# 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 @ 500 VDC
Heat Dissipation	2.5W
Enclosure Type	Open Equipment
Agency Approvals	UL508 file E157382, Canada & USA UL1604 file E200031, Canada & USA CE (EN61131-2*) This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or non-hazardous locations only.
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in any local, expansion, or remote base in a Productivity3000 System.
Field Wiring	Removable terminal block (not included). Use ZIPLink Wiring System or optional terminal block. See "Wiring Options" on page 5.
EU Directive	See the "EU Directive" topic in the Productivity3000 Help File. Information can also be obtained at: www.automationdirect.com/P3000
Terminal Type (not included)	20-position removable terminal block
Weight	105g (3.73 oz)

*Meets EMC and Safety requirements. See the D.O.C. for details.

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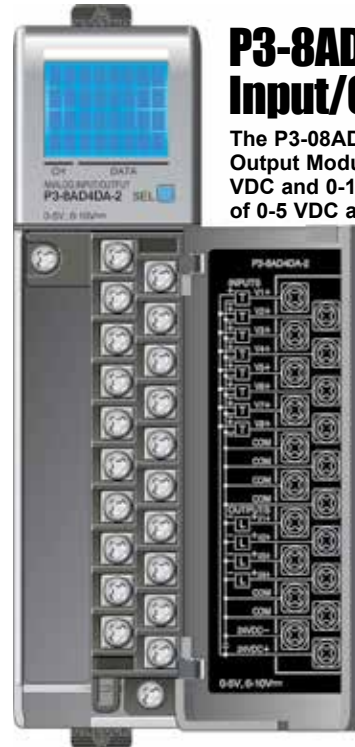
Productivity3000™

P3-8AD4DA-2 Analog Input/Output

The P3-08AD4DA-2 Voltage Analog Input/Output Module provides 8 channels of 0-5 VDC and 0-10 VDC inputs and 4 channels of 0-5 VDC and 0-10 VDC outputs for use with the Productivity3000 Programmable Automation Controller.

Terminal Block sold separately, Terminal Block Cover included (see wiring options on page 5).

Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.automationdirect.com/P3000 for details).

Input Specifications

Input channels	8 inputs (1 common)
Input ranges	0 - 5V, 0 - 10V
Signal resolution	12-16 bit, depending on input resolution
0-5V Input Resolution & Update Rate *See Note 1*	Fine: 7.1ms, 76µV, 16 bit Medium: 1.78ms, 305µV, 14 bit Coarse: 444µs, 1.22mV, 12 bit
0-10V Input Resolution & Update Rate *See Note 1*	Fine: 7.1ms, 152µV, 16 bit Medium: 1.78ms, 610µV, 14 bit Coarse: 444µs, 2.44mV, 12 bit
Data Range	0 - 65535 counts
Maximum continuous overload	±100V, voltage input
Input impedance	1M Ω (± 10%) voltage input
Hardware Filter Characteristics	Low pass 1st order, -3dB @ 80Hz
All Channel Update Rate *See Note 2*	Fine: 56.8ms Medium: 14.24ms Coarse: 3.55ms
Conversion Method	Successive approximation
Accuracy vs. Temperature	±15PPM / °C Maximum
Maximum Inaccuracy	0.1% of range
Linearity Error (end to end)	±0.015% of range maximum Monotonic with no missing codes
Input Stability and Repeatability	± 0.025% of range (after 10 min. warm up)
Full Scale Calibr. Error (minus offset)	±.05% of range maximum
Offset Calibration Error	±.05% of range maximum
Max Crosstalk	-96dB
External DC Power Required	24 VDC (-20% / + 25%), 90mA maximum

Note 1: The Input Resolution of Fine returns 16 bit resolution. Medium and Coarse are 14 and 12 bit respectively. The 12 and 14 bit input values are scaled to 0-65535.

