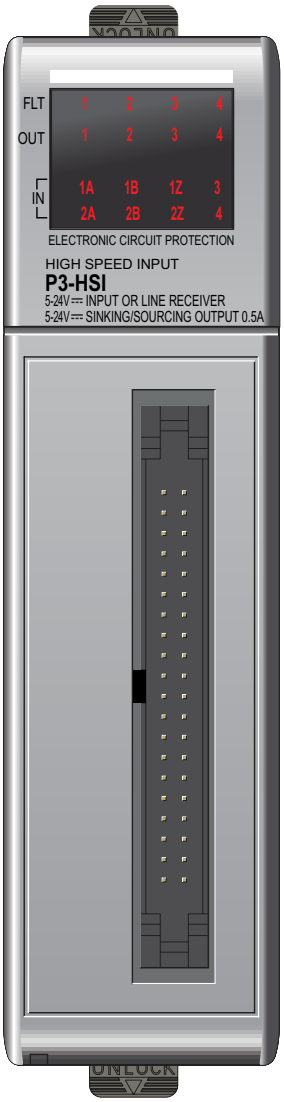
Specialty Modules

P3-HSI $619.00

High-Speed Pulse Input The P3-HSI is a high-speed pulse (1MHz) input module that has both differential and single ended inputs. This module accepts 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; *ZIP*Link required.

General Specifications	
Module Type	Intelligent
Modules per Base	11 Max
I/O Points Used	None, mapped directly to tags in CPU
Surrounding Air Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	5.76 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 any local, expansion, or remote base in a Productivity3000 system.
Field Wiring	Use ***ZIP***Link wiring system. See Wiring Solutions.
Weight	113.4 g (4oz)
Agency Approvals	UL508 file E157382, Canada & USA CE (EN61131-2*)

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

Power Specifications	
External Power	24VDC +10%/-15%, Class 2
Maximum Voltage	26.4 VDC
Minimum Voltage	20.4 VDC
Current Consumption Excluding Outputs	47mA
Maximum Current Consumption Total of the 4 Status Outputs	2A

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

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

NOTE: The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.

Specialty Modules

P3-HSI (cont'd)

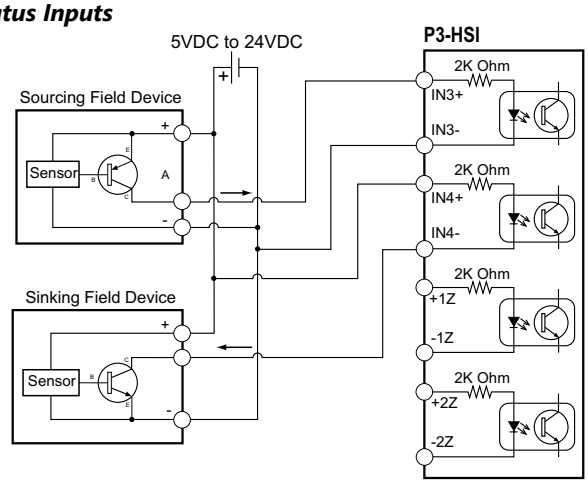
Single Ended (5-24V) Input Specifications	
Status Input	Single ended inputs (8 pts: 1A, 1B, 1Z, 2A, 2B, 2Z, 3IN, 4IN)
Isolation	Each input is isolated from other circuits
Input Volts Range	5–24 VDC
Input Volts Maximum	±34 VDC, limited by protection
Input Impedance	1kΩ min., 5kΩ max.
Inputs Rated Current	5–24 VDC, 16mA 5.2 mA typ. @ 5VDC 22mA max. @ 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: 200kHz* 1Z, 2Z, 3IN, 4IN: 200kHz*

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

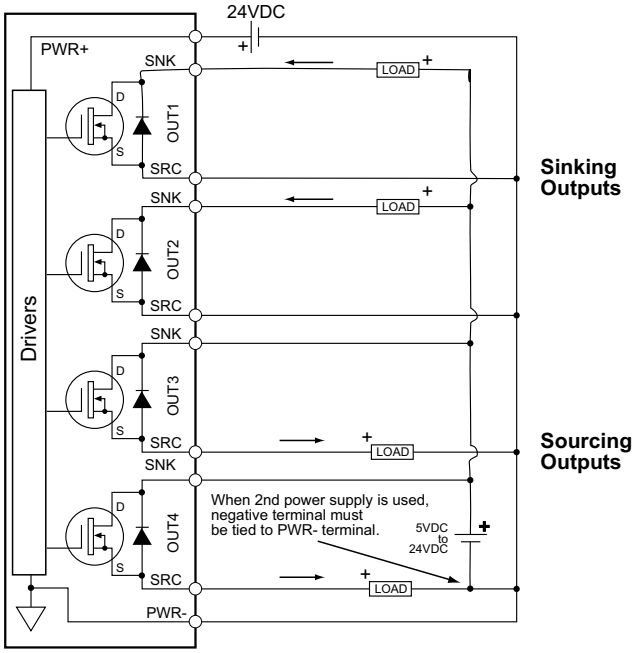
Status Output Specifications		
Status Outputs	4 Outputs	
Output Signal Type, per Output	Current Sinking	Current Sourcing
Operating Voltage1	5–24 VDC	5–24 VDC1
Output Volts Maximum	36VDC	26.4 VDC1
Output Current Maximum	500mA	500mA
Overcurrent Protection	Short circuit detect and current limit with automatic retry for each output	
Output Self Limiting Current	1.2 to 2.4 amps	
Max. Inrush Current	Self limited	
Output Voltage Drop	0.7 VDC @ 0.5 A	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	25ms[2]	
Maximum ON to OFF Response	25ms[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 curent.

