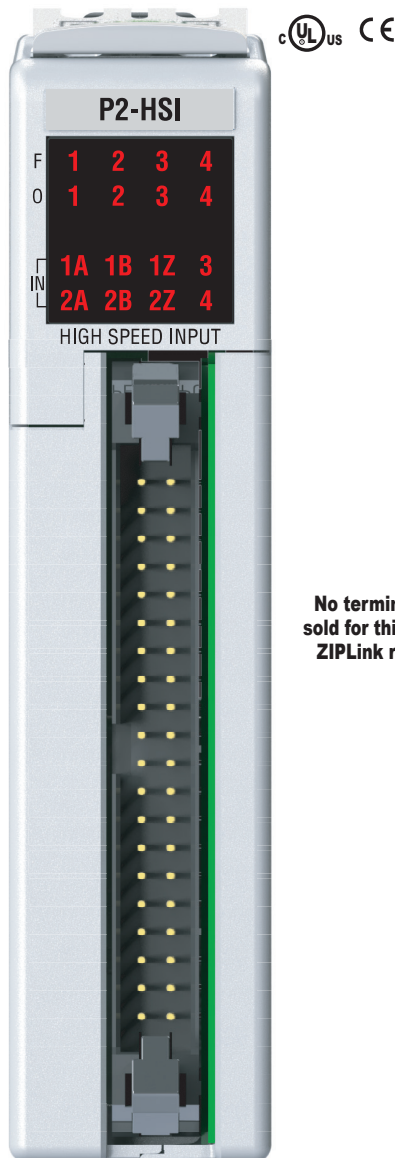


Specialty Modules

P2-HSI

High-Speed Pulse Input

The P2-HSI is a high-speed pulse (1MHz) input module with differential (line receiver, 5V max.) and single ended (5–24 V) inputs that accept up to 1MHz of pulse/direction and quadrature signals on each of the two independent input channels. It also provides four general purpose high-speed inputs and four general purpose 5–24 VDC 0.5 amp outputs.



No terminal block sold for this module; ZIPLink required.

CPU	Firmware	Productivity Suite
P2-550	Version 1.2.1.15 or later.	Version 2.1.016 or later.

See Wiring Solutions for part numbers of ZIPLink cables and connection modules required with this I/O module.



General Specifications

Module Type	Intelligent
Modules per Base	15 Maximum (See Note)
I/O Points Used	None, mapped directly to tags in CPU
Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC 60068-2-6 (Test Fc)
Shock	IEC 60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	5.76 W
Enclosure Type	Open equipment
Module Location	Any I/O slot in a Productivity2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See Wiring Solutions.
Weight	90g (3.2 oz)
Agency Approvals**	UL 61010-1 and UL 61010-2:201 File E139594, Canada & USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2:201 Safety)*

*Meets EMC and Safety requirements. See the Declaration of Conformity for details.

**To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific component part number web page.

Status LEDs

Fault Status LEDs*	(F) 1, 2, 3 & 4 (one per status output)
Input LEDs	(IN) 1A, 1B, 1Z, 2A, 2B, 2Z, IN3 & IN4 (one per status input)
Output Status LEDs	(O) OUT1, OUT 2, OUT3 & OUT4

* All front panel fault LED's blinking indicates loss of 24VDC external power to the module.

Connector Specifications

Connector Type	IDC style header with latch, Omron XG4A-4034
Number of Pins	40 point
Pitch	0.1 in (2.54 mm)

