

# Specialty Modules

## P2-HSO

### High-Speed Output

The P2-HSO High-Speed (1MHz) output module supports pulse/direction, up/down and quadrature pulse output on each of the two independent output channels. Additionally, it has six 5–24 VDC general purpose inputs and four 5–24 VDC general purpose 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	6.26 W
Enclosure Type	Open equipment
Emissions	EN61000-6-4 (Conducted and Radiated RF Emissions)
Module Keying to Backplane	Electronic
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, 5, 6 (one per pulse output and one per status output)
Input LEDs	(IN) 1, 2, 3, 4, 5, 6 (one per status input)
Output Status LEDs	(O) OUT 1A & 1B, OUT 2A & 2B, OUT 3, 4, 5, 6

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

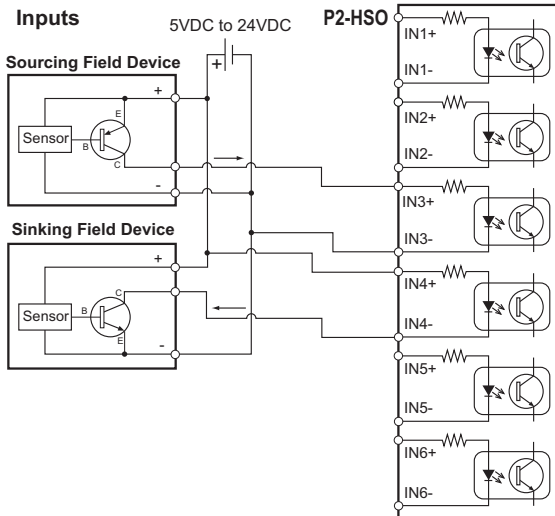
Connector Specifications	
Connector Type	IDC style header with latch, Omron XG4A-4034
Number of Pins	40 point
Pitch	0.1 in (2.54 mm)

Power Specifications	
External Power	24VDC -15% / +10%, Class 2
Maximum Voltage	26.4 VDC
Minimum Voltage	20.4 VDC
Current Consumption Excluding Outputs	130mA
Maximum Current Consumption Total of the 4 Status Outputs	2A

# Specialty Modules

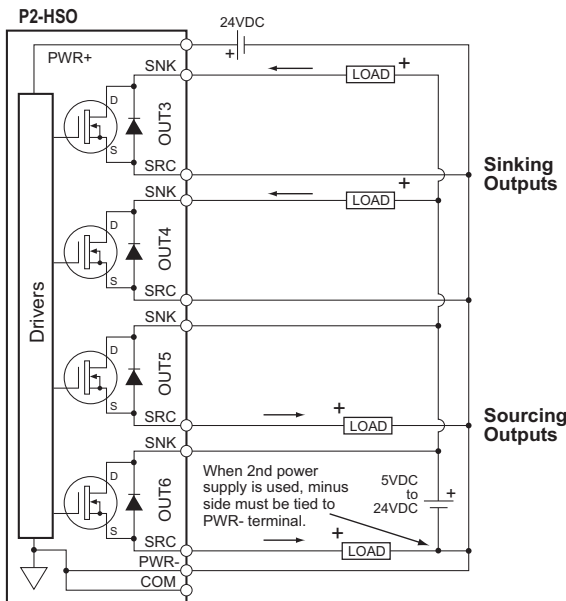
## P2-HSO (cont'd)

### Status Inputs



Status Input Specifications	
<b>Status Input</b>	6 sink/source
<b>Isolation</b>	Each status input is individually isolated from all other circuits
<b>Input Volts Range</b>	5–24 VDC
<b>Input Volts Maximum</b>	34VDC, limited by protection
<b>Input Impedance</b>	1kΩ minimum, 5kΩ maximum
<b>Inputs Rated Current</b>	5–24 VDC, 16mA 5.2 mA typical @ 5VDC 22mA maximum @ 34VDC
<b>Input Minimum ON Voltage</b>	4.5 VDC
<b>Input Maximum OFF Voltage</b>	2.0 VDC
<b>Input Minimum ON Current</b>	5.0 mA
<b>Input Maximum OFF Current</b>	1.4 mA
<b>OFF to ON Response Time</b>	4μs
<b>ON to OFF Response Time</b>	4μs

