

Product Details and Certifications

Cross Reference RA Part Number: 1746-INT4 B

 **Product: 1746-INT4**

Description: 1746 SLC System, Thermocouple Input Module for Programmable Controller



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	4 Plus a CJC Sensor
Input Type	Thermocouple Types J,K,T,E,R,S,B,N,C,D Millivolt Input Ranges ± 50 mV and ± 100 mV
Filter Frequency	Low pass digital filter corner frequency of 8 Hz
Backplane Current (mA) @ 5V	110 mA
Backplane Current (mA) @ 24V	85 mA
Input Step Response (95% of final value)	600 ms @ 8 Hz

Module update time is dependent on the number of channels enabled and the filter frequency, as illustrated in the table below.

Module Update Times for 1746-NI16I and 1746-NI16V

Filter Frequency	Module Update Time ⁽¹⁾			
	16 Channels Enabled	12 Channels Enabled	8 Channels Enabled	4 Channels Enabled
6 Hz	630 ms	473 ms	314 ms	7 ms
10 Hz	380 ms	285 ms	190 ms	4 ms
20 Hz	194 ms	145 ms	96 ms	4 ms
40 Hz	100 ms	75 ms	50 ms	4 ms
60 Hz	69 ms	52 ms	34 ms	4 ms
80 Hz	54 ms	39 ms	26 ms	4 ms
100 Hz	37 ms	27 ms	18 ms	4 ms
250 Hz	18 ms	13 ms	9 ms	4 ms

(1) Assuming all of the enabled channels have the filter frequency shown in the first column.

Temperature Modules

SLC 500 Thermocouple/mV Input Modules


All modules interface to thermocouple types J, K, T, E, R, S, B, and N, and also accept millivolt signals that standard analog modules are not able to detect. The 1746-INT4 module also interfaces with thermocouple types C and D.

All modules provide fully-integrated cold-junction compensation (CJC) to retain thermocouple input signal accuracy, a choice of input filter frequencies, as well as fault diagnostics and status LEDs.

Note: Block transfers are required in a remote I/O configuration, using a 1747-ASB module with a PLC.


Thermocouple Module Specifications

Attribute	1746-NT4	1746-NT8	1746-INT4
Backplane current (mA) @ 5V	60 mA	120 mA	110 mA
Backplane current (mA) @ 24V	40 mA	70 mA	85 mA
Number of inputs	4 plus a CJC sensor	8 plus a CJC sensor	4 plus a CJC sensor
Input type	Thermocouple Types J, K, T, E, R, S, B, N Millivolt Input Ranges ± 50 mV and ± 100 mV		Thermocouple Types J, K, T, E, R, S, B, N, C, D Millivolt Input Ranges ± 50 mV and ± 100 mV
Filter frequency	10 Hz, 50 Hz, 60 Hz, 250 Hz		low pass digital filter corner frequency of 8 Hz
Input step response (95% of final value)	50 ms @ 60 Hz	80 ms @ 60 Hz	600 ms @ 8 Hz
Temperature units	°C or °F		


Thermocouple Module Specifications


Attribute	1746-NT4	1746-NT8	1746-INT4
Data formats	Raw/Proportional, Engineering Units, Engineering Units x 10, Scaled-for-PID		
Calibration	Autocalibration on channel enable and on a configuration change between channels.	Autocalibration at power-up and approximately every 2 minutes afterward.	Calibrate via ladder program once a year, as required.
Isolation	500V DC transient between inputs and chassis ground, and between inputs and backplane. 2V DC continuous between channels (series B or later).	500V DC transient between inputs and chassis ground, and between inputs and backplane. 12.5V DC continuous between channels.	1000V DC transient or 150V AC continuous channel-to-channel or channel-to-backplane.

The module update time is calculated by summing all the enabled Channel Sampling Times plus the CJC Update Time.

Module Update Time for 1746-NT4 and 1746-NT8


Catalog Number	CJC Update Time	Channel Sampling Time per Channel			
		250 Hz Filter	60 Hz Filter	50 Hz Filter	10 Hz Filter
1746-NT4	14 ms	12 ms	50 ms	60 ms	300 ms
1746-NT8 ⁽¹⁾	290 ms	66 ms	125 ms	140 ms	470 ms

(1) The sampling times for filter frequencies listed do not include a 45 ms open-circuit detection.