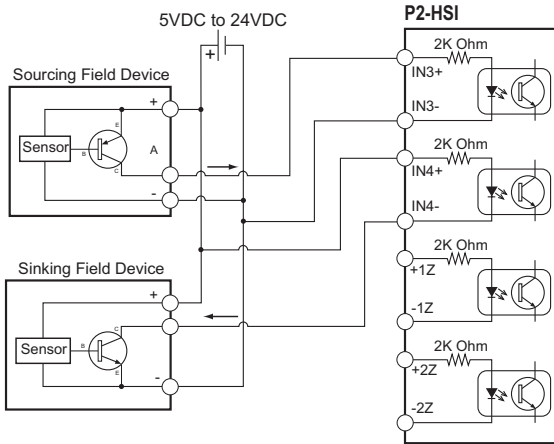
Power Specifications

External Power	24VDC -15% / +10%, Class 2
Maximum Voltage	26.4 VDC
Minimum Voltage	20.4 VDC
Current Consumption Excluding Outputs	50mA
Maximum Current Consumption Total of the 4 Status Outputs	2A

Specialty Modules

P2-HSI (cont'd)

Status Inputs

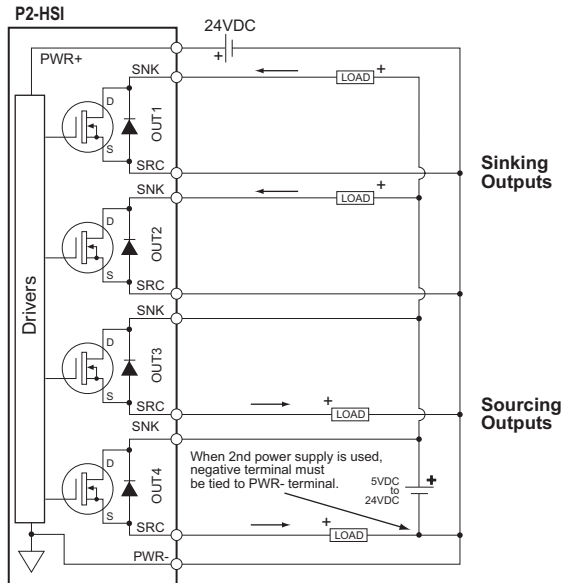


Single Ended (5-24V) Input Specifications

Status Input	Single ended inputs (8 pts: 1A, 1B, 1Z, 2A, 2B, 2Z, 3IN, 4IN)
Isolation	Each input is isolated from other circuits
Input Volts Range	5–24 VDC
Input Volts Maximum	±34VDC, limited by protection
Input Impedance	1kΩ minimum, 5kΩ maximum
Input Rated Current	5–24 VDC, 16mA 5.2 mA typical @ 5VDC 22mA maximum @ 34VDC
Input Minimum ON Voltage	4.5 VDC
Input Maximum OFF Voltage	2.0 VDC
Input Minimum ON Current	5.0 mA
Input Maximum OFF Current	1.4 mA
OFF to ON Response Time	1A, 1B, 2A, 2B: 0.48 μs 1Z, 2Z, 3IN, 4IN: 6μs
ON to OFF Response Time	1A, 1B, 2A, 2B: 0.48 μs 1Z, 2Z, 3IN, 4IN: 6μs
Max. Input Frequency*	1A, 1B, 2A, 2B: 1MHz 1Z, 2Z, 3IN, 4IN: 200kHz

* Inputs are not limited to this speed but single ended signals are not usually reliable above 200 kHz due to cabling capacitance.

Status Outputs



Status Output Specifications

Status Outputs	4 sink/source	
Output Signal Type, per Channel Select	Current Sinking	Current Sourcing
Operating Voltage¹	5–24 VDC	5–24 VDC ¹
Output Volts Maximum	36VDC	26.4 VDC ¹
Output Current Maximum	500mA	
Overcurrent Protection	Short circuit detect and current limit with automatic retry for each output	
Output Self Limiting Current	1.2 to 2.4 A	
Max Inrush Current	Self limited	
Output Voltage Drop	0.7 VDC @ 0.5 A	
Thermal Protection	Independent over temperature protection each output	
Output Voltage Clamp During Inductive Switching	+45VDC	-20VDC
Maximum OFF to ON Response	25μs ²	
Maximum ON to OFF Response	25μs ²	

NOTES:

1. Operating voltage of current sourcing outputs must be no greater than external power.
2. Measured at 5VDC operating voltage, 0.5 A load current.

