speed counter





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



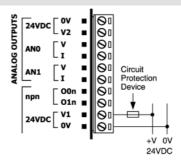


Digital Outputs

Wiring Power Supplies

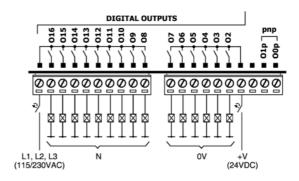
Use a 24VDC power supply for both relay and transistor outputs.

- Connect the "positive" lead to the "V1" terminal, and the "negative" lead to the "0V" terminal.
- In the event of voltage fluctuations or nonconformity to voltage power supply specifications, connect the device to a regulated power supply.



Relay Outputs

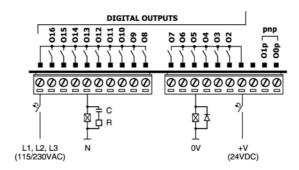
- Each group can be wired separately to either AC or DC as show.
- The 0V signal of the relay outputs is isolated from the controller's 0V signal.



Increasing Contact Life Span

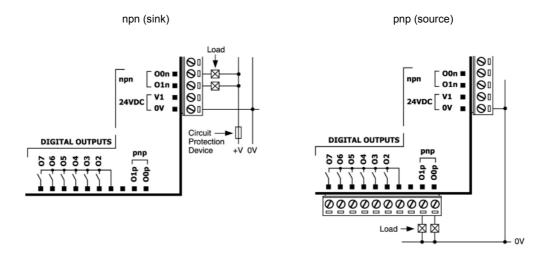
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- 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

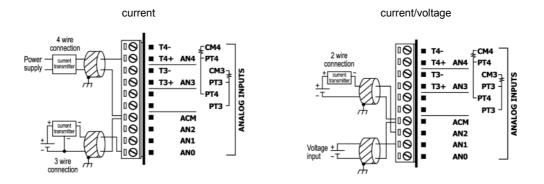
5 analog inputs:

- Inputs 0 to 2 can be wired to work with either current or voltage.
- Inputs 3 and 4 can function as either analog, RTD, or thermocouple, when appropriately wired as shown in the following figures.

To configure an input, open the device and set the jumpers according to the instructions beginning on page 8. Shields should be connected at the signal source.

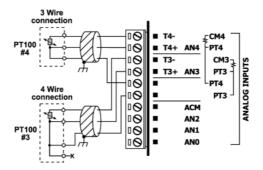
Analog Inputs

 When set to current/voltage, all inputs share a common ACM signal, which must be connected to the 0V of the controller.



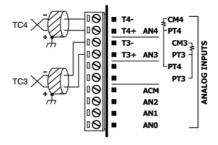
RTD Inputs

- PT100 (Sensor 3): use both inputs related to CM3 signal.
- PT100 (Sensor 4): use both inputs related to CM4 signal.
- 4 wire PT100 can be used by leaving one of the sensor leads unconnected.



Thermocouple Inputs

- Supported thermocouple types include B, E, J, K, N, R, S, and T, in accordance with software and jumper settings. See table, Thermocouple Input Ranges, on page 15.
- Inputs may be set to mV by software settings (Hardware Configuration); note that in order to set mV inputs, thermocouple jumper settings are used.
- To ensure proper performance, a warm-up period of a half an hour is recommended.



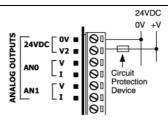
Analog Outputs Power Supply

Use a 24VDC power supply for all analog output modes.

- 1. Connect the "positive" cable to the "V2" terminal, and the "negative" to the "0V" terminal.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Since the analog I/O power supply is isolated, the controller's 24VDC power supply may also be used to power the analog I/Os.



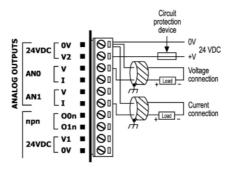
The 24VDC power supply must be turned on and off simultaneously with the controller's power supply.



Analog Outputs

- Shields should be earthed, connected to the earth of the cabinet.
- An output can be wired to either current or voltage, use the appropriate wiring as shown below.
- Do not use current and voltage from the same source channel.

current/voltage



Changing Jumper Settings

To access the jumpers, you must remove the snap-in I/O module from the controller, and then remove the module's PCB board.

