

Combination I/O Modules

Specifications	1746-IO4	1746-IO8	1746-IO12	1746-IO12DC
Number of inputs	2	4	6	6
Number of outputs	2	4	6	6
Points per common	2	4	6	6
Voltage category	120V AC (inputs) 100/120V AC (relay contact outputs)			10...30V DC (inputs) 5...265V AC @ 47...63 Hz / 5...125V DC (outputs)
Operating voltage range	85...132V AC @ 47...63 Hz (inputs) 5...265V AC @ 47...63 Hz / 5...125V DC (outputs)			10...30V DC (inputs) 5...265V AC @ 47...63 Hz / 5...125V DC (outputs)
Backplane current (mA) @ 5V	30 mA	60 mA	90 mA	80 mA
Backplane current (mA) @ 24V	25 mA	45 mA	70 mA	60 mA
Continuous current per point	See Relay Contact Ratings for 1746-OW4 on page 16		See Relay Contact Ratings for 1746-OW16 on page 16	
Continuous current per module	4 A	8 A	8 A	8 A

1746-SIM Input Simulator

The 1746-SIM Input Simulator is designed for use on 16-channel 24V DC sinking and sourcing modules with removable terminal blocks, including 1746-IB16, 1746-ITB16, 1746-IV16, 1746-ITV16, and 1746-IN16 modules. The input simulator provides 16 switches for simulating inputs to the SLC 500.

1746 Analog I/O Modules

Analog I/O modules feature user-selectable voltage or current inputs, backplane isolation, removable terminal blocks, and diagnostic feedback.

The 1746-NI4, 1746-NIO4I, and 1746-NIO4V input channels are filtered to reject high frequency noise and provide 14- to 16-bit (range-dependent) resolution.

All 4-channel analog output modules provide 14-bit resolution and a 2.5 ms conversion rate.

The 1746-FIO4I and 1746-FIO4V modules have less input filtering and can sense more rapidly changing inputs. However, their input resolution is only 12-bit. Because the input filter on the 1746-FIO4I or 1746-FIO4V module may pass more electrical noise, you should thoroughly ground and shield the input transducer, its power supply, and cables.

The 1746-NI8 module provides high accuracy and fast analog signal conversion. The 1746-NI8, 1746-NI16I and 1746-NI16V modules are high density analog input modules that are software configurable.

The 1746-NO8I (current output) and 1746-NO8V (voltage output) modules are high density, analog output modules that provide 8 individually configurable output channels with 16-bit resolution.

Analog I/O Module Overview

Catalog Number	Description	Voltage Category	For specifications, see
1746-NI4	High Resolution (4) Analog Input Module	-20...+20 mA (or) -10...+10V DC	page 19: General Input Specifications page 19: Current Loop Input Specifications page 20: Voltage Input Specifications
1746-NI8	High Resolution (8) Analog Input Module	-20...+20 mA (or) -10...+10V DC	page 22: General input specifications page 22: Input step response page 23: Current loop input specifications page 23: Voltage input specifications
1746-NI16I ⁽¹⁾	High Resolution (16) Analog Input Module	-20...+20 mA	page 25: General input specifications page 26: Module update times
1746-NI16V ⁽¹⁾	High Resolution (16) Analog Input Module	-10...+10V DC	
1746-NIO4I	High Resolution (2) Analog Input, (2) Analog Current Output Module	-20...+20 mA (or) -10...+10V DC (inputs) 0...20 mA (outputs)	page 19: General Input Specifications page 19: Current Loop Input Specifications page 20: Voltage Output Specifications
1746-NIO4V	High Resolution (2) Analog Input, (2) Analog Voltage Output Module	20...+20 mA (or) -10...+10V DC (inputs) -10...+10V DC (outputs)	page 19: General Input Specifications page 19: Current Loop Input Specifications page 20: Voltage Input Specifications
1746-FIO4I	(2) Fast Analog Input, (2) Analog Current Output Module	0...20 mA (or) 0...10V DC (inputs) 0...20 mA (outputs)	page 19: General Input Specifications page 19: Current Loop Input Specifications page 20: Voltage Input Specifications
1746-FIO4V	(2) Fast Analog Input, (2) Analog Voltage Output Module	0...20 mA	page 20: Output specifications
1746-NIO4I	(4) Analog Current Output Module	-10...+10V DC	page 20: Output specifications
1746-NIO4V	(4) Analog Voltage Output Module	0...20 mA	page 20: Output specifications
1746-NO8I	(8) Analog Current Output Module	-10...+10V DC	page 24: Output specifications
1746-NO8V	(8) Analog Voltage Output Module	-10...+10V DC	page 24: Output specifications

(1) Single-ended connections only.

