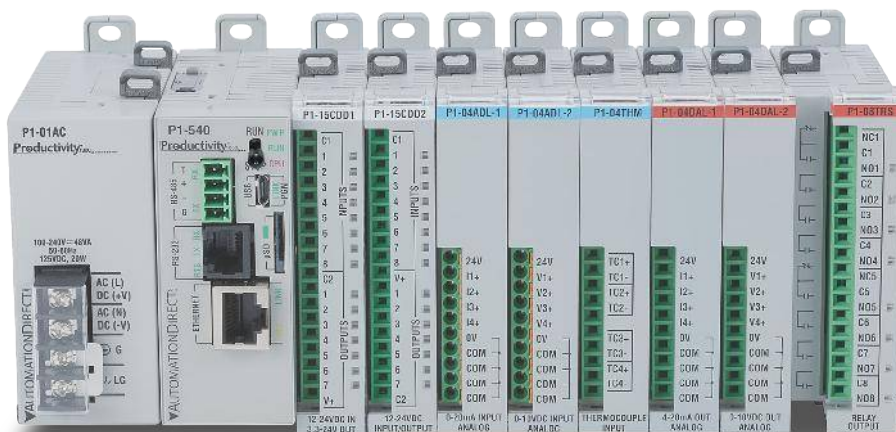


Technical Specifications

Productivity¹⁰⁰⁰.....



NOTE: This is a summary document of the Productivity1000 PLC hardware user manual (P1-USER-M).



Overview

Hardware

The Productivity1000 system of components is designed to combine practical PLC features in a compact and expandable design, with a simple-to-use philosophy. A powerful Productivity1000 PLC can be expanded with the addition of easily connected I/O modules. The Productivity1000 PLC system does not require a mounting base. The Productivity1000 PLC and I/O modules are connected together via an expansion port on the right side of the PLC case. A variety of I/O modules are available for flexible and optimal system configuration.

The Productivity1000 PLC is supported by the robust and powerful Productivity Suite programming software; designed with an easy-to-use instruction set that covers all applications suitable for this class of PLC. The CPU stores and executes the user designed program.

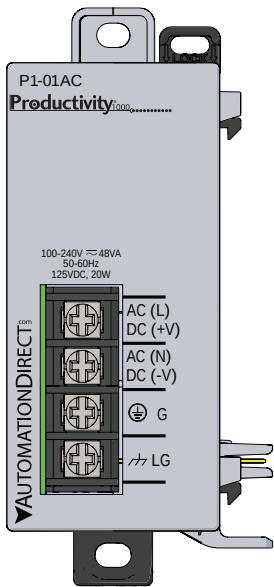


P1-01AC Power Supply

The P1-01AC power supply module requires power from an external 120–240 VAC or 125VDC source. When the power supply is connected to the P1-540 CPU, it will provide required power to the Productivity1000 CPU.

No Power Budgeting

Any combination of I/O modules may be installed in any slot without power budget considerations.

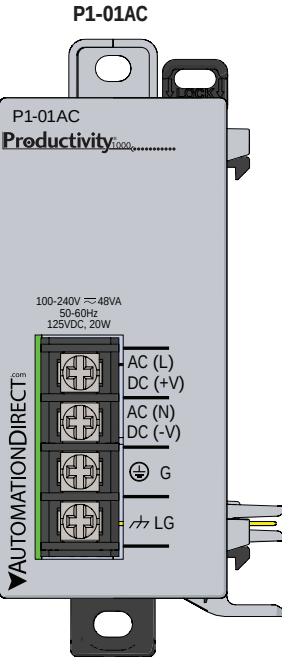


P1-01AC

Terminal Block Specifications	
Number of positions	4 screw terminals
Wire Range	22–12 AWG (0.324 to 3.31 mm²) Solid / Stranded conductor 3/64 in (1.2 mm) Insulation Max. 1/4 in (6–7 mm) Strip Length
Conductors	Use copper conductors, 75°C or equivalent
Screw Driver	1/4 in (6.5 mm) maximum
Screw Size	M3
Screw Torque	7–9 lb-in (0.882–1.02 N-m)

*Recommended screw driver P/N: TW-SD-MSL-2

P1-01AC Power Supply



IMPORTANT!



Hot-Swapping Information

Note: This device cannot be Hot Swapped.

User Specifications

Input Voltage Range (Tolerance)	100–240 VAC (-15% / +10%) 125VDC (-15% / +20%)
Rated Operating Frequency	50 to 60Hz with $\pm 5\%$ tolerance
Maximum Input Power	48VA (AC) 20W(DC)
Cold Start Inrush Current	21A
Maximum Inrush Current (Hot Start)	21A
Input Fuse Protection (Internal)	Micro fuse 250V, 1A Non-replaceable
Efficiency	75%
Output Voltages	24VDC, 0.67 A
Maximum Output Power	16W
Isolated User 24VDC Output	None
Output Protection for Over Current, Over Voltage, and Over Temperature	Self resetting
Under Input Voltage Lock-out	40–75 VAC - 24VDC On @ 76.15 VAC 55–99 VDC - 24VDC On @ 100.2 VDC
Input Transient Protection	Varistor, plus input choke and filter
Operating Design Life	10 years at full load at 40°C ambient and 5 years at 60°C ambient

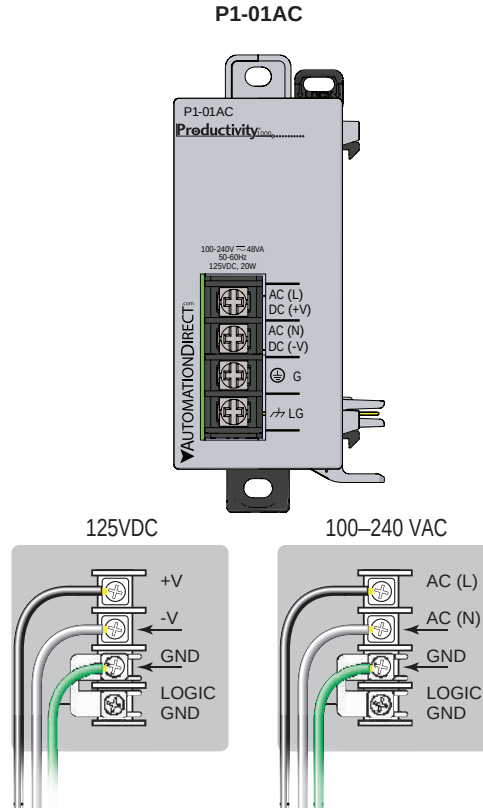
General Specifications

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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Insulation Resistance	>10M Ω @ 500VDC
Heat Dissipation	5000mW
Enclosure Type	Open Equipment
Voltage Withstand (dielectric)	2100VDC applied for 2 seconds
Module Location	Power Supply latches to CPU in the module stacking Productivity1000 System.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Weight	146g (5.1 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

*See CE Declaration of Conformity for details.

Power Connections

2

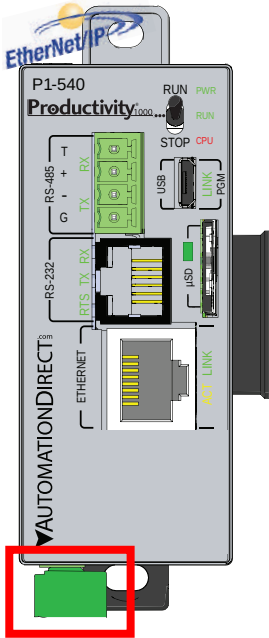


Grounding

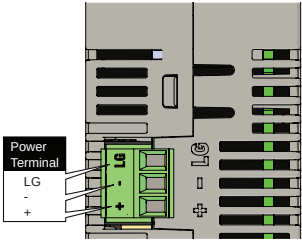
A good common ground reference (earth ground) is essential for proper operation of the Productivity1000 system. One side of all control circuits, power circuits and the ground lead must be properly connected to earth ground by either installing a ground rod in close proximity to the enclosure or by connecting to the incoming power system ground. There must be a single-point ground (i.e. copper bus bar) for all devices in the enclosure that require an earth ground.

Productivity1000 Alternate Power Supply Connection *

All Productivity1000 CPUs require 24VDC input power. When using an alternate 24VDC power source, connect wiring to the bottom removable terminal block as shown below.



P1-540



Removable connector included.
Spare connectors available
(part no. PCON-KIT).

Pin	Signal
LG	Ground
-	24V DC -
+	24V DC +

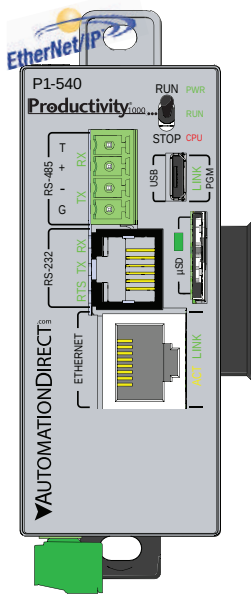
Removable Terminal Block Specifications	
Part Number	PCON-KIT (Includes power terminal block)
Number of Positions	3 Screw Terminals
Pitch	3.5 mm
Wire Range	28–16 AWG Solid Conductor 28–16 AWG Stranded Conductor
Screw Driver	1/8 inch (3.175 mm) Maximum
Screw Size	M2
Screw Torque	1.7 lb-in (0.4 N-m)

* Recommended Fuse: 2A Slow Blow

* If you do not use a Productivity1000 power supply (P1-01AC), then use a power supply that has transformer isolation. Use different 24VDC supplies for the CPU and inductive loads to keep the CPU power clean and free of voltage spikes caused by switching solenoids, motors and relay coils.

Productivity1000 CPU Module

P1-540 CPU Specifications



P1-540



IMPORTANT!

Hot-Swapping Information

Note: This device cannot be Hot Swapped.

CPU	Productivity Suite
P1-540	Version 3.0 or later

* If you do not use a Productivity1000 power supply (P1-01AC), then use a power supply that has transformer isolation. Use different 24VDC supplies for the CPU and inductive loads to keep the CPU power clean and free of voltage spikes caused by switching solenoids, motors and relay coils.

CPU Specifications*

User Memory	50MB (Includes program, data and documentation)														
Memory Type	Flash and Battery Backed RAM														
Retentive Memory	500kB														
Scan Time	1.3 ms (1K Boolean, 128 I/O)														
External Power Voltage Range*	24VDC $\pm 2\%$ @ 5W plus 1.25 W per additional I/O module														
Communications; 4 Integrated Ports	USB IN: Programming, Monitoring, Debug, Firmware ETHERNET: (10/100 Mbps Ethernet) Programming, Monitoring, Debug, Firmware, Email SMTP Client, Modbus TCP Client (16 Servers) and Server (16 Clients), EtherNet/IP Scanner (32) and Adapter (4), Custom Protocol over Ethernet, ProNET. RS-232: (RJ12, 1200–115.2k baud) ASCII, Modbus RS-485: Removable Terminal Included, (1200–115.2k baud) ASCII, Modbus RTU														
Data Logging/Project Transfer	microSD card slot														
Hardware Limits of System	128 Hardware I/O Points: All 16-point I/O Modules														
Instruction Types	<table border="1"> <tr> <td>Application Functions</td><td>PID</td></tr> <tr> <td>Array Functions</td><td>Program Control</td></tr> <tr> <td>Counters/Timers</td><td>String Functions</td></tr> <tr> <td>Communications</td><td>System Functions</td></tr> <tr> <td>Data Handling</td><td>Contacts</td></tr> <tr> <td>Drum Sequencers</td><td>Coils</td></tr> <tr> <td>Math Functions</td><td></td></tr> </table>	Application Functions	PID	Array Functions	Program Control	Counters/Timers	String Functions	Communications	System Functions	Data Handling	Contacts	Drum Sequencers	Coils	Math Functions	
Application Functions	PID														
Array Functions	Program Control														
Counters/Timers	String Functions														
Communications	System Functions														
Data Handling	Contacts														
Drum Sequencers	Coils														
Math Functions															
Real Time Clock Accuracy	$\pm 2s$ per day typical at 25°C $\pm 10s$ per day maximum at 60°C														

General Specifications

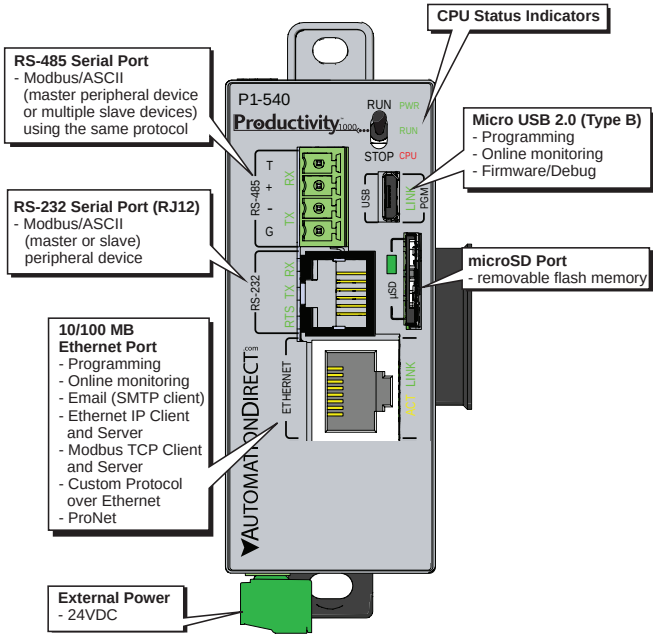
Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Heat Dissipation	3810mW
Enclosure Type	Open Equipment
Module Location	Controller connector on the side of the power supply in a Productivity1000 System.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Weight	136g (4.8 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

*See CE Declaration of Conformity for details.