Before you begin, turn off the power supply, disconnect and dismount the controller.

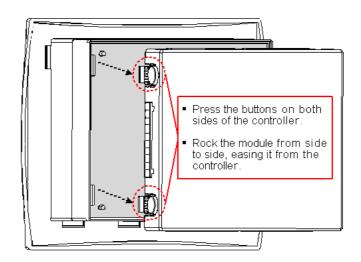


- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly by holding the PCB board by its connectors.

Accessing the Jumpers

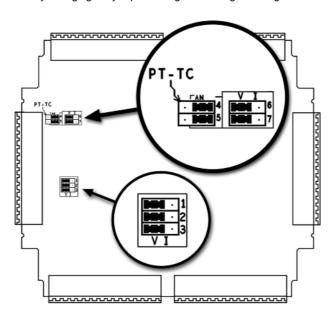
First, remove the snap-in module.

- Locate the 4 buttons on the sides of the module, 2 on either side. Press the 2 buttons on either side of the module as shown, and hold them down to open the locking mechanism.
- Gently rock the module from side to side, easing the module from the controller.



3. Using a Philips screwdriver, remove the center screw from the module's PCB board.

Select the desired function by changing the jumper settings according to the figure and tables shown below.



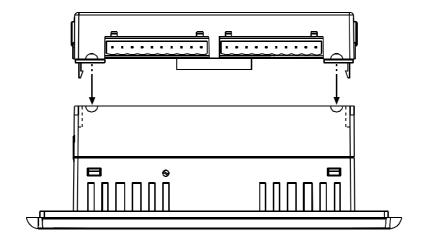
	Jumper #	Voltage*	Current
Analog input 0	3	V	I
Analog input 1	2	V	I
Analog input 2	1	V	I

	Jumper #	Voltage*	Current	T/C or mV	PT100
Analog input 3	5	AN	AN	PT-TC	PT-TC
Analog input 5	7	V	1	V	V
Analog input 4	4	AN	AN	PT-TC	PT-TC
Analog Input 4	6	V	I	V	V

^{*} Default factory setting

Reassembling the controller

- 1. Return the PCB board to the module and secure the center screw.
- 2. Next, reinstall the module. Line the circular guidelines on the controller up with the guidelines on the Snap-in I/O Module as shown below.
- 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.



V200-18-E6B Technical Specifications

Digital Inputs

Number of inputs 18 (in two groups)
Input type pnp (source) or npn (sink)

Galvanic isolation

Digital inputs to bus Yes
Digital inputs to digital inputs in No

same group

Group to group, digital inputs Yes

Nominal input voltage 24VDC

Input voltage

npn (sink)

pnp (source) 0-5VDC for Logic '0'

17-28.8VDC for Logic '1' 17-28.8VDC for Logic '0' 0-5VDC for Logic '1'

Input current 6mA@24VDC for inputs 4 to 17 8.8mA@24VDC for inputs 0 to 3

Response time 10mSec typical

High-speed inputs Specifications below apply when these inputs are wired for use as a high-

speed counter input/shaft encoder. See Notes 1 and 2.

Resolution 32-bit

Frequency 10kHz maximum

Minimum pulse width 40µs

Notes:

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.

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.

Digital Outputs

Digital Output's Power Supply

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC Quiescent current 5mA@24VDC.

Max. current consumption 85mA@24VDC. See Note 3.

Galvanic isolation

Digital power supply to bus Yes
Digital power supply to relay Yes

outputs

Digital power supply to No

transistor outputs

Notes:

Maximum current consumption does not provide for pnp output requirements.
 The additional current requirement of pnp outputs must be added.

Relay Outputs

Number of outputs 15 relays (in two groups). See Note 4.

Output type SPST-NO (Form A)

Isolation By relay

Type of relay Tyco PCN-124D3MHZ or compatible
Outputs' power supply See Digital Output's Power Supply page 11.