Status Inputs



Status Outputs



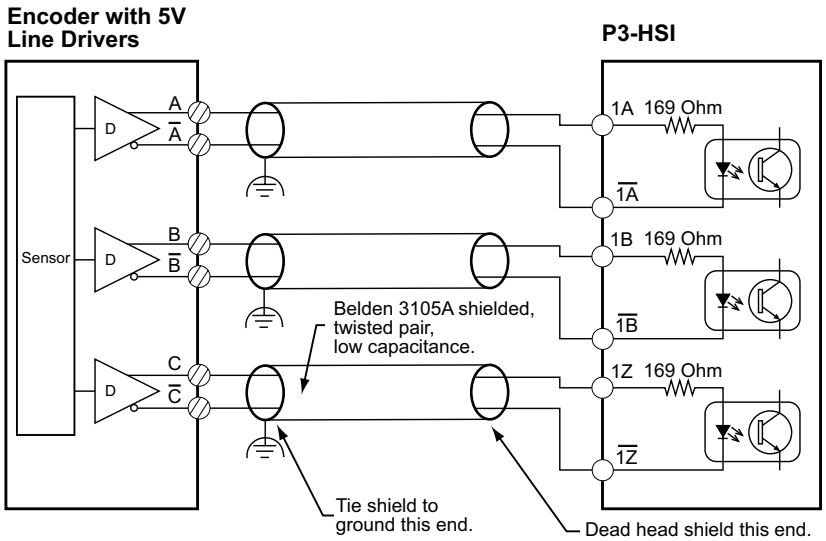
Differential (5V) Input Specifications	
Pulse Inputs	Differential inputs (6 pts: 1A, 1B, 1Z, 2A, 2B, 2Z)
Isolation	Each input is isolated from other circuits
Input Signal Type, per Channel Select	Differential
Input Volts	5VDC
Input Volts Maximum	±5.6 VDC, limited by protection
Input Impedance	200Ω min., 500Ω max.
Inputs Rated Current	5VDC, 15mA (8mA typ., 15mA max.)
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: 300kHz*

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

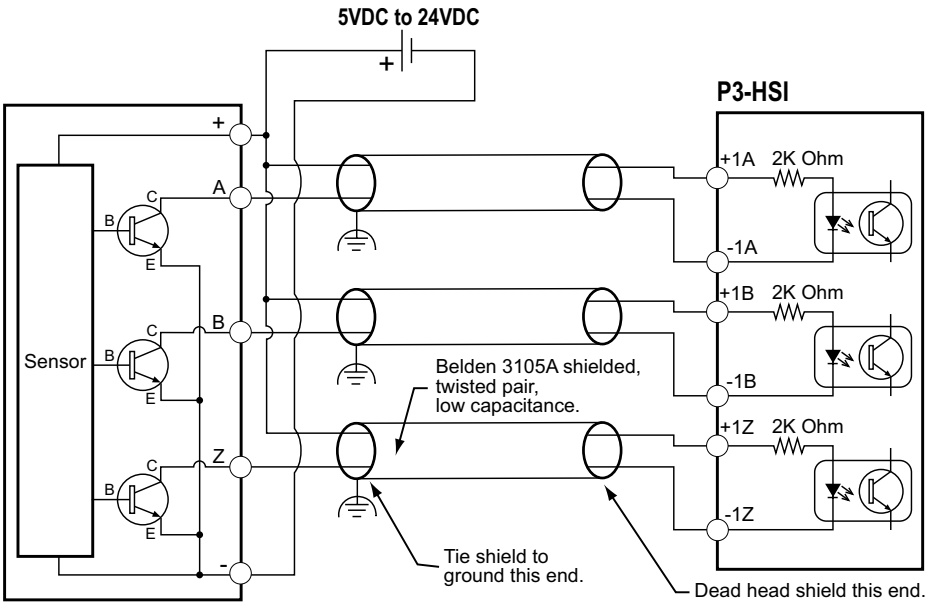
P3-HSI (cont'd)

5V Encoder Inputs

To prevent damage to P3-HSI 5V inputs,
do not exceed 6.8 V or 30mA on inputs
1A, $\overline{1A}$, 1B, $\overline{1B}$, 1Z, $\overline{1Z}$, 2A, $\overline{2A}$, 2B, $\overline{2B}$, 2Z, & $\overline{2Z}$.

