Analog I/O Specifications

In This Chapter...

Analog I/O Modules Overview

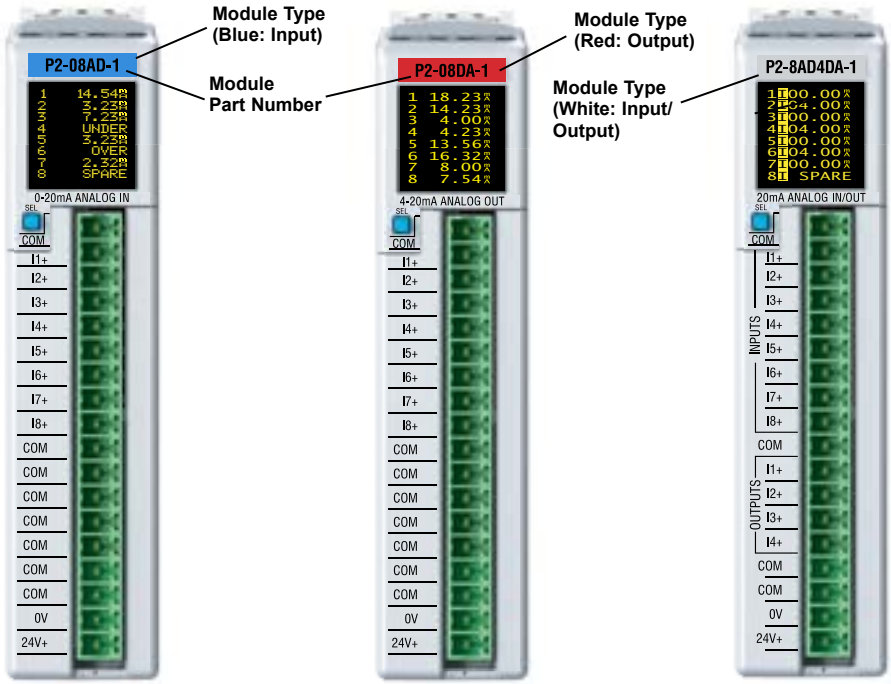
A variety of analog I/O modules are available for use in local I/O bases.

Each I/O module is identified as an "Input", "Output", or "Input/Output" module on its front panel using the color coding scheme listed below. See Chapter 2 for discrete I/O module specifications, Chapter 4 for specialty module specifications and Chapter 5 for module wiring and communications. The following pages contain the analog I/O module specifications.

There are twenty-two analog I/O modules available. The specifications and wiring diagrams, along with configuration and scaling information are in this chapter.

Use the hardware configuration tool in the Productivity Suite programming software to setup the I/O modules. See the Productivity Suite help file.

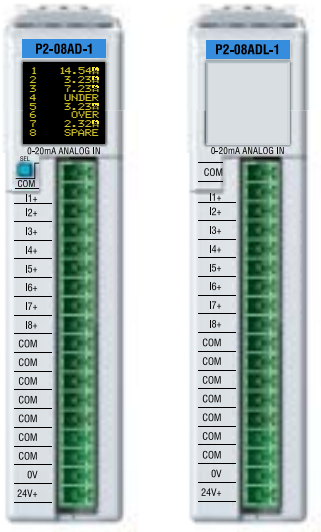
Analog Input Modules **Analog Output Modules** **Analog Input/Output Modules**



NOTE: *The OLED display will time-out after approximately 4 hours without interaction. To wake, press SEL button below display on the front panel.*

Analog I/O Modules

Analog Input Modules



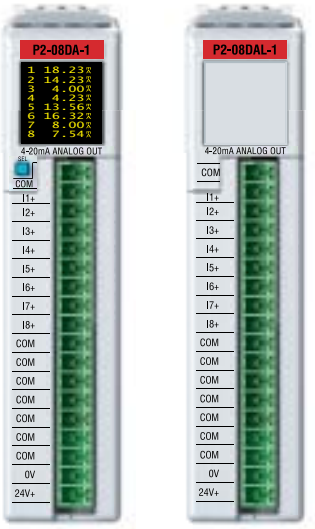
Productivity2000 Analog Input Modules			
Part Number	**Number of Channels**	**Description**	**See Page**
P2-04AD	4	Voltage/Current	3–6
P2-04AD-1	4	Current	3-12
P2-04AD-2	4	Voltage	3-17
P2-08AD-1	8	Current	3–22
P2-08AD-2	8	Voltage	3–27
P2-08ADL-1*	8	Current	3–32
P2-08ADL-2*	8	Voltage	3–36
P2-16AD-1	16	Current	3–40
P2-16AD-2	16	Voltage	3–45
P2-16ADL-1*	16	Current	3–50
P2-16ADL-2*	16	Voltage	3–54
P2-06RTD	6	RTD Input	3–58
P2-08THM	8	Thermocouple Input	3-65
P2-08NTC	8	Thermistor Input	3–72

** Low resolution analog modules without OLED display.*

NOTE: *The OLED display will time-out after approximately 4 hours without interaction. To wake, press SEL button below display on the front panel.*

Analog I/O Modules

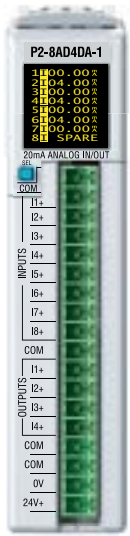
Analog Output Modules



Productivity2000 Analog Output Modules			
Part Number	**Number of Channels**	**Description**	**See Page**
P2-04DA	4	Voltage/Current	3–76
P2-04DA-1	4	Current	3-82
P2-04DA-2	4	Voltage	3-87
P2-04DAL-1*	4	Current	3-92
P2-04DAL-2*	4	Voltage	3-96
P2-08DA-1	8	Current	3–100
P2-08DA-2	8	Voltage	3–105
P2-08DAL-1*	8	Current	3–110
P2-08DAL-2*	8	Voltage	3–114
P2-16DA-1	16	Current	3–118
P2-16DA-2	16	Voltage	3–123
P2-16DAL-1*	16	Current	3–128
P2-16DAL-2*	16	Voltage	3–132

** Low resolution analog modules without OLED display.*

Analog Input/Output Modules

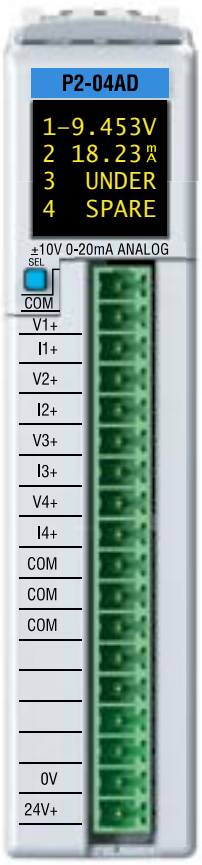


Productivity2000 Analog Input/Output Modules			
Part Number	**Number of Channels**	**Description**	**See Page**
P2-08AD4DA-1	8/4	Analog Input/Output (Current)	3–136
P2-8AD4DA-2	8/4	Analog Input/Output (Voltage)	3–142

** **NOTE**: The OLED display will time-out after approximately 4 hours without interaction. To wake, press SEL button on the front panel.*

P2-04AD Analog Input

The P2-04AD Voltage/Current Analog Input Module provides four channels for receiving ±10 VDC, ±5 VDC, 0–5 VDC, and 0 to 20mA signals.



Input Specifications

Input Channels	4	
Module Signal Input Ranges	±10VDC, ±5VDC, 0–5 VDC, 0–10 VDC, 0–20mA	
Signal Resolution	16-bit	
Resolution Value of LSB (least significant bit)	1 LSB = 1 count ±10V = 305µV ±5V = 152µV	0–5V = 76µV 0–10V = 152µV 0–20mA = 0.305 µA
Data Range	0–65535 counts unipolar -32768 to +32767 counts bipolar	
Maximum Continuous Overload	±31mA, current input ±100V, voltage input	
Input Impedance	1MΩ±10% voltage input 250Ω±0.1% 1/4 W current input	
Hardware Filter Characteristics	Low Pass 1st order, -3dB @ 48Hz	
Sample Duration Time	2ms per channel (does not include ladder scan time)	
All Channel Update Rate	8ms	
Open Circuit Detection Time	Zero reading within 1s (current input only)	
Conversion Method	Successive approximation	
Accuracy vs. Temperature	±10PPM / ºC maximum	
Maximum Inaccuracy	0.1% of range voltage, 0.2% of range current (including temperature drift)	
Linearity Error (end to end)	±0.01% of range max., ±10V & ±5V ±0.015% of range max., 0–10V, 0–5V & 0–20mA Monotonic with no missing codes	
Input Stability and Repeatability	±0.035% of range (after 10 minute warmup)	
Full Scale Calibration Error	±0.2% of range maximum	
Offset Calibration Error	±0.065% of range maximum	
Max Crosstalk	-96dB, 1 LSB	
Recommended Fuse (external)	Edison S500-32-R, 0.032A fuse on current inputs only	
External DC Power Required	24VDC (-20% / +25%) 35mA	

Terminal block sold separately.

