

Product Details and Certifications

Cross Reference RA Part Number: 1746-NIO4I A



Product: 1746-NIO4I

Description: 1746 SLC System, (2) Analog Input, 2 Analog Current Output



Representative Photo Only (actual product may vary based on configuration sections)

I/O MODULES AND HARDWARE

Bulletin Number	1746 SLC 500 I/O Module
Number of Inputs	2
Backplane Current (mA) @ 5V	55 mA
Backplane Current (mA) @ 24V	145 mA
Backplane Isolation	500V AC and 710V DC withstand for 1 minute
Step Response	60 ms
Conversion Method	Sigma-Delta-Modulation


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-NI16 ⁽¹⁾	High Resolution (16) Analog Input Module	-20...+20 mA	page 25: General input specifications
1746-NI16V ⁽¹⁾	High Resolution (16) Analog Input Module	-10...+10V DC	page 26: Module update times
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
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 20: Voltage Output 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	


General Input Specifications for 4-Channel Modules


Specification	1746-NI4	1746-NIO4I	1746-NIO4V	1746-FIO4I	1746-FIO4V
Conversion method	sigma-delta modulation			successive approximation	
Converter resolution	16 bit			12 bit	
Conversion time	N/A			7.5 μ s every 512 μ s (nominal)	
Module throughput delay	512 μ s (nominal)			1.10 ms (maximum) ⁽¹⁾ 512 μ s (typical)	

(1) Worst-case throughput occurs when the module just misses an event.


Current Loop Input Specifications for 4-Channel Modules


Specification	1746-NI4	1746-NIO4I	1746-NIO4V	1746-FIO4I	1746-FIO4V
Full scale	20 mA	20 mA	20 mA	20 mA	20 mA
Input range	\pm 20 mA (nominal) \pm 30 mA (maximum)			0...20 mA (nominal) for 0...30 mA (maximum)	
Current input coding	\pm 16,384 for \pm 20mA			0...2047 counts for 0...20 mA	
Absolute maximum input voltage	\pm 7.5V DC or 7.5V AC RMS				
Input Impedance	250 Ω (nominal)			250 Ω (nominal)	
Resolution	1.22070 μ A per LSB			9.7656 μ A per bit	
Overall accuracy @ 25 °C (77 °F)	\pm 0.365% of full scale			\pm 0.510% of full scale	
Overall accuracy, 0...60 °C (32...140 °F)	\pm 0.642% of full scale (maximum)			\pm 0.850% of full scale	
Overall accuracy drift	+79 ppm/°C of full scale			+98 ppm/°C of full scale (maximum)	
Gain error @ 25 °C (77 °F)	+0.323% (maximum)			+0.400% (maximum)	
Gain error, 0...60 °C (32...140 °F)	+0.556% (maximum)			+0.707% of full scale	
Gain error drift	\pm 67 ppm/°C			\pm 89 ppm/°C (maximum)	


Voltage Input Specifications for 4-Channel Modules


Specification	1746-NI4	1746-NIO4I	1746-NIO4V	1746-FIO4I	1746-FIO4V
Full Scale	10V DC	10V DC	10V DC	10V DC	10V DC
Input Range	\pm 10V DC -1 LSB			0...10V DC -1 LSB	
Input Impedance	1 M Ω				
Overvoltage Protection (IN+ to -IN)	220V DC or AC RMS continuously			220V dc or ac RMS continuously	
Resolution	305.176 μ V per LSB			2.4414 mV per LSB (nominal)	
Voltage input coding	-32,768...+32,767 for +10V DC			0...4095 counts for 0...10V DC	
Overall accuracy @ 25 °C (77 °F)	\pm 0.284% of full scale			\pm 0.440% of full scale	
Overall Accuracy, 0...60 °C (32...140 °F)	\pm 0.504% of full scale			\pm 0.750% of full scale	


Voltage Input Specifications for 4-Channel Modules


Specification	1746-NI4	1746-NIO4I	1746-NIO4V	1746-FIO4I	1746-FIO4V
Overall accuracy drift (maximum)	+63 ppm/°C of full scale (maximum)			+88 ppm/°C (maximum)	
Gain error @ 25 °C (77 °F)	+0.263% (maximum)			+0.323% of full scale	
Gain error, 0...60 °C (32...140 °F)	+0.461% (maximum)			+0.530% of full scale	
Gain error drift	±57 ppm/°C			±79 ppm/°C	


Output Specifications for 4-Channel Modules


Specification	1746-FIO4I	1746-NIO4I	1746-NO4I	1746-FIO4V	1746-NIO4V	1746-NO4V
Number of outputs	2	2	4	2	2	4
Backplane current (mA) @ 5V	55 mA	55 mA	55 mA	55 mA	55 mA	55 mA
Backplane current (mA) @ 24V	150 mA	145 mA	195 mA ⁽¹⁾	120 mA	115 mA	145 mA
Isolation voltage	Tested @ 500V AC and 710V DC for 60 seconds					
Full scale	21 mA			10V DC		
Output range (normal)	0...20 mA -1 LSB			±10V DC -1 LSB		
Output coding	0...32,764 for 0...21 mA			-32,768...+32,764 for ±10V DC		
Output resolution (per LSB)	2.56348 µA			1.22070 mV		
Converter resolution	14-bit			14-bit		
Conversion method	R-2R ladder			R-2R ladder		
Step response	2.5 ms (5...95%)			2.5 ms (normal)		
Load range	0...500 Ω			1K...? Ω		
Load current, max	N/A			10 mA		
Overrange capability	5% (0...21 mA -1 LSB)			N/A		
Overall accuracy @ 25 °C (77 °F)	±0.298% of full scale			±0.208% of full scale		
Overall Accuracy, 0...60 °C (32...140 °F)	±0.541% of full scale			±0.384% of full scale		
Overall accuracy drift, max	±70 ppm/°C of full scale			±0.384% of full scale		
Gain error @ 25 °C (77 °F)	±298% of full scale			±208% of full scale		
Gain Error, 0...60 °C (32...140 °F)	±516% of full scale			±374% of full scale		
Gain error drift, max	±62 ppm/°C of full scale			±47 ppm/°C of full scale		

(1) The 1746-NO4I and 1746-NO4V analog output modules have connections for user-supplied 24V dc power supplies. When external 24V DC power is used, the module only draws 5V DC current from the SLC backplane. If an external 24V DC power supply is required, the tolerance must be 24V ±10% (26.6...26.4V DC). The user power supplies for SLC 500 modular systems, 1746-P1, 1746-P2, 1746-P5, and 1746-P6 power supplies do not meet this specification.