4-Channel Analog I/O Modules**General Input Specifications for 4-Channel Modules**

Specification	1746-NI4	1746-NIO4I	1746-NIO4V	1746-FIO4I	1746-FIO4V
Backplane current (mA) @ 5V	25 mA	55 mA	55 mA	55 mA	55 mA
Backplane current (mA) @ 24V	85 mA	145 mA	115 mA	150 mA	120 mA
Number of inputs	4	2	2	2	2
Backplane isolation	500V AC and 710V DC withstand for 1 minute				
Step response	60 ms			100 µs	

8-Channel Output Modules

Optional 24V DC power supply must be N.E.C. Class 2.

Output Specifications for 8-Channel Modules

Catalog Number	1746-N08I	1746-N08V
Backplane current (mA) @ 5V	120 mA	120 mA
Backplane current (mA) @ 24V	250 mA	160 mA ⁽¹⁾
Backplane power consumption	5.6 W	5.6 W
Thermal dissipation, max	6.6 W	4.44 W
Isolation voltage	Tested @ 500V DC	Tested @ 500V DC
Number of outputs	8	8
Output type	Current	Voltage
Output range	0...21.5 mA	±10.25V DC
Output coding (proportional scaling)	0...32,767	-32,768...+32,767
Resolution	16-bit 366 nA/count	16-bit 320 µV/count
Non-Linearity	0.06% of full scale	
DAC conversion method	R-2R Ladder Network	
Output step response	1 ms (0...95% of full scale)	
Channel update time (typical)	Class 1: 5 ms to update all 8 channels Class 3: 10 ms to update all 8 channels	
Load range	0...500 Ω	1 kΩ and greater
Load current	N/A	10 mA, max
Output impedance	Greater than 1M Ω	Less than 1.0 Ω
Overrange capability	7.5% (21.5 mA)	2.5% (±10.25V)
Overall accuracy	0.1% of full scale @ 25 °C (77 °F) 0.2% of full scale @ 60 °C (140 °F)	
Overall accuracy drift, max	±33 ppm/°C of full scale	
Gain error	0.08% of full scale @ 25 °C (77°F) 0.15% of full scale @ 60 °C (140°F)	
Gain error drift, max	±25 ppm/°C of full scale	
Calibration	Factory calibrated.	

(1) J4 jumper set to RACK; 0 mA at 24V dc with J4 Jumper set to EXT.

Digital Combination Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1746-IO4	30 mA	25 mA	0.270 W per input point 0.133 W per output point	0.75 W	1.60 W
1746-IO8	60 mA	45 mA	0.270 W per input point 0.133 W per output point	1.38 W	3.00 W
1746-IO12	90 mA	70 mA	0.270 W per input point 0.133 W per output point	2.13 W	4.60 W
1746-IO12DC	80 mA	60 mA	0.200 W per input point 0.133 W per output point	1.84 W	3.90 W

Analog Input Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1746-NI4	25 mA	85 mA	N/A	2.17 W	2.20 W
1746-NI8	200 mA	100 mA	N/A	3.4 W	3.4 W
1746-NI16I	125 mA	75 mA	N/A	2.43 W	2.43 W
1746-NI16V	125 mA	75 mA	N/A	3.76 W	3.8 W

Analog Output Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1746-NO4I	55 mA	195 mA	N/A	4.96 W	5.00 W
1746-NO4V	55 mA	145 mA	N/A	3.04 W	3.80 W
1746-NO8I	120 mA	250 mA ⁽¹⁾	N/A	3.76 W	6.6 W
1746-NO8V	120 mA	160 mA ⁽¹⁾	N/A	3.04 W	4.44 W

(1) With jumper set to RACK, otherwise 0.000.

Analog Combination Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1746-FIO4I	55 mA	150 mA	N/A	3.76 W	3.80 W
1746-FIO4V	55 mA	120 mA	N/A	3.04 W	3.10 W
1746-NIO4I	55 mA	145 mA	N/A	3.76 W	3.80 W
1746-NIO4V	55 mA	115 mA	N/A	3.04 W	3.10 W