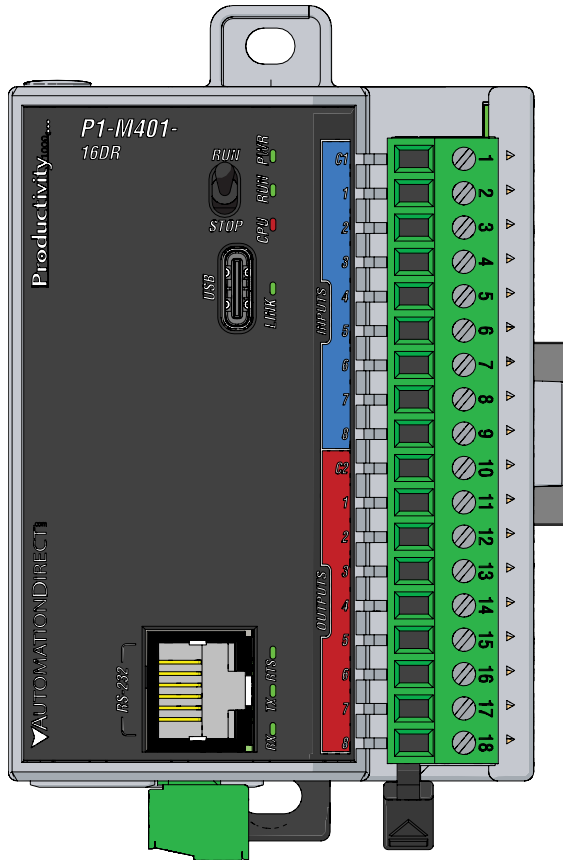




## P1-M401-16DR

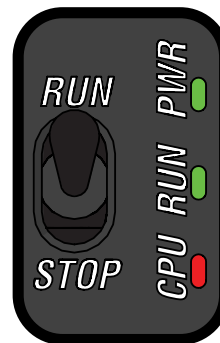
The P1-M401-16DR is a P1000 CPU with 8 integrated sinking/sourcing inputs and 8 relay outputs. This PLC can be used as a stand-alone controller for small applications, or expanded with 2 additional P1000 I/O modules.

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

| CPU Specifications                           |                                                                                                                                                   |                                                                                     |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>User Memory</b>                           | 32MB (Includes program, data and documentation)                                                                                                   |                                                                                     |
| <b>Memory Type</b>                           | Flash and RAM                                                                                                                                     |                                                                                     |
| <b>Retentive Memory</b>                      | 27KB                                                                                                                                              |                                                                                     |
| <b>Scan Time</b>                             | 1.7 ms (1K Boolean, Max I/O)                                                                                                                      |                                                                                     |
| <b>External Power Required</b>               | 24VDC $\pm 2\%$ @ 6.5 W plus 1.25 W per additional I/O module.                                                                                    |                                                                                     |
| <b>Protection Circuit</b>                    | Not built into module – Install protection element such as Edison S5061-R, Time Delay, 1A Fuse                                                    |                                                                                     |
| <b>Communication;<br/>2 Integrated Ports</b> | <b>USB IN:</b> Programming, Monitoring, Debug, Firmware<br><b>RS-232:</b> (RJ-12, 1200-115.2 k baud) ASCII, Modbus                                |                                                                                     |
| <b>Data Logging</b>                          | MicroSD card slot                                                                                                                                 |                                                                                     |
| <b>Hardware Limits of System</b>             | <b>Onboard I/O Points:</b> 8 sink/source inputs and 8 relay outputs<br><b>Expansion I/O Point Limit:</b> 32 (2 modules with up to 16 points each) |                                                                                     |
| <b>Instruction Types</b>                     | Application Functions<br>Array Functions<br>Counters/Timers<br>Communications<br>Data Handling<br>Drum Sequencers<br>Math Functions               | PID<br>Program Control<br>String Functions<br>System Functions<br>Contacts<br>Coils |
| <b>Real Time Clock</b>                       | None                                                                                                                                              |                                                                                     |