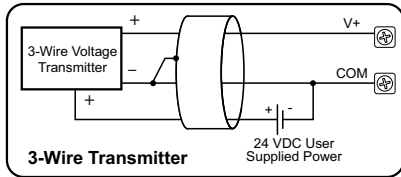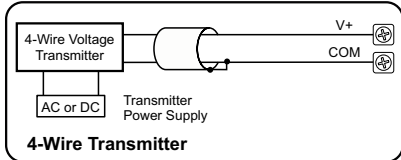Note 2: Valid when all channels are set for the same Input Resolution.
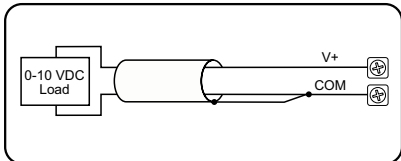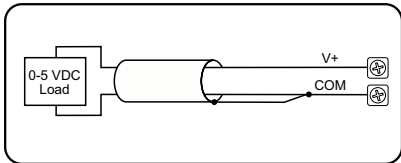
Output Specifications

Output channels	4 (1 common)
Output ranges	0 - 10V, 0 - 5V
Output Signal resolution	16-bit
Resolution Value of LSB (least significant bit)	0 - 5V = 76µV/count 0 - 10V = 152µV/count 1 LSB = 1 count
Data Range	0 - 65535 counts
Output Type	Voltage sourcing/sinking at 10mA max.
Output Value in Fault Mode	0V
Load Impedance	≥1125Ω
Maximum capacitive load	.01µF maximum
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range
Maximum Full Scale Calibration Error (not including offset error)	±0.065% of range maximum
Maximum Offset Calibration Error	±0.065% of range maximum
Accuracy vs. Temperature	±25 ppm/ °C maximum full scale calibration change (± 0.0025% of range / °C)
Max Crosstalk	-96 dB
Linearity Error (end to end)	0.015% of full scale Monotonic with no missing codes
Output Stability and Repeatability	±0.015% after 10 min. warm-up typical
Output Ripple	.01% of Full Scale at 50/60 Hz
Output Settling Time	0.5 ms max, 5 µs min (full scale change)
All Channel Update Rate	5ms
Maximum Continuous Overload	Outputs current limited to 15mA typical
Type of Output Protection	15VDC peak output voltage
Output Signal (power-up, -down)	0V

Voltage Input Circuits

4-Wire Transmitter

4-Wire Voltage Transmitter

AC or DC | Transmitter Power Supply

V+
COM

3-Wire Transmitter

3-Wire Voltage Transmitter

+
−
+

V+
COM

24 VDC User Supplied Power
+ −

Voltage Output Circuits

0-5 VDC Load

V+
COM

0-10 VDC Load

V+
COM

Note: This module includes input and output channels. Before connecting field wiring, verify that you are connecting to the appropriate terminals.

INTERNAL MODULE CIRCUITRY

Input Channels

V1+	CH1 ADC
V2+	CH2 ADC
V3+	CH3 ADC
V4+	CH4 ADC
V5+	CH5 ADC
V6+	CH6 ADC
V7+	CH7 ADC
V8+	CH8 ADC
COM	
COM	
COM	
COM	

Output Channels

V1+	CH1 DAC
V2+	CH2 DAC
V3+	CH3 DAC
V4+	CH4 DAC
COM	
COM	
24VDC−	
24VDC+	ISOLATED ANALOG CIRCUIT POWER

24 VDC User Supplied Power
− +

ISOLATED ANALOG CIRCUIT COMMON
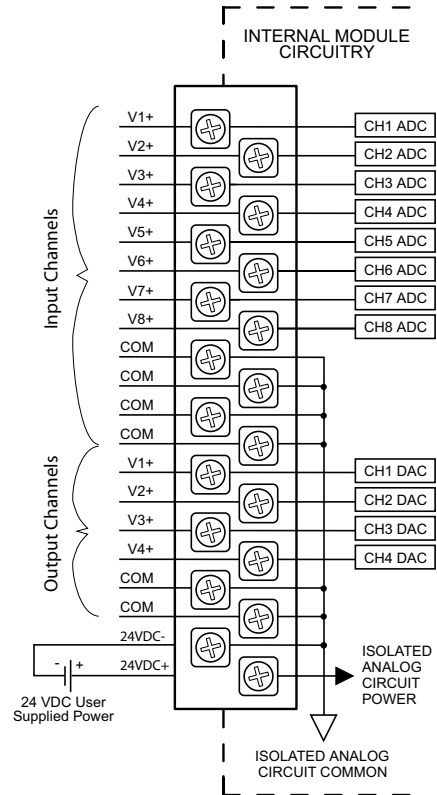
Module Installation Procedure

Align here

Align here
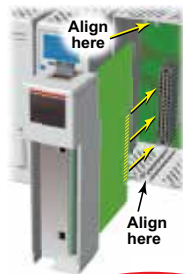
WARNING: Do not apply field power until the following steps are completed. See hot-swapping procedure for exceptions.