### Status Outputs



Status Output Specifications		
<b>Status Outputs</b>	4 sink/source	
<b>Output Signal Type, per Channel Select</b>	Current Sinking	Current Sourcing
<b>Operating Voltage<sup>2</sup></b>	5–24 VDC	5–24 VDC <sup>2</sup>
<b>Output Volts Maximum<sup>2</sup></b>	36VDC	26.4 VDC <sup>2</sup>
<b>Output Current Maximum</b>	500mA	
<b>Overcurrent Protection</b>	Short circuit detect, overcurrent shutdown <sup>1</sup>	
<b>Output Self Limiting Current</b>	1.2 to 2.4 A	
<b>Max Inrush Current</b>	Self limited	
<b>Output Voltage Drop</b>	0.7 VDC @ 0.5 A	
<b>Thermal Protection</b>	Independent over temperature protection each output	
<b>Output Voltage Clamp During Inductive Switching</b>	+45VDC	-20VDC
<b>Maximum OFF to ON Response</b>	25μs <sup>3</sup>	
<b>Maximum ON to OFF Response</b>	25μs <sup>3</sup>	

**Notes:**

1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. Operating voltage for current sourcing outputs must be less or equal to the external power.
3. Measured at 5VDC operating voltage, 0.5A load.

# Specialty Modules

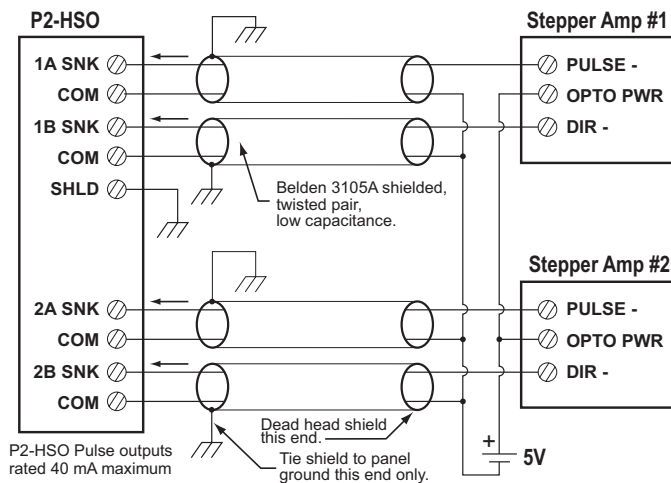
## P2-HSO (cont'd)

Pulse Output Specifications		
<b>Pulse Outputs</b>	2 Channels	
<b>Output Pulse Type, per Channel Select</b>	Selectable for pulse & direction, up/down or quadrature	
<b>Output Signal Type, per Channel Select</b>	RS-422 Line Driver Current Sinking and Sourcing	Open Drain FET Outputs Current Sinking
<b>Output Volts</b>	RS-422 levels	24VDC
<b>Output Volts Maximum</b>	5VDC	36VDC
<b>Protection for Overcurrent and Short Circuit to Power</b>	Current limit and thermal shutdown <sup>2</sup>	Current limit and thermal shutdown <sup>1</sup>
<b>Protection Short to Ground</b>	Yes	Yes
<b>Overcurrent Trip Level</b>	Output current limit $\pm 200\text{mA max}^2$	100mA minimum
<b>Maximum Continuous Output Current</b>	$\pm 60\text{mA}$	40mA
<b>Maximum Switching Frequency, 1m cable<sup>3</sup></b>	1MHz	500kHz
<b>Maximum Switching Frequency, 10m cable<sup>3</sup></b>	1MHz	200kHz

