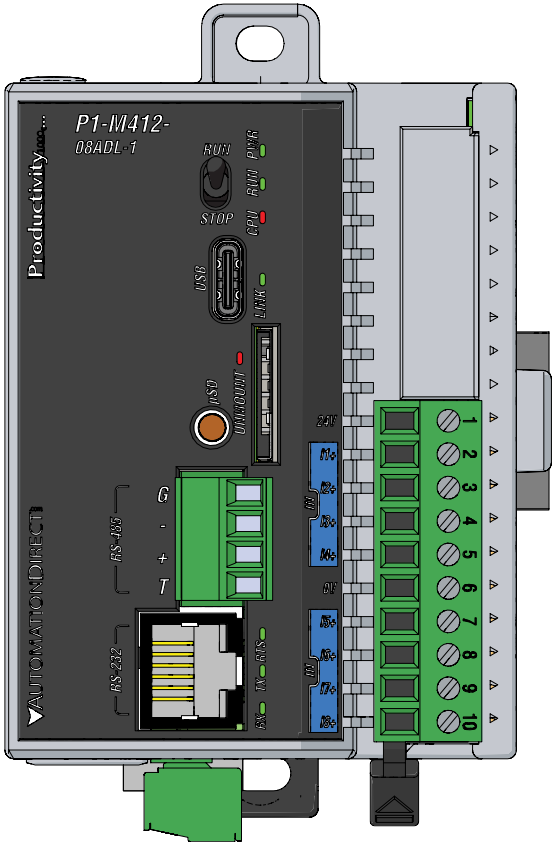


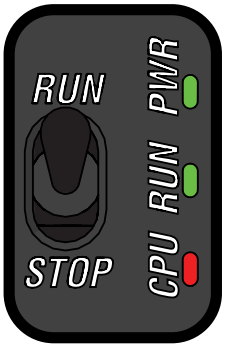
P1-M412-08ADL-1

The P1-M412-08ADL-1 is a P1000 CPU with eight current sinking channels for converting 0–20 mA analog signals to digital value of 0–8191 (13-bit). This PLC can be used as a stand-alone controller for small applications, or expanded with 2 additional P1000 I/O modules.

Terminal Block sold separately, (see wiring options on page 4).

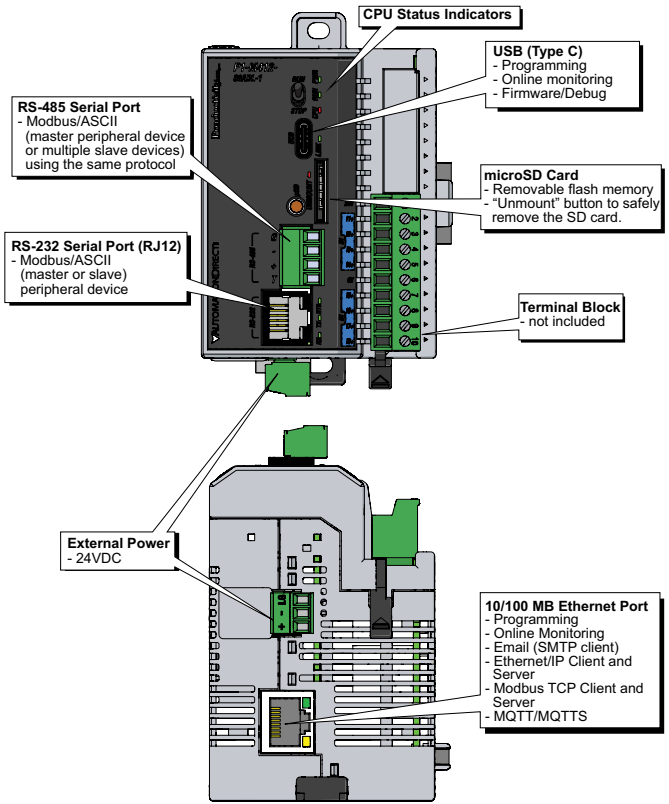
CPU Specifications		
User Memory	32MB (Includes program, data and documentation)	
Memory Type	Flash and RAM	
Retentive Memory	27KB	
Scan Time	1.7 ms (1K Boolean, Max I/O)	
External Power Required	24VDC ±2% @ 6W plus 1.25 W per additional I/O module.	
Protection Circuit	Not built into module – Install protection element such as Edison S5061-R, Time Delay, 1A Fuse	
Communication; 4 Integrated Ports	**USB IN**: Programming, Monitoring, Debug, Firmware **ETHERNET**: (10/100Mbps Ethernet) Programming, Monitoring, Debug, Firmware, Email SMTP Client, Modbus TCP Client (8 Servers) and Server (4 Clients), Ethernet IP Scanner (4) and Adapter (2), Custom Protocol over Ethernet, ProNet, MQTT/MQTTS. **RS-232:** (RJ-12, 1200-115.2 k baud) ASCII, Modbus **RS-485**: Removable Terminal Included, (1200-115.2k Baud) ASCII, Modbus RTU	
Data Logging	MicroSD card slot	
Hardware Limits of System	**Onboard I/O Points:** 8 0–20mA inputs **Expansion I/O Point Limit:** 32 (2 modules with up to 16 points each)	
Instruction Types	Application Functions Array Functions Counters/Timers Communications Data Handling Drum Sequencers Math Functions	PID Program Control String Functions System Functions Contacts Coils
Real Time Clock	None	