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-04AD Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	1.4 W
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (not included)	18-position removable terminal block
Weight	90g (3.2 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)*

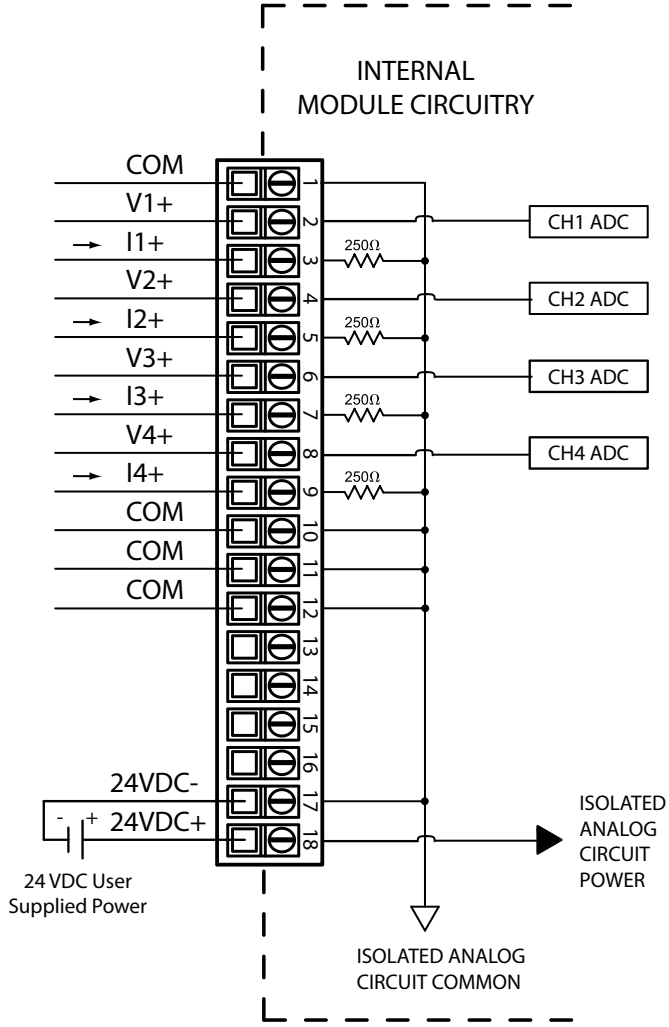
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

P2-04AD Analog Input (continued)

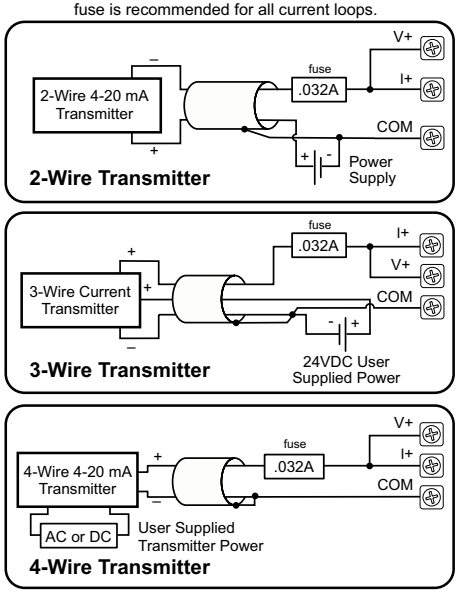
Wiring Diagrams



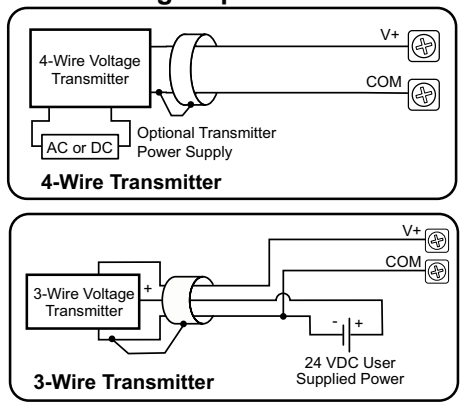
P2-04AD Analog Input (continued)

Current Sinking Input Circuits

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



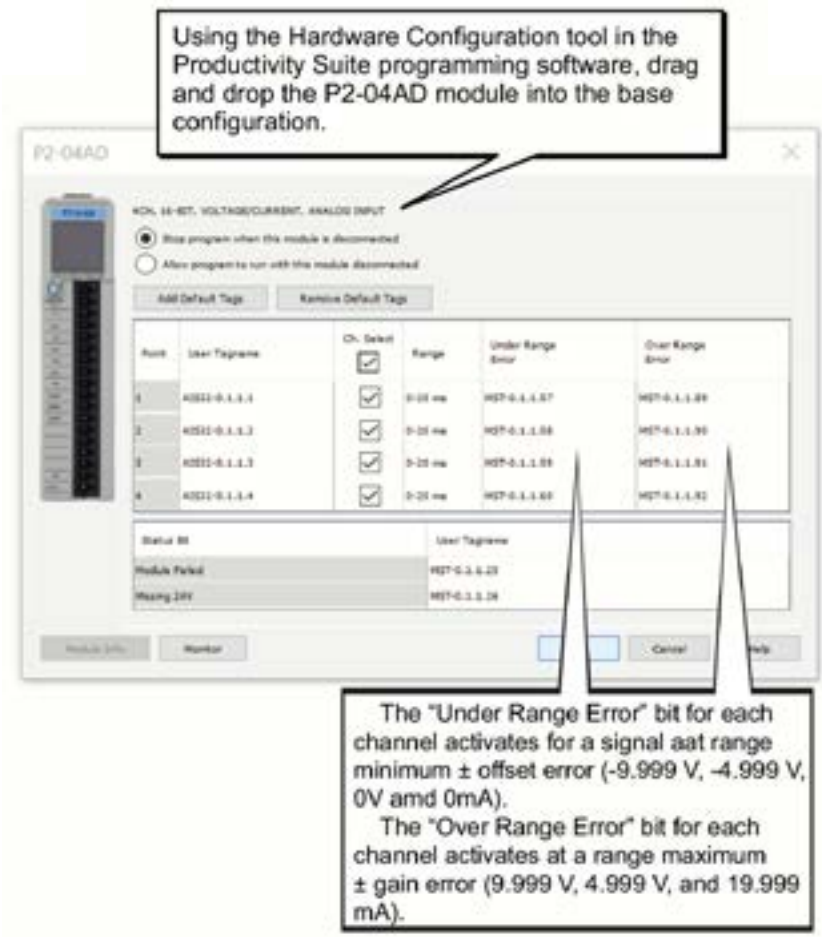
Voltage Input Circuits



Notes:
1. Shield connected to signal source common.
2. If current is chosen, I+ MUST be jumpered to V+. For example, when using 4-20 mA source for Input 3, I3+ must be connected to V3+.

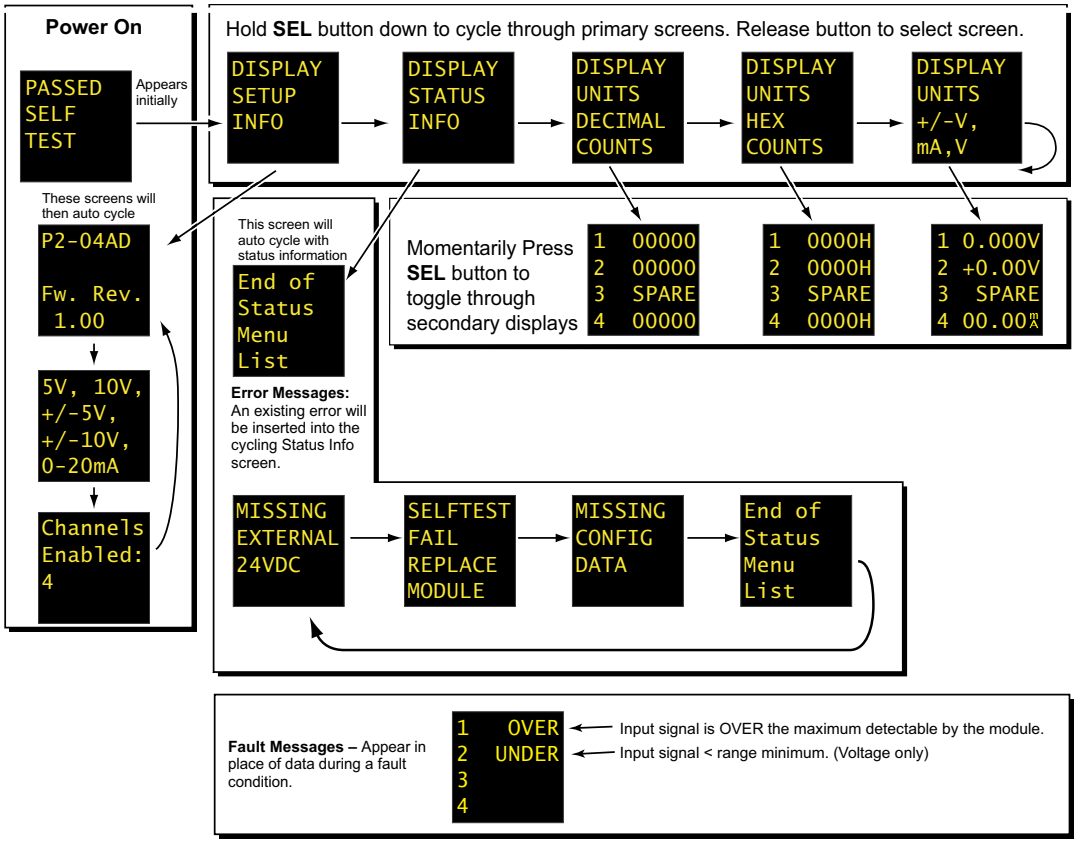
P2-04AD Analog Input (continued)

