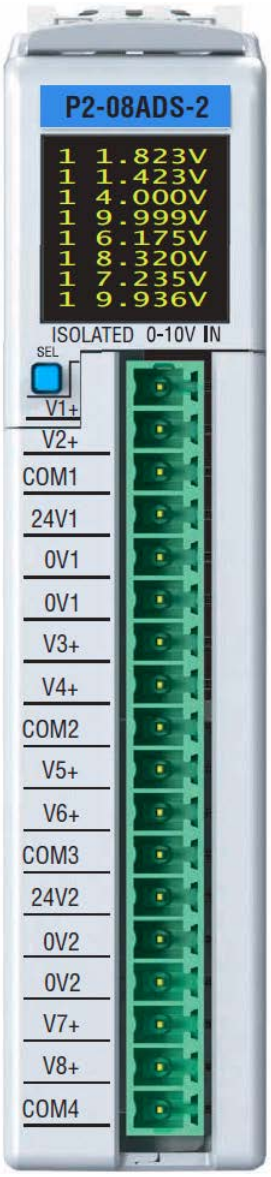
# Analog Input Modules

## P2-08ADS-2 $479.00

***Voltage Analog Input***

The P2-08ADS-2 Isolated Voltage Analog Input Module provides eight channels for receiving 0–10 VDC signals for use with the Productivity2000 system.




**Terminal block sold separately.**

| Input Specifications | |
|---|---|
| ***Input Channels*** | 8 with 4 pairs of isolated channels |
| ***Module Signal Input Range*** | 0–10 VDC |
| ***Signal Resolution*** | 16-bit |
| ***Resolution Value of LSB (least significant bit)*** | 0–10 VDC = 152 µA per count (1 LSB = 1 count) |
| ***Data Range*** | 0 to 65535 counts |
| ***Input Type*** | Single-ended (1 common) |
| ***Maximum Continuous Overload*** | ±100V |
| ***Input Impedance*** | 250 kΩ (typical) |
| ***Filter Characteristics*** | Low Pass, -3 dB @ 22.1 Hz |
| ***Sample Duration Time*** | 60 ms per channel (does not include ladder scan time) |
| ***All Channel Update Rate*** | 600 ms |
| ***Open Circuit Detection Time*** | Zero reading within 1s |
| ***Conversion Method*** | Sigma-Delta |
| ***Accuracy vs. Temperature*** | ±25 PPM / °C maximum |
| ***Maximum Inaccuracy*** | 0.1% of range (including temperature drift) |
| ***Linearity Error (end to end)*** | ±10 LSB maximum (±0.015% of range) Monotonic with no missing codes |
| ***Input Stability and Repeatability*** | ±10 LSB |
| ***Full Scale Calibration Error (not including offset)*** | ±10 LSB maximum (±0.015% of range) |
| ***Offset Calibration Error*** | ±10 LSB maximum |
| ***Max Crosstalk*** | -76 dB, ±10 LSB |
| ***External DC Power Required*** | 24 VDC (-20% / +25%) 45 mA |

| 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 mm²] Solid/stranded conductor 3/64in [1.2mm] insulation max. 1/4in [6–7mm] strip length | 28–16 AWG [0.081–1.31 mm²] Solid/stranded conductor 3/64in [1.2mm] insulation max. 19/64in [7–8mm] strip length |
| ***Conductors*** | USE COPPER CONDUCTORS, 75 °C or equivalent. | |
| ***Screw Driver Width*** | 0.1in [2.5mm] maximum* | N/A |
| ***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*

| Diagnostic/Status | |
|---|---|
| Under Range Error | 1 bit per channel |
| Over Range Error | 1 bit per channel |
| Module Failed | 1 bit per module |
| Missing 24V | 1 bit per module |

**We recommend using prewired ZIPLink cables and connection modules. See Wire & Cable Termination.**
**If you wish to hand-wire your module, a removable terminal block is sold separately. Order part number P2-RTB or P2-RTB-1.**