Specialty Modules

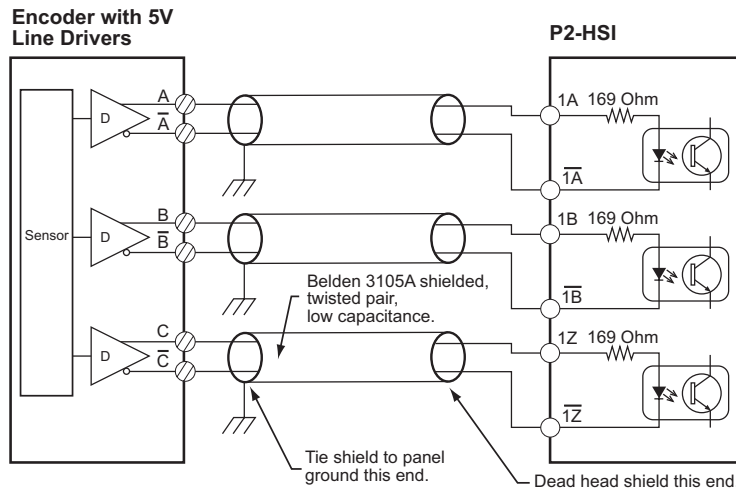
P2-HSI (cont'd)

Differential (5V) Input Specifications	
Pulse Inputs*	Differential inputs (6 pts: 1A, 1B, 1Z, 2A, 2B, 2Z)
Isolation	Each input is isolated from other circuits
Input Signal Type, per Channel Select	Differential
Input Volts	5VDC
Input Volts Maximum	±5.6 VDC, limited by protection
Input Impedance	200Ω minimum, 500Ω maximum
Inputs Rated Current	5VDC, 15mA (8mA typical, 15mA maximum)
Input Minimum ON Voltage	3.0 VDC
Input Maximum OFF Voltage	1.0 VDC
Input Minimum ON Current	5.0 mA
Input Maximum OFF Current	2.0 mA
OFF to ON Response Time	1A, 1B, 2A, 2B: 0.48 μs 1Z, 2Z, 3IN, 4IN: 6μs
ON to OFF Response Time	1A, 1B, 2A, 2B: 0.48 μs 1Z, 2Z, 3IN, 4IN: 6μs
Max. Input Frequency*	1A, 1B, 2A, 2B: 1MHz 1Z, 2Z, 3IN, 4IN: 200kHz

* The Z pulse input (1Z & 2Z) is capable of capturing a 1MHz wide pulse for the purpose of resetting an encoder count but a 3 microsecond pause (300kHz) is required between pulses.
 Note: The voltage difference between the input pairs must be between 3-5.6 volts.

5V Encoder Inputs

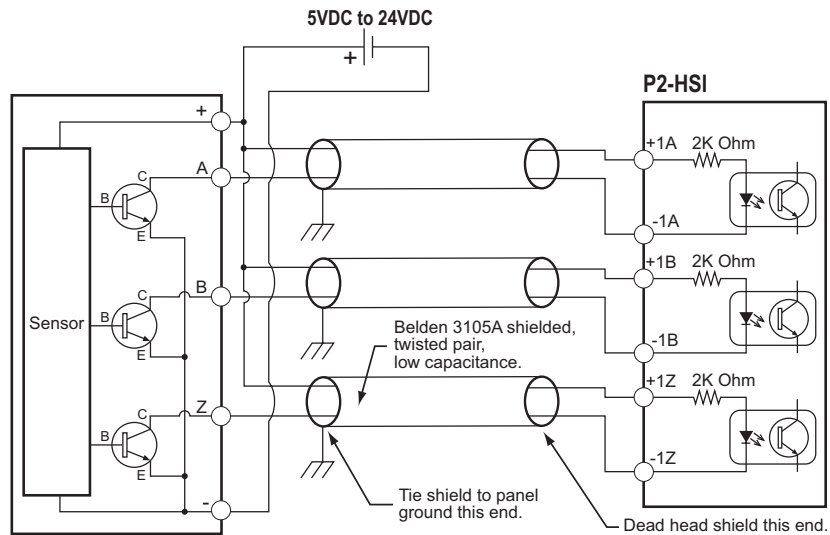
To prevent damage to P2-HSI 5V inputs, do not exceed 6.8V or 30 mA on inputs 1A, 1A, 1B, 1B, 1Z, 1Z, 2A, 2A, 2B, 2B, 2Z, & 2Z.