Module Configuration



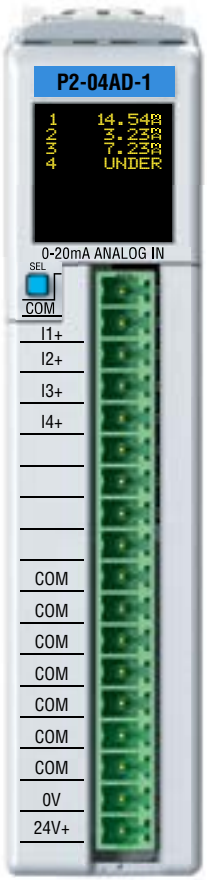
P2-04AD Analog Input (continued)

OLED Panel Display



P2-04AD-1 Analog Input

The P1-04AD-1 Current Analog Input Module provides four channels for receiving 0–20 mA signals for use with the Productivity®2000 system.



Terminal block sold separately.

Input Specifications

Inputs per Module	4
Input Range	0–20 mA
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–20 mA=0.305 µA per count (1LSB = 1 count)
Data Range	0-65535 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	250 ±0.1% 1/4 W current input
Hardware Filter Characteristics	Low Pass, -3dB @ 100Hz
Sample Duration Time	9ms per channel (does not include ladder scan time)
All Channel Update Rate	80ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs Temperature	±25PPM / °C maximum
Maximum Inaccuracy	0.1% of range (Including temperature drift)
Linearity Error	±0.015% of range max., 0–5 V & 0–20 mA; Monotonic with no missing codes
Input Stability and Repeatability	±0.015% of range (after 10 min. warm-up)
Maximum Full Scale Calibration Error	±0.15% of range maximum
Offset Calibration Error	±0.015% of range maximum
Maximum Crosstalk at DC, 50Hz and 60Hz	-76dB, ±10LSB
Common Mode Rejection	-90dB min. @ DC, -150dB min.@50/60 Hz.
Common Mode Voltage Range	±5VDC
Isolation	±750V continuous
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External Power Supply Required	24VDC (-20% / + 25%), 35mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-04AD-1 Analog Input (continued)

General Specifications	
Operating Temperature	0°C to 60°C (32°F to 140°F)
Storage Temperature	-20ºC to 70ºC (-4ºF 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)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1200mW
Overvoltage Category	II
Enclosure Type	Open equipment
Field Wiring	Use ZIPLink wiring system or removable terminal block (sold separately). See “Wiring Options” in Chapter 5.
Connector Type (sold separately)	18-position Removable Terminal Block
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity2000 system
Agency Approvals	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)*
Weight	90g (3.2 oz)

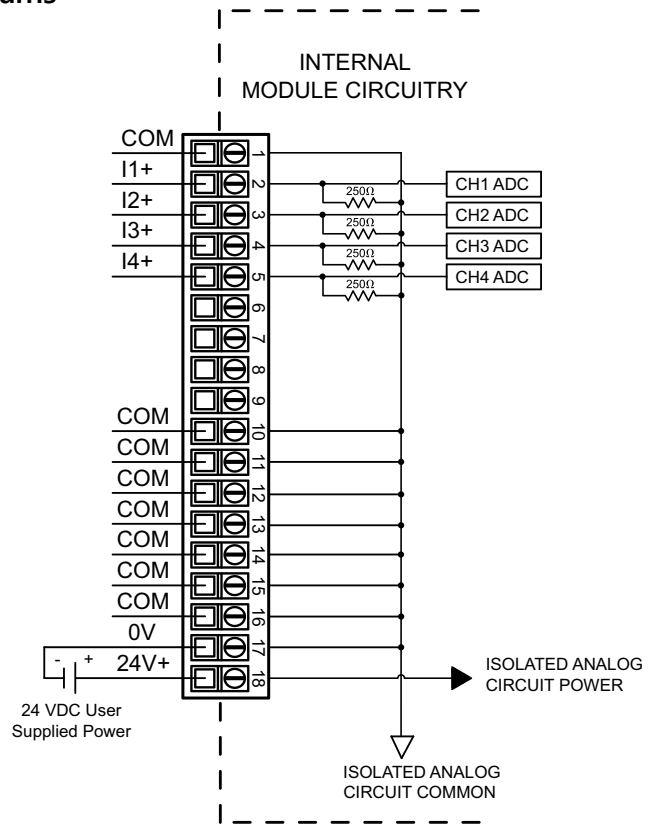
** Meets EMC and Safety requirements. See CE D.O.C for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

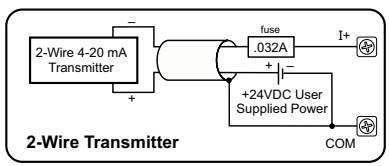
P2-04AD-1 Analog Input (continued)

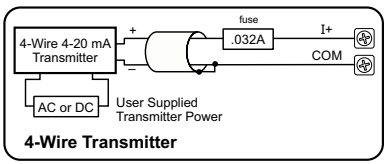
Wiring Diagrams



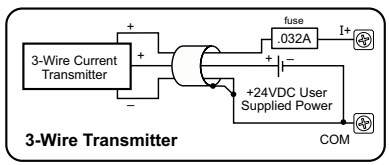
Current Input Circuits

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



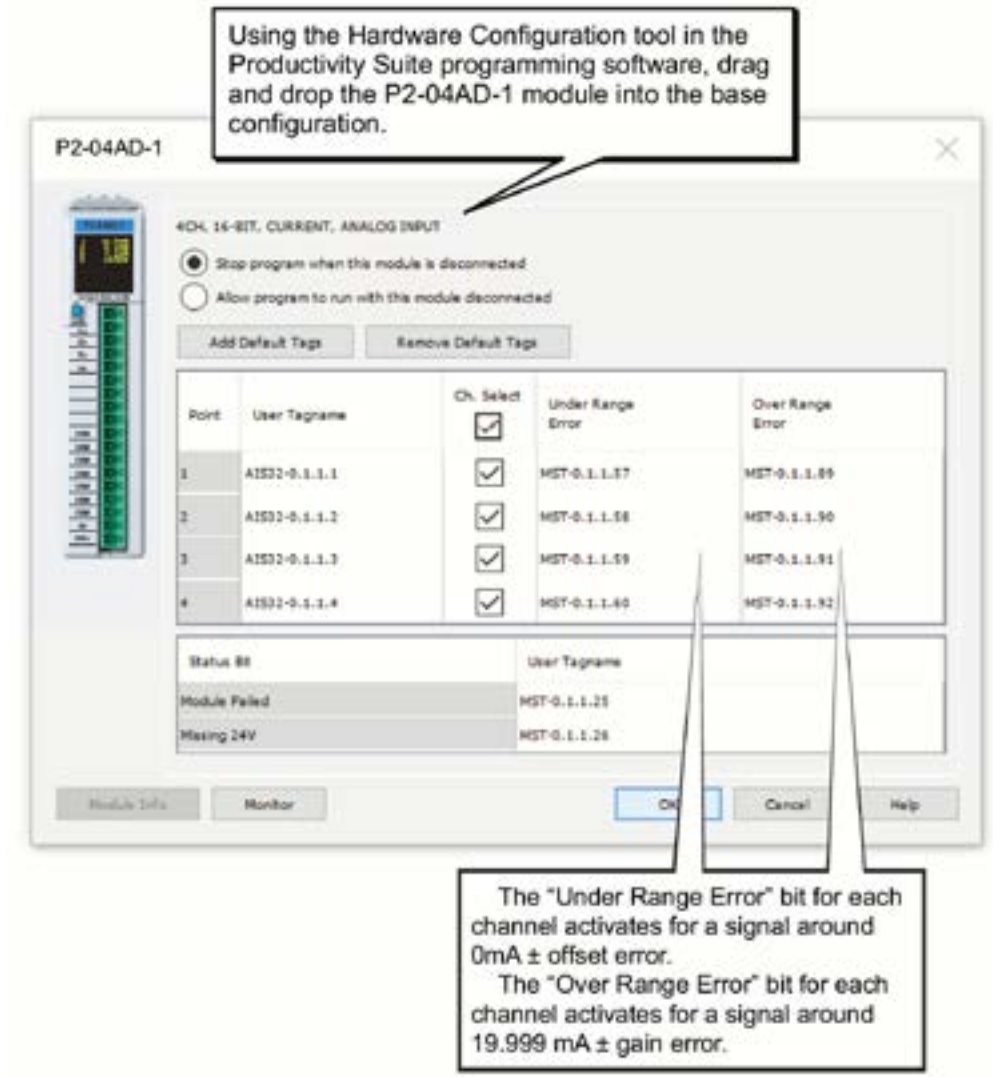


Note: Do not connect both ends of shield.