AVERTISSEMENT: Ne pas appliquer la puissance de champ avant l'exécution des étapes qui suivent. Consultez la procédure de remplacement à chaud pour les exceptions.

Step One: Align circuit card with slot and press firmly to seat module into connector.

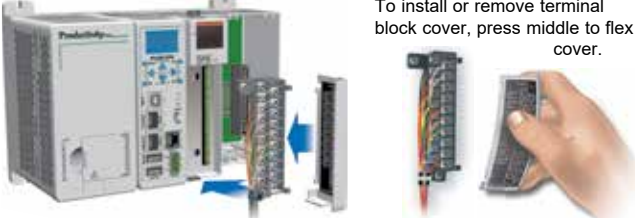**Step Two:** Pull top and bottom locking tabs toward module face. Click indicates lock is engaged.

Unlock   Lock

Step Three: Attach field wiring using optional terminal block or ZIPLink wiring system and install cover.
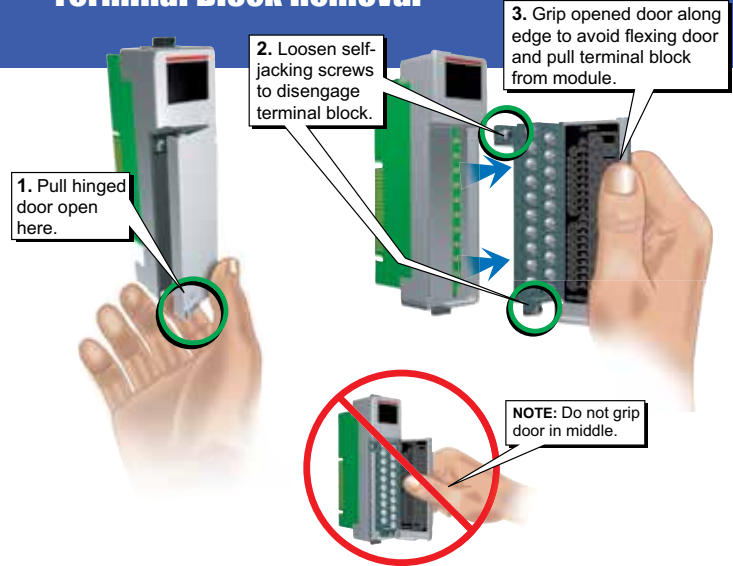

To install or remove terminal block cover, press middle to flex cover.

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.

AVERTISSEMENT: Risque d'explosion : ne pas connecter ou déconnecter les connecteurs ni actionner les commutateurs alors que le circuit est sous tension, à moins que la zone ne soit reconnue non dangereuse. Ne pas remplacer à chaud les modules à moins que la zone ne soit reconnue non dangereuse.

Terminal Block Removal

1. Pull hinged door open here.

2. Loosen self-jacking screws to disengage terminal block.

3. Grip opened door along edge to avoid flexing door and pull terminal block from module.

NOTE: Do not grip door in middle.

Important Hot-Swap Information

The Productivity3000 PAC supports hot-swap! Individual modules, expansion bases, and entire remote base groups can be taken offline, removed, and replaced while the rest of the PAC system continues controlling your process. Before attempting to use the hot-swap feature, be sure to read the hot-swap topic in the programming software's help file or our online documentation at AutomationDirect.com for details on how to plan your installation for use of this powerful feature.

Wiring Options

1 ZIPLink Connection System
Cable + ZIPLink Module = Complete System

ZIPLink
▼AUTOMATIONDIRECT

ZIPLink pre-wired terminal block cables

0.5m (1.6FT) cable	ZL-P3-CBL20-L
1.0m (3.3FT) cable	ZL-P3-CBL20-1L
2.0m (6.6FT) cable	ZL-P3-CBL20-2L

ZIPLink Modules

Feed through	ZL-RTB20

2 Terminal Block with pigtail cable

ZIPLink
▼AUTOMATIONDIRECT

0.5m (1.6FT) cable	ZL-P3-CBL20-P
1.0m (3.3FT) cable	ZL-P3-CBL20-1P
2.0m (6.6FT) cable	ZL-P3-CBL20-2P

3 Terminal Block only

	P3-RTB (Quantity 1)

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P3-8AD4DA-2 module into the base configuration.