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



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 Front and Bottom Panels

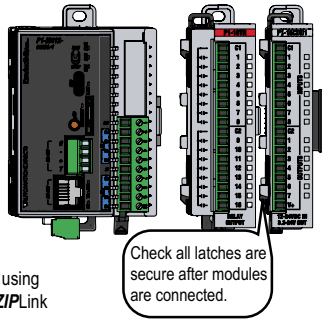


Input Specifications	
Input Channels	8
Module Signal Input Range	0–20 mA
Signal Resolution	13-bit
Resolution Value of LSB (least significant bit)	0–20 mA = 2.44µA per count (1LSB = 1 count)
Data Range	0–8191 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	243Ω, ±1%, 1/8W Current Input
Filter Characteristics	Low Pass, -3dB @ 120Hz
Sample Duration Time	2ms per channel (does not include ladder scan time)
All Channel Update Rate	20ms
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)	±0.037% of range Monotonic with no missing codes
Input Stability and Repeatability	±0.024% of range
Maximum Full Scale Calibration Error (Including Offset)	±0.098% of range
Maximum Offset Calibration Error	±0.098% of range
Max Crosstalk at DC, 50Hz and 60Hz	±0.049% of range
Recommended External Fuse	Edison S500-32-R, 0.032 A fuse
External Power Supply Required	24VDC (-20% / + 25%), 30mA

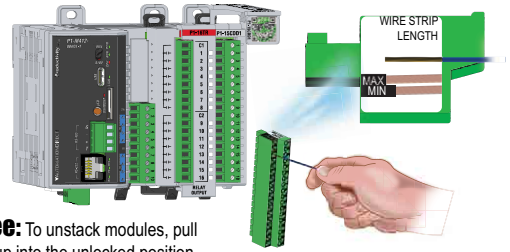
Module Installation

WARNING: Do not add or remove modules with field power applied.

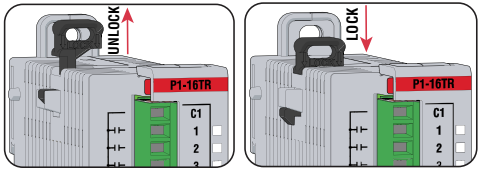
Step One: With latch in "locked" position, align connectors on the side of each module and stack by pressing together. Click indicates lock is engaged.



Step Two: Attach field wiring using the removable terminal block or ***ZIP***Link wiring system.

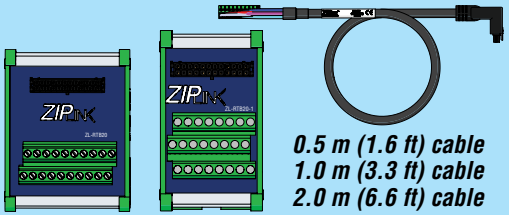


Step Three: To unstack modules, pull locking latch up into the unlocked position and then pull modules apart.



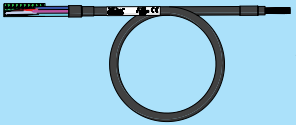
Wiring Options

1 ***ZIP***Link Feed Through *Modules and Cables*[1]



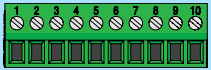
0.5 m (1.6 ft) cable	ZL-RTB20
1.0 m (3.3 ft) cable	ZL-RTB20-1
0.5 m (1.6 ft) cable	ZL-P1-CBL10
1.0 m (3.3 ft) cable	ZL-P1-CBL10-1
2.0 m (6.6 ft) cable	ZL-P1-CBL10-2