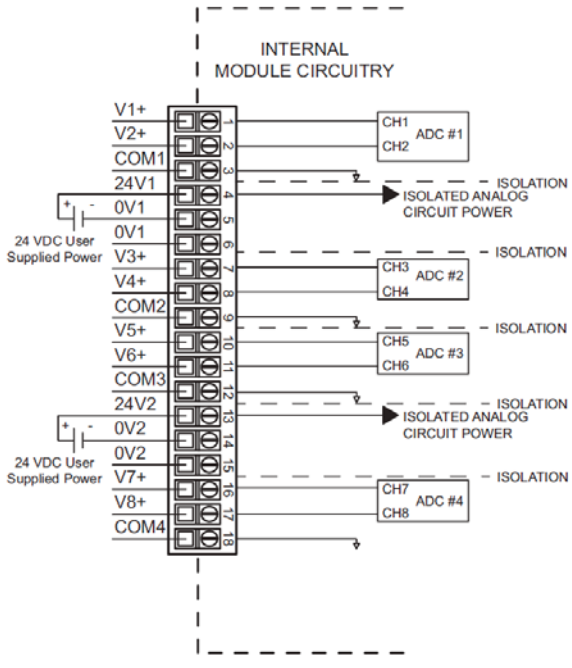
# Analog Input Modules

## P2-08ADS-2 (cont'd)

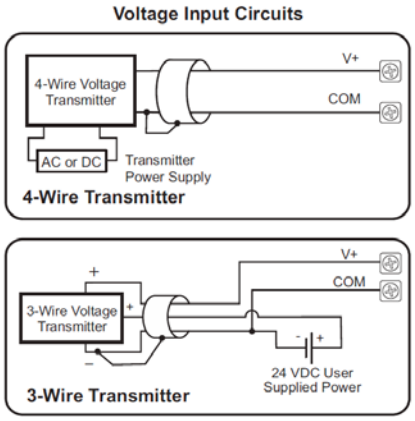
| General Specifications | |
|---|---|
| ***Operating Temperature*** | 0 to 60 °C [32 to 140 °F] |
| ***Storage Temperature*** | -20 to +70 °C [-4 to +158 °F] |
| ***Humidity*** | 5 to 95% (non-condensing) |
| ***Altitude*** | 2000m max. |
| ***Pollution Degree*** | 2 |
| ***Environmental Air*** | No corrosive gases permitted |
| ***Vibration*** | IEC60068-2-6 (Test Fc) |
| ***Shock*** | IEC60068-2-27 (Test Ea) |
| ***Field to Logic Side Isolation*** | 1750 VDC applied for 5s or 420 VDC applied for 1 minute |
| ***Input to Power Supply Isolation*** | 1750 VDC applied for 5s or 420 VDC applied for 1 minute |
| ***Input to Input Isolation*** | 1750 VDC applied for 5s or 420 VDC applied for 1 minute |
| ***Insulation Resistance*** | >10 MΩ @ 500 VDC |
| ***Heat Dissipation*** | 1160 mW |
| ***Overvoltage Category*** | II |
| ***Enclosure Type*** | Open equipment |
| ***Module Keying to Backplane*** | Electronic |
| ***Module Location*** | Any I/O slot in a Productivity2000 system |
| ***Field Wiring*** | Use ***ZIPL***ink wiring system or removable terminal block (sold separately). See Wire & Cable Termination. |
| ***Connector Type (Sold separately)*** | 18-position removable terminal block |
| ***Weight*** | 3.8 oz [170g] |
| ***Agency Approvals**** | UL 61010-1 and UL 61010-2-201 File E139594, Canada & USA<br>CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)* |

*Meets EMC and Safety requirements. See the Declaration of Conformity for details.
**To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific component part number web page.

## Wiring Diagrams




*Note: Sourcing power to both 24V1 and 24V2 is required.