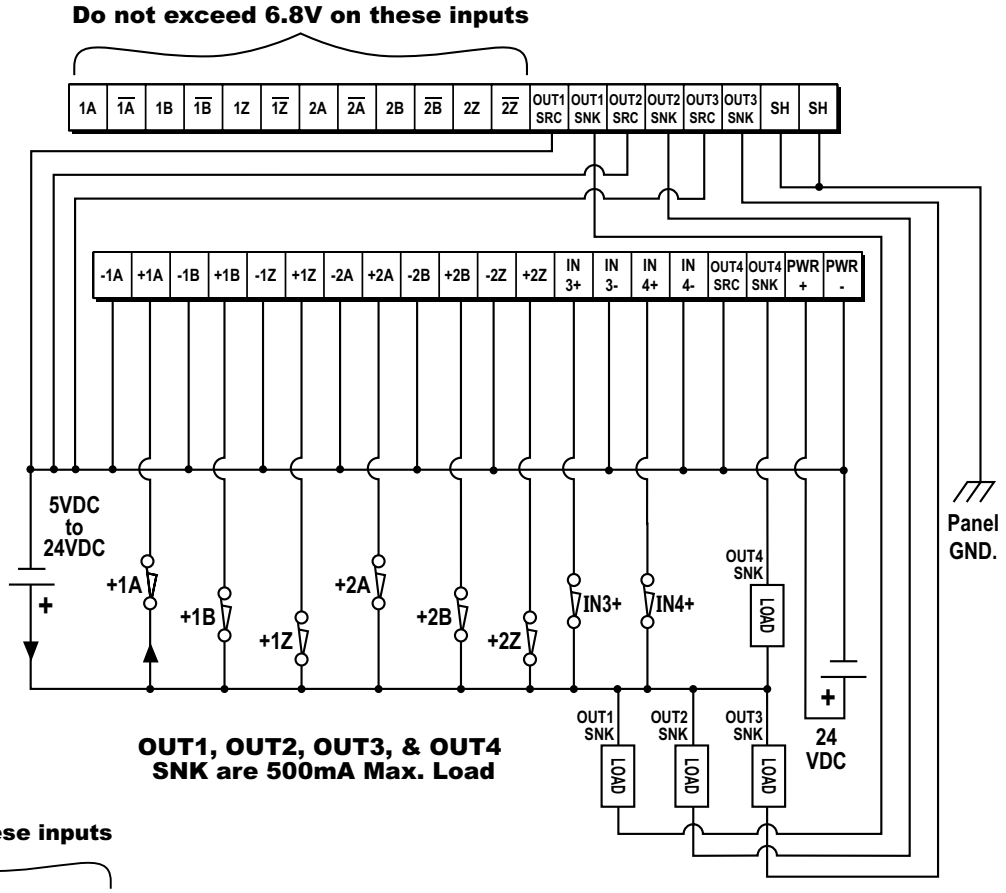


24V Encoder Inputs

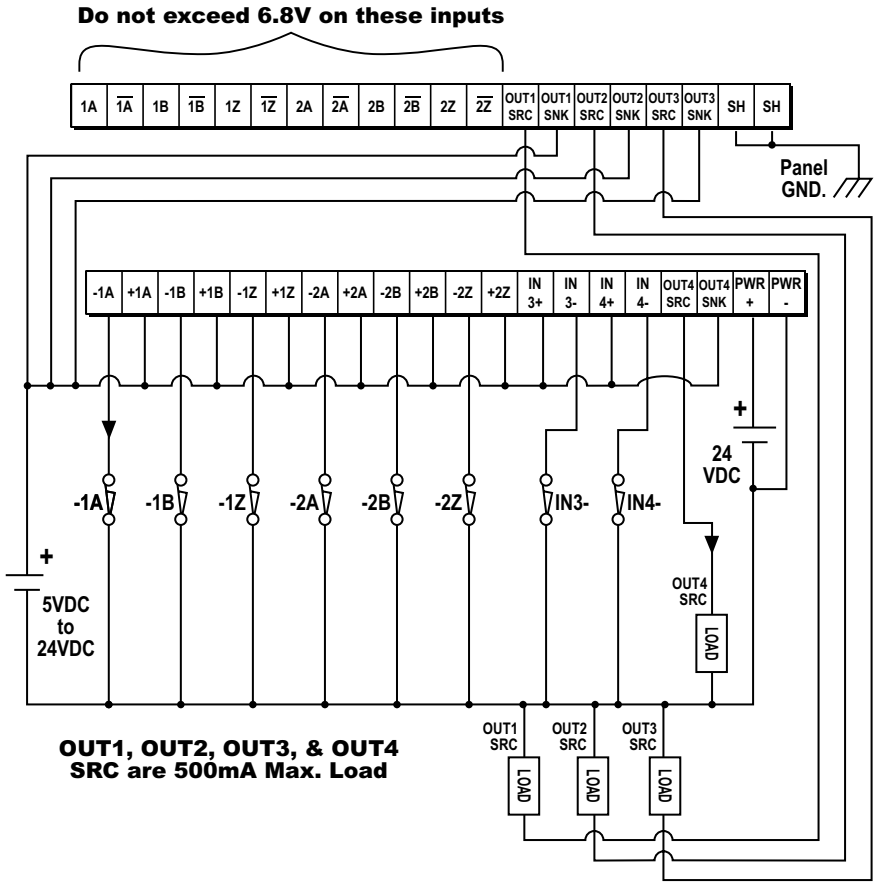


P3-HSI (cont'd)

Sinking I/O Wiring Diagram



Sourcing I/O Wiring Diagram

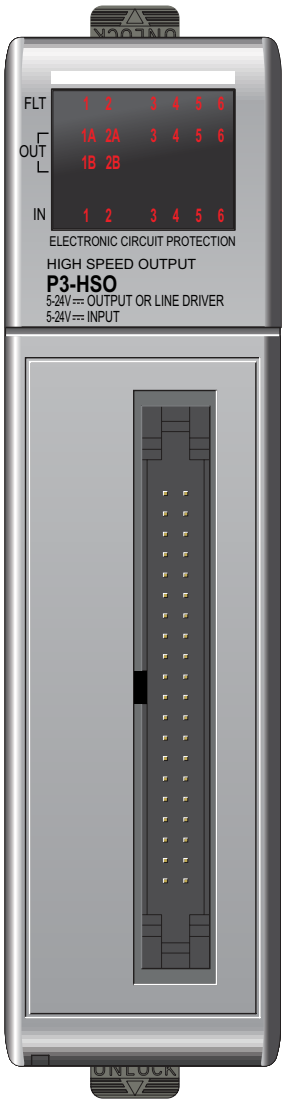


Specialty Modules

P3-HSO $646.00

High-Speed Output

The P3-HSO is a high-speed pulse (1MHz) output module that supports Pulse/Direction, Up/Down and Quadrature pulse output on each of the two independent output channels. It has both line driver and open drain outputs. Additionally, it has six general purpose high-speed inputs and four general purpose outputs. Simple move, velocity move, and additional high level instructions make it easy to implement the application's motion profile.



No terminal block sold for this module; *ZIP*Link required.

General Specifications	
Module Type	Intelligent
Modules per Base	11 Max
I/O Points Used	None, mapped directly to tags in CPU
Surrounding Air Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
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 any local, expansion, or remote base in a Productivity3000 system.
Field Wiring	Use ***ZIP***Link wiring system. See Wiring Solutions.
Weight	114g (4oz.)
Agency Approvals	UL508 file E157382, Canada & USA CE (EN61131-2*)

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

Power Specifications	
External Power	24VDC +10%/-15%, 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

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

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

NOTE: The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.