Productivity1000 CPU Module

P1-540 Module Faceplate Layout

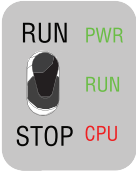
2



P1-540

CPU Run/Stop Switch Specifications	
RUN position	Executes user program, run-time edits possible.
STOP position	Does not execute user program, normal program load position.

CPU Status Indicators	
PWR	Green LED is illuminated when power is ON
RUN	Green LED is illuminated when CPU is in RUN mode
CPU	Red LED is illuminated during power ON reset, power down, or watch-dog time-out.



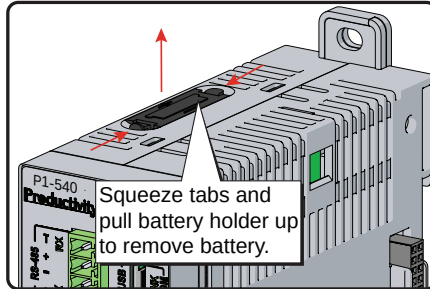
P1-540 Battery

A battery is included with the P1-540 CPU module, but is not installed. The battery may be installed in order to retain the Time and Date along with any Tagname values that are set up as retentive.

The battery is not required for program backup.

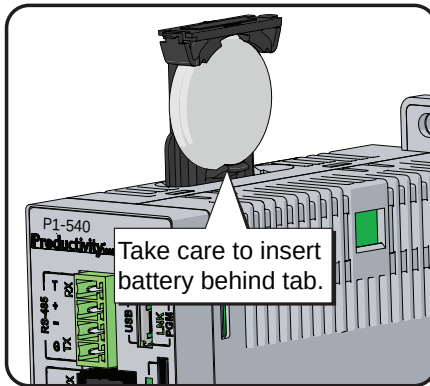
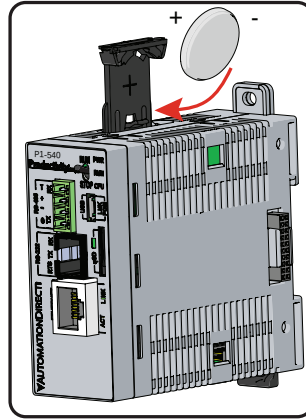
Step One:

Open battery compartment located on the top of the CPU.



Step Two:

Insert battery and close compartment.



Battery (Optional)

D2-BAT-1

Coin type, 3.0 V Lithium battery, 560mA, battery number CR2354

Note: Although not needed for program backup, an uninstalled battery is included with the P1-540. Install this battery if you want the CPU to retain the Time and Date along with any Tagname values that you have set up as retentive.

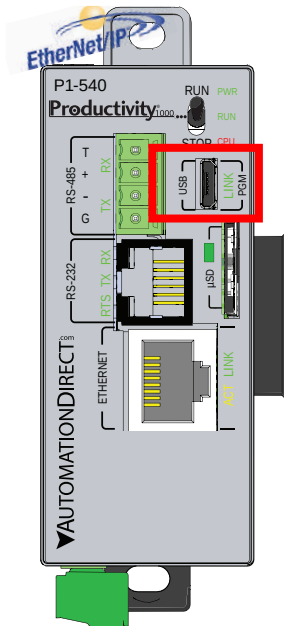
P1-540 Communication Ports

The P1-540 CPU has several communications ports. The following pages contain their specifications and pin-out diagrams.

2

MicroUSB Programming Port

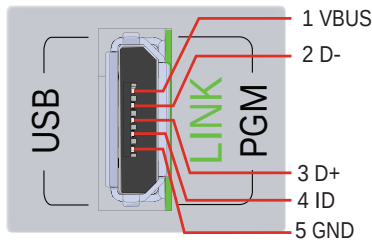
Used exclusively for connecting to a PC running the Productivity Suite programming software.



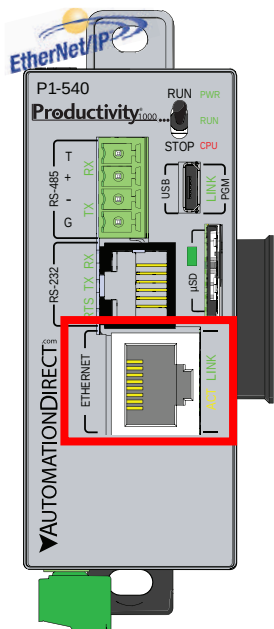
P1-540

Micro USB Input Specifications

Port Name	MicroUSB
Description	Standard MicroUSB Slave input for programming and on-line monitoring, with built-in surge protection. Not compatible with older full speed USB devices.
Transfer Rate	480 Mbps
Port Status LED	Green LED is illuminated when LINK is established to programming software.
Cables	USB Type A to MicroUSB Type B: 6ft cable part # USB-CBL-AMICB6 15ft cable part # USB-CBL-AMICB15



P1-540 Ethernet Port



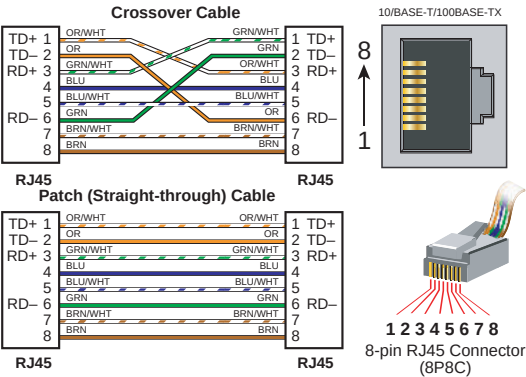
P1-540

RJ-45 style connector used for:

- Connection to a PC running the ProductivitySuite programming software
- Modbus TCP Client connections (Modbus requests sent from the CPU)
- Modbus TCP Server connections (Modbus requests received by the CPU)
- EtherNet/IP (Client/Server)
- Custom Protocol over Ethernet
- ProNET
- Outgoing Email

2

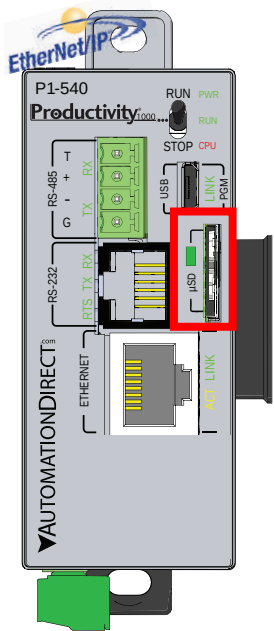
Ethernet Specifications	
Port Name	ETHERNET
Description	Standard transformer isolated Ethernet port with built-in surge protection for programming, online monitoring, Email (SMTP client), Modbus/TCP client/server connections (fixed IP or DHCP), EtherNet/IP Scanner/Adapter, Custom Protocol over Ethernet and ProNET connections.
Transfer Rate	10 Mbps and 100 Mbps (auto-crossover).
Port Status LED	LINK (Amber LED) is solid when network LINK is established. ACT (Green LED) flashes when port is active.



microSD Slot

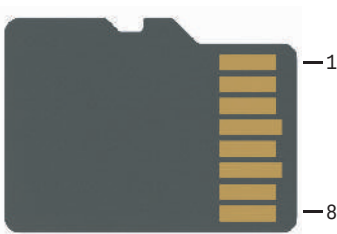
Used for data logging or project transfers.

2



P1-540

microSD Specifications				
Port Name	microSD			
Description	Standard microSD socket for data logging			
Maximum Card Capacity	32GB			
Transfer Rate (ADATA microSDHC Class 4 memory card)	Mbps	Minimum	Typical	Maximum
	Read	14.3	14.4	14.6
	Write	4.8	4.9	5.1
Port Status LED	Green LED is illuminated when card is inserted/ detected			



Note: Card not included with unit.

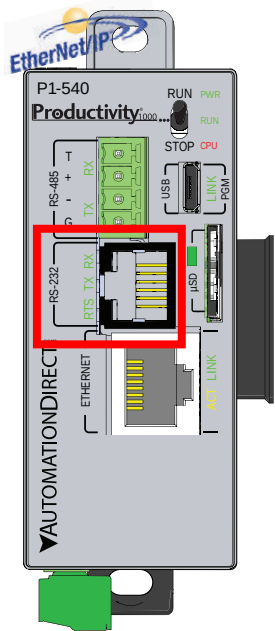
Pin	SD
1	DAT2
2	CD/DAT3
3	CMD
4	VDD
5	CLK
6	VSS
7	DAT0
8	DAT1

P1-540 RS-232 Port

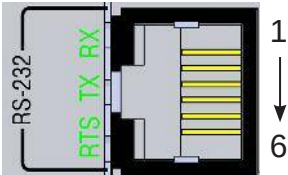
RS-232 Port

RJ-12 style connector used for:

- Modbus RTU Master connections
- Modbus RTU Slave connections
- ASCII full or half duplex communications
- Custom Protocol Incoming and Outgoing communications



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, 38400, 57600, and 115200 baud
+5V Cable Power Source	210mA maximum at 5V, $\pm 5\%$. Reverse polarity and overload protected
TXD	RS-232 Transmit output
RXD	RS-232 Receive input
RTS	Handshaking output for modem control
GND	Logic ground
Maximum Output Load (TXD/RTS)	3k Ω , 1000pf
Minimum Output Voltage Swing	$\pm 5V$
Output Short Circuit Protection	$\pm 15mA$
Port Status LED	Green LED is illuminated when active for TXD, RXD and RTS
Cable Options	EA-MG-PGM-CBL D2-DSCBL USB-RS232 with D2-DSCBL FA-CABKIT FA-ISOCAN for converting RS-232 to isolated RS-485



6-Pin RJ12 Female Modular Connector

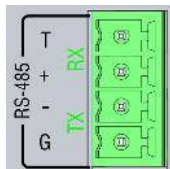
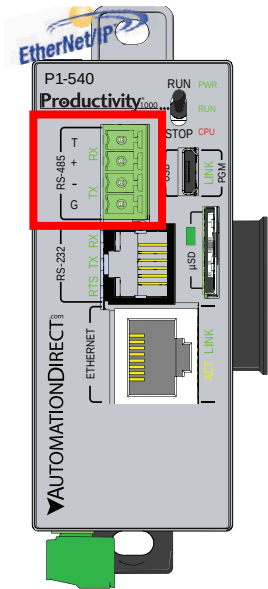
Pin	Label	Signal
1	GND	Logic Ground
2	+5V	210mA Maximum
3	RXD	RS-232 Input
4	TXD	RS-232 Output
5	RTS	RS-232 Output
6	GND	Logic Ground

P1-540 RS-485 Port

RS-485 Port

A 4-pin removable terminal block used for:

- Modbus RTU Master connections
- Modbus RTU Slave connections
- ASCII Incoming and Outgoing communications
- Custom Protocol Incoming and Outgoing communications



Pin	Signal
T	Termination
+	TXD+/RXD+
-	TXD-/RXD-
G	GND



Removable connector included.
Spare connectors available
(part no. P3-RS485CON-1).

RS-485 Port Specifications	
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, 38400, 57600, and 115200 baud
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
Output Short Circuit Protection	±250mA, thermal shut-down protection
Electrostatic Discharge Protection	±8kV per IEC1000-4-2
Electrical Fast Transient Protection	±2kV 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	Green LED illuminated when active for TXD and RXD
Cable Options	L19827-XXX from AutomationDirect.com

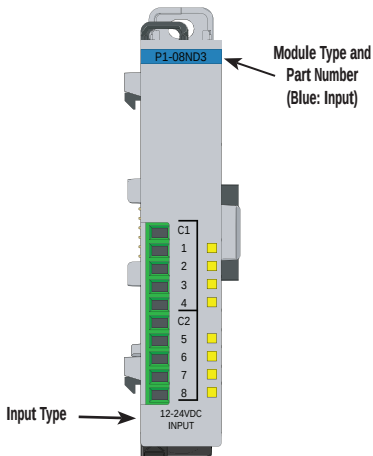
Removable Terminal Block Specifications	
Part Number	P3-RS485CON-1
Number of Positions	4 Screw Terminals
Pitch	3.5 mm
Wire Range	28–16 AWG Solid Conductor 28–16 AWG Stranded Conductor
Screw Driver	1/8 inch (3.175 mm) Maximum
Screw Size	M2
Screw Torque	1.7 lb-in (0.4 N-m)

I/O Modules Overview

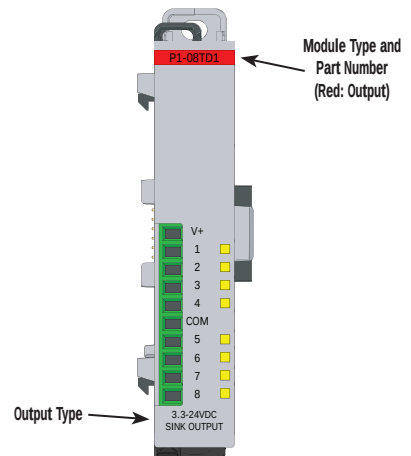
A variety of discrete and analog I/O modules are available for use in the P1000 System.