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

# Wiring I/O Modules

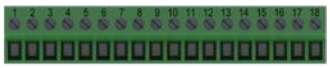
## Wiring Methods

There are two available methods for wiring most I/O modules: The ZIPLink wiring system (See page following), or hand wiring to the optional Removable Terminal Blocks.

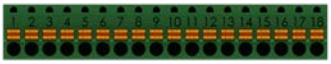
## Removable Terminal Blocks

For most I/O modules you can purchase a removable terminal block (p/n shown below).

**Note:** Thermocouple and RTD modules are not compatible with the ZIPLink system and are shipped with the optional terminal blocks included.



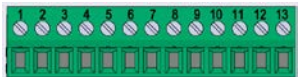
**Removable Terminal Block: p/n P2-RTB**



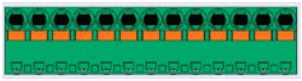
**Removable Terminal Block: p/n P2-RTB-1**

| Removable Terminal Block Specifications | | |
|---|---|---|
| ***Part Number*** | ***P2-RTB*** | ***P2-RTB-1*** |
| ***Price*** | $10.00 | $10.00 |
| ***Number of positions*** | 18 screw terminals | 18 push release terminals |
| ***Wire Range*** | 30–16 AWG [0.051–1.31 mm²]<br>Solid/stranded conductor<br>3/64in [1.2mm] insulation max.<br>1/4in [6–7mm] strip length | 28–16 AWG [0.081–1.31 mm²]<br>Solid/stranded conductor<br>3/64in [1.2mm] insulation max.<br>19/64in [7–8mm] strip length |
| ***Conductors*** | USE COPPER CONDUCTORS, 75 ºC or equivalent. | |
| ***Screw Driver Width*** | 0.1 in. [2.5mm] maximum | N/A |
| ***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.*



**Removable Terminal Block: p/n P2-RTB13**



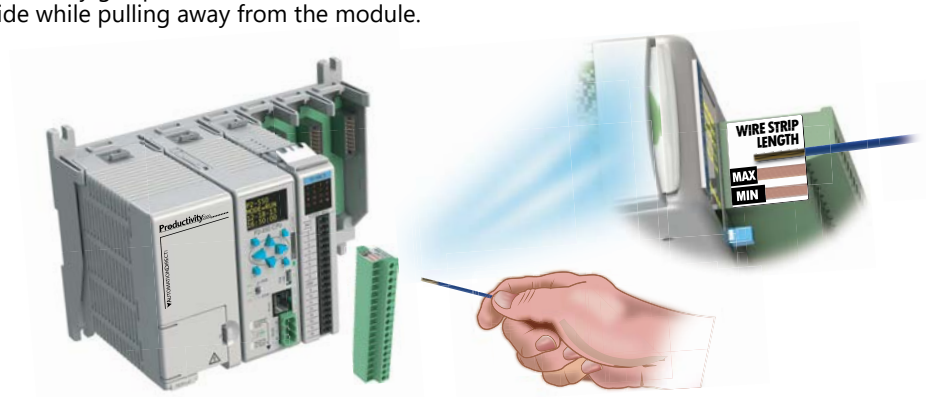
**Removable Terminal Block: p/n P2-RTB13-1**

| Removable Terminal Block Specifications | | |
|---|---|---|
| ***Part Number*** | ***P2-RTB13*** | ***P2-RTB13-1*** |
| ***Price*** | $11.50 | $11.50 |
| ***Number of positions*** | 13 screw terminals | 13 push release terminals |
| ***Wire Range*** | 24–12 AWG [0.25–4 mm²]<br>Solid/stranded conductor<br>3/64in [1.2mm] insulation max.<br>3/8in [9–10mm] strip length | |
| ***Conductors*** | USE COPPER CONDUCTORS, 75 ºC or equivalent. | |
| ***Screw Driver Width*** | 0.13in [3.5mm] maximum | N/A |
| ***Screw Size*** | M2.5 | N/A |
| ***Screw Torque*** | 4.4 lb·in [0.5 N·m] | N/A |

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

## Terminal Block Removal

Removable Terminal Blocks fit firmly into the I/O module terminal recess. To remove, firmly grasp the removable terminal block and wiggle side to side while pulling away from the module.