Specialty Modules

P3-HSO (cont'd)

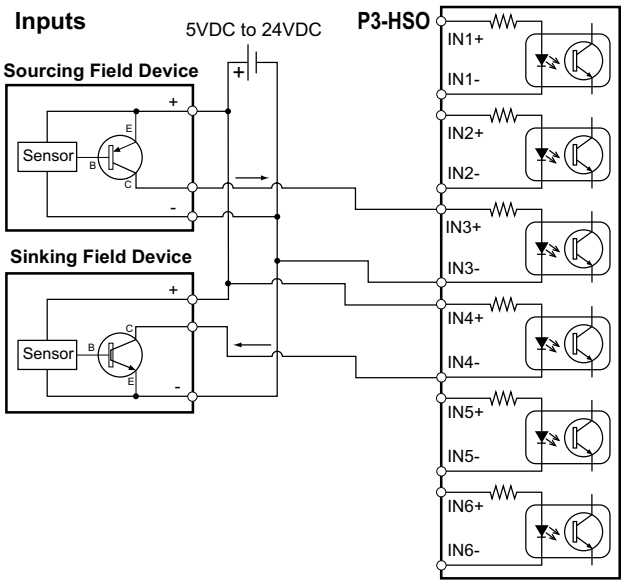
Status Input Specifications	
Status Input	6 inputs
Isolation	Each status input is individually isolated from all other circuits
Input Volts Range	5–24 VDC
Input Volts Maximum	± 34VDC, limited by protection
Input Impedance	1kΩ min., 5kΩ max.
Inputs Rated Current	5–24 VDC, 16mA 5.2 mA typ. @ 5VDC 22mA max. @ 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	4ms
ON to OFF Response Time	4ms

Status Output Specifications		
Status Outputs	4 Outputs	
Output Signal Type, per Output	Current Sinking	Current Sourcing
Operating Voltage1	5–24 VDC	5–24 VDC1
Output Volts Maximum	36VDC	26.4 VDC1
Output Current Maximum	500mA	500mA
Overcurrent Protection	Short circuit detect, overcurrent shutdown1	
Output Self Limiting Current	1.2 to 2.4 amps	
Max. Inrush Current	Self limited	
Output Voltage Drop	0.7 VDC @ 0.5 A	0.7 VDC @ 0.5 A
Thermal Protection	Independent overtemperature protection each output	
Overtemperature Shutdown	155° to 185°C (311° to 365°F)	
Temperature Shutdown Hysteresis	5° to 15°C (41° to 59°F)	
Output Voltage Clamp During Inductive Switching	+45VDC	-20VDC
Maximum OFF to ON Response	25ms2	
Maximum ON to OFF Response	25ms2	

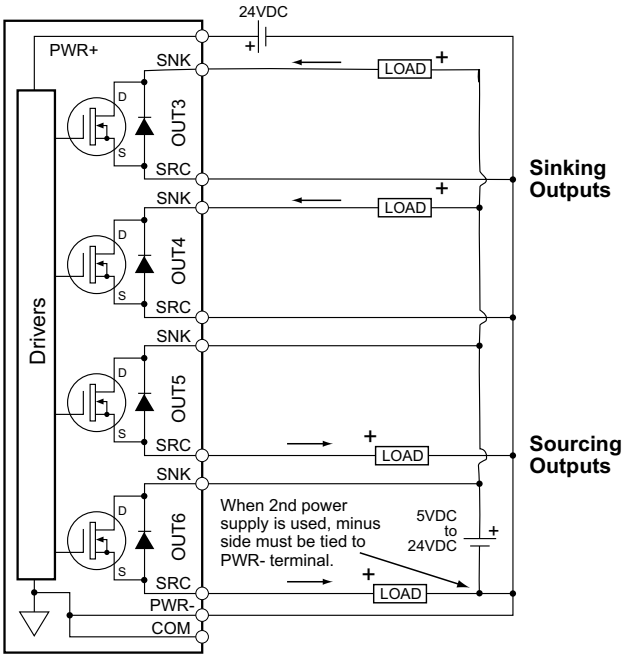
Notes:
1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. Operating voltage for current sourcing outputs must be less or equal to the external power.
3. Measured at 5VDC operating voltage, 0.5 A load.

Pulse Outputs Specifications		
Pulse Outputs	2 Channels	
Output Pulse Type, per Channel Select	Selectable for pulse & direction, up/down or quadrature	
Output Signal Type, per Channel Select	RS-422 Line Driver Current Sinking and Sourcing	Open Drain FET Outputs Current Sinking
Output Volts	RS-422 levels	24VDC
Output Volts Maximum	5VDC	36VDC
Protection for Overcurrent and Short Circuit to Power	Current limit and Thermal shutdown2	Current limit and Thermal shutdown1
Protection Short to Ground	Yes	Yes
Overcurrent Trip Level	Output current limit ±200mA max.2	100mA minimum
Maximum Continuous Output Current	±60mA	40mA
Max Switching Frequency, 1m Cable	1MHz	500kHz*
Max Switching Frequency, 10m Cable	1MHz	200kHz*

Status Inputs



Status Outputs

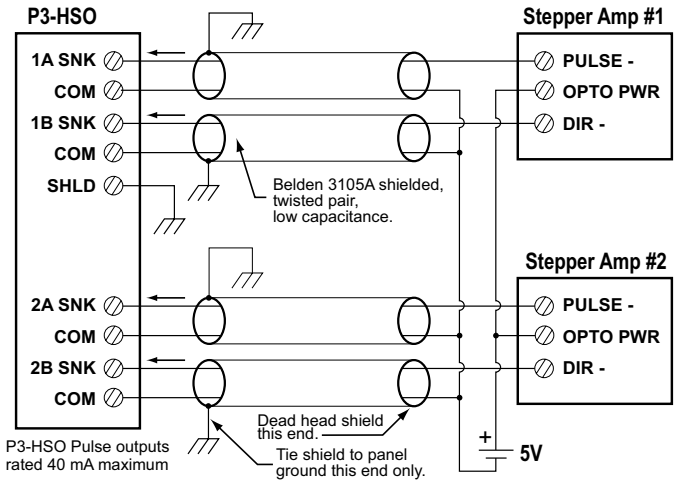


Notes:
1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. RS-422 thermal faults auto reset after device cool down.