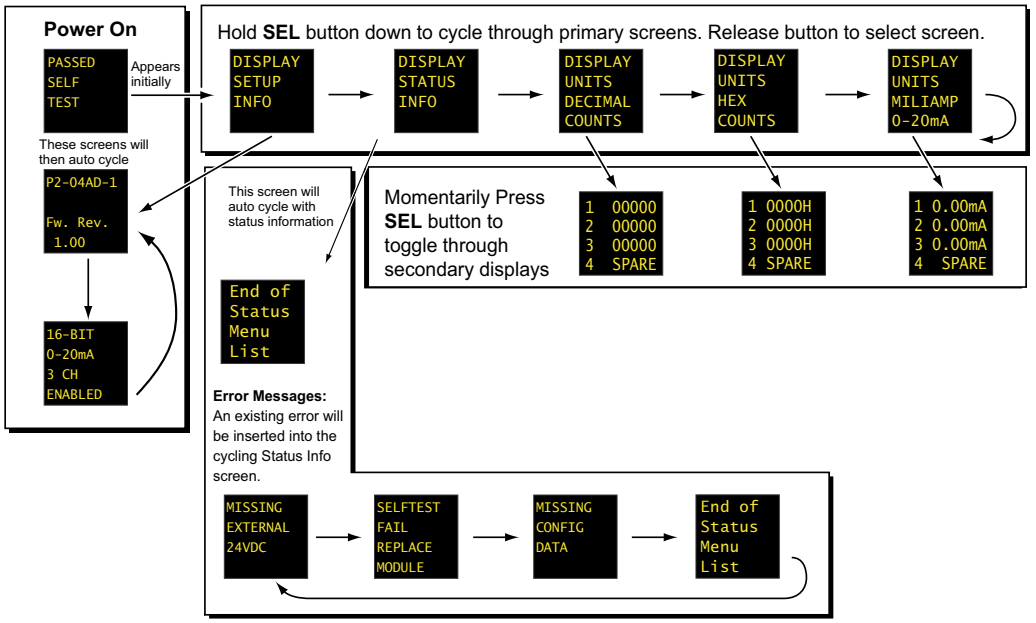
P2-04AD-1 Analog Input (continued)

Module Configuration



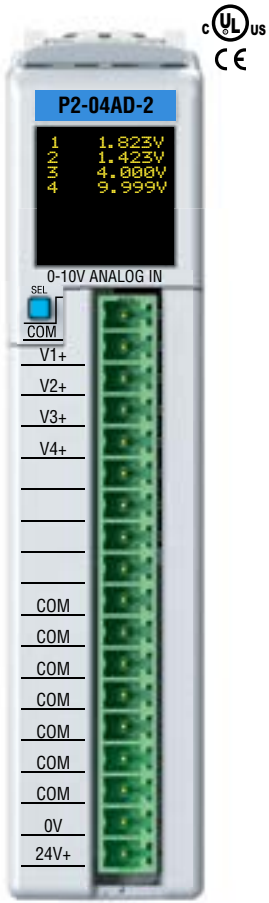
P2-04AD-1 Analog Input (continued)

OLED Panel Display Menu



P2-04AD-2 Analog Input

The P2-04AD-2 Voltage Analog Input Module provides four channels for receiving 0–10 VDC signals for use with the Productivity2000 system.



Terminal block sold separately

Input Specifications	
Inputs Module	4
Input Range	0–10 VDC
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–10 VDC = 152µV per count, (1 LSB = 1 count)
Data Range	0-65535 counts
Input Type	Single-ended (1 common)
Maximum Continuous Overload	±100V
Input Impedance	250kΩ (typical)
Hardware Filter Characteristics	Low Pass -3dB @ 100Hz
Sample Duration Time	7ms per channel (does not include ladder scan time)
All Channel Update Rate	80ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs Temperature	±25PPM / ºC maximum
Maximum Inaccuracy	0.1% of range voltage (Including temperature drift)
Linearity Error	±0.015% of range Monotonic with no missing codes
Input Stability and Repeatability	±0.015% of range (after 10 min. warm-up)
Maximum Full Scale Calibration Error	±0.015% of range maximum
Offset Calibration Error	±0.015% of range maximum
Maximum Crosstalk	-76dB, ±10 LSB
External Power Supply Required	24VDC (-20% / + 25%), 35mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your modules, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-04AD-2 Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–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)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	82mW
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 ***ZIP***Link wiring system or removable terminal block. See "Wiring Options" in Chapter 5.
Terminal Type (sold separately)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	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)*

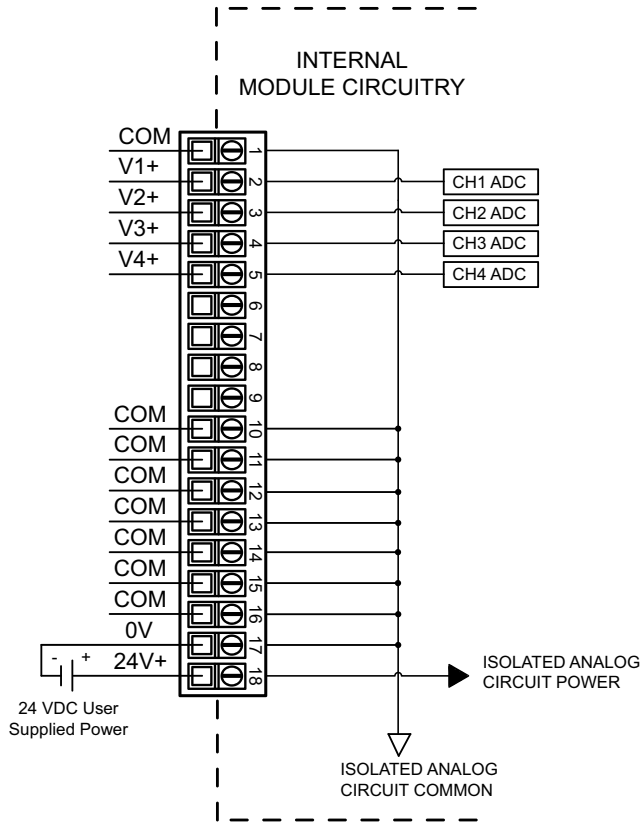
** See CE Declaration of Conformance for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

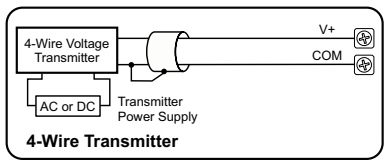
** Recommended screw driver P/N: TW-SD-MSL-1.*

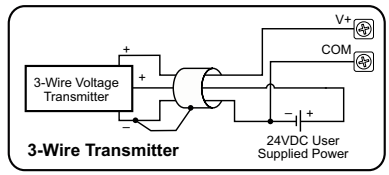
P2-04AD-2 Analog Input (continued)