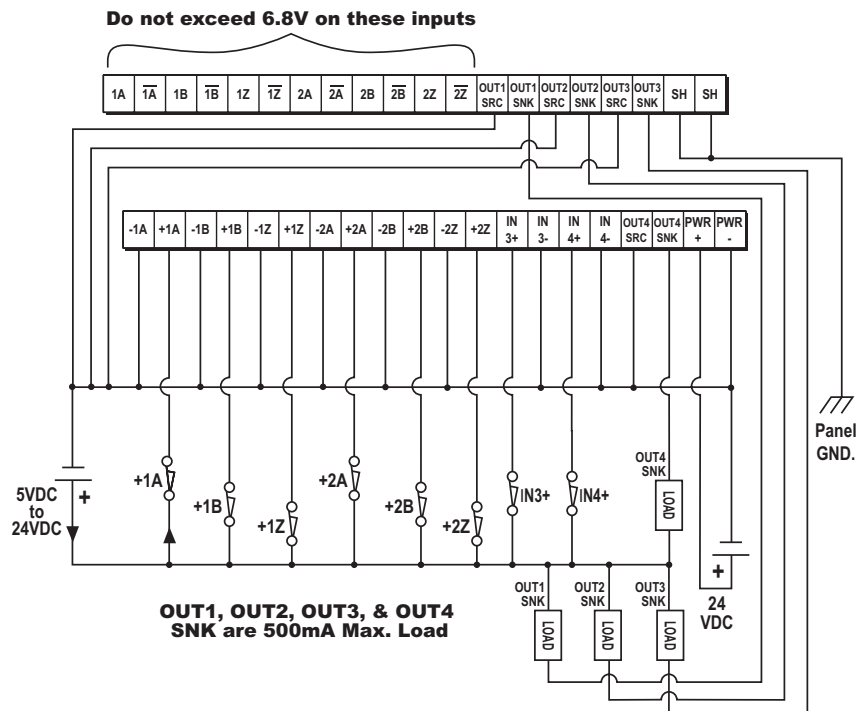
Specialty Modules

P2-HSI (cont'd)