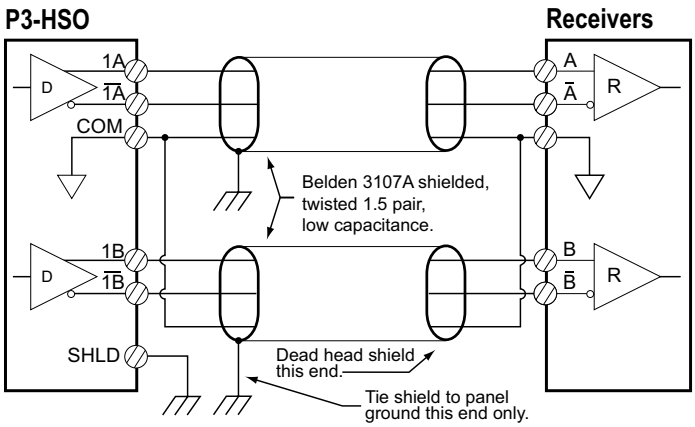
* Outputs are not limited to these speeds but single ended signals produced by the FETs are not usually reliable above these speeds due to cabling capacitance.

P3-HSO (cont'd)

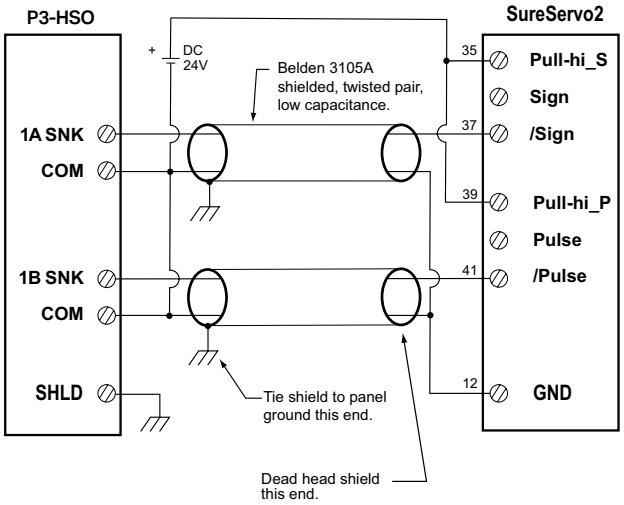
Sinking Pulse Outputs



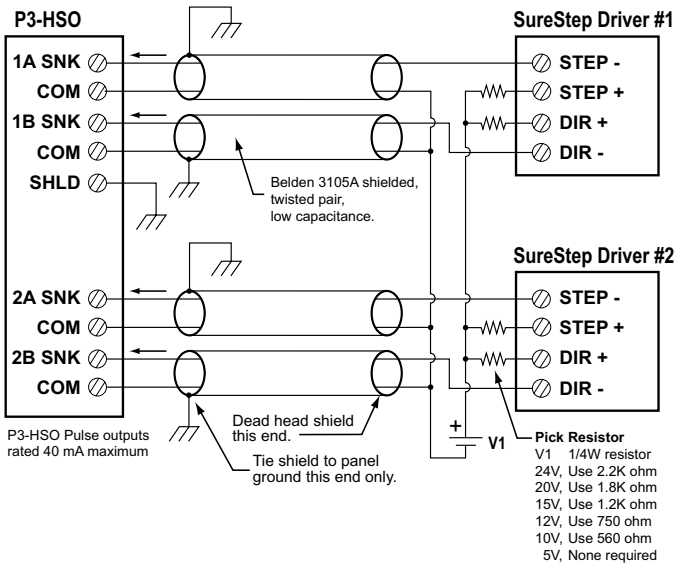
Line Driver Pulse Outputs



SureServo Wiring Diagram

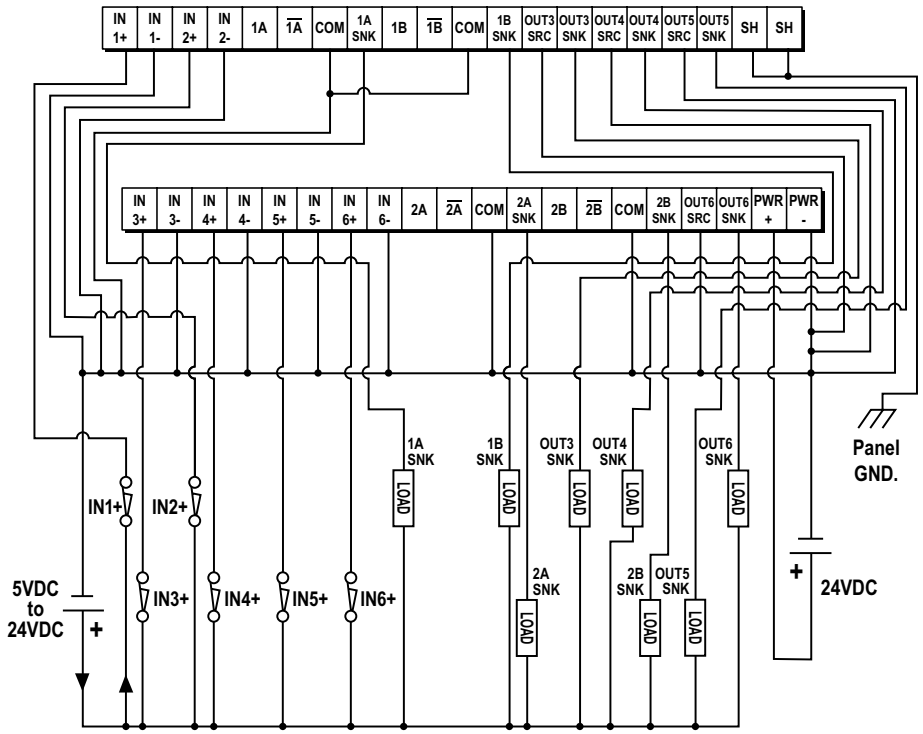


SureStep Wiring Diagram

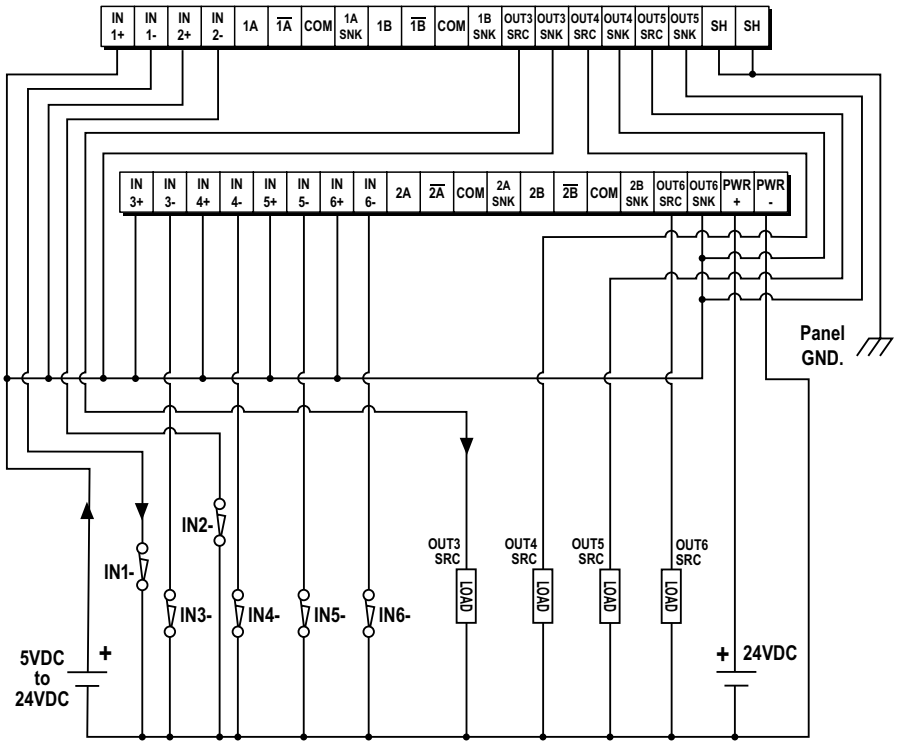


P3-HSO (cont'd)

Sinking I/O Wiring Diagram



Sourcing I/O Wiring Diagram

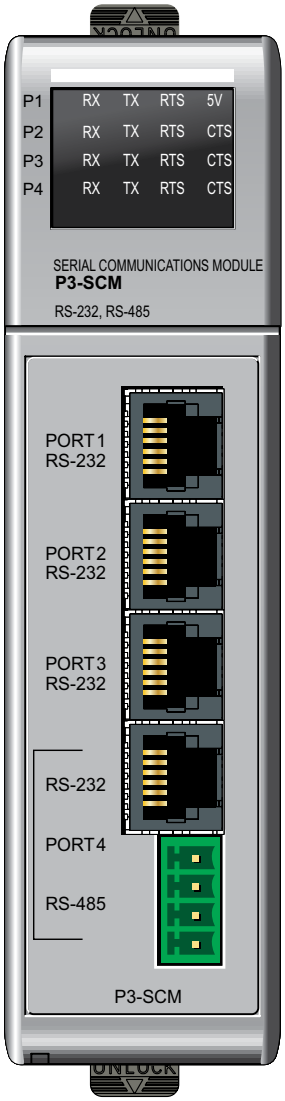


Specialty Modules

P3-SCM $523.00

Serial Communications Module
Productivity3000 4-port serial communications module capable of Modbus, ASCII and Custom Communications Protocols. The P3-SCM is also able to power the ***C-more*** Micro HMI through RS-232 (Port 1 only) for use with the Productivity3000.

P3-SCM contains (4) RS-232 (RJ12) ports half or full duplex, (1) RS-485 port (4-wire terminal block) half duplex, all supporting Modbus RTU Master/Slave, ASCII In/Out and Custom Protocol up to 38.4 K baud rate.

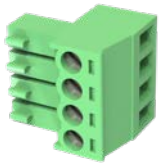


General Specifications	
Module Type	Intelligent
Modules per Base	Base size limited, 11 Max
