EX-D16A3-TO16

XL I/O Expansion Module (Built-in Adapter) Technical Specifications

The Unitronics® EX-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. In addition, this module comprises a built-in adapter for communicating with the PLC and providing power to the other expansion modules in the system.
This 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

I/O module capacity	Up to 7 I/O expansion modules can be connected to this module. This number may vary according to the modules used.
Status indicators	
RUN: Green LED	▪ Lights when a communication link is established between the module and the PLC ▪ Blinks when the communication link fails
PWR: Green LED	▪ Lights when power is supplied

Power Supply

Input voltage	24VDC
Permissible range	20.4 to 28.8VDC, ripple < 10%
Maximum current consumption	90mA @ 24VDC – EX-D16A3-TO16 alone 220mA @ 24VDC – maximum load on the 5VDC supply when the EX-D16A3-TO16 powers seven additional I/O expansion modules
Current for additional modules	500mA maximum from 5VDC, see note 1

Notes:

1. For example, 2 IO-DI8-TO8 modules consume a maximum of 140mA of the adapter's 5VDC supply.

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	▪ One green LED for each input: Lights when the input is active, see note 2
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	6.5kΩ
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 3, 4, and 5.
Resolution	16-bit or 32-bit, depending on the PLC
Frequency	30kHz maximum (at 24VDC ±10%)
Minimum pulse width	14µs

Notes:

2. If the input is active but there is no communication with the PLC (RUN blinks), the status LED does not light.
3. Input 36 can function either as a high-speed counter, frequency measurer, or general purpose digital input.
4. Input 37 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.
5. If input 36 is set as a high-speed counter and no reset input is configured, input 37 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*1.67 = 5ms to sample all the analog inputs. See note 6.
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:

6. 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 32: Either pnp: P-MOSFET (open drain) or npn: N-MOSFET (open drain) Outputs 33–47: pnp: P-MOSFET (open drain) Refer to notes 10 and 11	
Galvanic isolation	None	
Status Indicators		
OUT: Red LEDs	▪ One red LED for each output: Lights when the corresponding output is active	
S.C.: Red LED	▪ Lights when a pnp output transistor load causes a short-circuit, see note 12	
	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:

10. Output 32 can be wired either as pnp (source) or npn (sink). pnp and npn can be wired simultaneously.
11. Output 32 can be used as a high speed output.
12. 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)	383g (13.5oz)

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)