Galvanic isolation

Relay outputs to bus Yes
Group to group, relay Yes

outputs

Relay to transistor outputs Yes

Output current 3A maximum per output (resistive load)

8A maximum total for common (resistive load)

Rate voltage 250VAC / 30VDC Minimun load 1mA@5VDC

Life expectancy 100k operations at maximum load

Response time 10mS (typical)

Contact protection External precautions required (see Increasing Contact Life Span, p.4)

Notes:

4. Outputs 2, 3, 4, 5, 6 and 7 share a common signal. Outputs 8, 9, 10, 11, 12, 13, 14, 15 and 16 share a common signal.

Transistor Outputs/H.S.O.

Number of outputs 2, high-speed. Each can be individually wired as pnp (source) or npn (sink).

Output type pnp: P-MOSFET (open drain)

Yes

npn: N-MOSFET (open drain)

Galvanic isolation

Transistor outputs to bus Yes
Transistor outputs to No
transistor outputs

Transistor outputs to relay

outputs
Output current

pnp: 0.5A maximum per output

npn: 50mA maximum per output

Maximum frequency Resistive load

pnp: 0.5kHz npn: 50kHz Inductive load 0.5Hz

ON voltage drop pnp: 0.5VDC maximum

npn: 0.4VDC maximum Yes (pnp only)

Short circuit protection Yes (pnp

Voltage reference

pnp (source) See Digital Output's Power Supply page 11

npn (sink) 3.5V to 28.8VDC, unrelated to the voltage of either the I/O module

or the controller

Analog/RTD/TC Inputs

Number of inputs 5

Type of input Set via appropriate wiring and jumper settings. See Note 5.

Isolation None

Analog Inputs

	AN0-AN2 (10-bit)	AN3-AN4 (14-bit)
Input range	0-10V, 0-20mA , 4-20mA	0-10V, 0-20mA , 4-20mA
Conversion method	Succesive approximation	Voltage to frequency
Normal mode		
Resolution, except 4-20mA	10-bit (1024 units)	14-bit (16384 units)
Resolution at 4-20mA	204-1023 (820 units)	3277 to 16384 (13107 units)
Conversion time	Synchronized to scan time	100mSec minimum per input (according to filter type)
Fast Mode		
Resolution, except 4-20mA		12-bit (4096 units)
Resolution at 4-20mA	<u> </u>	819 to 4095 (3277 units)
Conversion time	_	30mSec minimum per input (according to filter type)
Input impedance	>100kΩ—voltage	12.77kΩ —voltage
	500Ω—current	37Ω —current
Absolute maximum rating	±15V—voltage	±15V—voltage
	±30mA, 15V—current	±30mA, 1.1V—current
Full-scale error	±3 LSB (0.3%)	±0.4%
Linearity error	±3 LSB (0.3%)	±0.04%
Status indication	Yes. See Note 6.	Yes. See Note 7.

Notes:

Inputs 0 to 2 may be wired to work with either current or voltage.
 Inputs 3 and 4 can function as either analog, RTD, or thermocouple.

6. The analog value can indicate a fault:

Value: 10-bitPossible Cause1024Deviates above the input range

7. The analog value can indicate faults:

Value: 14-bit	Possible Cause
-1	Deviates slightly below the input range
16384	Deviates slightly above the input range
32767	Deviates greatly above or below the input range
	-1 16384

RTD Inputs

-200 to 600°C/-328 to 1100°F. 1 to 320Ω. See Note 8.

RTD type PT100
Temperature coefficient α 385/392

Conversion method Voltage to frequency

Resolution 0.1°C/0.1°F

Conversion time 300mS minimum per channel, depending on software filter type

 $\begin{array}{lll} \text{Input impedance} & > 10 \text{M}\Omega \\ \text{Auxillary current for PT100} & 150 \mu\text{A typical} \\ \text{Full-scale error} & \pm 0.4 \% \\ \text{Linearity error} & \pm 0.04 \% \end{array}$

Status indication Yes. See Note 9.