Select *Automatic Module Verification* or *No Verification and Enable Hot Swap*. Also specify *Input Range* and *Input Resolution* for inputs along with *Output Range* and *Stop Mode Value* for outputs. If desired, assign a *User Tagname* to each input and output point (channel) selected and to each *Status Bit Item*.
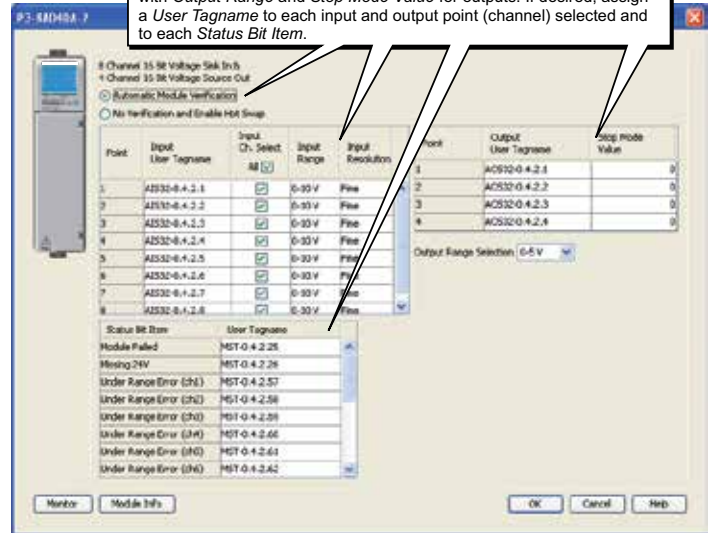
Linear Scaling

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.

- Convert an application specific range to a range which is native to the analog output module.

- Make other linear conversions in ranges appropriate to the application.

Select the Input and Output tags appropriate for the application. Convert raw input signals to engineering units for use in the program, or convert engineering units to output signals for control purposes
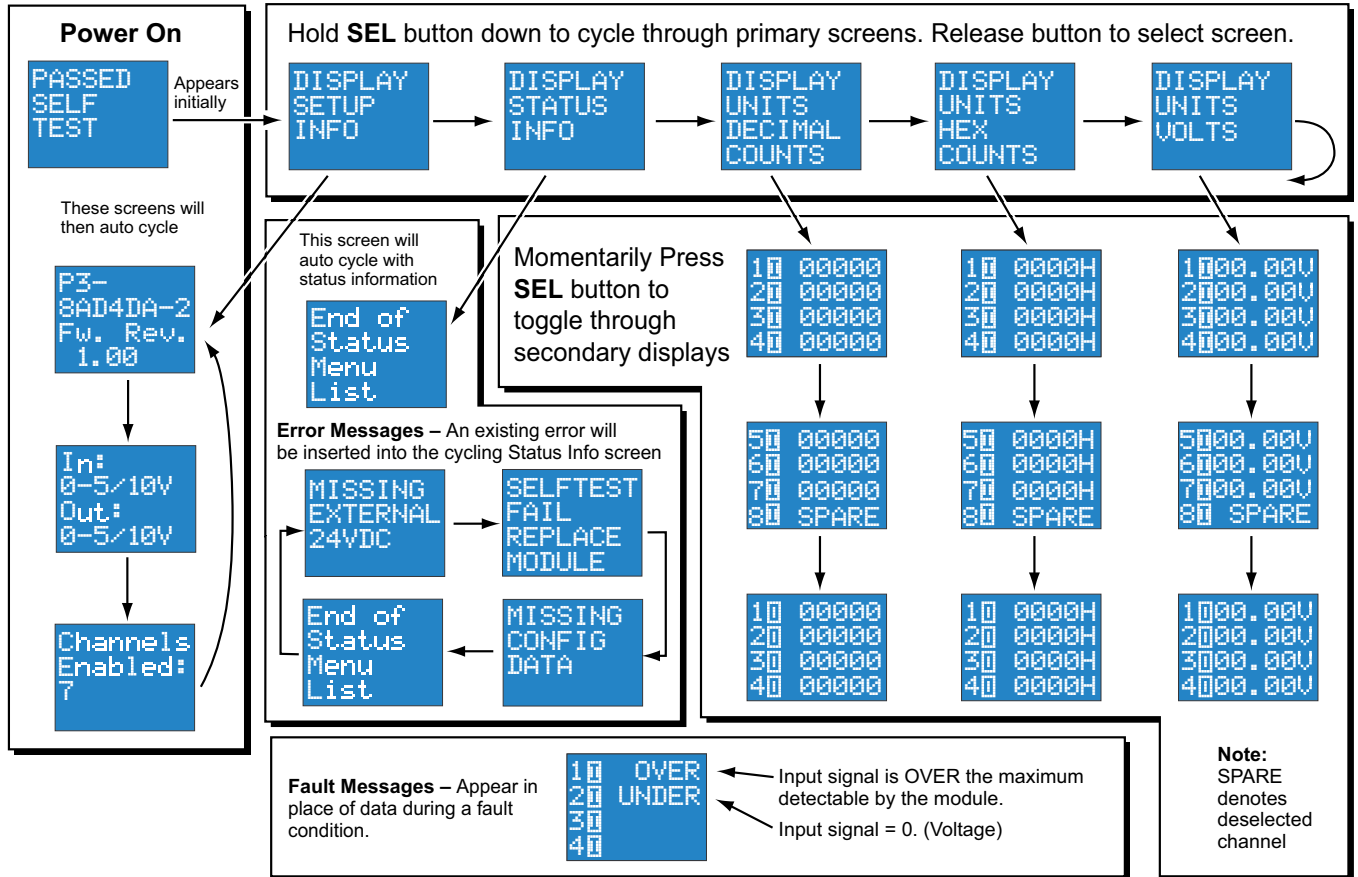
Non-Linear Scaling