Modules per Group	11 Max
I/O Points Used	None, mapped directly to tags in CPU
Field Wiring Connector	4 - RJ12, 1 - 4 Position Terminal Block
Operating Temperature	0°C– 60°C (32°F–140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat) IEC 60068-2-14 (Test Na, Thermal Shock)
Humidity	5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp Heat)
Environmental Air	No corrosive gases permitted (EN61131-2 pollution degree 1)
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	None
Insulation Resistance	No Isolation
Noise Immunity	NEMA ICS3-304 IEC 61000-4-2 (ESD) Impulse 1000V @ 1µS pulse IEC 61000-4-4 (FTB) RFI, (145MHz, 440MHz 5W @ 15cm) IEC 61000-4-3 (RFI)
Emissions	EN61000-6-4 (Conducted and radiated RF emissions)
Module Location	Any I/O slot in any local, expansion, or remote base in a Productivity3000 system.
Weight	260g (9.17 oz)
Agency Approvals1	UL508 file E157382, Canada & USA CE (EN61131-2007)

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

Removable Terminal Block Specifications	
Number of Positions	4 Screw Terminals, 3.5 mm Pitch
Wire Range	16–28 AWG Solid/Stranded Conductor "Use Copper Conductors, 75°C or Equivalent"
Screwdriver Size	TW-SD-VSL-1 (recommended)
Screw Torque	0.4 N·m

*Removable Terminal Connector included.