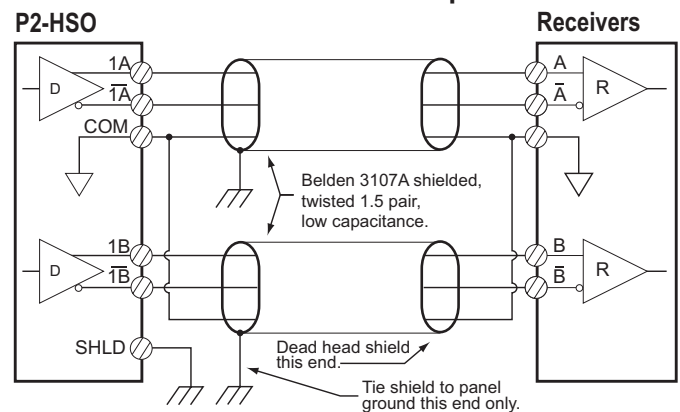
**NOTES:**

1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. RS-422 thermal faults auto reset after device cool down.
3. Outputs are not limited to these speeds but single ended signals produced by the FETs are not usually reliable above these speeds due to cabling capacitance.

### Sinking Pulse Outputs



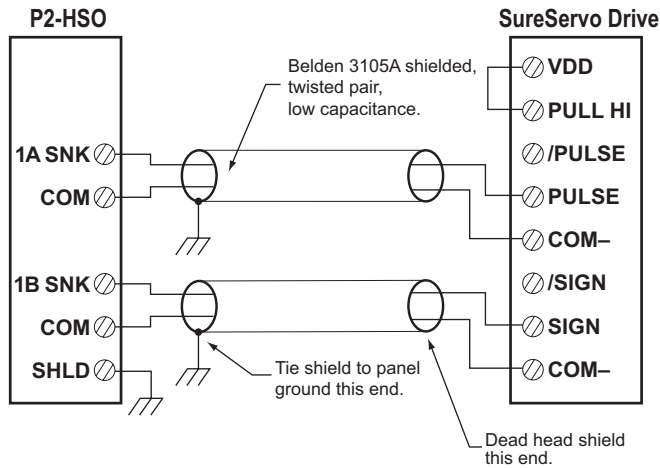
### Line Driver Pulse Outputs



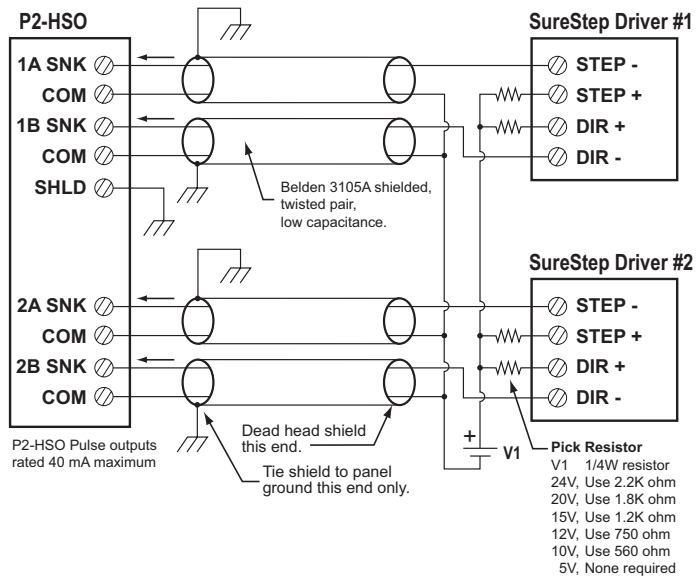
