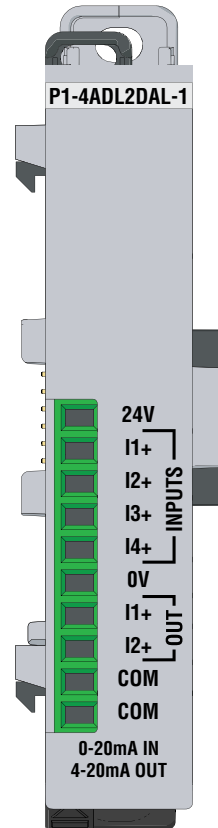


General Specifications	
<b>Operating Temperature</b>	0° to 60°C (32° to 140°F)
<b>Storage Temperature</b>	-20° to 70°C (-4° to 158°F)
<b>Humidity</b>	5 to 95% (non-condensing)
<b>Altitude</b>	2,000 meters max
<b>Pollution Degree</b>	2
<b>Environmental Air</b>	No corrosive gases permitted
<b>Vibration</b>	IEC60068-2-6 (Test Fc)
<b>Shock</b>	IEC60068-2-27 (Test Ea)
<b>Field to Logic Side Isolation</b>	1800VAC applied for 1 second
<b>Insulation Resistance</b>	> 10MΩ @ 500VDC
<b>Heat Dissipation</b>	2470mW
<b>Overvoltage Category</b>	II
<b>Enclosure Type</b>	Open Equipment
<b>Module Location</b>	Any I/O position in a Productivity1000 System
<b>Field Wiring</b>	Removable terminal block (sold separately). Use <b>ZIP</b> Link Wiring System optional See "Wiring Options" on page 5.
<b>Terminal Type (sold separately)</b>	10-position Removable Terminal Block
<b>Weight</b>	60g (2.1 oz)
<b>Agency Approvals</b>	UL 61010-1 and UL 61010-2-201 File E139594, Canada and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)*

\*See CE Declaration of Conformance for details.



## P1-4ADL2DAL-1 Analog Input/Output

The P1-4ADL2DAL-1 Current Analog Input/Output Module provides four 13 bit input channels at 0-20 mA and two 12 bit output channels at 4-20 mA for use with the Productivity1000 system.

General Specifications	1
Input Specifications	2
Output Specifications	2
Wiring Diagram and Schematic	3
Module Installation Procedure	4
QR Code	4
Wiring Options	5
Module Configuration	5
Linear Scaling	6
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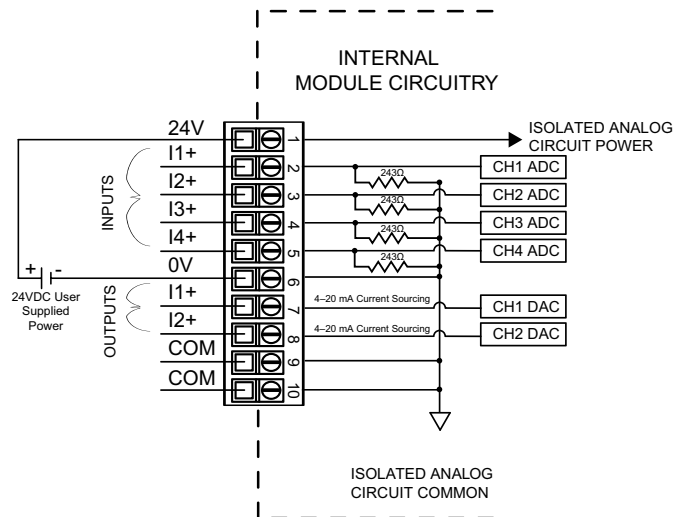
**Terminal Block sold separately, (see wiring options on page 5).**

Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See [www.productivity1000.com](http://www.productivity1000.com) for details).