Module Update Time and Step Response for 1746-INT4

Corner frequency	50/60 Hz NMR	Filter Time	Update Time	Step Response (worst)
8 Hz	50...60 dB	180 ms	400 ms	600 ms

Thermocouple Temperature Ranges

Input	Temperature Range for All Modules		Accuracy max. error @ +25 °C (+77 °F)		
	°C	°F	1746-NT4	1746-NT8	1746-INT4
J	-210...760 °C	-346...1400 °F	±1.06 °C (±1.91 °F)	±1.4 °C (±2.52 °F)	±1.6 °C (±2.88 °F)
K	-270...1370 °C	-454...2498 °F	±1.72 °C (±3.10 °F)	±1.5 °C (±2.7 °F)	±3.8 °C (±6.84 °F)
T	-270...400 °C	-454...752 °F	±1.43 °C (±2.57 °F)	±1.3 °C (±2.34 °F)	±2.05 °C (±3.69 °F)
B	-300...1820 °C	-572...3308 °F	±0.73 °C (±1.3 °F)	±1.0 °C (±1.8 °F)	±2.4 °C (±4.32 °F)
E	-270...1000 °C	-454...1832 °F	±1.39 °C (±2.5 °F)	±1.3 °C (±2.34 °F)	±1.79 °C (±3.23 °F)
R	0...1768 °C	32...3214 °F	±3.59 °C (±6.46 °F)	±3.6 °C (±6.48 °F)	±2.23 °C (±4.02 °F)
S	0...1768 °C	32...3214 °F	±3.61 °C (±6.5 °F)	±3.4 °C (±6.12 °F)	±2.38 °C (±4.29 °F)
N	0...1300 °C	32...2372 °F	±3.12 °C (±5.62 °F)	±2.7 °C (±4.86 °F)	±3.83 °C (±6.90 °F)
C ⁽¹⁾	0...2317 °C	32...4201 °F	N/A	N/A	±2.38 °C (±4.11 °F)
D ⁽¹⁾	0...2317 °C	32...4201 °F	N/A	N/A	±2.52 °C (±4.54 °F)
CJC Sensor	0...85 °	32...185 °F	N/A	N/A	N/A

(1) Thermocouple type only available with 1746-INT4 module.



DC Millivolt Input Ranges for 1746-NT4, 1746-NT8, and 1746-INT4 Modules

Input Type	Range	Accuracy @ 25 °C (77 °F)
±50 mV	-50 mV dc...+50 mV DC	50 µV
±100 mV	-100 mV DC...+100 mV DC	50 µV

RTD Input Modules

The RTD modules interface with platinum, nickel, copper, and nickel-iron RTDs, and with variable resistance devices such as potentiometers (0 to 3000Ω maximum). The module provides on-board RTD temperature scaling in degrees Celsius and degrees Fahrenheit or resistance scaling in ohms.

TIP Block transfers are required in a remote I/O configuration, using a 1747-ASB with a PLC.

RTD/Resistance Input Modules

Attribute	1746-NR4	1746-NR8
Backplane current (mA) @ 5 V	50 mA	100 mA
Backplane current (mA) @ 24V	50 mA	55 mA
Number of inputs	4	8
Input type	100 Ω Platinum (385) 200 Ω Platinum (385) 500 Ω Platinum (385) 1000 Ω Platinum (385) 100 Ω Platinum (3916) 200 Ω Platinum (3916) 500 Ω Platinum (3916) 1000 Ω Platinum (3916) 10 Ω Copper (426) 120 Ω Nickel (618) 120 Ω Nickel (672) 604 Ω Nickel-Iron (518) 150 Ω Resistance Input 500 Ω Resistance Input 1000 Ω Resistance Input 3000 Ω Resistance Input	
Temperature scale (selectable)	1 °C or 1 °F and 0.1 °C and 0.1 °F	
Resistance scale (selectable)	1 or 0.1 Ω for all resistance ranges; or 0.1 Ω or 0.01 Ω for 150 Ω potentiometer	
Filter frequency (selectable filter)	10 Hz 50 Hz 60 Hz 250 Hz	28 Hz 50/60 Hz 800 Hz 6400 Hz
RTD excitation current (Two current values are user-selectable)	0.5 mA ⁽¹⁾ 2.0 mA ⁽²⁾	0.25 mA ⁽¹⁾ 1.0 mA ⁽²⁾
Open-circuit or short-circuit detection	Zero, upscale or downscale	
Maximum cable impedance	25 Ω maximum per 308.4 m (1000 ft)	
Data formats	Raw/Proportional, Engineering Units, Engineering Units x 10, Scaled-for-PID	
Calibration	Autocalibration at powerup and when a channel is enabled	Autocalibration at powerup and user-enabled periodic calibration