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

Select the minimum and maximum values of the raw input signal. These values will relate to the minimum and maximum scaled values.

LCD Panel Display

Power On

```
PASSED
SELF
TEST
```
Appears initially

These screens will then auto cycle

```
P3-
8AD4DA-2
Fw. Rev.
 1.00
```

```
In:
0-5/10V
Out:
0-5/10V
```

```
Channels
Enabled:
7
```

Hold **SEL** button down to cycle through primary screens. Release button to select screen.

```
DISPLAY
SETUP
INFO
```
→
```
DISPLAY
STATUS
INFO
```
→
```
DISPLAY
UNITS
DECIMAL
COUNTS
```
→
```
DISPLAY
UNITS
HEX
COUNTS
```
→
```
DISPLAY
UNITS
VOLTS
```

This screen will auto cycle with status information

```
End of
Status
Menu
List
```

Error Messages – An existing error will be inserted into the cycling Status Info screen

```
MISSING
EXTERNAL
24VDC
```
→
```
SELFTEST
FAIL
REPLACE
MODULE
```

```
End of
Status
Menu
List
```
←
```
MISSING
CONFIG
DATA
```

Momentarily Press **SEL** button to toggle through secondary displays

```
1▯ 00000
2▯ 00000
3▯ 00000
4▯ 00000
```

```
5▯ 00000
6▯ 00000
7▯ 00000
8▯ SPARE
```

```
1▯ 00000
2▯ 00000
3▯ 00000
4▯ 00000
```

```
1▯ 0000H
2▯ 0000H
3▯ 0000H
4▯ 0000H
```

```
5▯ 0000H
6▯ 0000H
7▯ 0000H
8▯ SPARE
```

```
1▯ 0000H
2▯ 0000H
3▯ 0000H
4▯ 0000H
```

```
1▯00.00V
2▯00.00V
3▯00.00V
4▯00.00V
```

```
5▯00.00V
6▯00.00V
7▯00.00V
8▯ SPARE
```

```
1▯00.00V
2▯00.00V
3▯00.00V
4▯00.00V
```

Note: SPARE denotes deselected channel

Fault Messages – Appear in place of data during a fault condition.

```
1▯  OVER
2▯ UNDER
3▯
4▯
```

Input signal is OVER the maximum detectable by the module.

Input signal = 0. (Voltage)

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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Removable Terminal Block Specifications

Number of Positions	20 screw terminals
Wire Range	22-14 AWG (0.324 to 2.08 sq. mm) solid / stranded conductor 3/64 in. (1.2 mm) insulation maximum "USE COPPER CONDUCTORS, 60°C" or equivalent*.
Screw Driver Width	1/4 inch (6.5 mm) maximum
Screw Size	M3 size
Screw Torque	Field terminals – 7 - 9 in./lb (.0.882 - 1.02 Nm) Self-jacking screws – 2.7 - 3.6 in./lb (0.3 - 0.4 Nm). Do not overtighten screws when installing terminal block.

Document Name	Edition/Revision	Date
P3-8AD4DA-2-M	1st Ed.Rev. C	12/05/2017