Input Specifications	
<b>Inputs per Module</b>	4
<b>Module Signal Input Range</b>	0–20 mA
<b>Signal Resolution</b>	13-bit
<b>Resolution Value of LSB (least significant bit)</b>	0–20 mA = 2.44 $\mu$ A per count (1LSB = 1 count)
<b>Data Range</b>	0–8191 counts
<b>Input Type</b>	Sinking, Single-ended (1 common)
<b>Maximum Continuous Overload</b>	$\pm$ 31mA
<b>Input Impedance</b>	243 $\Omega$ , $\pm$ 0.5%, 1/8W Current Input
<b>Filter Characteristics</b>	Low Pass, -3dB @ 120Hz
<b>Sample Duration Time</b>	4ms per channel (does not include ladder scan time)
<b>All Channel Update Rate</b>	20ms
<b>Open Circuit Detection Time</b>	Zero reading within 100ms
<b>Conversion Method</b>	Successive approximation
<b>Accuracy vs. Temperature</b>	$\pm$ 75PPM / $^{\circ}$ C maximum
<b>Maximum Inaccuracy</b>	0.5% of range (including temperature drift)
<b>Linearity Error (end to end)</b>	$\pm$ 0.037% of range Monotonic with no missing codes
<b>Input Stability and Repeatability</b>	$\pm$ 0.024% of range (after 10 minute warm-up)
<b>Maximum Full Scale Calibration Error</b>	$\pm$ 0.098% of range
<b>Offset Calibration Error</b>	$\pm$ 0.098% of range
<b>Maximum Crosstalk at DC, 50Hz and 60Hz</b>	$\pm$ 0.049% of range
<b>Recommended Fuse (external)</b>	Edison S500-32-R, 0.032 A fuse
<b>External Power Supply Required</b>	24VDC (-20% / + 25%), 140mA (Loop Power Included)

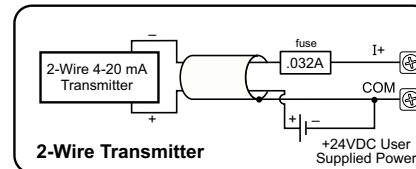
Output Specifications	
<b>Outputs per Module</b>	2
<b>Output Range</b>	4–20 mA
<b>Signal Resolution</b>	12-bit
<b>Resolution Value of LSB (least significant bit)</b>	4–20 mA = 3.9 $\mu$ A / count 1 LSB = 1 count
<b>Data Range</b>	0–4095 counts
<b>Output Type</b>	Current sourcing at 20mA max
<b>Output Value in Fault Mode</b>	Less than 4mA
<b>Load Impedance</b>	0–570 $\Omega$ (19.2 VDC), 0–690 $\Omega$ (21.6 VDC), 0–810 $\Omega$ (24.0 VDC), 0–930 $\Omega$ (26.4 VDC), 0–1100 $\Omega$ (30.0 VDC) Minimum Load: 0 $\Omega$ @ 0–45 $^{\circ}$ C 125 $\Omega$ @ 45–60 $^{\circ}$ C ambient temperature
<b>Maximum Inductive Load</b>	1mH
<b>Allowed Load Type</b>	Grounded
<b>Maximum Inaccuracy</b>	1% of range
<b>Full Scale Calibration Error</b>	$\pm$ 0.2% of range minimum
<b>Offset Calibration Error</b>	$\pm$ 0.2% of range maximum
<b>Accuracy vs. Temperature</b>	$\pm$ 75 PPM / $^{\circ}$ C maximum full-scale calibration change ( $\pm$ 0.005% of range / $^{\circ}$ C)
<b>Max Crosstalk at DC, 50Hz and 60Hz</b>	-72dB, 1 LSB
<b>Linearity Error (End to End)</b>	$\pm$ 4 counts max., ( $\pm$ 0.1% of full scale)
<b>Output Stability and Repeatability</b>	$\pm$ 2% counts after 10 min. warm up (typical)
<b>Output Ripple</b>	$\pm$ 0.2% of full scale
<b>Output Settling Time</b>	0.3 ms max., 5 $\mu$ s min. (full scale range)
<b>All Channel Update Rate</b>	4ms (max)
<b>Maximum Continuous Overload</b>	Outputs open circuit protected
<b>Type of Output Protection</b>	Electronically current limited to 20mA or less
<b>Output Signal at Power Up and Power Down</b>	4mA

# P1-4ADL2DAL-1 Schematic

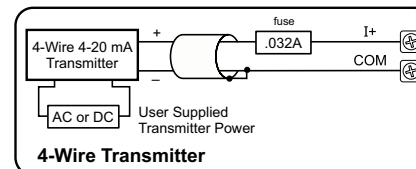
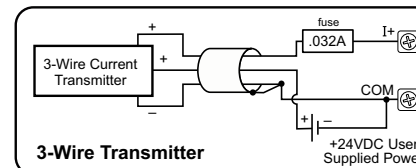