24V Encoder Inputs



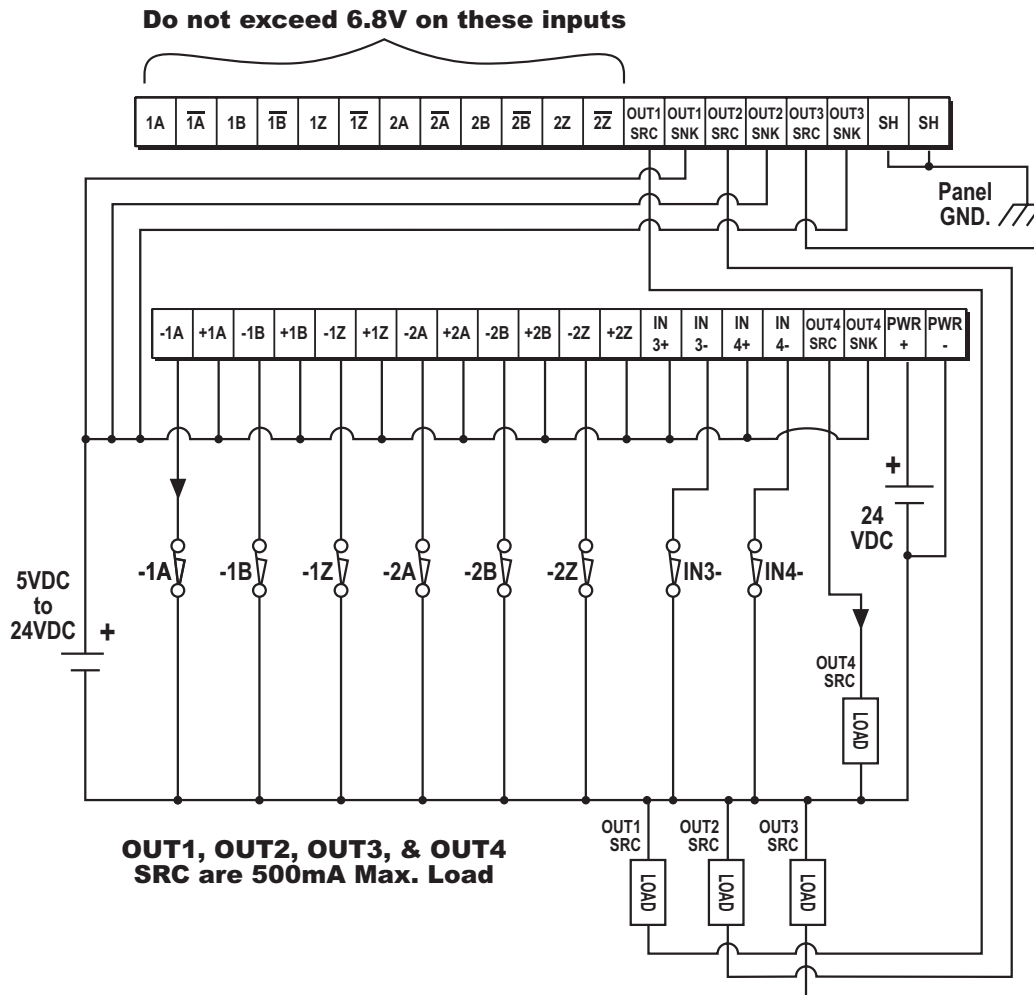
Sinking I/O Wiring Diagram



Specialty Modules

P2-HSI (cont'd)

Sourcing I/O Wiring Diagram



Specialty Modules

P2-HSI (cont'd)

Frequency Response

Inaccuracy of Frequency Measurements ^{1,2} for "Fast Mode"				
Input Frequency	Sampling Period	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±1 Second	±1Hz	±1 Hz	±1 Hz
10Hz				
100Hz				
1kHz				
10kHz				
100kHz				
1MHz				

Resolution of Frequency Measurements for "Fast Mode"		
Input Frequency	Sampling Period	Resolution
1 Hz to 1 MHz	1000ms	±1Hz
10 Hz to 1 MHz	100ms	±10Hz
100 Hz to 1 MHz	10ms	±100Hz
1 MHz	1ms	±1000Hz

Inaccuracy of Frequency Measurements ^{1,2} for "Slow Mode"			
Input Frequency	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±0.002 Hz	±0.002 Hz	±0.002 Hz
10Hz	±0.009 Hz	±0.009 Hz	±0.009 Hz
100Hz	±0.015 Hz	±0.015 Hz	±0.015 Hz
1kHz	±1Hz	±1Hz	±1Hz
10kHz	±100Hz	±100Hz	±100Hz
100kHz	±1000Hz	±1000Hz	±1000Hz
1MHz	±40000Hz	±40000Hz	±40000Hz

Inaccuracy of Frequency Measurements ^{1,2,3,4} for "Auto Mode"			
Input Frequency	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±1Hz	±1Hz	±1Hz
10Hz	±1Hz	±1Hz	±1Hz
100Hz	±1Hz	±1Hz	±1Hz
1kHz	±1Hz	±1Hz	±1Hz
10kHz	±100Hz	±100Hz	±100Hz
100kHz	±1000Hz	±1000Hz	±1000Hz
1MHz	±10000Hz	±10000Hz	±10000Hz

1. For stable input signal at given input frequency.
2. For total measurement error add the time base error to the tabulated error.
3. Maximum sample period: 1 second.
4. Minimum sample period: 0.001 seconds.