# Specialty Modules

## P2-HSO (cont'd)

**SureServo Wiring Diagram**



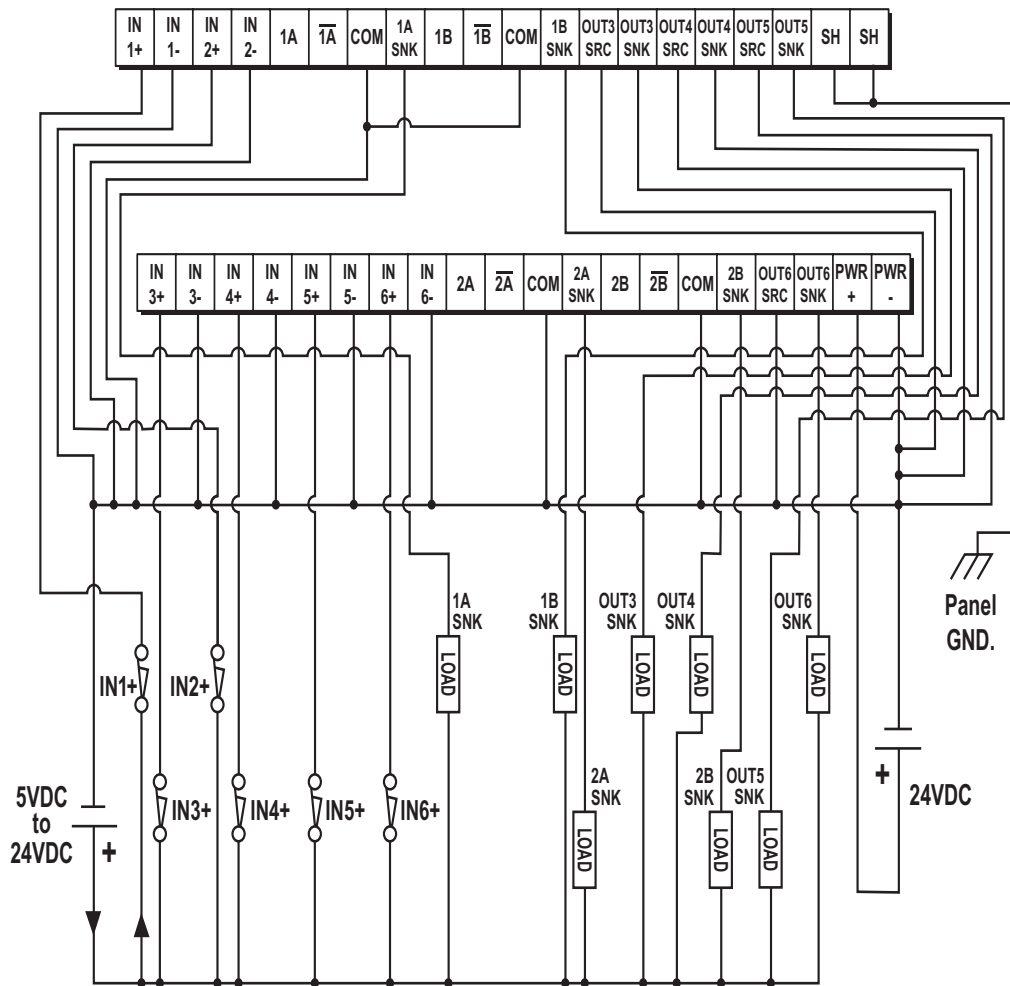
**SureStep Wiring Diagram**



# Specialty Modules

## P2-HSO (cont'd)

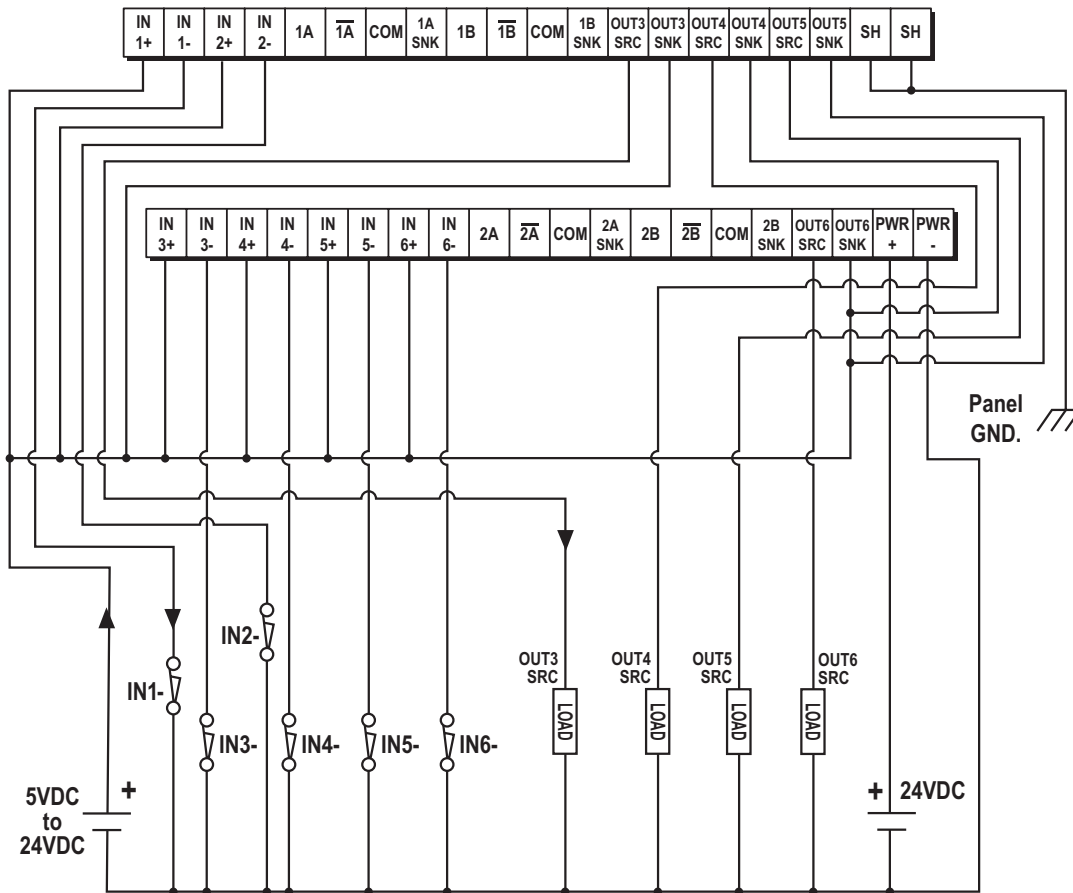
### Sinking I/O Wiring Diagram



# Specialty Modules

## P2-HSO (cont'd)

### Sourcing I/O Wiring Diagram



Resolution of Frequency Output Measurements	
<b>Output Frequency</b>	Resolution
1kHz	0.01 Hz
10kHz	0.67 Hz
100kHz	67Hz
1MHz	6622Hz

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

<b>Module Range:</b>	Target position range ±2.147 billion (32-bit signed integer)
----------------------	--



# 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.
<b>P2-08ND3-1</b>	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
<b>P2-16ND3-1</b>		Sensor/LED	ZL-LTB16-24-1	
<b>P2-08NE3</b>		Feedthrough	ZL-RTB20 (-1)	
<b>P2-16NE3</b>				
<b>P2-32ND3-1</b>		40	Feedthrough	
		Sensor/LED	ZL-LTB32-24-1	
<b>P2-32NE3</b>	40	Feedthrough	ZL-RTB40 (-1)	
<b>P2-08NAS</b>	8	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
<b>P2-16NA</b>	18			