2 *Terminal Block with pigtail cable*



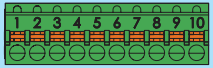
1.0 m (3.3 ft) cable	ZL-P1-CBL10-1P
2.0 m (6.6 ft) cable	ZL-P1-CBL10-2P

3 *Screw Terminal Block only*



P1-10RTB (Quantity 1)

4 *Spring Clamp Terminal Block only*



P1-10RTB-1 (Quantity 1)

5 *Accessories*[2]

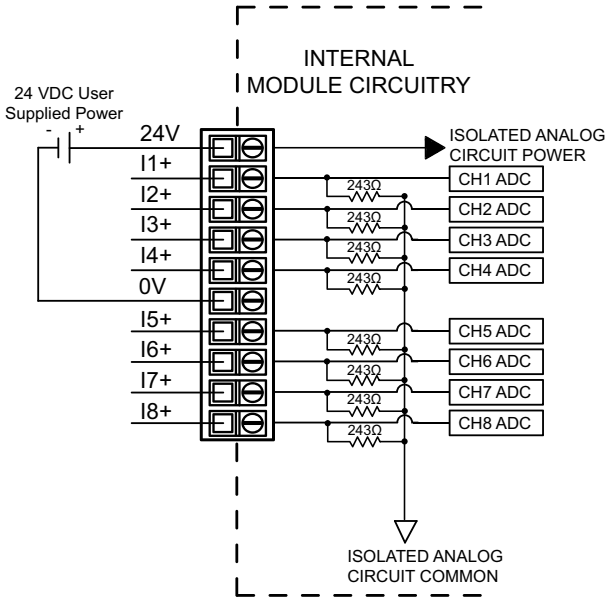
ZL-RTB-COM

TW-SD-SL-1

TW-SD-MSL-1

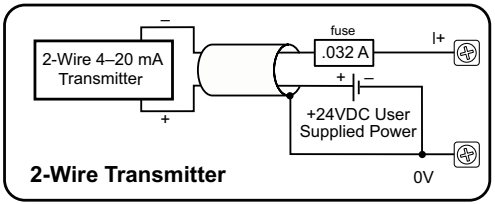
1. Cable + ***ZIP***Link Module = Complete System
2. ZL-RTB-COM provides a common connection point for power or ground

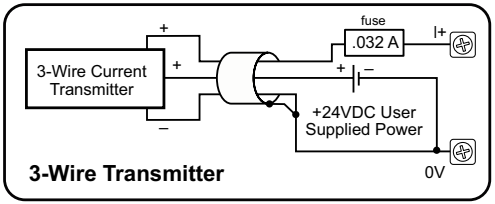
Schematic and Wiring Diagram

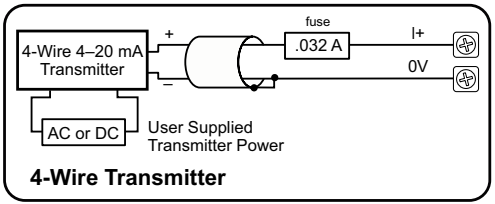


Current Input Circuits

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



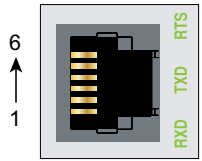




Note: Do not connect both ends of shield.

Port Specifications

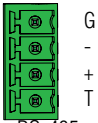
RS-232 Specifications	
Port Name	**RS-232**
Description	Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection
Data Rates	Selectable,1200, 2400, 4800, 9600, 19200, 33600, 38400, 57600, and 115200
+5V Cable Power 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 modem control
GND	Logic ground
Maximum Output Load (TXD/RTS)	3kΩ, 1000 pf
Minimum Output Voltage Swing	±5 V
Output Short Circuit Protection	±15 mA
Port Status LED	Green LED is illuminated when active for TXD, RXD and RTS
Cable Options	EA-MG-PGM-CBL D2-DSCBL USB-RS232-1 with D2-DSCBL FA-CABKIT FA-ISOCON for converting RS-232 to isolated RS-485



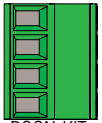
6-pin RJ12 Female Modular Connector

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

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
TXD+/RXD+	RS-485 transceiver high
TXD-/RXD-	RS-485 transceiver low
GND	Logic ground
Input Impedance	19kΩ
Termination Resistance (TB Jumper Wire "T" to "+")	120Ω. To use, add a jumper between "T" and "+". Resistor is internally connected between "T" and "-'.
Maximum Load	50 transceivers, 19kΩ each, 60Ω termination
Output Short Circuit Protection	± 250mA, thermal shut-down protection
Electrostatic Discharge Protection	Contact ± 4KV, Air ± 8KV per IEC1000-4-2 Cable is installed for testing
Electrical Fast Transient Protection	± 1KV 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	Go to AutomationDirect.com for RS-232 and RS-485 cables