Notes:

8. The device can also measure resistance with the range of 1-320 Ω at a resolution of 0.1 Ω .

9. The analog value can indicate faults:

Value Possible Cause

32767 Sensor is not connected to input, or value exceeds permissible range

-32767 Sensor is short-circuited

Thermocouple Inputs

Input range See Note 10.

Conversion method Voltage to frequency

Resolution 0.1°C/0.1°F maximum

Conversion time 100mS minimum per channel, depending on software filter type

Input impedance $>10M\Omega$

Cold junction compensation Local, automatic

Cold junction compensation error ±1.5°C/±2.7°F maximum

Absolute maximum rating ±0.6VDC
Full-scale error ±0.4%
Linearity error ±0.04%

Warm-up time ½ hour typically, ±1°C/±1.8°F repeatability

Status indication None

Notes:

10. The device can also measure voltage within the range of -5 to 56mV, at a resolution of 0.01mV. The device can also measure raw value frequency at a resolution of 14-bits (16384). Input ranges are shown in the following table:

Table 1:	Thermocoup	ıdni əld	ut ranges
----------	------------	----------	-----------

Type	Temperature range	Wire Color ANSI (USA) BS 1843 (UK)	
mV	-5 to 56mV	-	-
В	200 to 1820°C	+Grey	+None
	(300 to 3276°F)	-Red	-Blue
E	-200 to 750°C	+Violet	+Brown
	(-328 to 1382°F)	-Red	-Blue
J	-200 to 760°C	+White	+Yellow
	(-328 to 1400°F)	-Red	-Blue
K	-200 to 1250°C	+Yellow	+Brown
	(-328 to 2282°F)	-Red	-Blue
N	-200 to 1300°C	+Orange	+Orange
	(-328 to 2372°F)	-Red	-Blue
R	0 to 1768°C	+Black	+White
	(32 to 3214°F)	-Red	-Blue
S	0 to 1768°C	+Black	+White
	(32 to 3214°F)	-Red	-Blue
Т	-200 to 400°C	+Blue	+White
	(-328 to 752°F)	-Red	-Blue

Analog Outputs

Analog Output's Power Supply

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC
Quiescent current 30mA@24VDC
Max. current consumption 80mA@24VDC

Galvanic isolation

Analog power supply to bus Yes
Analog power supply to analog No

outputs

Analog Outputs

Number of outputs 2 (single-ended)

Output range 0-10V, 4-20mA. See Note 11.

Resolution 12-bit (4096 units)

 $\begin{array}{lll} \text{Conversion time} & & \text{Synchronized to scan time} \\ \text{Load impedance} & & 1k\Omega \text{ minimum-voltage} \\ & & 500\Omega \text{ maximum-current} \end{array}$

Galvanic isolation

Analog outputs to bus
Analog output to analog output
No
Linearity error
Operational error limits
Yes
No
±0.1%
±0.1%

Notes:

11. Note that the range of each I/O is defined 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) 10% to 95% (non-condensing)
Dimensions (WxHxD) 138x23x123mm (5.43x0.9x4.84")

Weight 140g (4.94oz)

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.

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DSP-V200-E6B 06/08

V200-18-E46B

Snap-in I/O Module

The V200-18-E46B plugs directly into the back of compatible Unitronics OPLCs, creating a self-contained PLC unit with a local I/O configuration.

Features

- 18 isolated digital inputs configurable to type pnp/npn (source/sink), includes 2 shaft encoder inputs.
- 15 isolated relay outputs.
- 2 isolated pnp/npn (source/sink) transistor outputs, includes 2 high-speed outputs.
- 9 analog inputs.
- 2 isolated 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
<u>\$</u>	Danger	The identified danger causes physical and property damage.
<u> </u>	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 shortcircuiting 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.

Wiring



- Do not touch live wires.
- \bigwedge
- 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 (0.13mm ²–3.31mm²) 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·cm).
- 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.

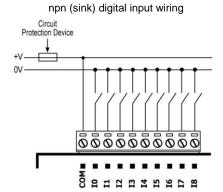
I/O Wiring—General

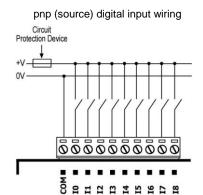
- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with input lines used over an extended distance.
 Use wire that is properly sized for the load.