Each I/O module is identified as an “Input”, “Output”, or “Input/Output” module on its front panel using the color coding scheme listed below. See the following pages for discrete I/O module specifications and Chapter 3 for analog I/O module specifications.

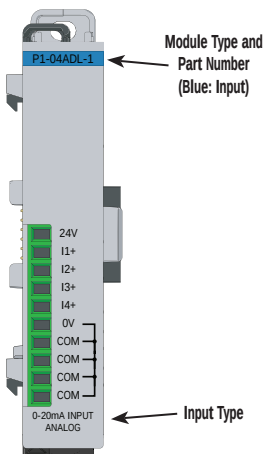
Discrete Input Modules



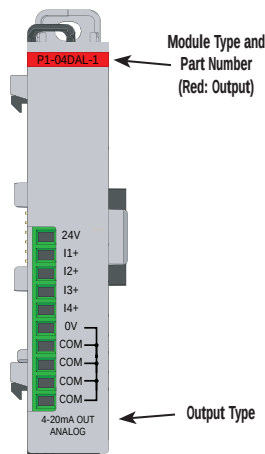
Discrete Output Modules



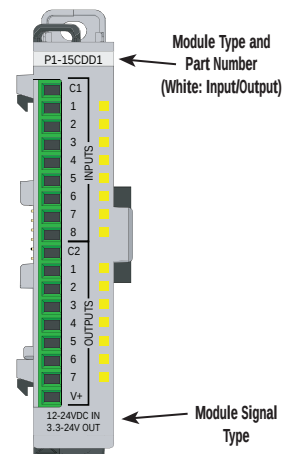
Analog Input Modules



Analog Output Modules



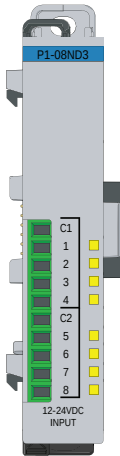
Discrete Input/Output Modules



Discrete I/O Modules

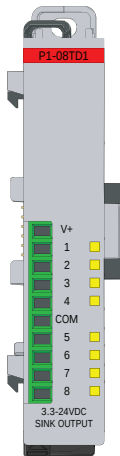
Discrete Input Modules

2



Productivity1000 Discrete Input Modules			
Part Number	Number of Inputs	Description	See Page
P1-08SIM	8	Input Simulator Module	2-18
P1-08ND3	8	Sinking/Sourcing 12–24 VDC Input	2-19

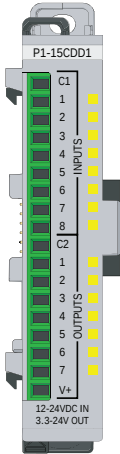
Discrete Output Modules



Productivity1000 Discrete Output Modules			
Part Number	Number of Outputs	Description	See Page
P1-08TD1	8	Sinking Output	2-22
P1-08TD2	8	Sourcing Output	2-25
P1-08TRS	8	Isolated Relay Output	2-28
P1-16TR	16	Relay Output	2-31

Discrete Combo I/O Modules

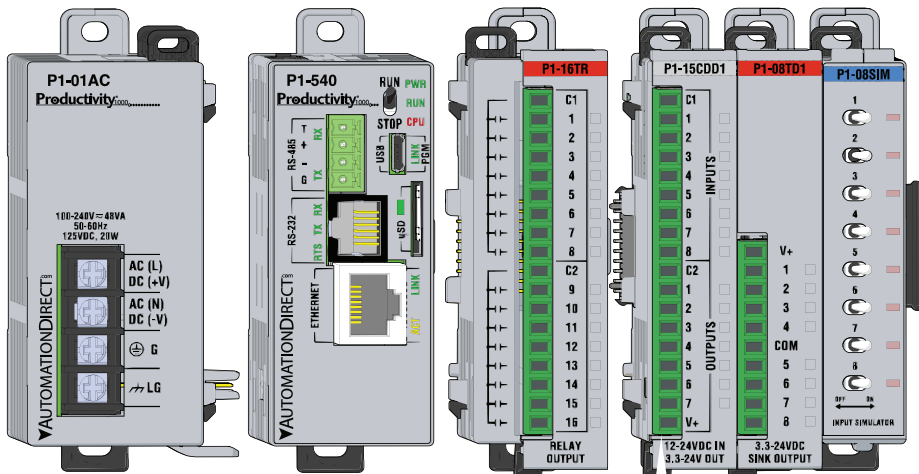
Discrete Combo Input/Output Modules



Part Number	Inputs	Outputs	Description	See Page
P1-15CDD1	8	7	Input: Sinking/Sourcing; Output: Sinking	2-34
P1-15CDD2	8	7	Input: Sinking/Sourcing; Output: Sourcing	2-37
P1-16CDR	8	8	Input: Sinking/Sourcing; Output: Relay	2-40

I/O Modules Installation

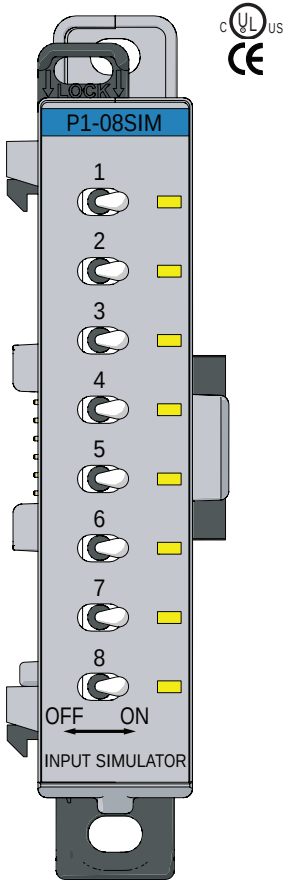
A variety of discrete and analog I/O modules can be added to the P1000 PLC to create a custom control system. To add an I/O module (verify field power is not energized), with the latch in “locked” position, align connectors on the side of each module and press together. An audible click indicates the module lock is engaged. Verify each connecting module tab is firmly in the locked position.



P1-08SIM Input Simulator Module

The P1-08SIM Input Simulator Module provides 8 toggle switches to simulate input devices.

2



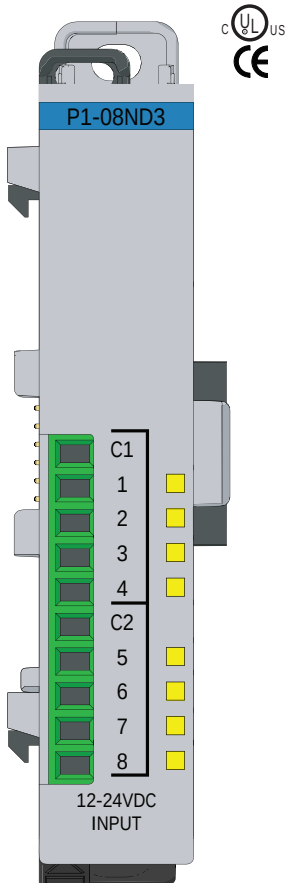
Input Specifications	
Inputs per Module	8 Internal switches
OFF to ON Response	Max. 20ms
ON to OFF Response	Max. 20ms
Status Indicators	Logic Side (8 points)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Heat Dissipation	200mW
Enclosure Type	Open Equipment
Module Location	Any I/O slot in a Productivity1000 System.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Weight	70g (2.5 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details. See the D.O.C. for details.

P1-08ND3 Sinking/Sourcing DC Input

The P1-08ND3 Fast Response Input Module provides eight inputs for switches and other devices connected to ground or supplies ranging from 12–24 VDC for use with the Productivity1000 system.



Input Specifications	
Inputs per Module	8 (Sink/Source)
External 24VDC Power Required	12–24 VDC
Input Voltage Range	10.2–26.4 VDC
Peak Voltage	30VDC
Input Current	3.5 mA @ 12VDC 7.5 mA @ 24VDC
Maximum Input Current @ Temp	10mA @ 26.4 VDC
Input Impedance	3kΩ
ON Voltage Level	>9.5 VDC
OFF Voltage Level	<7VDC
Maximum ON Current	2mA
Maximum OFF Current	1.6 mA
OFF to ON Response	2ms Maximum, 1ms Typical
ON to OFF Response	
Status Indicators	Logic Side (8 points)
Commons	2 (4 points/common)

Terminal blocks sold separately.

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-08ND3 Sinking/Sourcing DC Input, (continued)

2

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10M Ω @ 500 VDC
Heat Dissipation	2000mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System.
Field Wiring	Use ZIP Link wiring system or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	10-position removable terminal block
Weight	85g (3oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See the Declaration of Conformity for details.

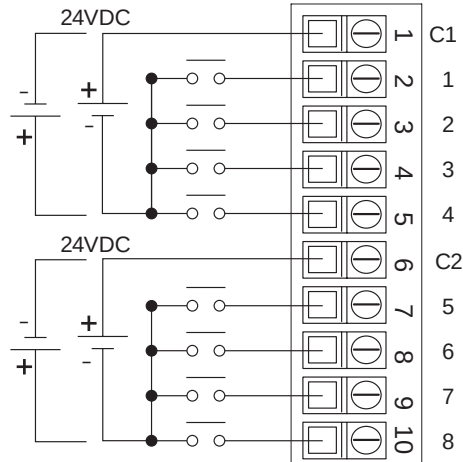
Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of Positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 inch (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1.

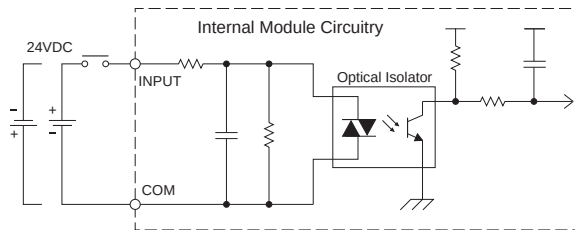
P1-08ND3 Sinking/Sourcing DC Input (continued)

Wiring Diagrams

Single Supply

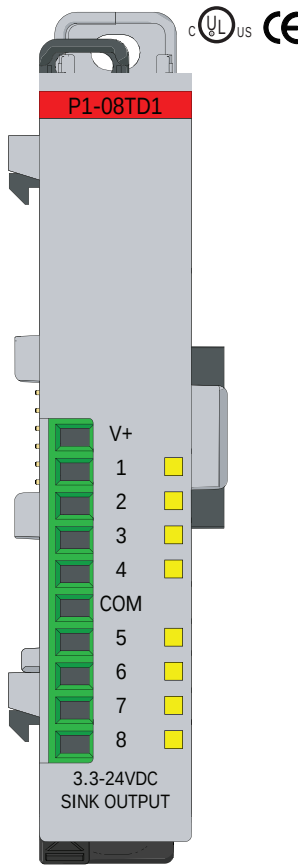


Equivalent Input Circuit



P1-08TD1 Sinking DC Output

The P1-08TD1 DC Output Module provides eight outputs that sink up to 1A per output from loads powered by 3.3–24 VDC supplies for use with the Productivity1000 system.



Output Specifications	
Outputs per Module	8 sinking
Output Type	N-channel MOSFET, open drain
Rated Voltage	3.3–24 VDC
Operating Voltage Range (Tolerance)	2.9–26.4 VDC
Maximum Output Current	1A continuous
Minimum Load Current	1mA
Maximum Leakage Current	0.3 mA @ 26.4 VDC
On Voltage Drop	0.2 VDC
Maximum Inrush Current	4A for 50ms, 6A for 10ms
OFF to ON Response	≤0.5 ms
ON to OFF Response	≤0.5 ms
Status Indicators	Logic Side (8 pins)
Commons	1 non-isolated
Maximum Applicable Fuse	8A
External Power Supply Required	12–24 VDC (-15%/+20%), 22mA

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of Positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

Terminal blocks sold separately.

* Recommended screw driver: P/N TW-SD-MSL-1



NOTE: Module shown with flip-up finger-safe terminal cover removed for clarity.

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-08TD1 Sinking DC Output (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1800mW
Enclosure Type	Open Equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	10-position removable terminal block
Weight	60g (2.1 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

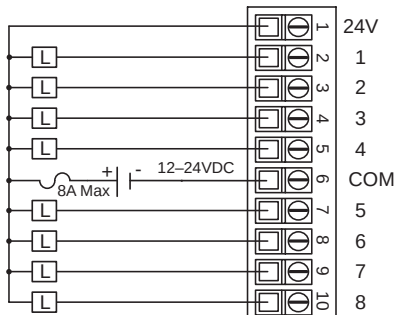
* See CE Declaration of Conformity for details.