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

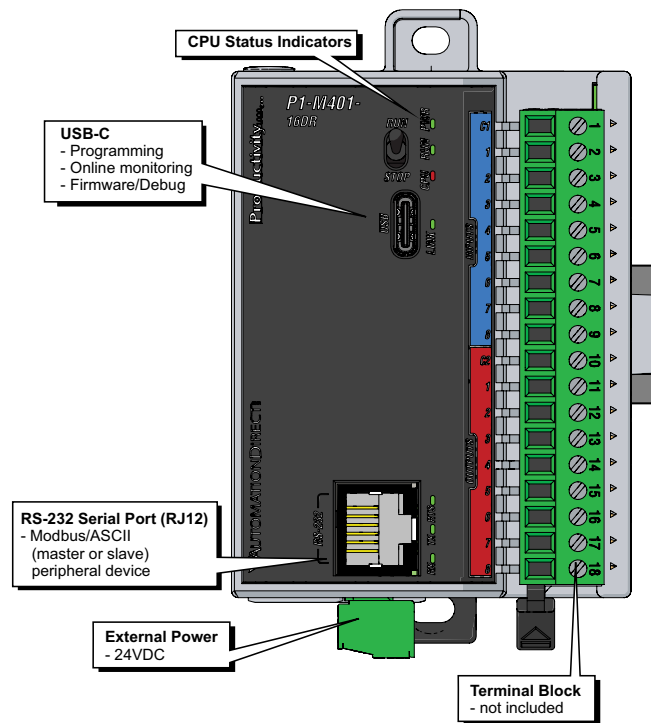


| CPU Run/Stop Switch Specifications |                                                             |
|------------------------------------|-------------------------------------------------------------|
| <b>RUN position</b>                | Executes user program, run-time edits possible             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

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

| Output Specifications                |                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Outputs per Module</b>            | 8                                                                                                         |
| <b>Rated Voltage</b>                 | 6–30 VDC<br>6–120 VAC                                                                                     |
| <b>Operating Voltage Range</b>       | 5–30 VDC<br>5–144 VAC                                                                                     |
| <b>Output Type</b>                   | Relay, Form A (SPST)                                                                                      |
| <b>AC Frequency</b>                  | 47–63 Hz                                                                                                  |
| <b>Maximum Output Current</b>        | 1A / point, 8A / common for both AC and DC<br>1A / point, 4A / common for both if used with ZIPLink Cable |
| <b>Minimum Load Current</b>          | 5mA @ 5VDC                                                                                                |
| <b>Maximum Inrush Current</b>        | 5A for 10ms                                                                                               |
| <b>OFF to ON, ON to OFF Response</b> | ≤ 10 ms                                                                                                   |
| <b>Status Indicators</b>             | Logic Side (8 points)                                                                                     |
| <b>Commons</b>                       | 1 (8 points/common)                                                                                       |
| <b>Protection Circuit</b>            | Not built into module – Install protection elements such as an external fuse – 8A.                        |

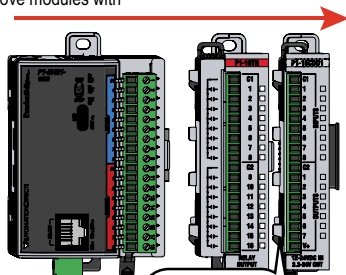
## CPU Front Panel



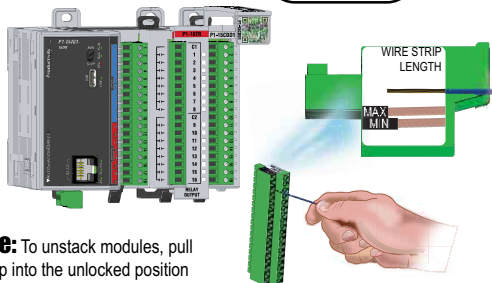
# Module Installation

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

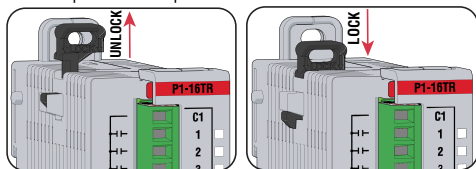
**Step One:** With latch in "locked" position, align connectors on the side of each module and stack by pressing together. Click indicates lock is engaged.