RS-485 Cable Options	
Recommended	Recommend Q8302-1 (cut to length) or Belden #9841

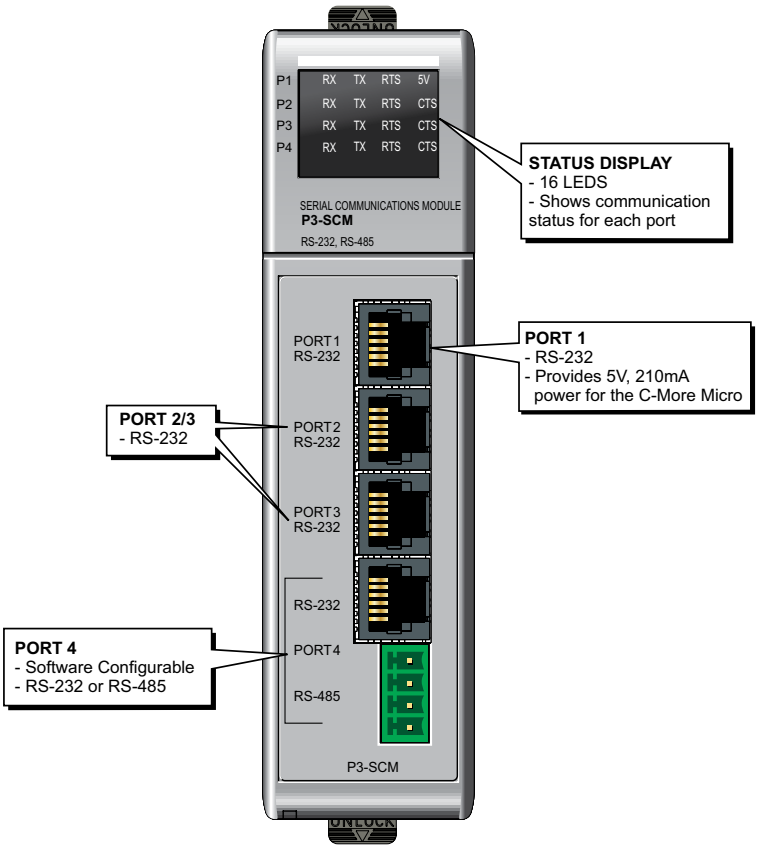
NOTE: The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.

Specialty Modules

P3-SCM (cont'd)

Diagnostic LEDs				
LED	***Port 1***	***Port 2***	***Port 3***	***Port 4***
RXD	X	X	X	X
TXD	X	X	X	X
RTS	X	X	X	X
CTS		X	X	X
5V	X			

1. All RS232 & RS485 LEDs reflect the actual electrical level of the signal, there is no direct firmware control of LEDs
2. RS232 LEDs RXD, TXD, RTS & CTS are turned ON when their voltage on the RS232 wire is postive.
a - This occurs when the UART I/O signal is low (GND)
b - They are turned OFF when the voltage on the RS232 wire is negative
3. RS485 LEDs RXD, TXD, RTS & CTS are turned ON when the UART I/O signal is low (GND)
4. 5V LED is ON when 5V power is good, 5V LED is OFF when 5V is shorted to ground



Port 4 LED Behavior				
Port 4	***RX***	***TX***	***RTS***	***CTS***
RS232	Flickers on RXD activity, OFF when idle	Flickers on TXD activity, OFF when idle	ON when asserted, OFF otherwise	ON when asserted, OFF otherwise
RS485				Always OFF

P3-SCM Configuration Options			
Configuration Item	***Port 1 (RS-232)***	***Ports 2, 3 & 4 (RS-232)***	***Port 4 (when RS-485)***
Protocol Selections	***Disabled, Modbus RTU, ASCII/Custom***	***Disabled, Modbus RTU, ASCII/Custom***	***Disabled, Modbus RTU, ASCII/Custom***
Data Rate, baud	1200,2400,4800, 9600,19200, 33600, & 38400	1200,2400,4800,9600,19200, 33600, & 38400	1200,2400,4800,9600,19200, 33600, & 38400
Parity	None, Odd or Even	None, Odd or Even	None, Odd or Even
Data Bits4	7 or 8 Bit	7 or 8 Bit	7 or 8 Bit
RTS Off Delay Time1	None, or 0–5,000 msec	None, or 0–5,000 msec	N/A
RTS On Delay Time1	None, or 0–5,000 msec	None, or 0–5,000 msec	N/A
Modbus Character Timeout2	None, or 0–10,000 msec	None, or 0–10,000 msec	None, or 0–10,000 msec
Communication Timeout (Timeout between query and response)	100–30,000 msec	100–30,000 msec	100–30,000 msec
Response/Request Delay Time	N/A	N/A	None, or 1–5,000 msec
Comm Heartbeat Value2	2–1,000 sec	2–1,000 sec	2–1,000 sec
Node Address (Station)	1 to 247	1 to 247	1 to 247
CTS	N/A	Ignore, Wait, System Input3	N/A
Enable/Disable CTS Wait Timeout	N/A	Enable Timeout, Disable Timeout (Never Timeout)	N/A
CTS Wait Timeout	N/A	100–999,900 msec	N/A
RTS	On, Off, Assert During Transmit, System Output	On, Off, Assert During Transmit, System Output	N/A
Port 4 RS-485 2-Wire Mode	N/A	N/A	Disable, Enable
MODBUS Port Security	Read/Write, Read Only	Read/Write, Read Only	Read/Write, Read Only

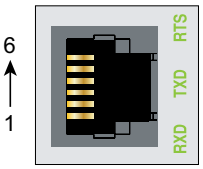
1. For "None" selection with Modbus RTU protocol, Modbus.org minimums are used. This minimum is 3.5 character times up to 19, 200 baud rate and 1.75 ms over 19,200 baud rate
2. Only applies to MODBUS messages
3. CTS signal is only provided on Ports 2, 3 & 4
4. 7-bit data is only supported with Odd or Even parity

Specialty Modules

P3-SCM (cont'd)

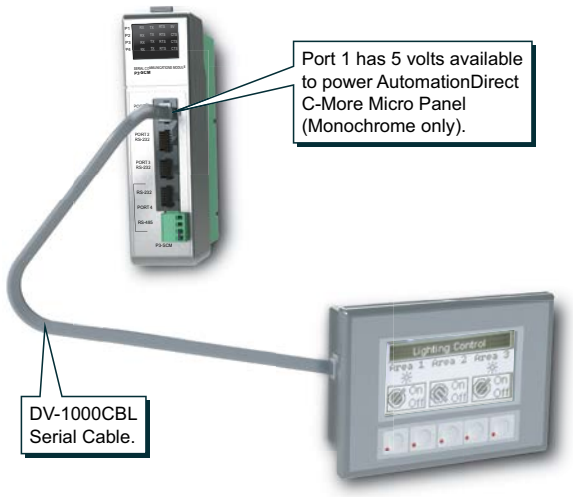
Port 1 RS-232 Specifications	
Port Name	***RS-232***
Description	Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection.
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400.
+5V Cable Power Source	210mA maximum at 5V, ±5%. Reverse polarity and overload protected.
TXD	RS-232 Transmit output
RXD	RS-232 Receive input
RTS	Handshaking output for flow control.
GND	Logic ground
Maximum Output Load (TXD/RTS)	3kV, 1,000pf
Minimum Output Voltage Swing	±5V
Output Short Circuit Protection	±15mA
Port Status LED	Red LED is illuminated when active for TXD, RXD,RTS