Wiring Diagrams



Voltage Input Circuits

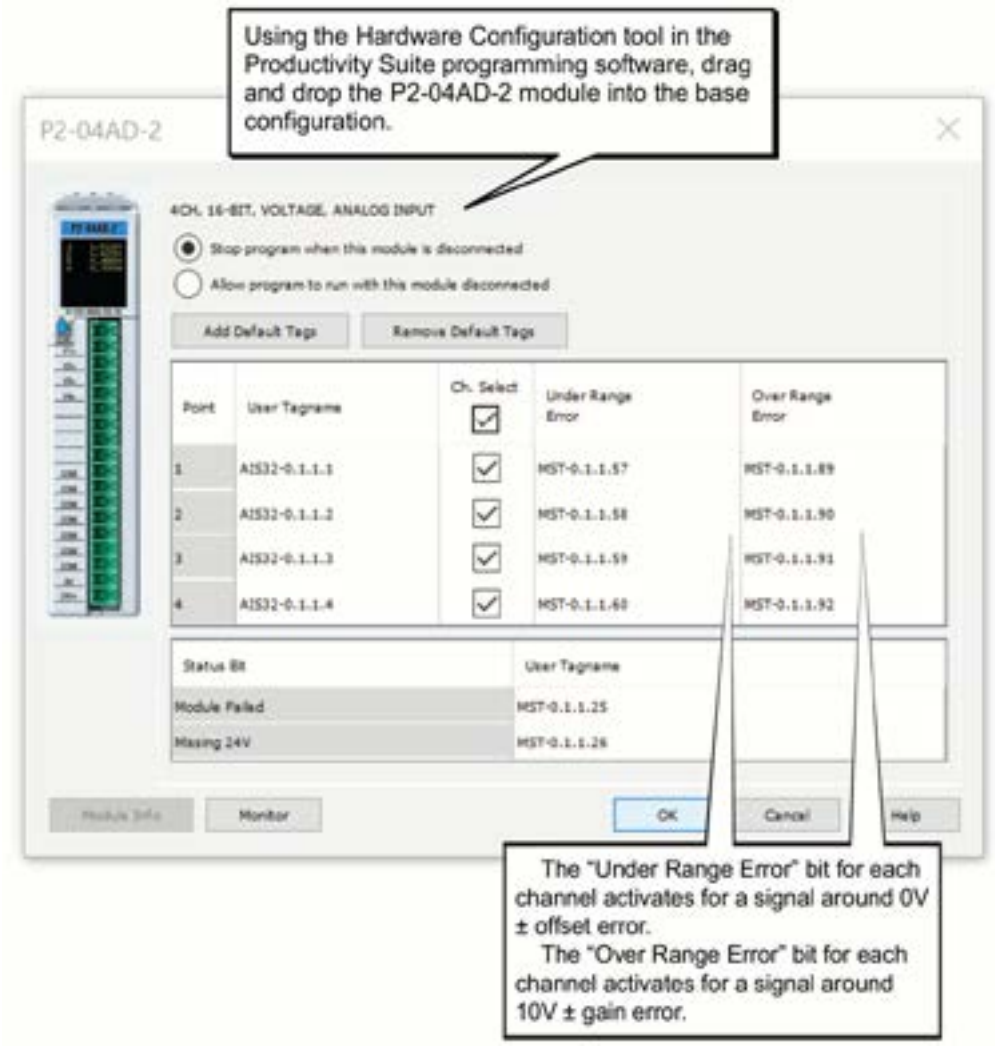




Notes for maximum accuracy:
1. Jumper unused inputs to common.

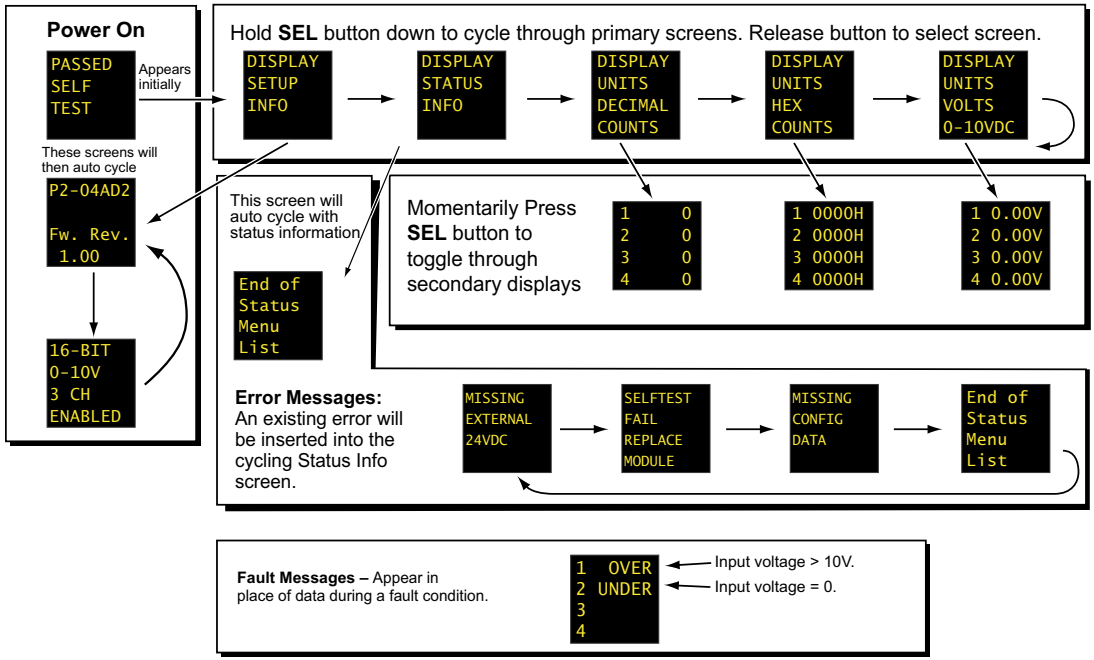
P2-04AD-2 Analog Input (continued)

Module Configuration



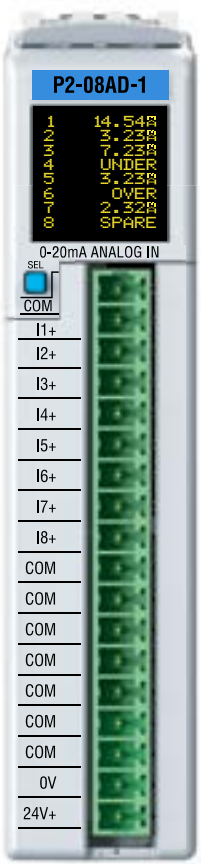
P2-04AD-2 Analog Input (continued)

OLED Panel Display Menu



P2-08AD-1 Analog Input

The P2-08AD-1 Current Analog Input Module provides 8 channels for receiving 0 to 20mA signals.



Terminal blocks sold separately

Input Specifications	
Input Channels	8
Module Signal Input Range	0–20mA
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–20 mA = 0.305 µA per count (1 LSB = 1 count)
Data Range	0 to 65535 counts
Input Type	Sinking, single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	250Ω ±0.1% 1/4 W
Filter Characteristics	Low Pass, -3dB @ 100Hz
Sample Duration Time	9ms per channel (does not include ladder scan time)
All Channel Update Rate	80ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs. Temperature	±25PPM / ºC maximum
Maximum Inaccuracy	0.1% of range (including temperature drift)
Linearity Error (end to end)	±0.015% of range Monotonic with no missing codes
Input Stability and Repeatability	±0.015% of range (after 10 minute warmup)
Full Scale Calibration Error (not including offset)	±0.015% of range maximum
Offset Calibration Error	±0.015% of range maximum
Max Crosstalk	-76dB, ±10 LSB
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / +25%) 35mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-08AD-1 Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–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)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	800mW
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (not included)	18-position removable terminal block
Weight	90g (3.2 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)*

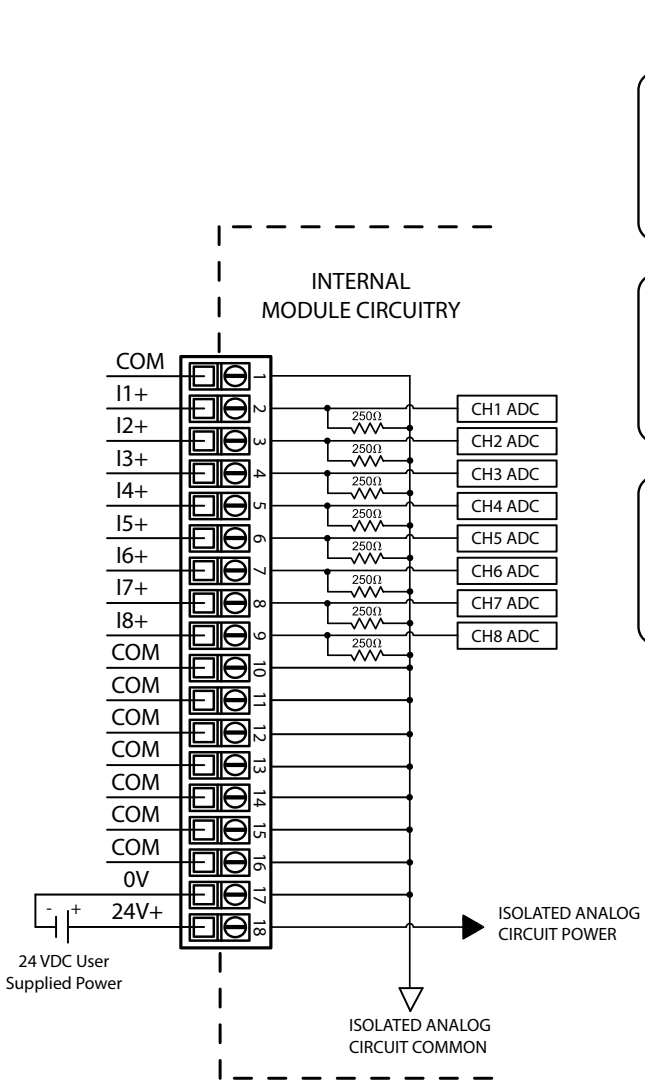
**Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