# P1-4ADL2DAL-1 Wiring Diagram

## Current Input Circuits

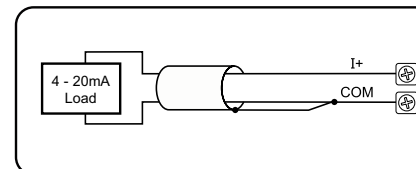


An Edison S500-32-R 0.032A fast-acting fuse is recommended for all 4-20 mA current loops.



Note: Do not connect both ends of shield.

## Current Output Circuits

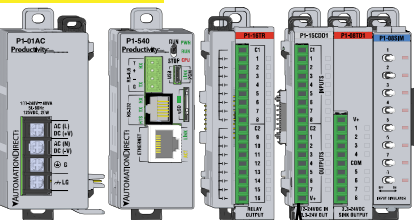


Note: Shield is connected to common at the source device.

# Module Installation

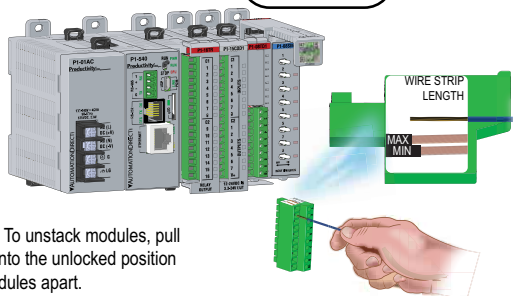
**WARNING:** Do not add or remove modules with field power applied.

**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.

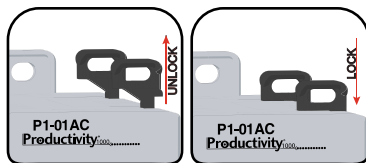


**Step Two:** Attach field wiring using the removable terminal block or ZIPLink wiring system.

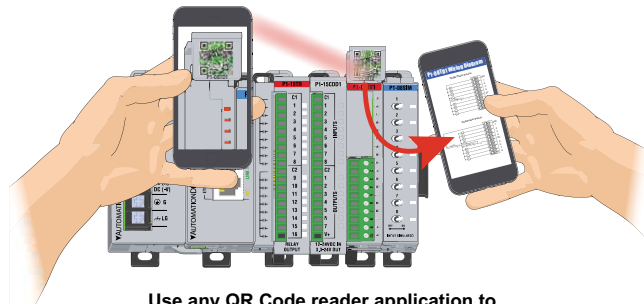
Check all latches are secure after modules are connected.



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



# QR Code

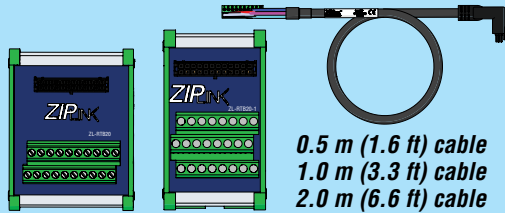


Use any QR Code reader application to display the module's product insert.

# Module Configuration

## Wiring Options

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

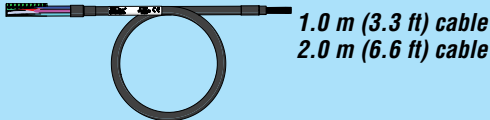


**ZIP LINK**  
AUTOMATIONDIRECT

ZL-RTB20  
ZL-RTB20-1

ZL-P1-CBL10  
ZL-P1-CBL10-1  
ZL-P1-CBL10-2

### 2 Terminal Block with pigtail cable



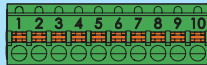
ZL-P1-CBL10-1P  
ZL-P1-CBL10-2P

### 3 Screw Terminal Block only



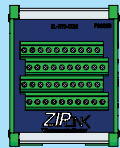
P1-10RTB  
(Quantity 1)

### 4 Spring Clamp Terminal Block only



P1-10RTB-1  
(Quantity 1)