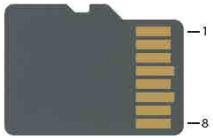
RS-485


PCON-KIT

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

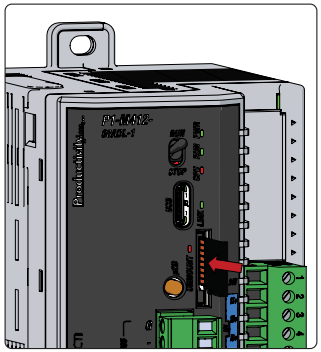
microSD Specifications				
Port Name	***microSD***			
Description	Standard microSD socket for data logging			
Maximum Card Capacity	32GB SDHC			
Transfer Rate (Class 4 memory card)*	Mbps	Minimum	Typical	Maximum
	Read	14.3	14.4	14.6
	Write	4.8	4.9	5.1
Port Status LED	Green LED is illuminated when card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

*Supported microSD MICSD-16G



NOTE: Card not included with unit.

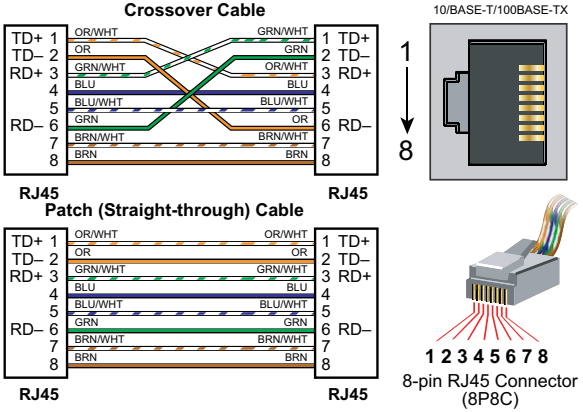
Pin	SD
1	DAT2
2	CD/DAT3
3	CMD
4	VDD
5	CLK
6	VSS
7	DAT0
8	DAT1



Port Specifications

Ethernet Specifications	
Port Name	***ETHERNET***
Description	Standard transformer isolated Ethernet port with built-in surge protection for programming and online monitoring. See table on page 2 for supported devices and protocols.
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.

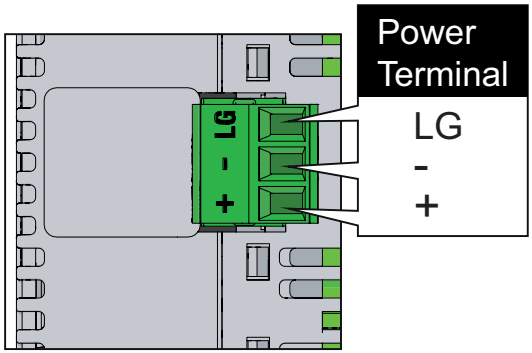
USB-C Specifications	
Port Name	***USB-C***
Description	Standard USB-C Slave input for programming and online monitoring and firmware update with built-in surge protection. Not compatible with older full speed USB devices.
Transfer Rate	480 Mbps
Port Status LED	Green LED is illuminated when LINK is established to programming software.
Cables	USB Type A to Micro USB Type C: 6ft cable part # USB-CBL-AC6



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

Input/Output Removable Terminal Block Specifications		
Part Number	***P1-10RTB***	***P1-10RTB-1***
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, 75ºC" 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 TW-SD-MSL-1



General Specifications	
Operating Temperature	0º to 60ºC (32º to 140ºF)
Storage Temperature	-20º to 70ºC (-4º to 158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2,000 meters max
Pollution Degree	2
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Overvoltage Category	II
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	2.25 W
Enclosure Type	Open Equipment
Module Location	Controller in a Productivity1000 System.
Field Wiring	Removable terminal block (sold separately). Use ***ZIP***Link Wiring System optional See “Wiring Options” on page 4.
Terminal Type (sold separately)	10-position Removable Terminal Block
Weight	125g (4.41 oz)
Agency Approvals	UL 61010-1 and UL 61010-2-201 File E139594, Canada & USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)*

*See CE Declaration of Conformance for details.

WARNING: To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call Technical Support at 770-844-4200.

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Document Name	Edition/Revision	Date
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