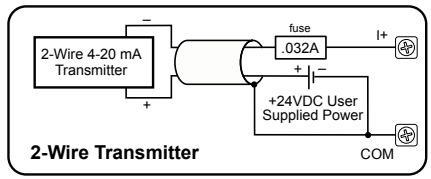
P2-08AD-1 Analog Input (continued)

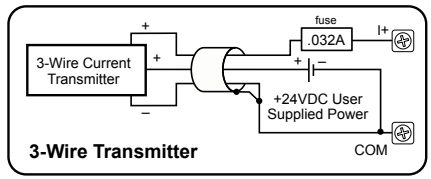
Wiring Diagrams

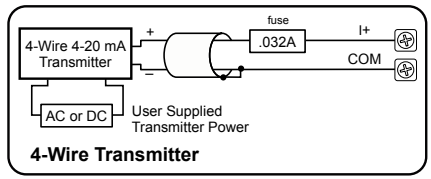


Current Input Circuits

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



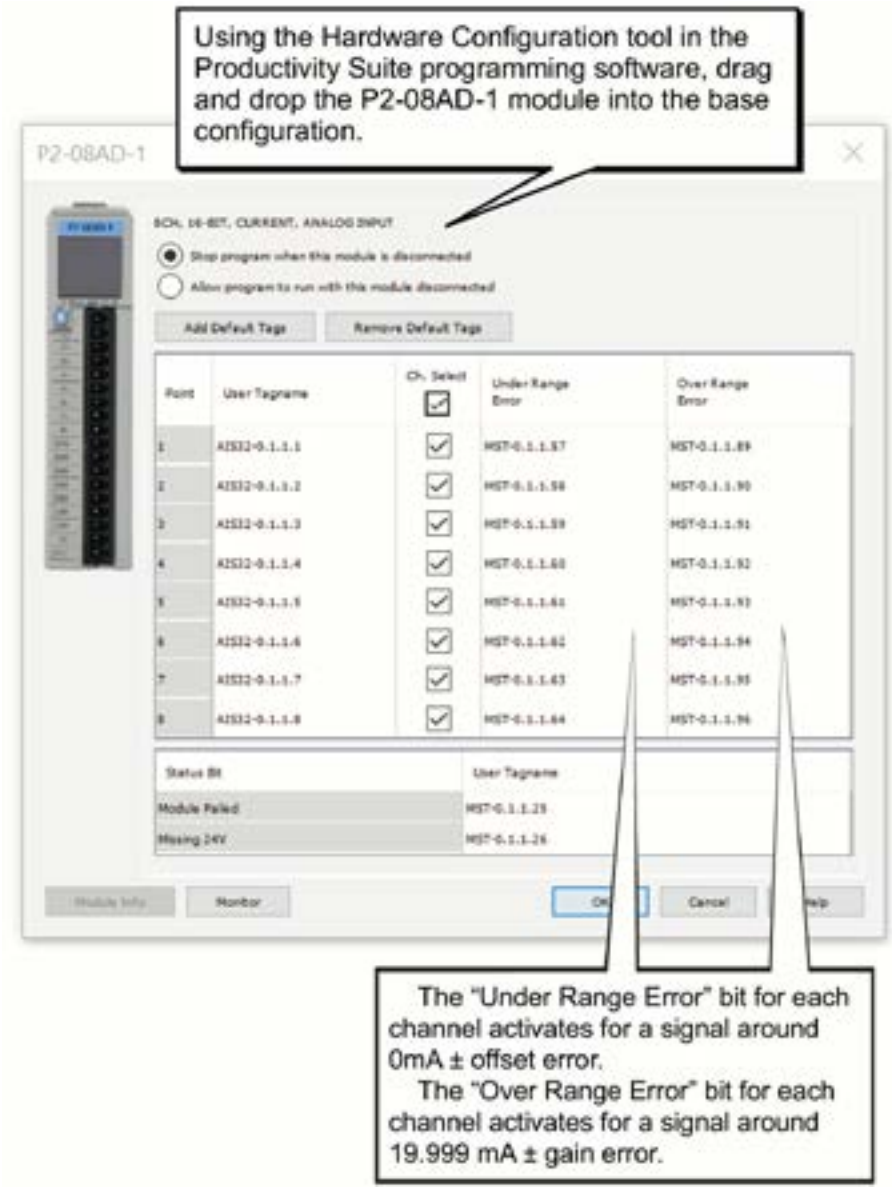




Note: Do not connect both ends of shield.

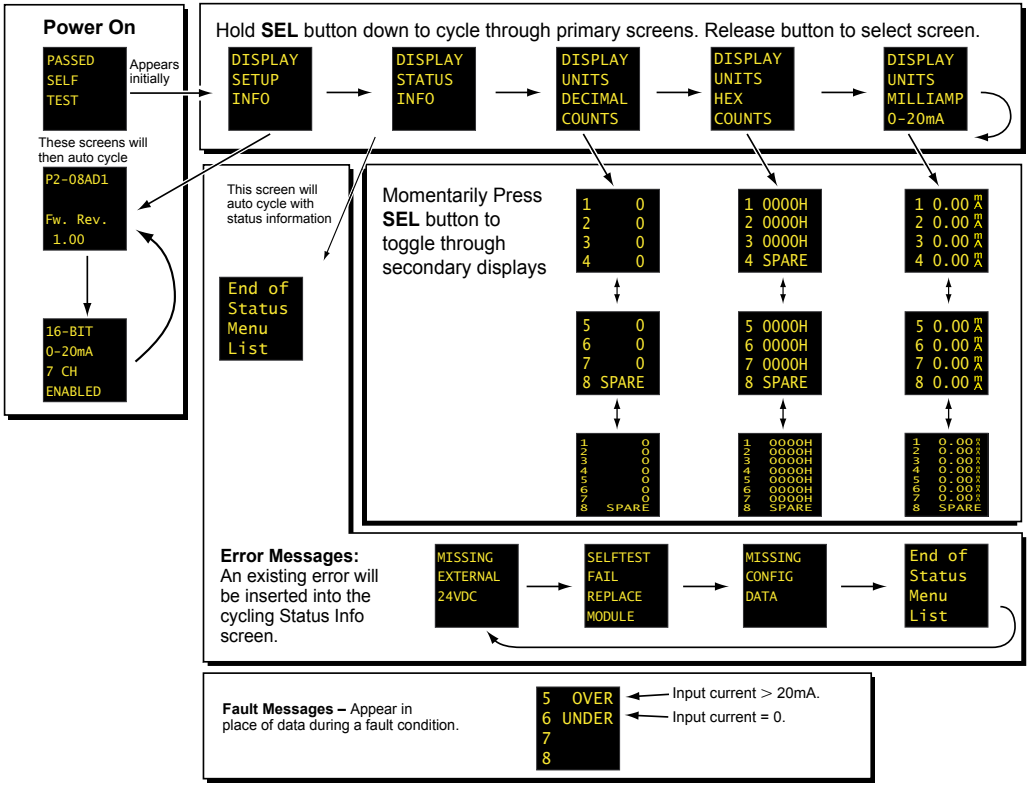
P2-08AD-1 Analog Input (continued)

Module Configuration



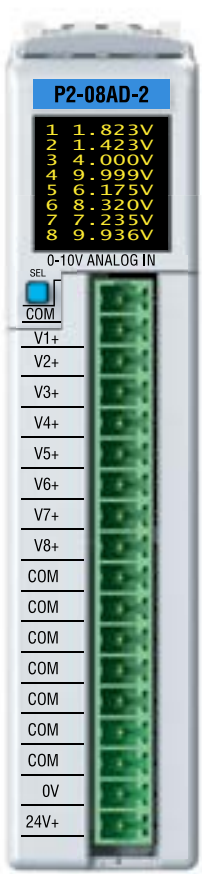
P2-08AD-1 Analog Input (continued)

OLED Panel Display



P2-08AD-2 Voltage Analog Input

The P2-08AD-2 Voltage Analog Input Module provides eight channels for receiving 0–10 VDC signals.