P1-08TD1 Sinking DC Output (continued)

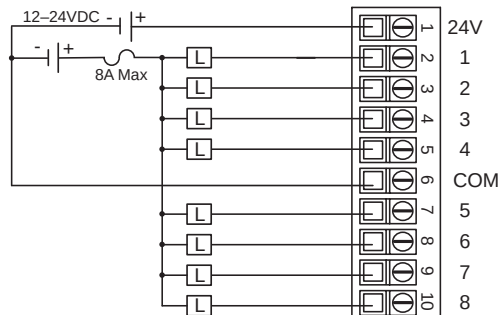
Wiring Diagrams

2

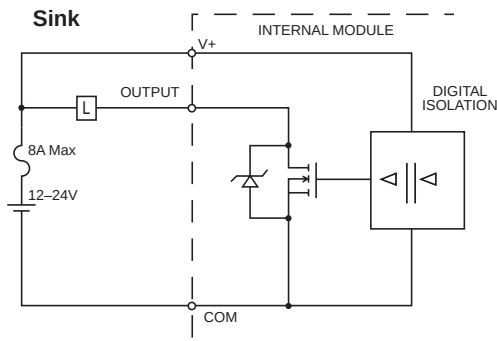
Single Power Source



Dual Power Source

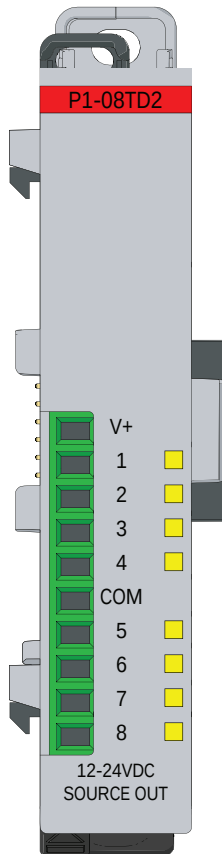


Sink



P1-08TD2 Sourcing DC Output

The P1-08TD2 DC Output Module provides eight non-isolated outputs that source up to 1A per output from a 12–24 VDC supply for use with the Productivity1000 system.



Output Specifications

Outputs per Module	8 sourcing
Voltage Rating	12–24 VDC
Operating Voltage Range	10.2–28.8 VDC
Output Type	P-channel MOSFET, open source
Maximum Output Current	1A per point
Minimum Load Current	1mA
Maximum Leakage Current	0.3 mA @ 28.8 VDC
On Voltage Drop	0.2 VDC @ 1A
Maximum Inrush Current	4A for 50ms, 6A for 10ms
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Status Indicators	Logic Side (8 points)
Commons	1
Maximum Applicable Fuses	8A
External Power Supply Required	12–24 VDC (-15%/+20%) @ 22mA

Removable Terminal Block Specifications

Part Number	P1-10RTB	P1-10RTB-1
Number of Positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

Terminal blocks sold separately.

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1.



P1-08TD2 Sourcing DC Output (continued)

2

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	2600mW
Enclosure Type	Open Equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O position in a Productivity1000 system
Field Wiring	Use ZIP Link Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	10-position removable terminal block
Weight	58g (2.1 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

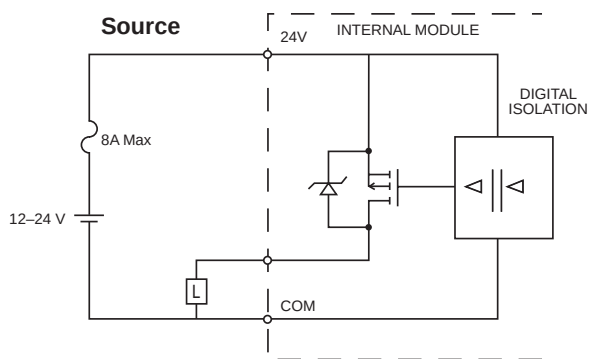
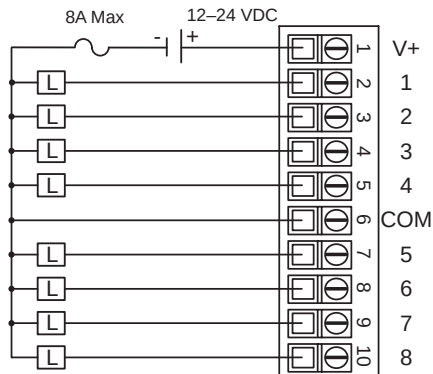
* See CE Declaration of Conformity for details.

P1-08TD2 Sourcing Output (continued)

Wiring Diagrams

2

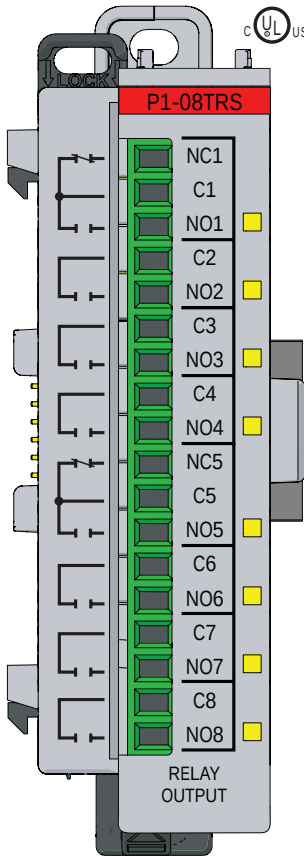
Single Power Source



P1-08TRS Isolated Relay

The P1-08TRS high-current isolated relay output module provides eight, 3A surge protected outputs. The P1-08TRS offers both normally open and normally closed relay contacts for use with the Productivity1000 System.

2



Terminal blocks sold separately.

Output Specifications	
Outputs per Module	8
Rated Voltage	6.25–30 VDC 6–120 VAC
Operating Voltage Range	5.1–28.8 VDC 5.1–132 VAC
Output type	6 Relays, FORM A (SPST) 2 Relays, FORM C (SPDT)
AC Frequency	47–63 Hz
Maximum Output Current	3A / point @ 60°C for both AC and DC 2A / point if used with ZIPLink Cable
Minimum Load Current	5mA @ 5VDC
Maximum Inrush Current	3A for 10ms
OFF to ON Response	<10ms
ON to OFF Response	<10ms
Status Indicators	Logic Side (8 points)
Commons	8 Isolated (1 point / common)
Maximum Applicable Fuse	8A Max

Removable Terminal Block Specifications		
Part Number	P2-RTB	P2-RTB-1
Number of Positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051– 1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1.



P1-08TRS Isolated Relay (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	3000mW
Enclosure Type	Open Equipment
Module Keying	Electronic
Module Location	Any I/O position in a Productivity1000 system
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	112g (4oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

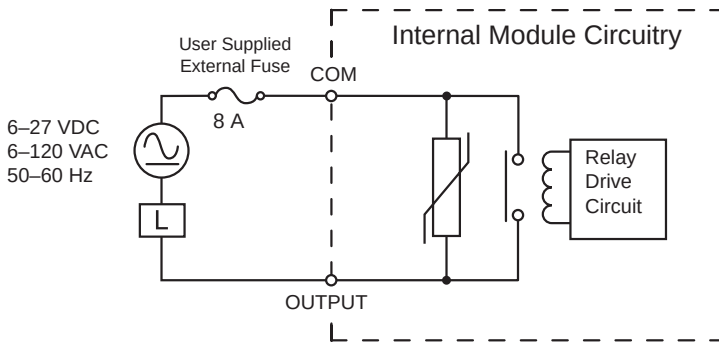
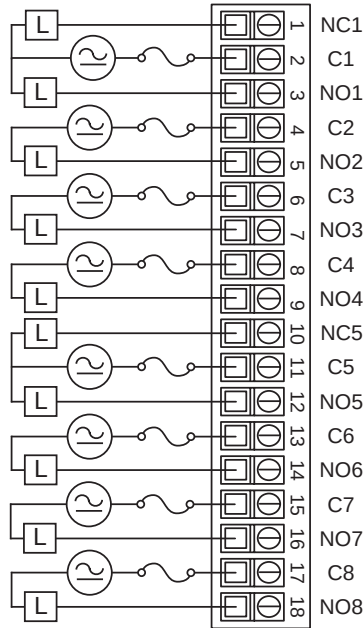
Typical Relay Life	
Voltage & Type of Load	Operations at 4A Load Current
30VDC Resistive	100,000
30VDC Solenoid	100,000
120VAC Resistive	100,000
120VAC Solenoid	100,000

P1-08TRS Isolated Relay (continued)

Wiring Diagrams

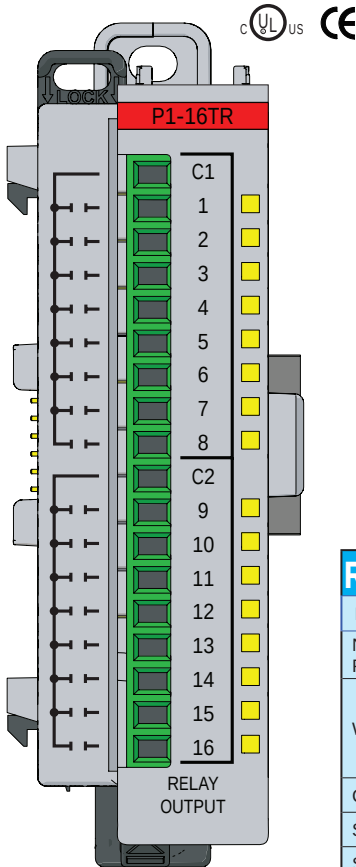
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6–27 VDC
6–120 VAC
50–60 Hz



P1-16TR Relay Output

The P1-16TR Relay Output Module provides sixteen 2A outputs with two isolated commons for use with the Productivity1000 system.



Terminal blocks sold separately.

Output Specifications

Outputs Channels	16
Rated Voltage	6.25–30 VDC, 6–120 VAC
Operating Voltage Range	5–30 VDC, 5–144 VAC
Output Type	Relay, FORM A (SPST)
AC Frequency	47–63 Hz
Maximum Output Current	2A / point, 8A / common for both AC and DC 2A / point, 4A / common if used with ZIPLink Cable
Minimum Load Current	5mA @ 5VDC
Maximum Inrush Current	2400VA make, 240VA break @ 120 or 240VAC (Make current is 2 AC cycles)
OFF to ON Response	≤10ms
ON to OFF Response	≤10ms
Status Indicators	Logic Side (16 points)
Commons	2 Isolated (8 point / common)
Maximum Applicable Fuse	8A

Removable Terminal Block Specifications

Part Number	P2-RTB	P2-RTB-1
Number of Positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1.



P1-16TR Relay Output (continued)

2

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	3000mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System.
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	91g (3.2 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

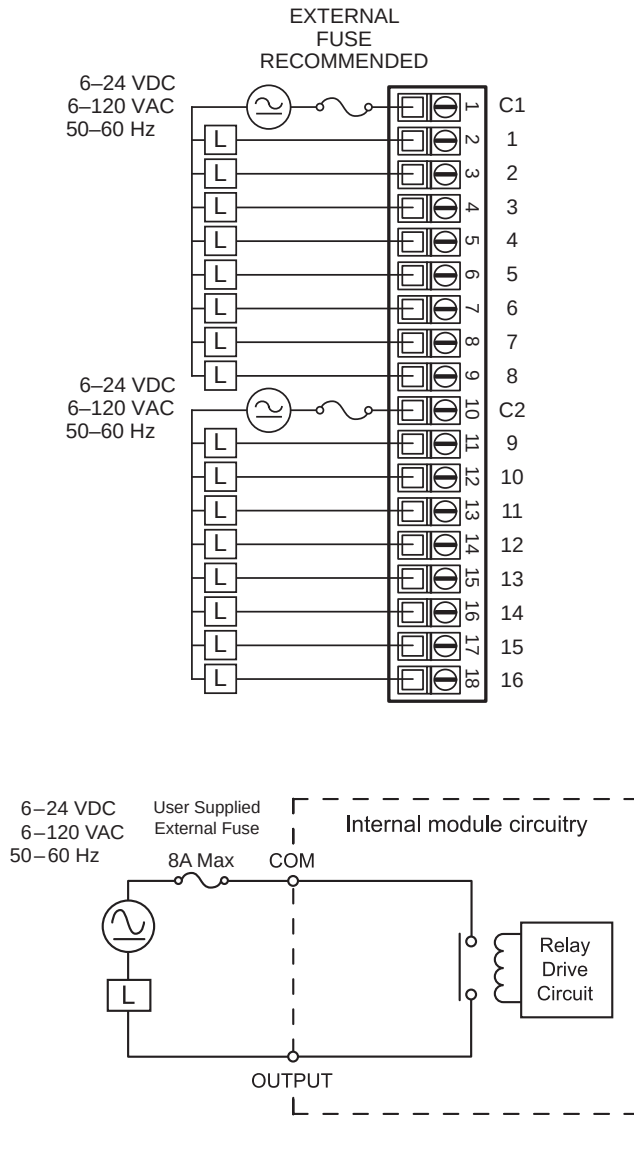
* See CE Declaration of Conformity for details.