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

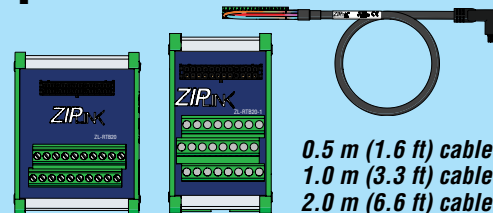


**Step Three:** To unstack modules, pull locking latch up into the unlocked position and then pull modules apart.



## Wiring Options

### 1 ZIPlink Feed Through Modules and Cables<sup>1</sup>

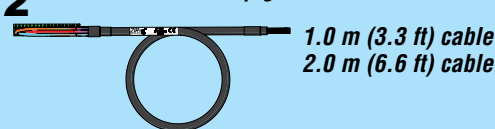


**ZIPINK**  
AUTOMATIONDIRECT

ZL-RTB20  
ZL-RTB20-1

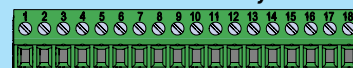
ZL-P1-CBL18  
ZL-P1-CBL18-1  
ZL-P1-CBL18-2

### 2 Terminal Block with pigtail cable



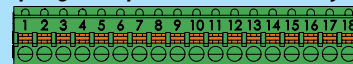
ZL-P1-CBL18-1P  
ZL-P1-CBL18-2P

### 3 Screw Terminal Block only



P2-RTB  
(Quantity 1)

### 4 Spring Clamp Terminal Block only



P2-RTB-1  
(Quantity 1)

### 5 Accessories<sup>2</sup>



ZL-RTB-COM

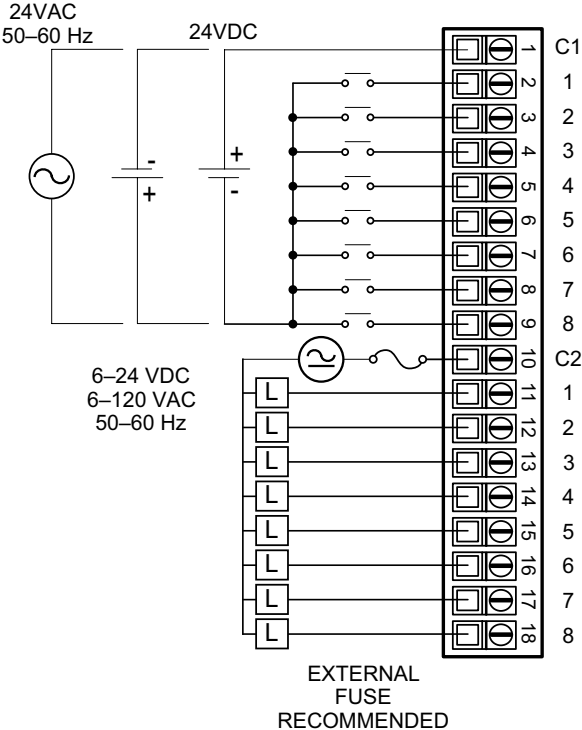
TW-SD-SL-1

TW-SD-MSL-1

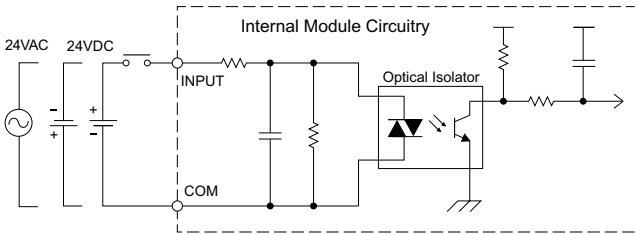
1. Cable + ZIPlink Module = Complete System