Terminal blocks sold separately

Input Specifications	
Input Channels	8
Module Signal Input Range	0–10 VDC
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–10 VDC = 152µV per count (1 LSB = 1 count)
Data Range	0 to 65535 counts
Input Type	Single-ended (1 common)
Maximum Continuous Overload	±100V
Input Impedance	250kΩ (typical)
Filter Characteristics	Low Pass, -3dB @ 100Hz
Sample Duration Time	7ms per channel (does not include ladder scan time)
All Channel Update Rate	80ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs. Temperature	±25PPM / °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	-76dB, ±10 LSB
External DC Power Required	24VDC (-20% / +25%) 35mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-08AD-2 Voltage Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–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)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	82mW
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ***ZIP***Link wiring system or removable terminal block (not included). See "Wiring Options" in Chapter 5.
Connector Type (not included)	18-position removable terminal block
Weight	90g (3.2 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)*

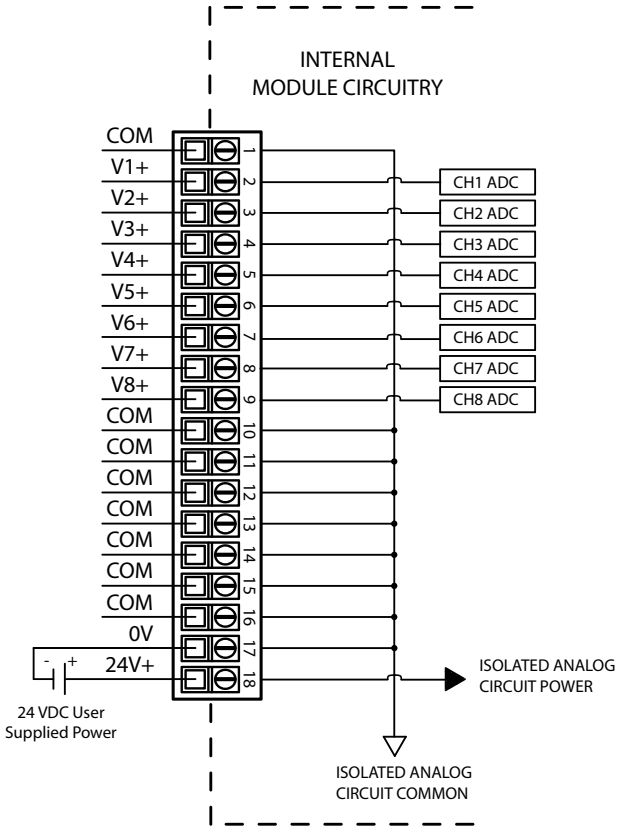
** Meets EMC and Safety requirements. See the D.O.C. for details.*

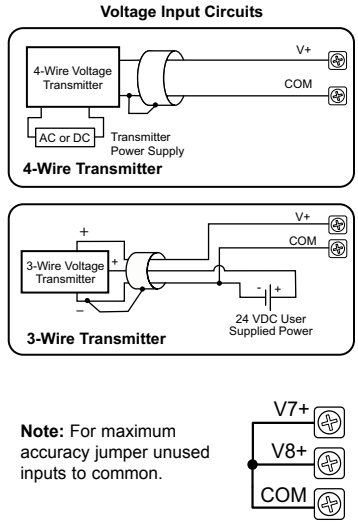
Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 1/4 in (6–7 mm) strip length	28–16 AWG (0.081–1.31 mm²) Solid/stranded 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

P2-08AD-2 Voltage Analog Input (continued)

Wiring Diagrams

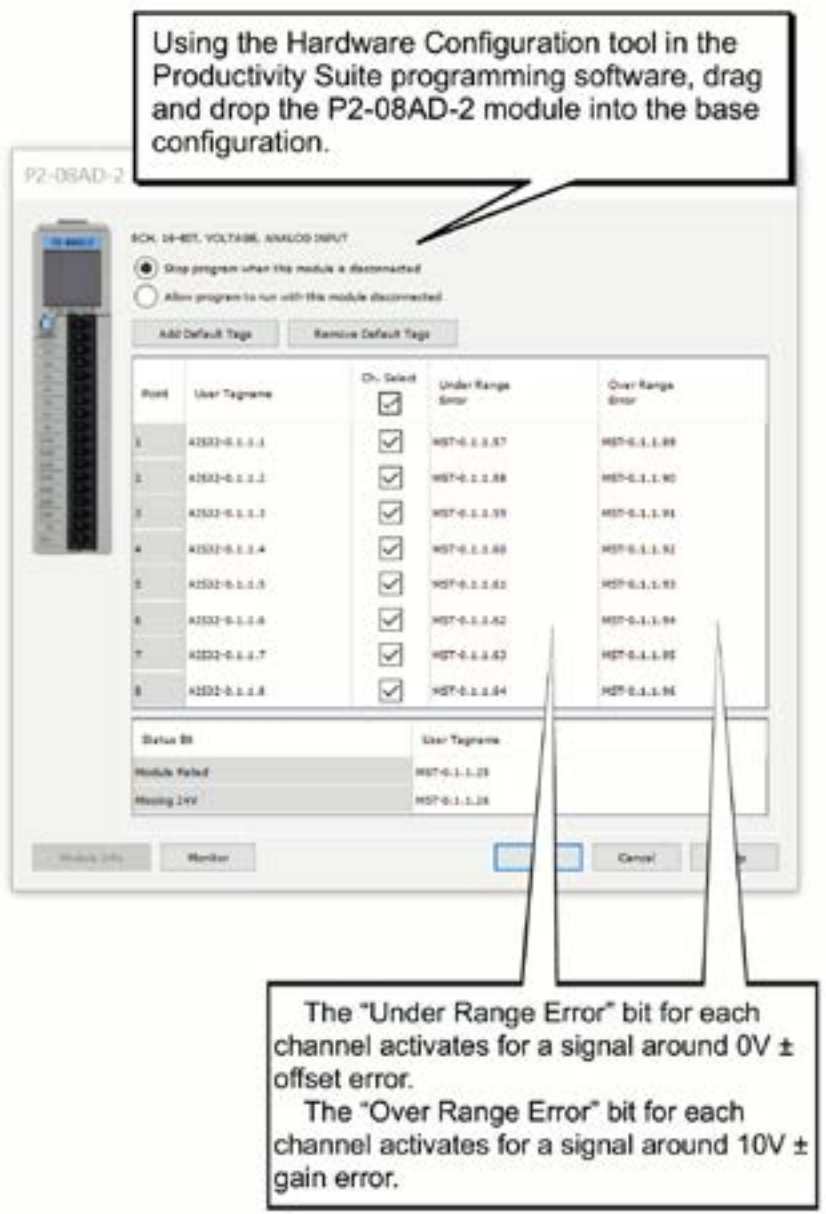




Note: For maximum accuracy jumper unused inputs to common.

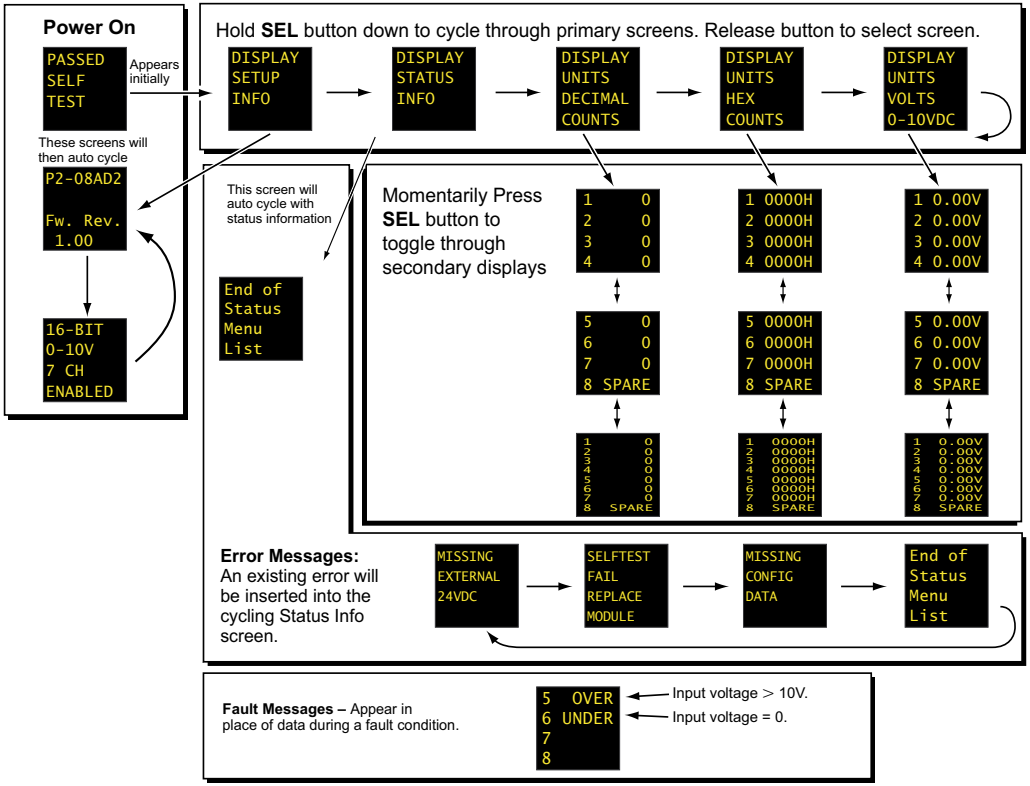
P2-08AD-2 Voltage Analog Input (continued)

Module Configuration



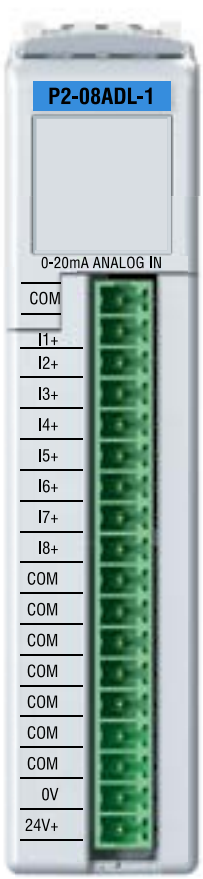
P2-08AD-2 Voltage Analog Input (continued)

OLED Panel Display



P2-08ADL-1 Current Analog Input

The P2-08ADL-1 Low Resolution Current Analog Input Module provides eight channels for receiving 0–20 mA signals for use with Productivity®2000 system.