Typical Relay Life	
Voltage & Type of Load	Operations at 1A Load Current
30VDC Resistive	100,000
30VDC Solenoid	100,000
120VAC Resistive	100,000
120VAC Solenoid	100,000
240VAC Resistive	100,000
240VAC Solenoid	100,000

P1-16TR Relay Output (continued)

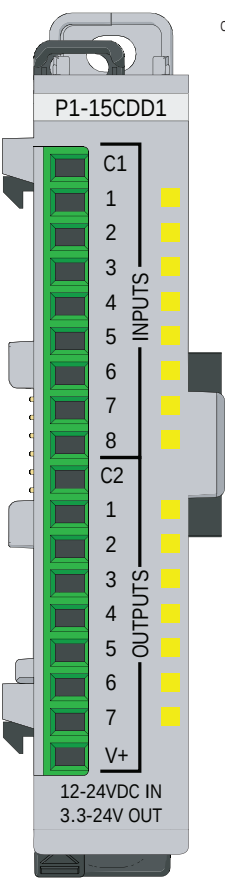
Wiring Diagrams

2



P1-15CDD1 Input/Output Module

The P1-15CDD1 Input/Output Module provides eight 12–24 VDC inputs plus seven outputs that sink up to 1A per output for loads connected to 3.3–24 V supplies for use with the Productivity1000 system.



Input Specifications	
Inputs	8 (sink/source)
Rated Voltage	12–24 VDC
Operating Voltage Range	10.2–26.4 VDC
Input Current	7.6 mA @ 24VDC
Maximum Input Current	8.8 mA @ 27.6 VDC)
Maximum ON Current	2.5 mA
Maximum OFF Current	0.5 mA
ON Voltage Level	>7.6 VDC
OFF Voltage Level	<6.4 VDC
OFF to ON Response	2ms Max
ON to OFF Response	2ms Max
Status Indicators	Logic Side (8 points)
Commons	1

Output Specifications	
Outputs per Module	7 sinking
Rated Voltage	3.3–24 VDC
Operating Voltage Range	2.8–30 VDC
Maximum Output Current	1A continuous 4A temporary overload, 50ms 6A temporary overload, 10ms
On Voltage Drop	0.18 VDC
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Status Indicators	Logic Side (7 points)
Commons	1
Maximum Applicable Fuse	8A
External Power Supply Required	12–24 VDC (-15%/+20%) @ 25mA

Terminal blocks sold separately.

We recommend using pre-wired **ZIP**Link cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1



P1-15CDD1 Input/Output Module (continued)

General Specifications

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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1800mW
Enclosure Type	Open Equipment
Module Location	Any I/O slot in any Productivity1000 System.
Field Wiring	Use ZIP Link Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	71g (2.5 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details..

Removable Terminal Block Specifications

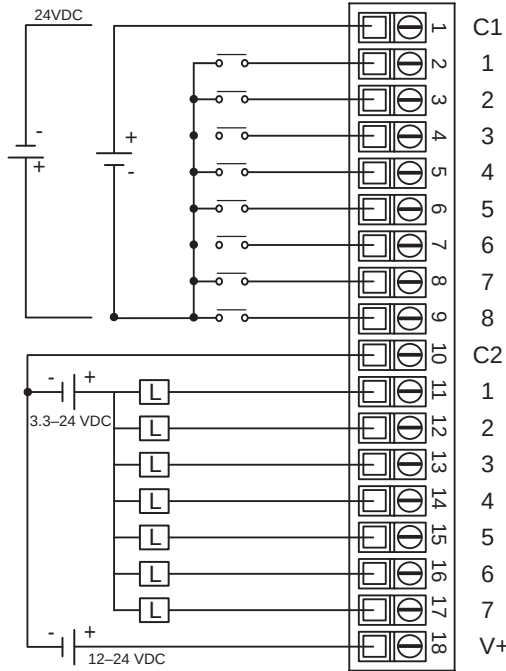
Part Number	P2-RTB	P2-RTB-1
Number of Positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

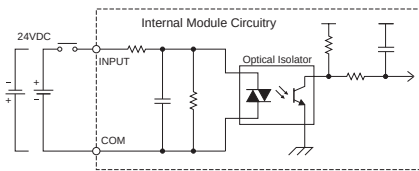
P1-15CDD1 Input/Output Module (continued)

Wiring Diagrams

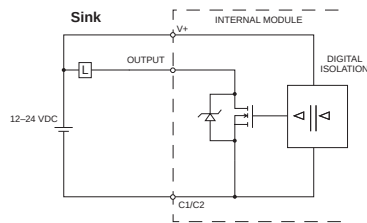
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Typical Input Circuit

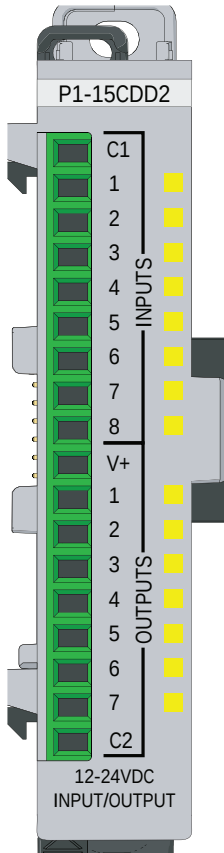


Typical Output Circuit



P1-15CDD2 Input/Output

The P1-15CDD2 Input/Output Module provides eight 12–24 VDC inputs plus seven 12–24 VDC outputs that source up to 1A per output to loads connected to ground for use with the Productivity1000 system.



Input Specifications

Inputs per Module	8 (Sinking/Sourcing)
Rated Voltage	12–24 VDC
Operating Voltage Range	10.4–28.8 VDC
Input Current	8.4 mA @ 24VDC
Maximum Input Current	11mA @ 28.8 VDC)
Input Impedance	3kΩ
Maximum ON Current	2.5 mA
Maximum OFF Current	1.8 mA
ON Voltage Level*	>8VDC
OFF Voltage Level	<6VDC
OFF to ON Response	2ms max
ON to OFF Response	
Status Indicators	Logic Side (8 points)
Commons	1

Output Specifications

Outputs per Module	7 (sourcing)
Voltage Rating	12–24 VDC
Operating Voltage Range	10.2–28.8 VDC
Maximum Output Current	1A continuous 4A temporary overload, 50ms 6A temporary overload, 10ms
On Voltage Drop	25mV
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Status Indicators	Logic Side (7 points)
Commons	1
Maximum Applicable Fuse	8A
External Power Supply Required	12–24 VDC (-20%/+25%) @ 50mA

Terminal blocks sold separately.

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1.



P1-15CDD2 Input/Output Module (continued)

2

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1800mW
Enclosure Type	Open Equipment
Module Keying	Electronic
Module Location	Any I/O position in a Productivity1000 system
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	71g (2.5 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

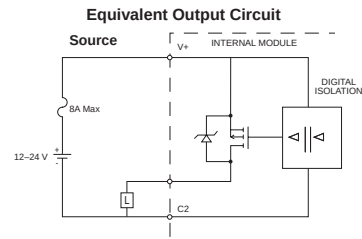
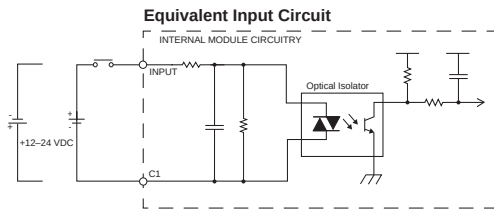
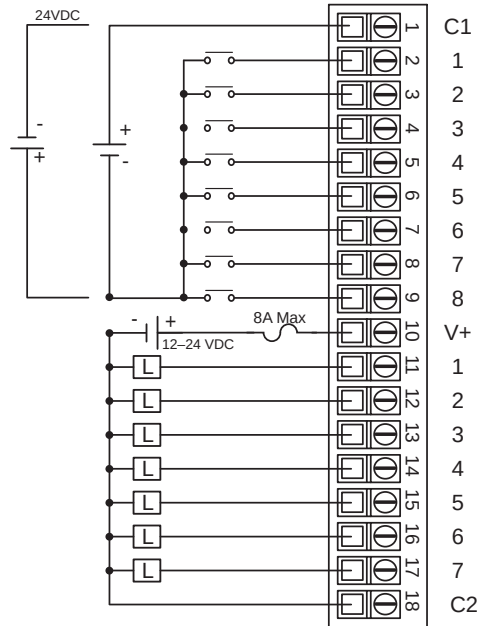
Removable Terminal Block Specifications		
Part Number	P2-RTB	P2-RTB-1
Number of Positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

P1-15CDD2 Input/Output Module (continued)

Wiring Diagrams

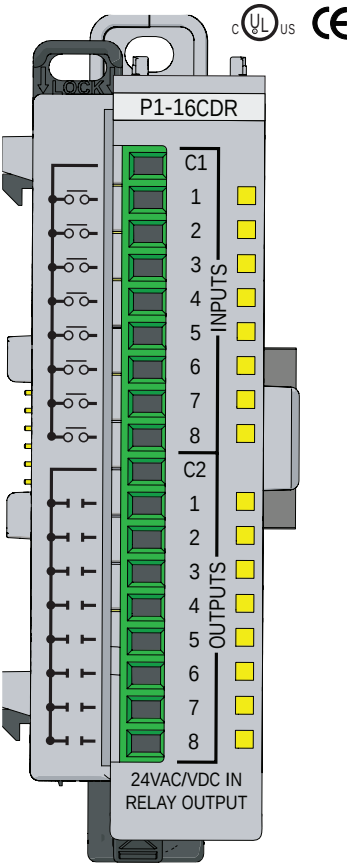
2



P1-16CDR Discrete Input/ Relay Output Module

The P1-16CDR Discrete Input / Relay Output Module provides eight 24 VAC/VDC inputs and eight relay outputs for use with the Productivity1000 system.

2



Terminal blocks sold separately.



We recommend using pre-wired ZIPLINK cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1.

Input Specifications

Inputs per Module	8 (sink/source)
Rated Voltage	24 VAC/VDC
Operating Voltage Range	20.4–27.6 VAC/VDC
Peak Voltage	27.6 VAC/ 30VDC
AC Frequency	47–63 Hz
Input Current	8mA @ 24 VAC/VDC
Maximum Input Current	10mA @ 27.6 VAC 10mA @ 30VDC
ON Voltage Level	>9.5 VDC, >8VAC
OFF Voltage Level	<4.5 VDC, <4VAC
Maximum ON Current	2.5 mA
Maximum OFF Current	0.5 mA
OFF to ON Response	AC: 10ms DC: 6ms
ON to OFF Response	AC: 20ms DC: 10ms
Status Indicators	Logic Side (8 points)
Commons	1 (8 points/common)

Output Specifications

Outputs per Module	8
Rated Voltage	6.25–24 VDC 6–120 VAC
Operating Voltage Range	5.31–28.8 VDC 5–132 VAC
Output Type	Relay, Form A (SPST)
AC Frequency	47–63 Hz
Maximum Output Current	1A / point, 8A / common @ 60°C for both AC and DC
Minimum Load Current	5mA @ 5VDC
Maximum Inrush Current	5A for 10ms
OFF to ON Response	≈ 10ms
ON to OFF Response	
Status Indicators	Logic Side (8 points)
Commons	1 (8 point / common)
Maximum Applicable Fuse	8A

P1-16CDR Discrete Input/ Relay Output Module

General Specifications

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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	2730mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System.
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	88g (3.2 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

Removable Terminal Block Specifications

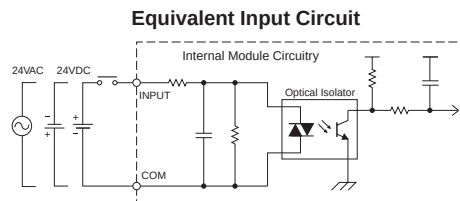
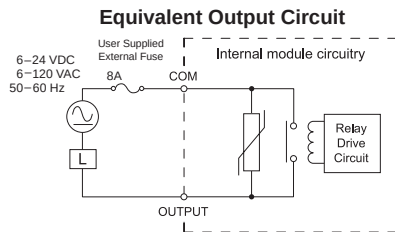
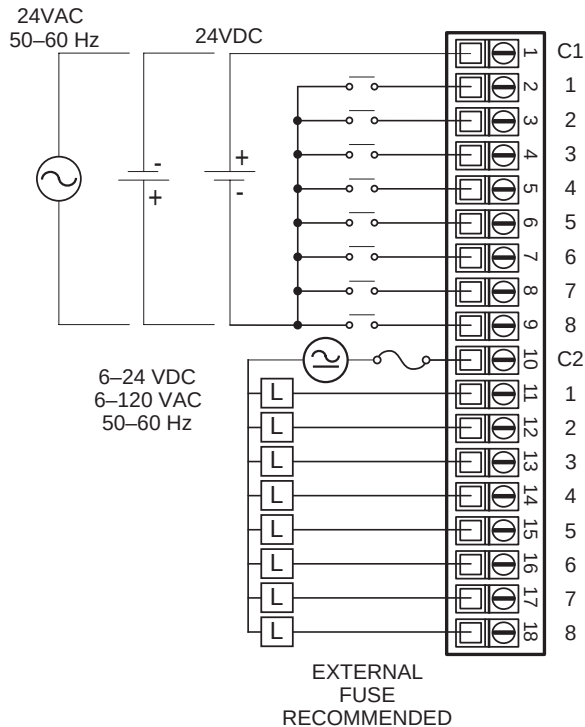
Part Number	P2-RTB	P2-RTB-1
Number of Positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in. (6–7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 19/64 in. (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or Equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum*	
Screw Size	M2	N/A
Screw Torque	2.5 lb-in (0.28 N-m)	N/A

* Recommended screw driver: P/N TW-SD-MSL-1

P1-16CDR Discrete Input/ Relay Output Module (continued)

2

Wiring Diagrams



Analog I/O Modules Overview

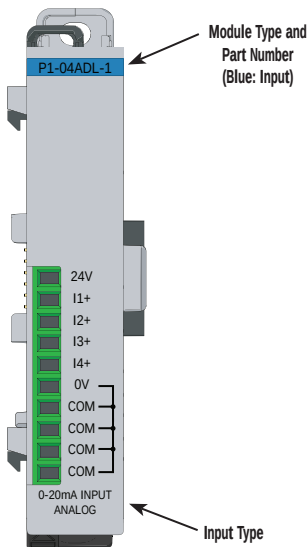
A variety of analog I/O modules are available for use with Productivity1000 system.