## Specialty Modules

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



## Discrete Output Modules

Productivity2000 Output Module ZIPLink Selector					
I/O Output Module	ZIPLink				
	# of Terms	Component	Part No.	Cable Part No.	
<b>P2-08TD1S</b>	8	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *	
<b>P2-08TD2S</b>	8				
<b>P2-15TD1</b>	15				
<b>P2-15TD2</b>	15				
<b>P2-08TD1P</b>	18				
<b>P2-08TD2P</b>	18				
<b>P2-08TRS</b>	18				
<b>P2-08TAS</b>	18				
<b>P2-16TA</b>	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *	
		Fuse	ZL-RFU20 2		
<b>P2-16TD1P</b>	18	Feedthrough	ZL-RTB20 (-1)		
		Relay (Sinking)	ZL-RRL16-24-1 ZL-RRL16W-24-1 ZL-RRL16F-24-1 ZL-RRL16HDF-24-1		
<b>P2-16TD2P</b>	18	Feedthrough	ZL-RTB20 (-1)		
		Relay (Sourcing)	ZL-RRL16-24-2 ZL-RRL16W-24-2 ZL-RRL16F-24-2 ZL-RRL16HDF-24-2		
<b>P2-32TD1P</b>	32	Feedthrough	ZL-RTB40 (-1)		ZL-CBL40 *
<b>P2-32TD2P</b>	32				
<b>P2-16TR</b>	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.
<b>P2-04AD</b>	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *
<b>P2-04AD-1</b>				
<b>P2-04AD-2</b>				
<b>P2-08AD-1</b>				
<b>P2-08AD-2</b>				
<b>P2-08ADL-1</b>				
<b>P2-08ADL-2</b>				
<b>P2-16AD-1</b>				
<b>P2-16AD-2</b>	24			ZL-P2-CBL24 *
<b>P2-16ADL-1</b>				
<b>P2-16ADL-2</b>				
<b>P2-06RTD</b>	Matched Only	See Note 1		
<b>P2-08THM</b>	T/C Wire Only	See Note 1		
<b>P2-08NTC</b>	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.				
<b>P2-04DA</b>	18	Feedthrough	ZL-RTB20 (-1)	ZL-P2-CBL18 *				
<b>P2-04DA-1</b>								
<b>P2-04DA-2</b>								
<b>P2-04DAL-1</b>								
<b>P2-04DAL-2</b>								
<b>P2-08DA-1</b>								
<b>P2-08DA-2</b>								
<b>P2-08DAL-1</b>								
<b>P2-08DAL-2</b>								
<b>P2-16DA-1</b>					24			ZL-P2-CBL24 *
<b>P2-16DA-2</b>								
<b>P2-16DAL-1</b>								
<b>P2-16DAL-2</b>	18			ZL-P2-CBL18 *				
<b>P2-8AD4DA-1</b>								
<b>P2-8AD4DA-2</b>								





# 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

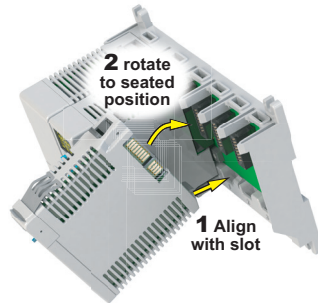
Productivity2000 Analog Input Modules			
Part Number	Number of Channels	Description	Price
P2-04AD	4	Analog Input (Voltage/Current)	
P2-04AD-1	4	Analog Input (Current)	
P2-04AD-2	4	Analog Input (Voltage)	
P2-08AD-1	8	Analog Input (Current)	
P2-08AD-2	8	Analog Input (Voltage)	
P2-08ADL-1*	8	Analog Input (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)	

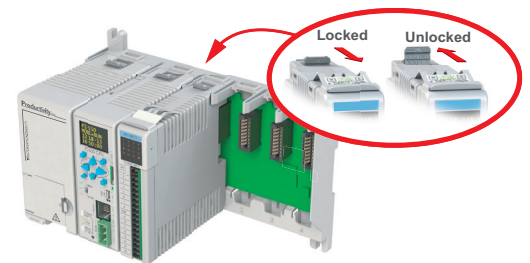
# I/O Module Installation Procedure

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

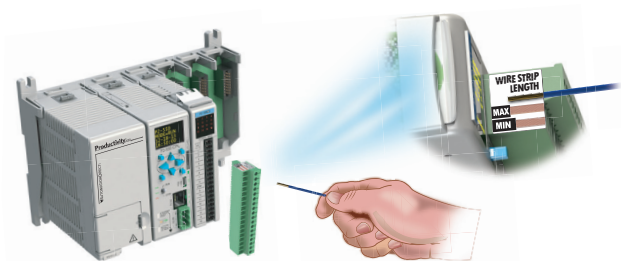
**Step One:** Align module catch with base slot and module into connector.



**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.