# ZIPLink Wiring Solutions

## Wiring Solutions using the ZIPLink wiring system

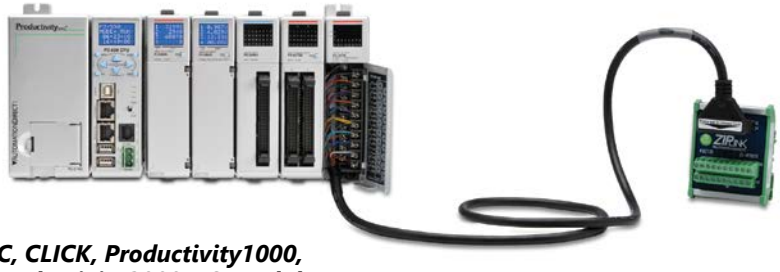
ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end and terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the ZIPLink System ranging from CPU I/O-to-ZIPLink Connector Modules that are ready for field termination, options for connecting to third party devices, GS Series, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of ZIPLink modules are provided with ZIPLink cables. See the following solutions to help determine the best ZIPLink system for your application.

***Solution 1: DirectLOGIC, CLICK, Productivity® 1000, Productivity® 2000 and Productivity3000® I/O Modules to ZIPLink Connector Modules***

When looking for quick and easy I/O-to-field termination, a ZIPLink connector module used in conjunction with a prewired ZIPLink cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.

Use the CPU I/O Modules to ZIPLink Connector Modules selector tables located in the ZIPLink Wiring Solutions section to:

1. Locate your I/O module/CPU,
2. Select a ZIPLink Module, and
3. Select a corresponding ZIPLink Cable.



***Solution 2: DirectLOGIC, CLICK, Productivity1000, Productivity2000 and Productivity3000 I/O Modules to 3rd Party Devices***

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the ZIPLink Pigtail Cables. ZIPLink Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.

Use the I/O Modules to 3rd Party Devices selector tables located in the ZIPLink Wiring Solutions section to:

1. Locate your CPU I/O module, and
2. Select a ZIPLink Pigtail Cable that is compatible with your 3rd party device.

***Solution 3: GS Series and DuraPulse Drives Communication Cables***

Need to communicate via Modbus RTU to a drive or a network of drives?

ZIPLink cables are available in a wide range of configurations for connecting to CPUs, SureServo, SureStep, Stellar Soft Starter and AC drives. Add a ZIPLink communications module to quickly and easily set up a multi-device network.

Use the Drives Communication selector tables located in the ZIPLink Wiring Solutions section to:

1. Locate your Drive and type of communications, and
2. Select a ZIPLink cable and other associated hardware.

# ZIPLink Wiring Solutions

***Solution 4: Serial Communications Cables***

ZIPLink offers communications cables for use with DirectLOGIC, CLICK, Productivity1000, Productivity2000 and Productivity3000 CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-Sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the Serial Communications Cables selector table located in the ZIPLink Wiring Solutions section,

1. Locate your connector type
2. Select a cable.

***Solution 5: Specialty ZIPLink Modules***

For additional application solutions, ZIPLink Specialty Modules are available in a variety of configurations including stand-alone relays, 24 VDC and 120 VAC transorb modules, D-Sub, RJ12 and RJ45 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

Using the ZIPLink Specialty Modules selector table located in the ZIPLink Wiring Solutions section:

1. Locate the type of application.
2. Select a ZIPLink module.

***Solution 6: ZIPLink Connector Modules to 3rd Party Devices***

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible ZIPLink Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Use the Universal Connector Modules and Pigtail Cables table located in the ZIPLink Wiring Solutions section to:

1. Select module type,
2. Select the number of pins
3. Select cable.

# I/O Modules to *ZIP*Link Connector Modules - Productivity2000

## Analog Input Modules

**Productivity2000 Analog Input Module ZIPLink Selector**

| *I/O Analog Module* | *ZIPLink Parameters* | | | |
|---|---|---|---|---|
| | # of Terms | Component | Part No. | Cable Part No. |
| ***P2-04AD*** | 18 | Feedthrough | ZL-RTB20 (-1) | ZL-P2-CBL18 * |
| ***P2-04AD-1*** | | | | |
| ***P2-04AD-2*** | | | | |
| ***P2-08AD-1*** | | | | |
| ***P2-08AD-2*** | | | | |
| ***P2-08ADL-1*** | | | | |
| ***P2-08ADL-2*** | | | | |
| ***P2-08ADS-1*** | | | | |
| ***P2-08ADS-2*** | | | | |
| ***P2-16AD-1*** | 24 | | | ZL-P2-CBL24 * |
| ***P2-16AD-2*** | | | | |
| ***P2-16ADL-1*** | | | | |
| ***P2-16ADL-2*** | | | | |
| ***P2-06RTD*** | Matched Only | See Note 1 | | |
| ***P2-08THM*** | T/C Wire Only | See Note 1 | | |
| ***P2-08THMS*** | T/C Wire Only | See Note 1 | | |
| ***P2-08NTC*** | Copper Conductors | See Note 1 | | |

** Select the cable length by replacing the * with: Blank = 0.5m, -1 = 1.0m, or -2 = 2.0m.*
*1. These modules are not supported by the ZIPLink wiring system.*

## Analog Output Modules

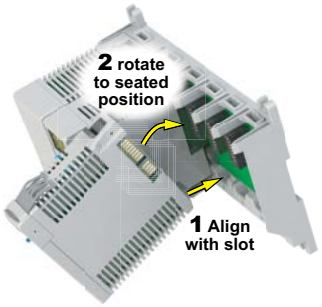
**Productivity2000 Analog Output Module ZIPLink Selector**

| *I/O Analog Module* | *ZIPLink Parameters* | | | |
|---|---|---|---|---|
| | # of Terms | Component | Part No. | Cable Part No. |
| ***P2-04DA*** | 18 | Feedthrough | ZL-RTB20 (-1) | ZL-P2-CBL18 * |
| ***P2-04DA-1*** | | | | |
| ***P2-04DA-2*** | | | | |
| ***P2-04DAL-1*** | | | | |
| ***P2-04DAL-2*** | | | | |
| ***P2-08DA-1*** | | | | |
| ***P2-08DA-2*** | | | | |
| ***P2-08DAL-1*** | | | | |
| ***P2-08DAL-2*** | | | | |
| ***P2-16DA-1*** | 24 | | | ZL-P2-CBL24 * |
| ***P2-16DA-2*** | | | | |
| ***P2-16DAL-1*** | | | | |
| ***P2-16DAL-2*** | | | | |
| ***P2-8AD4DA-1*** | 18 | | | ZL-P2-CBL18 * |
| ***P2-8AD4DA-2*** | | | | |

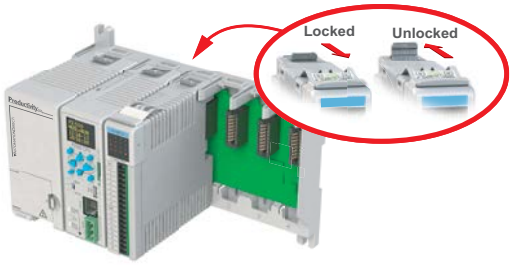
# I/O Module Installation Procedure

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

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




## Step Two: Pull top locking tab toward module face. Click indicates lock is en- gaged.




## Step Three: Attach field wiring using removable terminal block or ZIPLink wiring system.

**WARNING:** ***EXPLOSION HAZARD – DO NOT CONNECT OR DISCONNECT CONNECTORS OR OPERATE SWITCHES WHILE CIRCUIT IS LIVE UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS. DO NOT HOT-SWAP MODULES UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.***