Each I/O module is identified as an “Input” or “Output” module on its front panel using the color coding scheme listed below. See Chapter 2 for discrete I/O module specifications and Chapter 5 for module wiring and communications. The following pages contain the analog I/O module specifications.

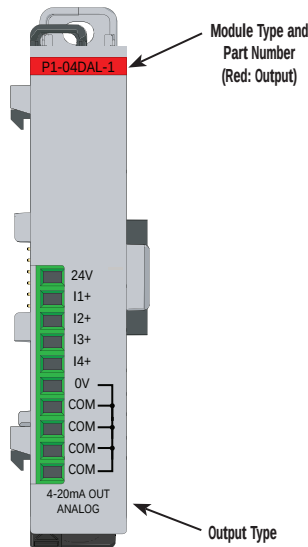
There are six analog I/O modules available; four Input and 2 Output modules. The specifications and wiring diagrams, along with configuration and signal scaling information are in this chapter.

Use the hardware configuration tool in the Productivity Suite programming software to setup the I/O modules. See the Productivity Suite help file for in-depth configuration and programming concepts.

Analog Input Modules

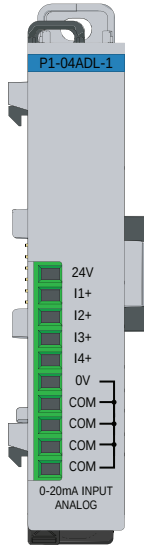


Analog Output Modules



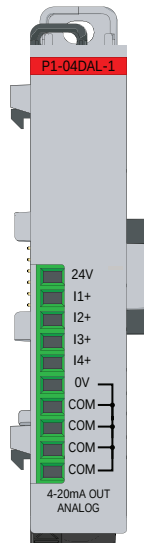
Analog I/O Modules

Analog Input Modules



Productivity1000 Analog Input Modules			
Part Number	Number of Channels	Description	See Page
P1-04ADL-1	4	Analog Input (Current)	3-4
P1-04ADL-2	4	Analog Input (Voltage)	3-8
P1-04THM	4	Analog Thermocouple Input	3-12
P1-04NTC	4	Analog Thermistor Input	3-17

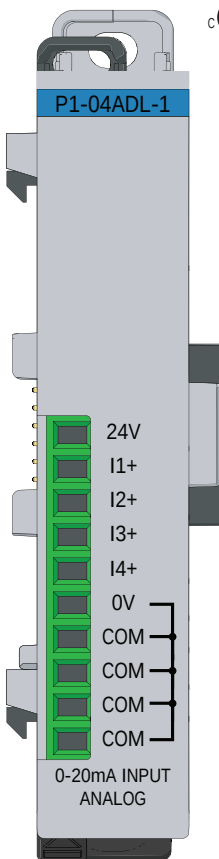
Analog Output Modules



Productivity1000 Analog Output Modules			
Part Number	Number of Channels	Description	See Page
P1-04DAL-1	4	Analog Output (Current)	3-21
P1-04DAL-2	4	Analog Output (Voltage)	3-25

P1-04ADL-1 Analog Input

The P1-04ADL-1 Low Resolution Analog Input Module provides four current sinking channels for converting 0–20 mA analog signals to a digital value of 0–8191 (13-bit) for use with the Productivity1000 system.



Terminal block sold separately.

Input Specifications

Input Channels	4
Input Range	0–20mA
Signal Resolution	13-bit
Resolution Value of LSB (least significant bit)	0–20mA = 2.44 μ A per count (1LSB = 1 count)
Data Range	0–8191 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	$\pm$ 31mA
Input Impedance	247 Ω , $\pm$ 0.5%, 1/4W Current Input
Filter Characteristics	Low Pass, -3dB @ 120Hz
Sample Duration Time	2.5 ms per channel (Does not include ladder scan time)
All Channel Update Rate	10ms
Open Circuit Detection Time	Zero reading within 100ms
Conversion Method	Successive approximation
Accuracy vs Temperature	$\pm$ 75PPM / $^{\circ}$ C maximum
Maximum Inaccuracy	0.5% of range (including temperature drift)
Linearity Error (end to end)	$\pm$ 0.037% of range Monotonic with no missing codes
Input Stability and Repeatability	$\pm$ 0.024% of range
Maximum Full Scale Calibration Error	$\pm$ 0.098% of range
Offset Calibration Error	$\pm$ 0.098% of range
Max Crosstalk at DC, 50Hz and 60Hz	$\pm$ 0.049% of range
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / + 25%), 30mA

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-04ADL-1 Analog Input (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1200mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Use ZIPLink Wiring System or removable terminal block (not included). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity2000.com
Terminal Type (sold separately)	10-position Removable Terminal Block
Weight	71g (2.5 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

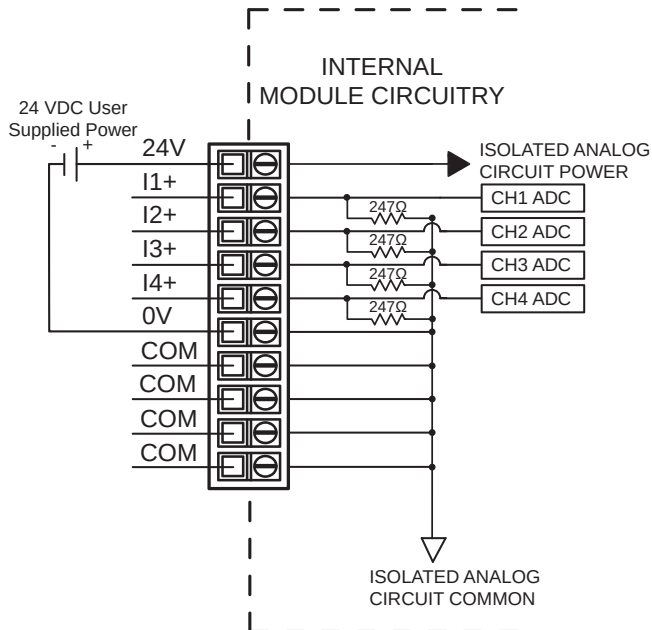
Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

* Recommended screw driver P/N: TW-SD-MSL-1.

P1-04ADL-1 Analog Input (continued)

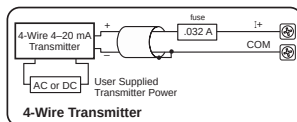
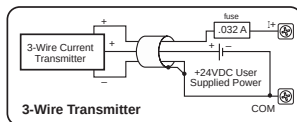
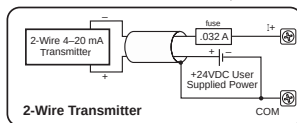
Wiring Diagrams

3



Current Input Circuits

An Edison S500-32-R 0.032 A fast-acting fuse is recommended for current loops.



Note: Do not connect both ends of shield.

P1-04ADL-1 Analog Input (continued)

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04ADL-1 module into the configuration.

If desired, assign a *User Tagname* to each input point (channel) selected and to each *Status Bit Item*.

P1-04ADL-1

4CH, 13-BIT, CURRENT, 0-20mA, ANALOG INPUT

Add Default Tags Remove Default Tags

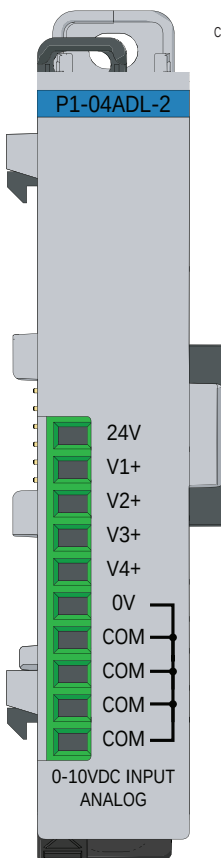
Point	User Tagname	Ch. Select All ☒	Under Range Error	Over Range Error
1	AIS32-0.1.1.1	☒	MST-0.1.1.57	MST-0.1.1.89
2	AIS32-0.1.1.2	☒	MST-0.1.1.58	MST-0.1.1.90
3	AIS32-0.1.1.3	☒	MST-0.1.1.59	MST-0.1.1.91
4	AIS32-0.1.1.4	☒	MST-0.1.1.60	MST-0.1.1.92

Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Missing 24V	MST-0.1.1.26

Module Info Monitor OK Cancel Help

P1-04ADL-2 Analog Input

The P1-04ADL-2 Low Resolution Voltage Analog Input Module provides four channels for converting 0–10 VDC analog signals to digital values of 0–8191 (13-bit) for use with the Productivity1000 system.



Terminal block sold separately.

Input Specifications

Input Channels	4
Input Range	0–10 VDC
Signal Resolution	13-bit
Resolution Value of LSB	0–10 VDC = 1.22 mV per count (1 LSB = 1 count)
Data Range	0–8191 counts
Input Type	Single-ended (1 common)
Maximum Continuous Overload	±100VDC
Input Impedance	>150kΩ
Hardware Filter Characteristics	Low Pass, -3dB @ 300Hz
Sample Duration Time	2.5 ms per channel (does not include ladder scan time)
All Channel Update Rate	10ms
Open Circuit Detection Time	Zero reading within 100ms
Conversion Method	Successive approximation
Accuracy vs Temperature	±75PPM / °C maximum
Maximum Inaccuracy	0.5% of range (including temperature drift)
Linearity Error (end to end)	±0.036% of range Monotonic with no missing codes
Input Stability and Repeatability	±0.024% of range
Full Scale Calibration Error (including offset)	±0.097% of range
Offset Calibration Error	±0.097% of range
Max Crosstalk at DC, 50Hz and 60Hz	±0.049% of range
External 24VDC Power Required	24VDC (-20% / +25%), 30mA

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-04ADL-2 Analog Input (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1200mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Use ZIPLink Wiring System or removable terminal block (not included). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity2000.com
Terminal Type (sold separately)	10-position Removable Terminal Block
Weight	62g (2.2 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

** See CE Declaration of Conformity for details.

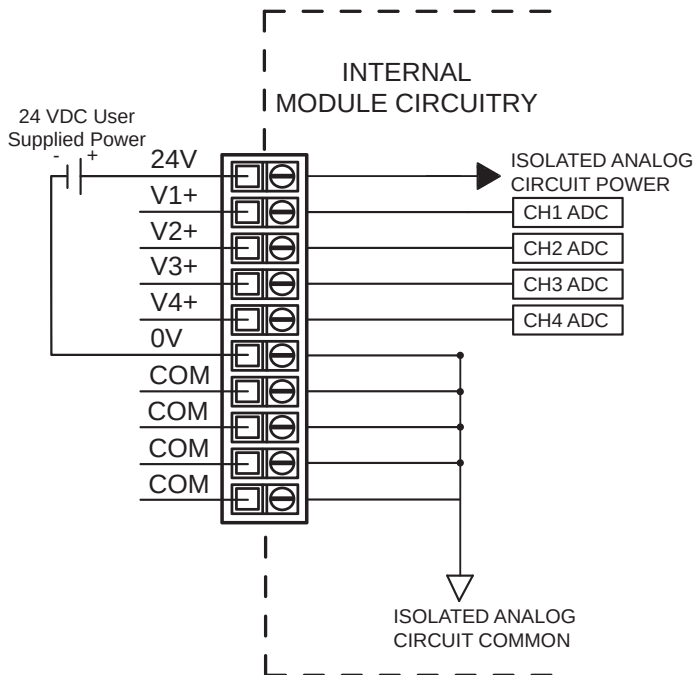
Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

* Recommended screw driver P/N: TW-SD-MSL-1.