Digital Inputs

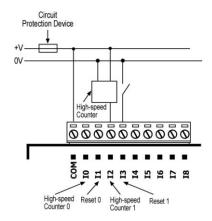
Each group of 9 inputs has a common signal. Each group can be used as either pnp (source) or npn (sink), when appropriately wired as shown in the following figures.

- Inputs I0 and I2 can be used as normal digital inputs, 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.

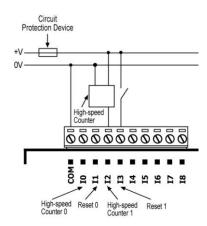




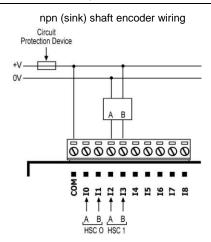
npn (sink) high-speed counter

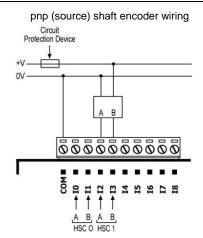


pnp (source) high-speed counter



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



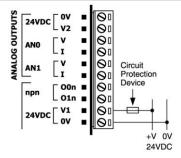


Digital Outputs

Wiring Power Supplies

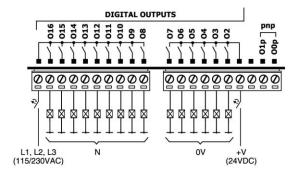
Use a 24VDC power supply for both relay and transistor outputs.

- Connect the "positive" lead to the "V1" terminal, and the "negative" lead to the "0V" terminal.
- In the event of voltage fluctuations or nonconformity to voltage power supply specifications, connect the device to a regulated power supply.



Relay Outputs

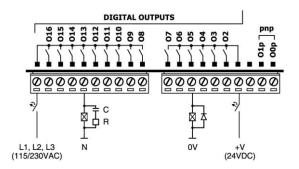
- Each group can be wired separately to either AC or DC as show.
- The 0V signal of the relay outputs is isolated from the controller's 0V signal.



Increasing Contact Life Span

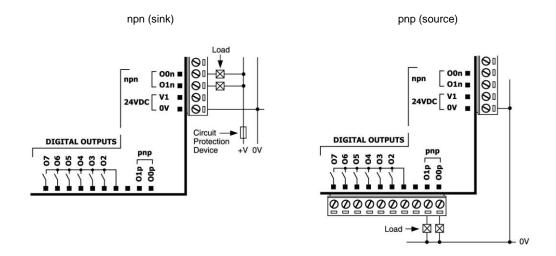
To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- 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

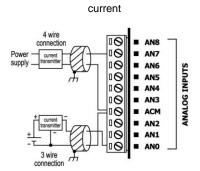
9 analog inputs, which can be wired to work with either current or voltage:

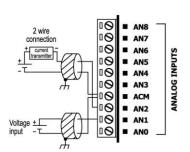
- Inputs 0 to 2 are 10-bit.
- Inputs 3 to 8 are 12 to 14-bit.

To configure an input, open the device and set the jumpers according to the instructions beginning on page 6. Shields should be connected at the signal source.

Analog Inputs

All inputs share a common ACM signal, which must be connected to the 0V of the controller.





current/voltage

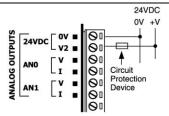
Analog Outputs Power Supply

Use a 24VDC power supply for all analog output modes.

- 1. Connect the "positive" cable to the "V2" terminal, and the "negative" to the "0V" terminal.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Since the analog I/O power supply is isolated, the controller's 24VDC power supply may also be used to power the analog I/Os.



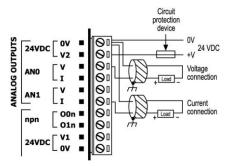
The 24VDC power supply must be turned on and off simultaneously with the controller's power supply.