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

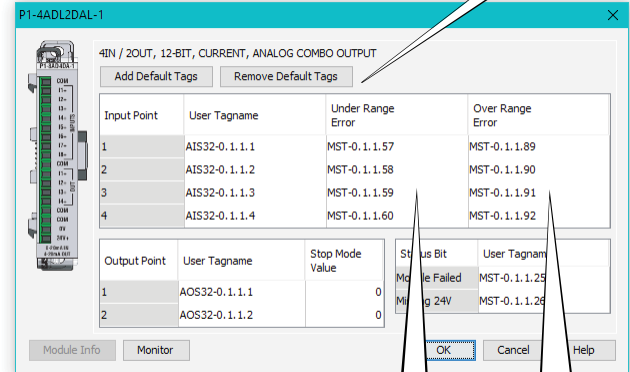


ZL-RTB-COM

TW-SD-SL-1

TW-SD-MSL-1

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P1-4ADL2DAL-1 module into the configuration.



The "Under Range Error" bit for each channel activates for a signal around 0mA ± offset error.  
The "Over Range Error" bit for each channel activates for a signal around 19.999 mA ± gain error.

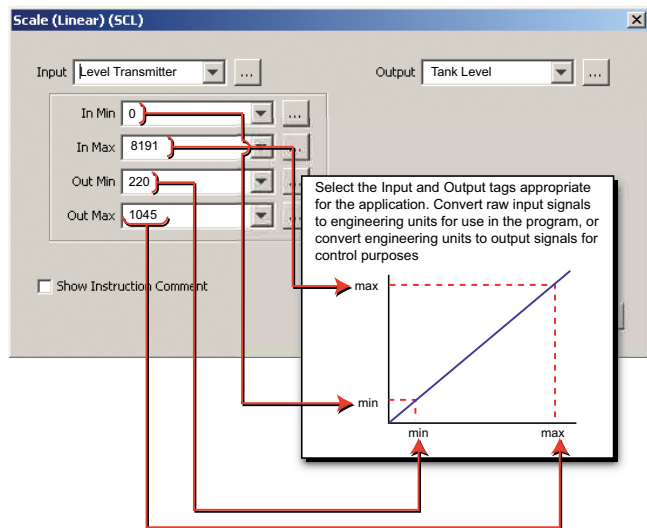
1. Cable + ZIPLink Module = Complete System

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

# Linear Scaling

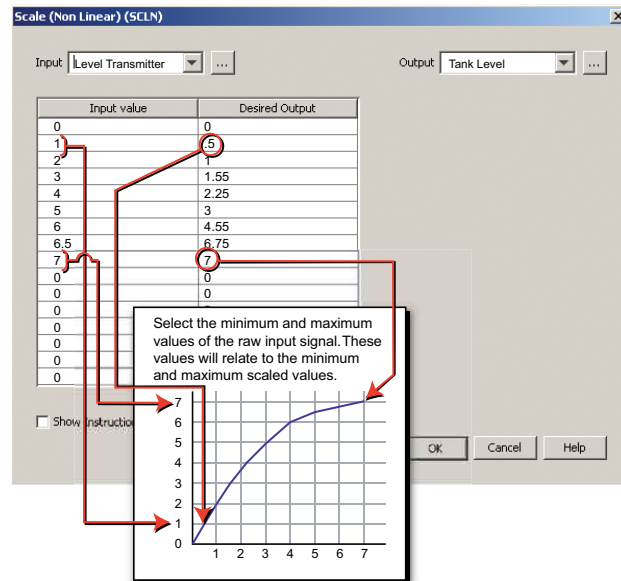
The Scale (Linear) function can be used to:

- Convert analog field input signals from the range which is native to the analog input module to an application specific range.
- Make other linear conversions in ranges appropriate to the application.



# Non-Linear Scaling

The Scale (Non-Linear) function can be used for Non-Linear applications.





**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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## Diagnostic/Status

<b>Under Range Error</b>	1 bit per channel
<b>Over Range Error</b>	1 bit per channel
<b>Module Failed</b>	1 bit per module
<b>Missing 24V</b>	1 bit per module

## Terminal Block Specifications

Part Number	P1-10RTB	P1-10RTB-1
<b>Positions</b>	10 Screw Terminals	10 Spring Clamp Terminals
<b>Wire Range</b>	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
<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

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