Inaccuracy of Frequency Measurements Due to Time Base Errors	
25 MHz Crystal for Time Base	
Inaccuracy at 25°C, Maximum	±30PPM
Inaccuracy 0–60°C, Referenced to 25°C	±30PPM
Inaccuracy Due to Aging, Maximum	±5PPM/Year
Max. Time Base Inaccuracy 0–60°C and 10 Years Operation	0.01%

Module Range:	Target position range ±2.147 billion (32-bit signed integer)
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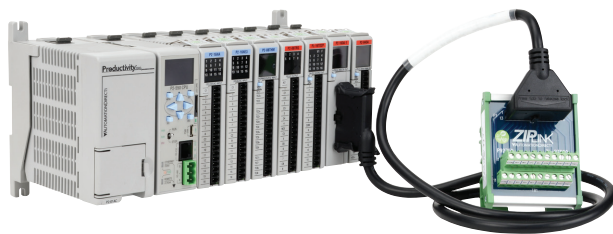
CPU I/O Modules to ZIPLink Connector Modules - Productivity2000

Discrete Input Modules

Productivity2000 Input Module ZIPLink Selector				
I/O Input Module	ZIPLink			
	# of Terms	Component	Part No.	Cable Part No.
P2-08ND3-1	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
P2-16ND3-1		Sensor/LED	ZL-LTB16-24-1	
P2-08NE3		Feedthrough	ZL-RTB20 (-1)	
P2-16NE3				
P2-32ND3-1		40	Feedthrough	
		Sensor/LED	ZL-LTB32-24-1	
P2-32NE3	40	Feedthrough	ZL-RTB40 (-1)	
P2-08NAS	8	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
P2-16NA	18			

Specialty Modules

Productivity2000 Specialty & Motion Modules ZIPLink Selector				
I/O Module	ZIPLink			
	# of Terms	Component	Part No.	Cable Part No.
P2-HSI	40	Feedthrough	ZL-RTB40 (-1)	ZL-CBL40-S
P2-HSO				ZL-CBL40-1S
P2-02HSC	See Note 1			
P2-04PWM	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
P2-08SIM	See Note 1			
P2-SCM	See Note 1			



Discrete Output Modules

Productivity2000 Output Module ZIPLink Selector				
I/O Output Module	ZIPLink			
	# of Terms	Component	Part No.	Cable Part No.
P2-08TD1S	8	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
P2-08TD2S	8			
P2-15TD1	15			
P2-15TD2	15			
P2-08TD1P	18			
P2-08TD2P	18			
P2-08TRS	18			
P2-08TAS	18			
P2-16TA	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
		Fuse	ZL-RFU20 2	
P2-16TD1P	18	Feedthrough	ZL-RTB20 (-1)	
		Relay (Sinking)	ZL-RRL16-24-1	
			ZL-RRL16W-24-1	
P2-16TD2P	18	Relay (Sourcing)	ZL-RRL16F-24-1	
			ZL-RRL16HDF-24-1	
		Feedthrough	ZL-RTB20 (-1)	
P2-32TD1P	32	Feedthrough	ZL-RTB40 (-1)	ZL-CBL40 *
P2-32TD2P	32			
P2-16TR	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
		Fuse	ZL-RFU20 2	

* Select the cable length by replacing the * with: Blank = 0.5 m, -1 = 1.0 m, or -2 = 2.0 m.

1. These modules are not supported by the ZIPLink wiring system

2. Note: Fuses (5 x 20 mm) are not included. See Edison Electronic Fuse section for (5 x 20 mm) fuse. S500 and GMA electronic circuit protection for fast-acting maximum protection. S506 and GMC electronic circuit protection for time-delay performance. Ideal for inductive circuits.

To ensure proper operation, do not exceed the voltage and current rating of ZIPLink module. ZL-RFU20 = 2A per circuit; ZL-RFU40 = 400 mA per circuit.

