

The Unitronics® IO-D16A3-TO16 is an XL I/O expansion module for use in conjunction with specific Unitronics controllers. XL modules comprise enhanced I/O configurations and detachable I/O connectors. A local or remote I/O adapter module is required to interface between the expansion module and the PLC controller and provide power to the expansion modules in the system.

The I/O expansion module provides:

- 16 digital inputs, includes 1 HSC
- 3 analog inputs
- 16 transistor outputs, includes 1 HSO

For additional information and wiring diagrams, visit the Technical Library at www.unitronics.com.

Technical Specifications

General

| | |
|-----------------------------|---|
| Maximum current consumption | 65mA (provided by the adapter 5VDC supply for I/O modules) |
| Status indicators | |
| RUN: Green LED | <ul style="list-style-type: none">▪ Lights when a communication link is established between the module and the PLC or remote I/O adapter▪ Blinks when the communication link fails |

Digital Inputs

| | |
|-----------------------|---|
| Number of inputs | 16 (in a single group) |
| Input mode | pnP (positive logic) or npN (negative logic) – configurable by hard-wiring |
| Galvanic isolation | None |
| Status indicators | |
| IN: Green LEDs | <ul style="list-style-type: none">▪ One green LED for each input: Lights when the input is active, see note 1 |
| Nominal input voltage | 24VDC |
| Input voltage | |
| pnP (positive logic) | 0–5VDC for logic state 0 17–28.8VDC for logic state 1 |
| npN (negative logic) | 17–28.8VDC for logic state 0 0–5VDC for logic state 1 |
| Input current | 3.7mA @ 24VDC |
| Input impedance | 6.5k Ω |
| Response time | 10ms typical |
| High-speed input | The specifications in this section apply when an input is configured as a high-speed counter or frequency measurer. If configured as a general purpose digital input, the specification is as above. See notes 2, 3, and 4. |
| Resolution | 16-bit or 32-bit, depending on the PLC or remote I/O adapter |
| Frequency | 30kHz maximum (at 24VDC \pm 10%) |
| Minimum pulse width | 14 μ s |

Notes:

1. If the input is active but there is no communication with the PLC or the remote I/O adapter (RUN blinks), the status LED does not light.
2. Input 4 can function either as a high-speed counter, frequency measurer, or general purpose digital input.
3. Input 5 can function either as a counter reset input or general purpose digital input. In both cases, the specifications of this input are those of a general purpose digital input.
4. If input 4 is set as a high-speed counter and no reset input is configured, input 5 functions as a general purpose digital input.

Analog Inputs

| | |
|----------------------|---|
| Number of inputs | 3 |
| Input type | 0–20mA or 4–20mA |
| Input impedance | 191Ω |
| Maximum input rating | 28mA, 5.3VDC |
| Galvanic isolation | None |
| Cable type | Shielded twisted-pair |
| Conversion method | Successive approximation |
| Resolution (0-20mA) | 10-bit (1024 units) |
| Resolution (4-20mA) | 204 to 1023 (820 units) |
| Conversion time | Each configured input is sampled once per 1.67ms. For example, if 3 inputs are configured, it takes $3 \times 1.67 = 5$ ms to sample all the analog inputs. See note 5. |
| Accuracy | ±0.9% of full scale |
| Status indication | In software: If a specific input value is 1024, a single analog input deviates above the permissible range. If all the input values are 1024, either all the inputs deviate above the permissible range or the RG signal is not connected. |

Notes:

5. The conversion time does not include communication time with the PLC and PLC scan time.

Digital Outputs

| | | |
|-------------------------------------|--|--|
| Number of outputs | 16 transistors | |
| Output type | Output 0: Either pnp: P-MOSFET (open drain) or npn: N-MOSFET (open drain) Outputs 1–15: pnp: P-MOSFET (open drain) Refer to notes 6 and 7 | |
| Galvanic isolation | None | |
| Status Indicators | <ul style="list-style-type: none"> ▪ One red LED for each output: Lights when the corresponding output is active ▪ Lights when a pnp output transistor load causes a short-circuit, see note 8 | |
| | pnp | npn |
| Maximum output current | 0.5A per output, 4A total | 50mA |
| Maximum surge current | 0.6A peak, once every 2 seconds, for a duration of 10ms per output, not simultaneously | N/A |
| Maximum delay OFF to ON | 1ms | 1μs |
| Maximum delay ON to OFF | 0.15ms | 10μs |
| HSO freq. range with resistive load | 1Hz–500Hz (at max. load resistance of 470kΩ) | 1Hz–32kHz (at max. load resistance of 1.5kΩ) |
| Maximum ON voltage drop | 0.5VDC | 0.4VDC |
| Short circuit protection | Yes | No |
| Voltage Reference | Digital output power supply | 3.5VDC to 28.8VDC, unrelated to the voltage of either the I/O module or the controller |
| Output power supply | | |
| Nominal operating voltage | 24VDC | |
| Operating voltage | 20.4VDC to 28.8VDC | |

Notes:

6. Output 0 can be wired either as pnp (source) or npn (sink). pnp and npn can be used simultaneously.
7. Output 0 can be used as a high speed output.
8. When an output load causes a short-circuit, the system disconnects that output and lights the S.C. LED on the module's front panel. The short circuit is also identified by the PLC software. For example, in the Vision OPLC, SB 5 turns on and SDW 5, containing a bitmap, indicates which module has caused the short-circuit. For more information, refer to the PLC online help.

Dimensions

| | |
|----------------------|---|
| Size (W x H x D) | 80 x 135 x 60mm (3.15 x 5.31 x 2.36"). For exact dimensions, refer to the product installation guide. |
| Weight (approximate) | 327g (11.5oz) |

Environmental

| | |
|------------------------|--|
| 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) |
| Mounting | Snap-mounted on 35mm DIN-rail (IP20/NEMA1) |

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