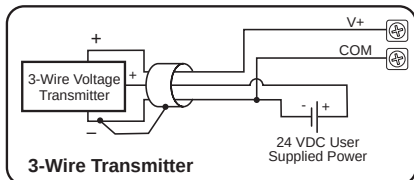
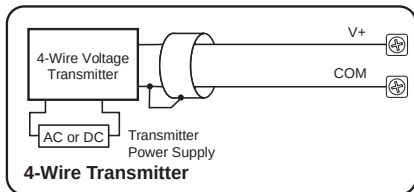
P1-04ADL-2 Analog Input (continued)

Wiring Diagrams

3



Voltage Input Circuits



Notes for maximum accuracy:
1. Jumper unused inputs to common.



P1-04ADL-2 Analog Input (continued)

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04ADL-2 module into the configuration.

If desired, assign a *User Tagname* to each input point (channel) selected and to each *Status Bit Item*.

P1-04ADL-2

4CH, 13-BIT, VOLTAGE, 0-10VDC, ANALOG INPUT

Add Default Tags Remove Default Tags

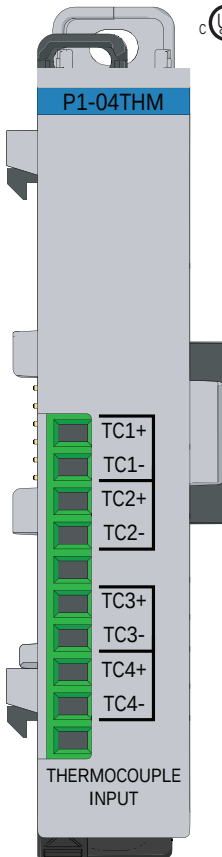
Point	User Tagname	Ch. Select	Under Range Error	Over Range Error
1	AIS32-0.1.1.1	☒	MST-0.1.1.57	MST-0.1.1.89
2	AIS32-0.1.1.2	☒	MST-0.1.1.58	MST-0.1.1.90
3	AIS32-0.1.1.3	☒	MST-0.1.1.59	MST-0.1.1.91
4	AIS32-0.1.1.4	☒	MST-0.1.1.60	MST-0.1.1.92

Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Missing 24V	MST-0.1.1.26

Module Info Monitor OK Cancel Help

P1-04THM Analog Input

The P1-04THM Thermocouple Input Module provides four differential channels for receiving thermocouple and voltage input signals for use with the Productivity1000 system.



Terminal Block Included. Not Compatible with ZIPLink.
Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.productivity1000.com for details).

Thermocouple Input Specifications

Input Channels	4 Differential
Data Format	Floating Point
Common Mode Range	±1.25 V
Common Mode Rejection	100dB @ DC and 130dB @ 60Hz
Input Impedance	>5MΩ
Maximum Ratings	Fault protected inputs to ±50V
Resolution	16-bit, ±0.1°C or °F
Thermocouple Input Ranges	Type J -190° to 760°C (-310° to 1400°F); Type E -210° to 1000°C (-346° to 1832°F); Type K -150° to 1372°C (-238° to 2502°F); Type R 65° to 1768°C (149° to 3214°F); Type S 65° to 1768°C (149° to 3214°F); Type T -230° to 400°C (-382° to 752°F); Type B 529° to 1820°C (984° to 3308°F); Type N -70° to 1300°C (-94° to 2372°F); Type C 65° to 2320°C (149° to 4208°F);
Thermocouple Linearization	Automatic
Cold Junction Compensation	Automatic
Sample Duration Time	270ms
All Channel Update Rate	1.08 s
Open Circuit Detection Time	Within 5s
Conversion Method	Sigma-Delta
Accuracy vs. Temperature	±50ppm per °C (maximum)
Maximum Inaccuracy	±3°C maximum (excluding thermocouple error).
Linearity Error	±1°C maximum (±0.5°C typical) Monotonic with no missing codes.
Warm-up Time	30 minutes for ±1% repeatability 2 minutes to reach voltage specifications
External Power Supply Required	None

Voltage Input Specifications

Linear mV Device Input Ranges	0–39.0625 mVDC, ±39.0625 mVDC, ±78.125 mVDC, 0–156.25 mVDC, ±156.25 mVDC, 0–1250 mVDC
Max Voltage Input Offset Error	0.05% @ 0°– 60°C, typical 0.04% @ 25°C
Max Voltage Input Gain Error	0.06% @ 25°C
Max Voltage Input Linearity Error	0.05% @ 0°– 60°C, typical 0.03% @ 25°C
Max Voltage Input Impedance	0.2% @ 0°– 60°C, typical 0.06% @ 25°C

P1-04THM Analog Input (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Heat Dissipation	100mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Removable terminal block (included). The P1-04THM module is not compatible with the ZIPLink wiring system.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (Included)	10-position removable terminal block
Weight	58g (2.0 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

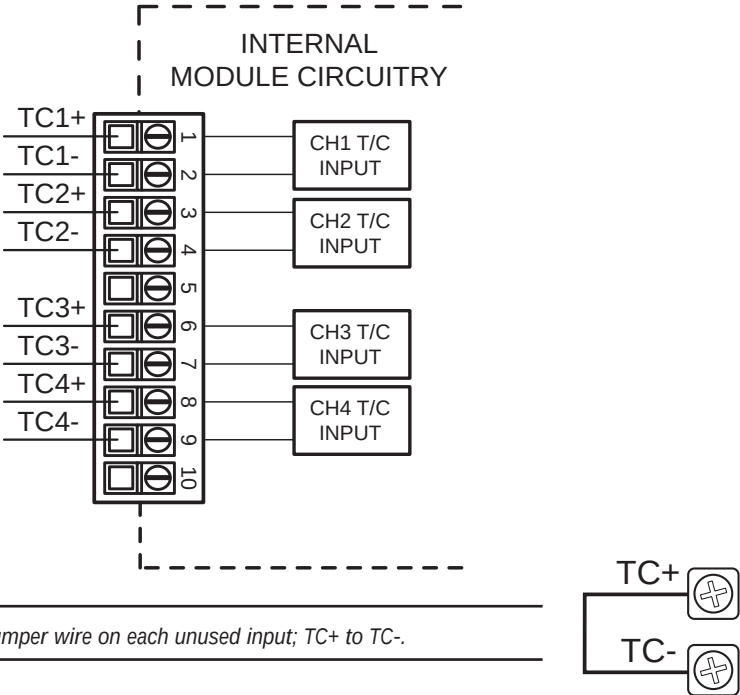
Configuration/Diagnostics	
Burn-out Detection: High Side/Disable	1 bit per module
°C/°F (T/C Only)	1 bit per module
Module Diagnostics Failure	1 bit per module
Burn-out (on if T/C input is open – no connection between TCn+ and TCn-)	1 bit per channel
Channel Under-range (T/C only)	1 bit per channel
Channel Over-range (T/C only)	1 bit per channel

P1-04THM Analog Input (continued)

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

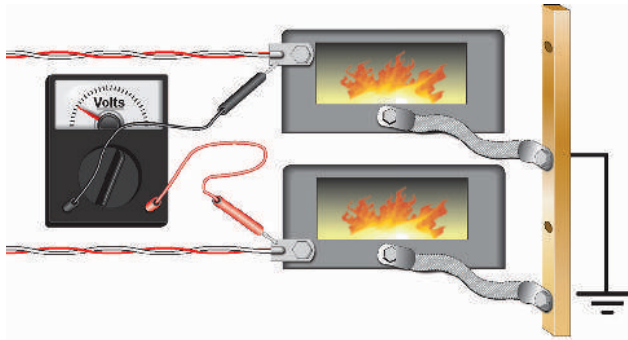
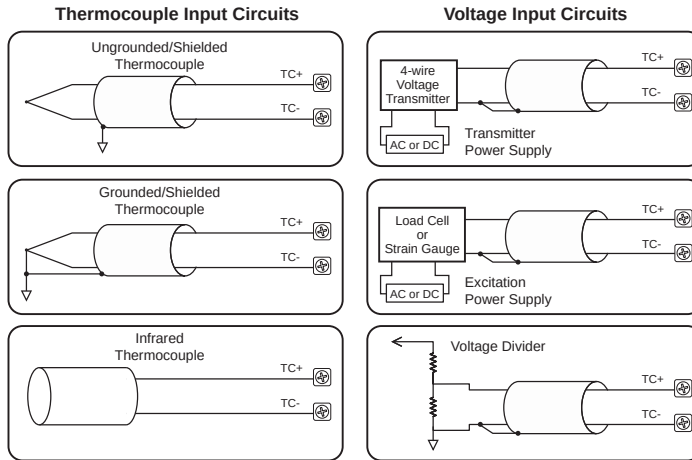
* Recommended screw driver P/N: TW-SD-MSL-1.

Wiring Diagrams



P1-04THM Analog Input (continued)

Wiring Diagrams



NOTES:

1. Connect shield to thermocouple signal/ground only. Do not connect to both ends.

2. Install jumper wire on each unused input, TC+ to TC-.



3. With grounded thermocouples, take precautions to prevent having a voltage potential between thermocouple tips. A voltage of 1.25V or greater between tips will skew measurements.

4. Use shielded, twisted thermocouple extension wire that matches the thermocouple type. Use thermocouple-compatible junction blocks.

P1-04THM Analog Input (continued)

Module Configuration

3

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04THM module into the base configuration.

Select *Automatic Module Verification* or *No Verification*. Specify *Temperature Scale* and *Burnout Detection*, and use the drop down menu to select module range and resolution. If desired, assign a *User Tagname* to each output point channel selected and to each *Status Bit* item.

P1-04THM

4CH, 16-BIT, THERMOCOUPLE INPUT

Temperature Scale: Degrees F

Burnout Detection: Low Side Burnout Detection

Add Default Tags Remove Default Tags

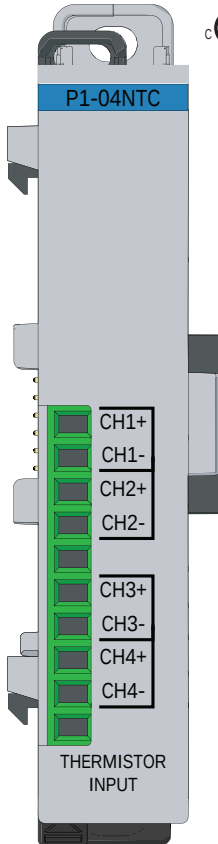
Point	User Tagname	Ch. Select	Range	Burnout Error	Under Range Error	Over Range Error
1	AIF32-0.1.1.1	All ☒	Type J	MST-0.1.1.41	MST-0.1.1.57	MST-0.1.1.89
2	AIF32-0.1.1.2	☒	Type J	MST-0.1.1.42	MST-0.1.1.58	MST-0.1.1.90
3	AIF32-0.1.1.3	☒	Type J	MST-0.1.1.43	MST-0.1.1.59	MST-0.1.1.91
4	AIF32-0.1.1.4	☒	Type J	MST-0.1.1.44	MST-0.1.1.60	MST-0.1.1.92

Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Module Not Ready	MST-0.1.1.27

Module Info Monitor OK Cancel Help

P1-04NTC Thermistor

The P1-04NTC module provides four Thermistor input channels for use with the Productivity1000 system.



NTC Input Specifications

Input Channels	4 Single Ended (Temperature only)	
Data Format	Floating Point	
Common Mode Rejection	100dB @ DC	
Input Impedance	>5MΩ	
Maximum Ratings	Fault protected inputs to ±50V	
Resolution	16-bit, ±0.1°C or °F	
Thermistor Input Ranges	2252 10K-AN Type 1 10K-CP Type 2 5K 3K 1.8K	-40° to 150°C (-40° to 300°F)
Thermistor Linearization	Automatic	
Sample Duration	Dependent on digital filter settings - 61ms @ 33Hz; 4ms @ 470Hz	
Sample Duration Time	Per channel: 61ms @ 33Hz, 4ms @ 470Hz	
All Channel Update Rate	1.2 s @ 33Hz; 300ms @ 470Hz	
Open Circuit Detection Time	Within 5s @ 33Hz	
Conversion Method	Sigma-Delta	
Accuracy vs. Temperature	±35PPM per °C (maximum)	
Maximum Inaccuracy	±1°C maximum (33Hz) ±2.5°C maximum (470Hz) (Excluding thermistor error; including temperature drift)	
Linearity Error	±0.5°C maximum (±0.35°C typical) Monotonic with no missing codes	
Filter Characteristics	Digital filter cutoff frequencies: 33Hz, 470Hz.	
External Power Supply Required	None	

Terminal Block Included.

Not Compatible with ZIPLink.

Warranty: Thirty-day money-back guarantee.

Two-year limited replacement.

(See www.productivity1000.com for details).