CPU I/O Modules to ZIPLink Connector Modules - Productivity2000

Analog Input Modules

Productivity2000 Analog Input Module ZIPLink Selector				
I/O Analog Module	ZIPLink			
	# of Terms	Component	Part No.	Cable Part No.
P2-04AD	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
P2-04AD-1				
P2-04AD-2				
P2-08AD-1				
P2-08AD-2				
P2-08ADL-1				
P2-08ADL-2				
P2-16AD-1				
P2-16AD-2				
P2-16ADL-1				
P2-16ADL-2				
P2-06RTD	Matched Only	See Note 1		
P2-08THM	T/C Wire Only	See Note 1		
P2-08NTC	Copper Conductors	See Note 1		

* Select the cable length by replacing the * with: Blank = 0.5 m, -1 = 1.0 m, or -2 = 2.0 m.

1. These modules are not supported by the ZIPLink wiring system.

Analog Output Modules

Productivity2000 Analog Output Module ZIPLink Selector								
I/O Analog Module	ZIPLink							
	# of Terms	Component	Part No.	Cable Part No.				
P2-04DA	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *				
P2-04DA-1								
P2-04DA-2								
P2-04DAL-1								
P2-04DAL-2								
P2-08DA-1								
P2-08DA-2								
P2-08DAL-1								
P2-08DAL-2								
P2-16DA-1					24			ZL-P2-CBL24 *
P2-16DA-2								
P2-16DAL-1								
P2-16DAL-2	18			ZL-P2-CBL18 *				
P2-8AD4DA-1								
P2-8AD4DA-2								



I/O Modules

A variety of discrete, analog and specialty I/O modules are available for use in a Productivity2000 system. Specifications for each module are on the following pages.

A filler module is available for unused I/O module slots (part number P2-FILL).

Discrete Input Modules

Productivity2000 Discrete Input Modules			
Part Number	Number of Inputs	Description	Price
P2-08SIM	8	Input Simulator Module	
P2-08ND3-1	8	Sinking/Sourcing 12-24 VDC	
P2-16ND3-1	8	Sinking/Sourcing 24V AC/DC	
P2-32ND3-1	16	Sinking/Sourcing 12-24 VDC	
P2-08NE3	16	Sinking/Sourcing 24V AC/DC	
P2-16NE3	32	Sinking/Sourcing 12-24 VDC	
P2-32NE3	32	Sinking/Sourcing 24V AC/DC	
P2-08NAS	8	AC Isolated 100-120 VAC	
P2-16NA	16	AC 100-240 VAC	

Specialty Modules

Productivity2000 Specialty Modules			
Part Number	Number of Channels	Description	Price
P2-HSI	2	High-Speed Input	
P2-HSO**	2	High-Speed Output	
P2-02HSC	2	High-Speed Counter	
P2-04PWM	4	Pulse-Width Modulation	
P2-SCM	4 ports	Serial Communications Module	

** ZIPLink required.

Analog Output Modules

Productivity2000 Analog Output Modules			
Part Number	Number of Channels	Description	Price
P2-04DA	4	Analog Output (Voltage/Current)	
P2-04DA-1	4	Analog Output (Current)	
P2-04DA-2	4	Analog Output (Voltage)	
P2-04DAL-1*	4	Analog Output (Current)	
P2-04DAL-2*	4	Analog Output (Voltage)	
P2-08DA-1	8	Analog Output (Current)	
P2-08DA-2	8	Analog Output (Voltage)	
P2-08DAL-1*	8	Analog Output (Current)	
P2-08DAL-2*	8	Analog Output (Voltage)	
P2-16DA-1	16	Analog Output (Current)	
P2-16DA-2	16	Analog Output (Voltage)	
P2-16DAL-1*	16	Analog Output (Current)	
P2-16DAL-2*	16	Analog Output (Voltage)	

* Low resolution analog modules without OLED display.