Analog Outputs

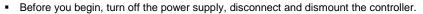
- Shields should be earthed, connected to the earth of the cabinet.
- An output can be wired to either current or voltage, use the appropriate wiring as shown below.
- Do not use current and voltage from the same source channel.

current/voltage



Changing Jumper Settings

To access the jumpers, you must remove the snap-in I/O module from the controller, and then remove the module's PCB board.



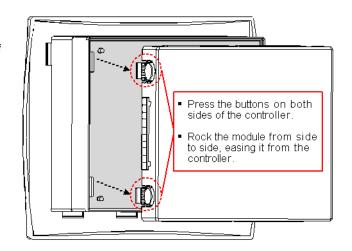


- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly by holding the PCB board by its connectors.

Accessing the Jumpers

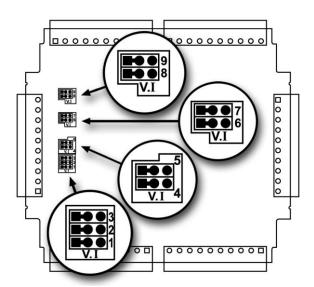
First, remove the snap-in module.

- Locate the 4 buttons on the sides of the module, 2 on either side. Press the 2 buttons on either side of the module as shown, and hold them down to open the locking mechanism.
- Gently rock the module from side to side, easing the module from the controller.



3. Using a Philips screwdriver, remove the center screw from the module's PCB board.

Select the desired function by changing the jumper settings according to the figure and tables shown below.

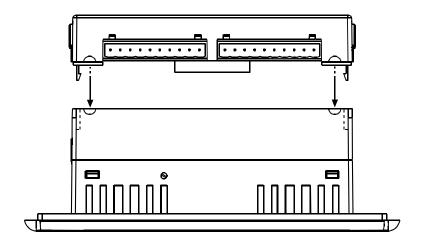


	Jumper #	Voltage*	Current
Analog input 0	1	V	1
Analog input 1	2	V	1
Analog input 2	3	V	I
Analog input 3	4	V	l
Analog input 4	5	V	I
Analog input 5	6	V	I
Analog input 6	7	V	I
Analog input 7	8	V	ı
Analog input 8	9	V	ı

^{*} Default factory setting

Reassembling the controller

- 1. Return the PCB board to the module and secure the center screw.
- 2. Next, reinstall the module. Line the circular guidelines on the controller up with the guidelines on the Snap-in I/O 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.



V200-18-E46B Technical Specifications

Digital Inputs

Number of inputs 18 (in two groups)
Input type pnp (source) or npn (sink)

Galvanic isolation

Digital inputs to bus Yes
Digital inputs to digital inputs in No

same group

Group to group, digital inputs Yes

Nominal input voltage 24VDC

Input voltage

npn (sink)

pnp (source) 0-5VDC for Logic '0'

17-28.8VDC for Logic '1' 17-28.8VDC for Logic '0' 0-5VDC for Logic '1'

Input current 8.8mA@24VDC for inputs 0 to 3

6mA@24VDC for inputs 4 to 17

Response time 10mSec typical

High-speed inputs Specifications below apply when these inputs are wired for use as a high-

speed counter input/shaft encoder. See Notes 1 and 2.

Resolution 32-bit

Frequency 10kHz maximum

Minimum pulse width 40µs

Notes:

- 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.
- 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.

Digital Outputs

Digital Output's Power Supply

Nominal operating voltage 24VDC

Operating voltage 20.4 to 28.8VDC Quiescent current 5mA@24VDC.

Max. current consumption 85mA@24VDC. See Note 3.

Galvanic isolation

Digital power supply to bus

Digital power supply to relay
outputs

Digital power supply to

No

otoci

transistor outputs

Notes:

Maximum current consumption does not provide for pnp output requirements.
 The additional current requirement of pnp outputs must be added.

Relay Outputs

Number of outputs 15 relays (in two groups). See Note 4.

Output type SPST-NO (Form A)

Isolation By relay

Type of relay Tyco PCN-124D3MHZ or compatible
Outputs' power supply See Digital Output's Power Supply page 11.