2. ZL-RTB-COM provides a common connection point for power or ground in a small footprint.

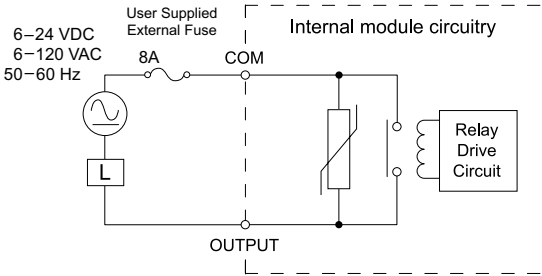
# Schematic and Wiring Diagram



## Equivalent Input Circuit



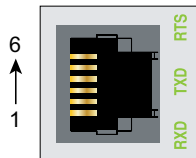
## Equivalent Output Circuit



# 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, $\pm 5\%$ . 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 $\Omega$ , 1000 pF                                                                                                                              |
| Minimum Output Voltage Swing    | $\pm 5$ V                                                                                                                                          |
| Output Short Circuit Protection | $\pm 15$ mA                                                                                                                                        |
| Port Status LED                 | Green LED is illuminated when active for TXD, RXD and RTS                                                                                          |
| Cable Options                   | EA-MG-PGM-CBL<br>D2-DSCBL<br>USB-RS232-1 with D2-DSCBL<br>FA-CABKIT<br>FA-ISOCON for converting RS-232 to isolated RS-485                          |



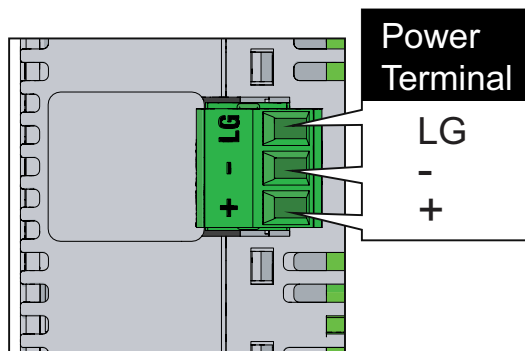
6-pin RJ12 Female Modular Connector

| 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  |

## 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:<br>6ft cable part # USB-CBL-AC6                                                                                                        |

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



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

\*Recommended Screw Driver TW-SD-MSL-1

| General Specifications                 |                                                                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating Temperature</b>           | 0° to 60°C (32° to 140°F)                                                                                                           |
| <b>Storage Temperature</b>             | -20° to 70°C (-4° to 158°F)                                                                                                         |
| <b>Humidity</b>                        | 5 to 95% (non-condensing)                                                                                                           |
| <b>Altitude</b>                        | 2,000 meters max                                                                                                                    |
| <b>Pollution Degree</b>                | 2                                                                                                                                   |
| <b>Environmental Air</b>               | No corrosive gases permitted                                                                                                        |
| <b>Vibration</b>                       | IEC60068-2-6 (Test Fc)                                                                                                              |
| <b>Shock</b>                           | IEC60068-2-27 (Test Ea)                                                                                                             |
| <b>Overvoltage Category</b>            | II                                                                                                                                  |
| <b>Field to Logic Side Isolation</b>   | 1800VAC applied for 1 second                                                                                                        |
| <b>Insulation Resistance</b>           | >10MΩ @ 500VDC                                                                                                                      |
| <b>Heat Dissipation</b>                | 6396mW                                                                                                                              |
| <b>Enclosure Type</b>                  | Open Equipment                                                                                                                      |
| <b>Module Location</b>                 | Controller in a Productivity1000 System.                                                                                            |
| <b>Field Wiring</b>                    | Use <b>ZIP</b> Link Wiring System or removable terminal block (Sold Separately). See "Wiring Options" on page 4.                    |
| <b>Terminal Type (sold separately)</b> | 18-Position Removable Terminal Block                                                                                                |
| <b>Weight</b>                          | 128g (4.52 oz)                                                                                                                      |
| <b>Agency Approvals</b>                | UL 61010-1 and UL 61010-2-201 File E139594, Canada & USA <sup>1</sup><br>CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)* |

\*See CE Declaration of Conformance for details.

1. See P1000 User Manual for Insulation Requirements for IEC/UL 61010-1 and 61010-2-201 (section 6.5 and 6.7)

**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.**

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|-----------------|---------------------|-----------|
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