Port 1



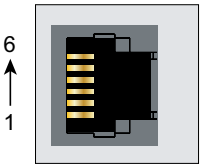
6-pin RJ12 Female Modular Connector

Pin #	Signal	
1	GND	Logic Ground
2	+5V	210 mA Maximum
3	RXD	RS-232 Input
4	TXD	RS-232 Output
5	RTS	Request to Send
6	GND	Logic Ground



Ports 2, 3 and 4 RS-232 Specifications	
Port Name	***RS-232***
Description	Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection.
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400.
TXD	RS-232 Transmit output
RXD	RS-232 Receive input
RTS	Handshaking output for flow control.
CTS	Handshaking input for flow control.
GND	Logic ground
Maximum Output Load (TXD/RTS)	3kV, 1,000pf
Minimum Output Voltage Swing	±5V
Output Short Circuit Protection	±15mA
Port Status LED	Red LED is illuminated when active for TXD, RXD,RTS

Ports 2, 3 and 4 (RS-232)



6-pin RJ12 Female Modular Connector

Pin #	Signal	
1	GND	Logic Ground
2	CTS	RS-232 Input
3	RXD	RS-232 Input
4	TXD	RS-232 Output
5	RTS	RS-232 Output
6	GND	Logic Ground

RS-232 Ports 1, 2, 3 and 4				
Electrical Specifications	***Min***	***Typ***	***Max***	***Units***
Output ON (3kΩ, 1000pF Load)	5.0	5.2		Volts
Output OFF (3kΩ, 1000pF Load)		-5.2	-5.0	Volts
Output Short-Circuit Current		15		mA
Short-Circuit Duration			No Limit	Seconds
Output Resistance	300			Ohm
Input ON Threshold		1.6	2.4	Volts
Input OFF Threshold	0.6	1.2		Volts
Input Resistance	3k	5k	7k	Ohm

Line Specifications for RS-232 Ports		
RS-232 Line Specifications	***Options***	***Units***
Data Rate Setting	1200,2400,4800,9600,19200, 33600, & 38400	baud
Data Rate Error	±2	%
Data Bits Setting1	7 or 8	Bits
Stop Bits Setting	1	Bits
Parity Setting	None1, Odd or Even	Parity
Data Transmission	Half duplex or Full duplex2	N/A
Network	Point-to-Point	N/A

1. 7-bit data are only supported with odd or even parity
2. Full duplex is only supported for ASCII/Custom Protocol

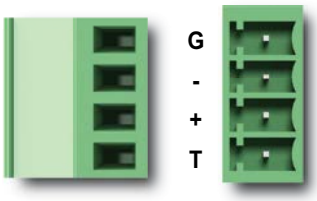
Specialty Modules

P3-SCM (cont'd)

Port 4 (RS-485 Configuration)	
Port Name	RS-485
Description	Non-isolated RS-485 port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD/EFT protection and automatic echo cancellation when transmitter is active
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400
TXD+/RXD+	RS-485 transceiver high
TXD-/RXD-	RS-485 transceiver low
GND	Logic ground
Input Impedance	19kΩ
Maximum load	50 transceivers, 19kΩ each, 60Ω termination (two 120Ω resistors at each end)
Output Short-Circuit Protection	±250mA, thermal shut-down protection
Electrostatic Discharge Protection	±8kΩ per IEC1000-4-2
Electrical Fast Transient Protection	±2kΩ per IEC1000-4-4
Minimum Differential Output Voltage	1.5 V with 60Ω load
Fail safe inputs	Logic high input state if inputs are unconnected
Maximum Common Mode Voltage	-7.5 V to 12.5 V.
Port Status LED	Red LED illuminated when active for TXD and RXD
Cable Options	Recommend Q8302-1 (cut to length) or Belden #9841

RS-485 Port 4				
Electrical Specifications	***Min***	***Typ***	***Max***	***Units***
Driver Differential Output (60Ω load)	1.5			Volts
Driver Common-Mode Output			3	Volts
Driver Short-Circuit Output Current			250	mA
Short-Circuit Duration (Thermal Shutdown)			No Limit	Seconds
Receiver Differential Input Threshold	200			mV
Receiver Common-Mode Input	-7.5		12.5	Volts
Input Resistance	12k			Ohm
Termination Resistance (TB jumper wire 'T' to '+')		120		Ohm
Cable Length (38400 baud max.)			1200	Meters

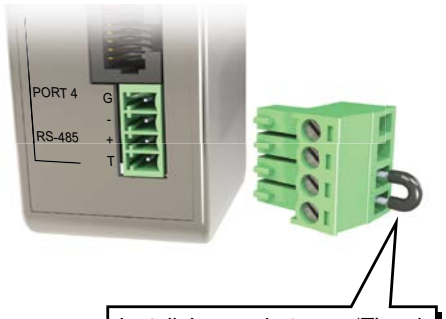
Port 4 (RS-485)



Pin #	Signal
G	GND
–	TXD-/RXD-
+	TXD+/RXD+
T	TERMINATION

Line Specifications for RS-485 Port		
RS-485 Line Specifications	***Options***	***Units***
Data Rate Setting	1200,2400,4800,9600,19200, 33600, & 38400	Baud
Data Rate Error	+/-2	%
Data Bits Setting1	7 or 8	Bits
Stop Bits Setting	1	Bits
Parity Setting	None1, Odd or Even	Parity
Data Transmission	Half duplex	N/A

1. 7-bit data is only supported with odd or even parity



*** Jumper not included**