Discrete Output Modules

Productivity2000 Discrete Output Modules			
Part Number	Number of Outputs	Description	Price
P2-08TD1S	8	Isolated Sinking	
P2-08TD2S	8	Isolated Sourcing	
P2-15TD1	15	Sinking	
P2-15TD2	15	Sourcing	
P2-08TD1P	8	Sinking Protected	
P2-08TD2P	8	Sourcing Protected	
P2-16TD1P	16	Sinking Protected	
P2-16TD2P	16	Sourcing Protected	
P2-32TD1P	32	Sinking Protected	
P2-32TD2P	32	Sourcing Protected	
P2-08TAS	8	Isolated AC	
P2-16TA	16	100-240 VAC Output	
P2-08TRS	8	Isolated Relay	
P2-16TR	16	Relay	

Analog Input Modules

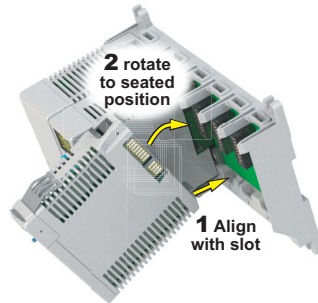
Productivity2000 Analog Input Modules			
Part Number	Number of Channels	Description	Price
P2-04AD	4	Analog Input (Voltage/Current)	
P2-04AD-1	4	Analog Input (Current)	
P2-04AD-2	4	Analog Input (Voltage)	
P2-08AD-1	8	Analog Input (Current)	
P2-08AD-2	8	Analog Input (Voltage)	
P2-08ADL-1*	8	Analog Input (Current)	
P2-08ADL-2*	8	Analog Input (Voltage)	
P2-16AD-1	16	Analog Input (Current)	
P2-16AD-2	16	Analog Input (Voltage)	
P2-16ADL-1*	16	Analog Input (Current)	
P2-16ADL-2*	16	Analog Input (Voltage)	
P2-06RTD	6	Analog RTD Input	
P2-08NTC	8	Analog Thermocouple Input	
P2-08THM	8	Analog Thermistor Input	

Productivity2000 Analog Input/Output Modules			
Part Number	Number of Channels	Description	Price
P2-8AD4DA-1	8/4	Analog Input/Output (Current)	
P2-8AD4DA-2	8/4	Analog Input/Output (Voltage)	

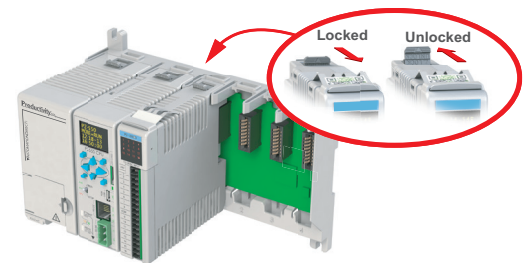
I/O Module Installation Procedure

WARNING: DO NOT APPLY FIELD POWER UNTIL THE FOLLOWING STEPS ARE COMPLETED. SEE HOT-SWAP PROCEDURE FOR EXCEPTIONS.

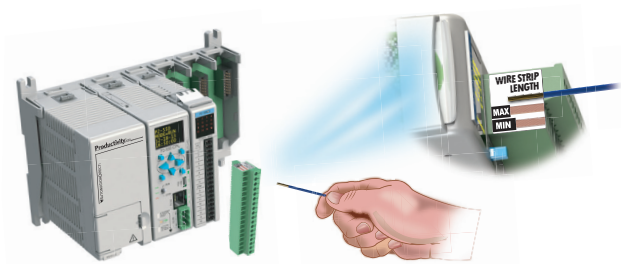
Step One: Align module catch with base slot and module into connector.



Step Two: Pull top locking tab toward module face. Click indicates lock is engaged.



Step Three: Attach field wiring using removable terminal block or ZIPLink wiring system.



WARNING: EXPLOSION HAZARD – DO NOT CONNECT OR DISCONNECT CONNECTORS OR OPERATE SWITCHES WHILE CIRCUIT IS LIVE UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS. DO NOT HOT-SWAP MODULES UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.