P1-04NTC Thermistor (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Heat Dissipation	100mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Removable terminal block (included). The P1-04NTC module is not compatible with the ZIPLink wiring system.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (included)	10-position removable terminal block
Weight	60g (2.1 oz)
Agency Approvals**	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

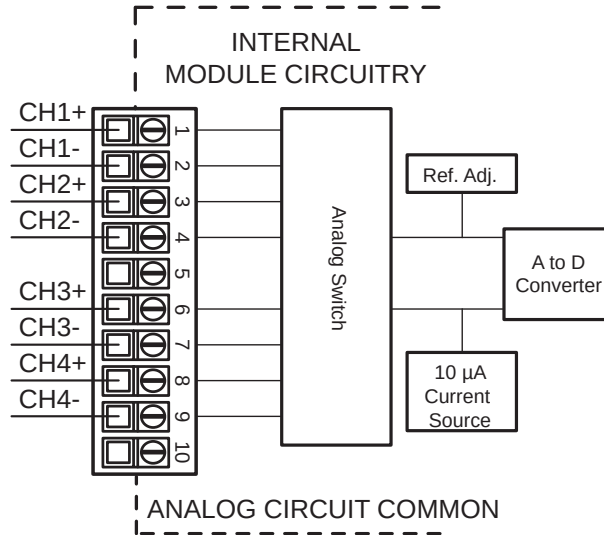
* See CE Declaration of Conformity for details.

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

* Recommended screw driver P/N: TW-SD-MSL-1.

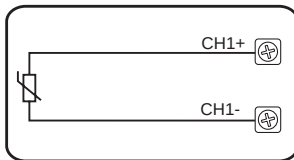
P1-04NTC Thermistor (continued)

Wiring Diagrams

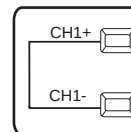


NOTE: Install jumper wire on each unused input; CH+ to CH-.

Thermistor Input



Jumpers



P1-04NTC Thermistor (continued)

Module Configuration

3

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04NTC module into the base configuration.

Specify *Temperature Scale* and *Burnout Detection*, and use the drop down menu to select module range and resolution. If desired, assign a *User Tagname* to each output point channel selected and to each *Status Bit Item*.

P1-04NTC

4CH, 16 BIT, THERMISTOR INPUT

Input Range: 2252 Temperature Scale: Degrees F Digital Filter: 61 msec Burnout Detection: Low Side Burnout Detection

Add Default Tags Remove Default Tags

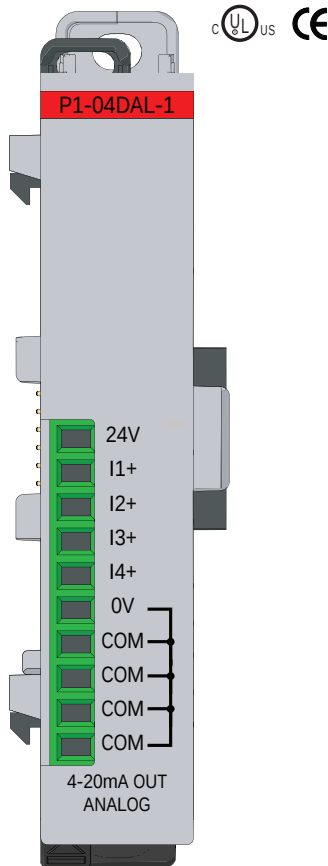
Point	User Tagname	Ch. Select	Burnout Error	Under Range Error	Over Range Error
1	AIF32-0.1.1.1	☒	MST-0.1.1.41	MST-0.1.1.57	MST-0.1.1.89
2	AIF32-0.1.1.2	☒	MST-0.1.1.42	MST-0.1.1.58	MST-0.1.1.90
3	AIF32-0.1.1.3	☒	MST-0.1.1.43	MST-0.1.1.59	MST-0.1.1.91
4	AIF32-0.1.1.4	☒	MST-0.1.1.44	MST-0.1.1.60	MST-0.1.1.92

Status Bit	User Tagname
Module Failed	MST-4.1.1.25
Module Not Ready	MST-0.1.1.27

Module Info Monitor OK Cancel Help

P1-04DAL-1 Analog Output

The P1-04DAL-1 Low Resolution Analog Output Module provides four current sourcing channels for converting a digital value of 0–4095 (12-bit) to 4–20 mA analog signals for use with the Productivity1000 system.



Terminal block sold separately.

Output Specifications

Output Channels	4
Output Range	4–20mA
Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	4–20mA = 3.9 μ A / count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type (sourcing)	Current sourcing at 20mA max
Output Value in Fault Mode	Less than 4mA
Load Impedance	0–570 Ω (19.2 VDC), 0–690 Ω (21.6 VDC), 0–810 Ω (24VDC), 0–930 Ω (26.4 VDC), 0–1100 Ω (30.0 VDC), Minimum Load: 0 Ω @ 0–45°C 125 Ω @ 45–60°C ambient temperature
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	1% of range
Maximum Full Scale Calibration Error (Including Offset)	$\pm$ 0.2% of range minimum
Maximum Offset Calibration Error	$\pm$ 0.2% of range maximum
Accuracy vs. Temperature	$\pm$ 75PPM / °C maximum full-scale calibration change ($\pm$ 0.005% of range / °C)
Max Crosstalk at DC, 50/60Hz	-72dB, 1 LSB
Linearity Error (End to End)	$\pm$ 4 counts max., ($\pm$ 0.1% of full scale)
Output Stability and Repeatability	$\pm$ 2 count after 10 min. warm up (typical)
Output Ripple	$\pm$ 0.2% of full scale
Output Settling Time	0.3 ms max., 5 μ s min. (full scale range)
All Channel Update Rate	2ms (max)
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal at Power Up and Power Down	4mA
External Power Supply Required	24VDC ($\pm$ 20% / $\pm$ 25%), 140mA (Loop power included)

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-04DAL-1 Analog Output (continued)

3

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	2000mW Maximum
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Use ZIP Link Wiring System or removable terminal block (not included). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity2000.com
Terminal Type (sold separately)	10-position Removable Terminal Block
Weight	85.1 g (3.0 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

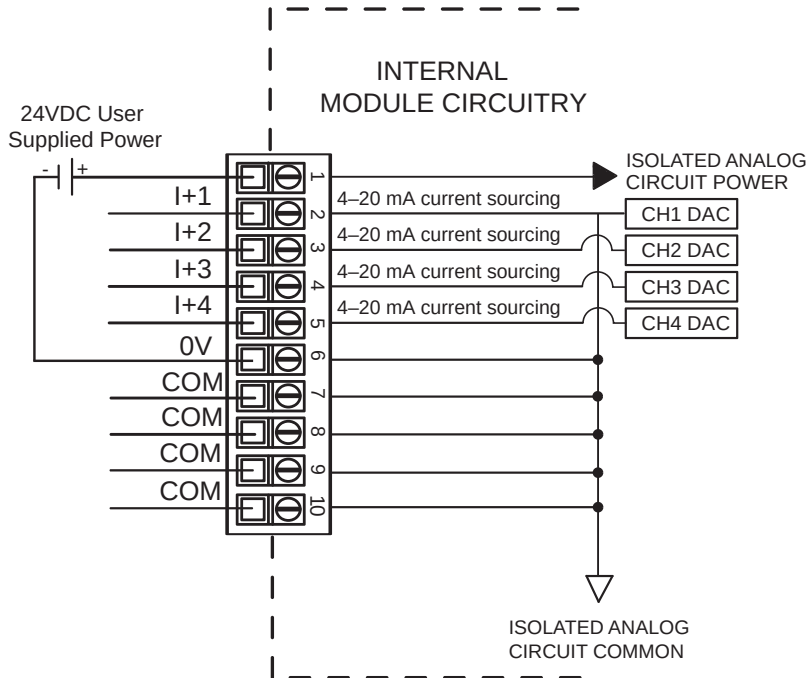
* See CE Declaration of Conformity for details.

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

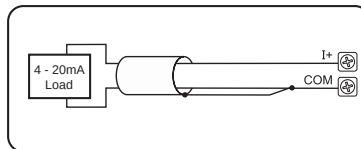
* Recommended screw driver P/N: TW-SD-MSL-1.

P1-04DAL-1 Analog Output (continued)

Wiring Diagrams



Current Source Output Circuit



Note: Shield is connected to common at the source device.

P1-04DAL-1 Analog Output (continued)

Module Configuration

3

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04DAL-1 module into the base configuration.

If desired, assign a *User Tagname* to each output point channel selected and to each *Status Bit Item*. A *Stop Mode Value* may also be assigned.

P1-04DAL-1

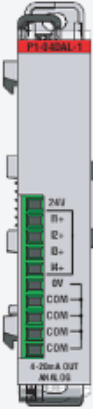
4CH, 12-BIT, CURRENT, 4-20mA, ANALOG OUTPUT

Add Default Tags Remove Default Tags

Point	User Tagname	Stop Mode Value
1	AOS32-0.1.1.1	0
2	AOS32-0.1.1.2	0
3	AOS32-0.1.1.3	0
4	AOS32-0.1.1.4	0

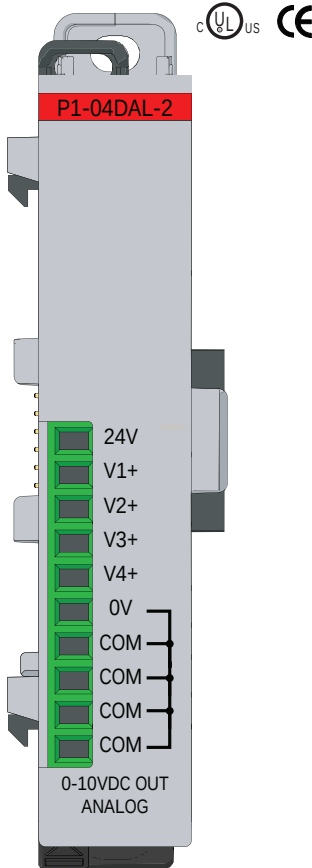
Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Missing 24V	MST-0.1.1.26

Module Info Monitor **OK** Cancel Help



P1-04DAL-2 Analog Output

The P1-04DAL-2 Low Resolution Voltage Analog Output Module provides four outputs for converting digital values from 0–4095 (12-bit) to 0–10 VDC analog signals for use with the Productivity1000 system.



Terminal block sold separately.

Output Specifications

Output Channels	4
Module Signal Input Range	0–10V
Output Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	0–10V = 2.44 mV per count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type	Voltage sourcing at 10mA
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load	0.01 μF
Allowed Load Type	Grounded
Maximum Inaccuracy	0.5% of range
Maximum Full Scale Calibration Error (Not Including Offset)	±0.2% of range
Maximum Offset Calibration Error	±0.2% of range
Accuracy vs. Temperature	±75PPM / °C maximum full-scale calibration change (±0.0025% of range / °C)
Max Crosstalk	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB maximum, (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2% LSB after 10 min. warm up (typical)
Output Ripple	±0.2% of full scale
Output Settling Time	0.3 ms max., 5μs min. (full scale range)
All Channel Update Rate (typical)	2ms
Maximum Continuous Overload	Outputs current limited to 40mA typical Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 μF Transient Suppressor
Output Signal at Power Up and Power Down	0V
External Power Supply Required	24VDC (-20% / +25%), 100mA

We recommend using pre-wired **ZIPLink** cables and connection modules. See Chapter 5.

If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P1-10RTB or P1-10RTB-1



P1-04DAL-2 Analog Output (continued)

General Specifications	
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	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	2000mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Productivity1000 System
Field Wiring	Use ZIPLink Wiring System or removable terminal block (sold separately). See "Wiring Options" in Chapter 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity1000.com
Connector Type (Not included)	10-position removable terminal block
Weight	62g (2.2 oz)
Agency Approvals	UL 61010-2-201 file E139594, Canada & USA CE (EN61131-2 EMC and EN61010-2-201 Safety)*

* See CE Declaration of Conformity for details.

Removable Terminal Block Specifications		
Part Number	P1-10RTB	P1-10RTB-1
Number of positions	10 Screw Terminals	10 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051–1.31 mm ²) Solid / Stranded Conductor 3/64 in. (1.2 mm) Insulation Max. 1/4 in (6– 7 mm) Strip Length	28–16 AWG (0.081–1.31 mm ²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 19/64 in (7–8 mm) Strip Length
Conductors	"USE COPPER CONDUCTORS, 75°C" or equivalent.	
Screw Driver	0.1 in (2.5 mm) Maximum	
Screw Size	M2	N/A
Screw Torque	2.5 lb in (0.28 N-m)	N/A

* Recommended screw driver P/N: TW-SD-MSL-1.

P1-04DAL-2 Analog Output (continued)

Module Configuration

3

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-04DAL-2 module into the base configuration.

If desired, assign a *User Tagname* to each output point channel selected and to each *Status Bit Item*. A *Stop Mode Value* may also be assigned.

P1-04DAL-2

4CH, 12-BIT, VOLTAGE, 0-10VDC, ANALOG OUTPUT

Add Default Tags Remove Default Tags

Point	User Tagname	Stop Mode Value
1	AOS32-0.1.1.1	0
2	AOS32-0.1.1.2	0
3	AOS32-0.1.1.3	0
4	AOS32-0.1.1.4	0

Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Missing 24V	MST-0.1.1.26

Module Info Monitor OK Cancel Help