Galvanic isolation

Relay outputs to bus Yes
Group to group, relay Yes

outputs

Relay to transistor outputs Yes

Output current 3A maximum per output (resistive load)

8A maximum total for common (resistive load)

Rate voltage 250VAC / 30VDC Minimun load 1mA@5VDC

Life expectancy 100k operations at maximum load

Response time 10mS (typical)

Contact protection External precautions required (see Increasing Contact Life Span, p.4)

Notes:

4. Outputs 2, 3, 4, 5, 6 and 7 share a common signal. Outputs 8, 9, 10, 11, 12, 13, 14, 15 and 16 share a common signal.

Transistor Outputs/H.S.O.

Number of outputs 2, high-speed. Each can be individually wired as pnp (source) or npn (sink).

Output type pnp: P-MOSFET (open drain) npn: N-MOSFET (open drain)

Galvanic isolation

Transistor outputs to bus Yes
Transistor outputs to No

transistor outputs

Transistor outputs to relay

outputs

Output current

pnp: 0.5A maximum per output

Yes

npn: 50mA maximum per output

Maximum frequency Resistive load

pnp: 0.5kHz npn: 100kHz Inductive load 0.5Hz

ON voltage drop pnp: 0.5VDC maximum

npn: 0.4VDC maximum

Short circuit protection Yes (pnp only)

Voltage reference

pnp (source) See Digital Output's Power Supply page 11

npn (sink) 3.5V to 28.8VDC, unrelated to the voltage of either the I/O module

or the controller

Notes:

5. Output #0 and 1 may be used as high-speed outputs.

Analog Inputs

Number of inputs 9

Type of input Set via appropriate wiring and jumper settings.

Isolation Nor

Analog Inputs

	AN0-AN2 (10-bit)	AN3-AN8 (12-14-bit)	
Input range	0-10V, 0-20mA , 4-20mA	0-10V, 0-20mA , 4-20mA	
Conversion method	Succesive approximation	Voltage to frequency	
Normal mode			
Resolution, except 4-20mA	10-bit (1024 units)	14-bit (16383 units)	
Resolution at 4-20mA	204-1023 (820 units)	3277 to 16383 (13107 units)	
Conversion time	Synchronized to scan time	100mSec minimum per input (according to filter type)	
Fast Mode			
Resolution, except 4-20mA		12-bit (4096 units)	
Resolution at 4-20mA		819 to 4095 (3277 units)	
Conversion time	_	20mSec minimum per input (according to filter type)	
Input impedance	>100kΩ—voltage	12.77kΩ —voltage	
	500Ω—current	37Ω —current	
Absolute maximum rating	±15V—voltage	±15V—voltage	
	±30mA, 15V—current	±30mA, 1.1V—current	
Full-scale error	±3 LSB (0.3%)	±0.5%	
Linearity error	±3 LSB (0.3%)	±0.04%	
atus indication Yes. See Note 6.		Yes. See Note 7.	

Notes:

6. The analog value can indicate a fault:

Value: 10-bit Possible Cause

1024 Deviates above the input range

7. The analog value can indicate faults:

Value: 12-bitValue: 14-bitPossible Cause-1-1Deviates slightly below the input range409616384Deviates slightly above the input range3276732767Deviates greatly above or below the input range

Analog Outputs

Analog Output's Power Supply

Nominal operating voltage 24VDC

 Operating voltage
 20.4 to 28.8VDC

 Quiescent current
 30mA@24VDC

 Max. current consumption
 80mA@24VDC

Galvanic isolation

Analog power supply to bus Yes
Analog power supply to analog No

outputs

Analog Outputs

Number of outputs 2 (single-ended)

Output range 0-10V, 4-20mA. See Note 8.

Resolution 12-bit (4096 units)

Conversion time Synchronized to scan time

Load impedance $1k\Omega$ minimum—voltage

500Ω maximum—current

Galvanic isolation

Analog outputs to bus
Analog output to analog output
No
Linearity error
Operational error limits

Yes
No
±0.1%
±0.2%

Notes:

8. Note that the range of each I/O is defined 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) 10% to 95% (non-condensing)

Dimensions (WxHxD) 138x23x123mm (5.43x0.9x4.84")

Weight 140g (4.94oz)

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