Terminal blocks sold separately

Input Specifications	
Input Channels	8
Module Signal Input Range	0–20mA
Signal Resolution	13-bit
Resolution Value of LSB (least significant bit)	0–20mA = 2.44 µA per count (1LSB = 1 count)
Data Range	0–8191 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	124Ω, ±0.5%, 1/2W 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 / ºC 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
Full Scale Calibration Error (including offset)	±0.098% of range
Offset Calibration Error	±0.098% of range
Max Crosstalk at DC, 50Hz and 60Hz	4 counts / 0.048% of range
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / + 25%), 30mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-08ADL-1 Current Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–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)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1200mW
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Terminal Type	18-position Removable Terminal Block
Weight	100g (3.5 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)*

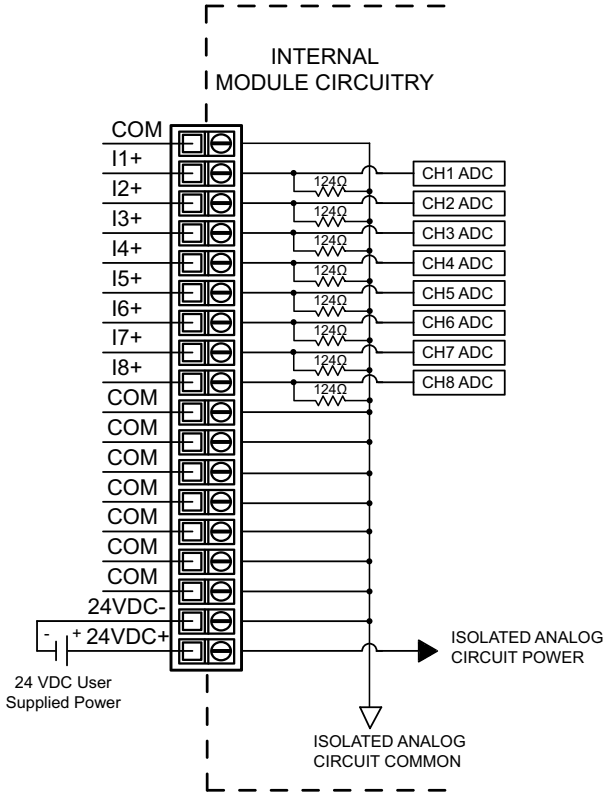
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

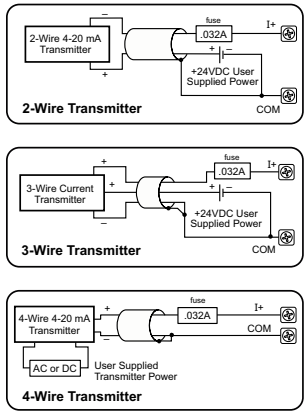
P2-08ADL-1 Current Analog Input (continued)

Wiring Diagrams



Current Input Circuits

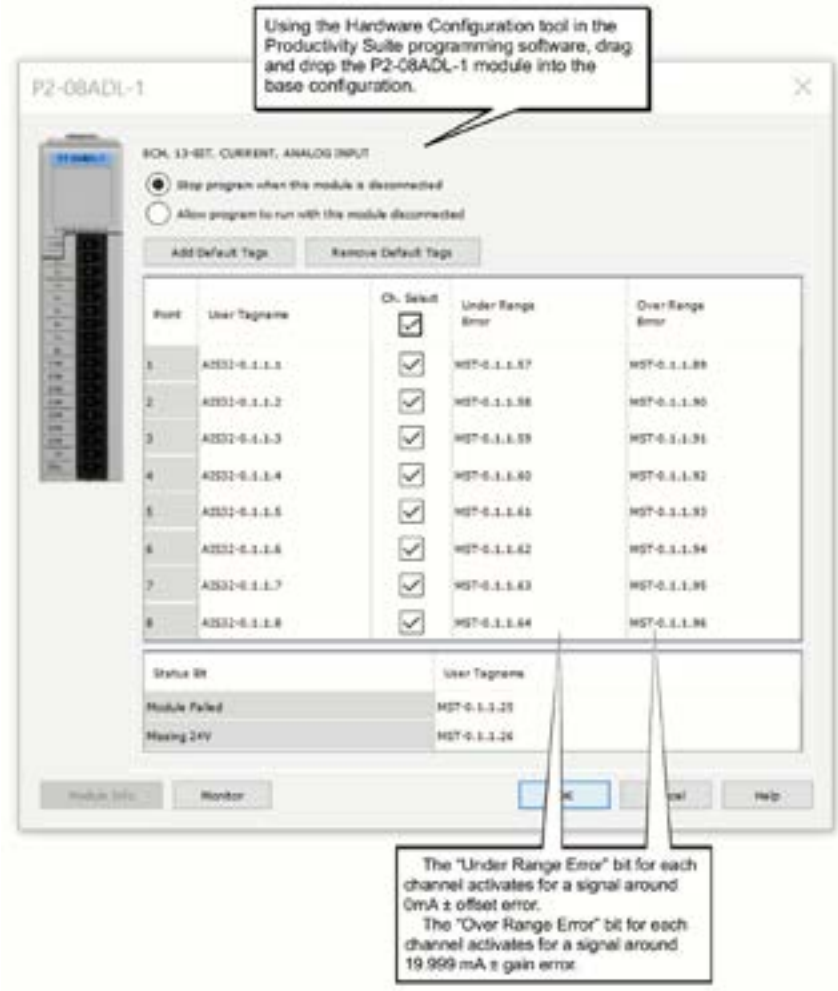
An Edison S500-32-R 0.032A fast-acting fuse is recommended for current loops.



Note: Do not connect both ends of shield.

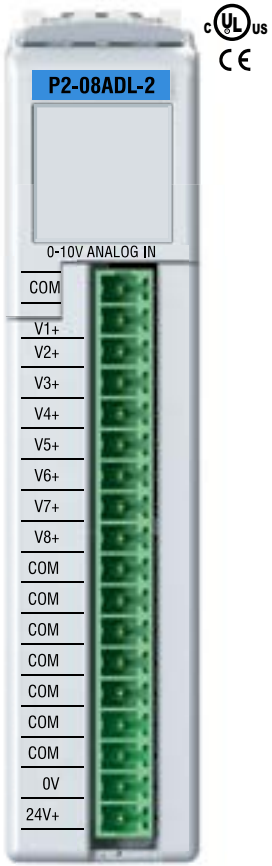
P2-08ADL-1 Current Analog Input (continued)

Module Configuration



P2-08ADL-2 Voltage Analog Input

The P2-08ADL-2 Low Resolution Voltage Analog Input Module provides eight channels for receiving 0–10 VDC signals.



Terminal blocks sold separately

Input Specifications	
Input Channels	8
Module Signal Input Range	0–10 VDC
Resolution	13-bit
Data Range	0–8191 counts
Input Type	Single-ended (1 common)
Resolution Value of LSB	0–10 VDC = 1.22 mV per count (1 LSB = 1 Count)
Maximum Continuous Overload	±100VDC
Input Impedance	>150kΩ
Filter Characteristics	Low Pass, -3dB @ 500Hz
Sample Duration Time	6.25 ms, (does not include ladder scan time)
All Channel Update Rate	25ms
Conversion Method	Successive approximation
Accuracy vs. Temperature	±75PPM / ºC maximum
Maximum Inaccuracy	0.5% of range (including temperature drift)
Linearity Error (end to end)	±3 count maximum Monotonic with no missing codes
Input Stability and Repeatability	±0.024% of range
Full Scale Calibration Error (including offset)	±0.097% of range
Offset Calibration Error	±0.097% of range
Max Crosstalk at DC, 50/60Hz	4 counts / 0.048% of range
External 24VDC Power Required	24VDC (-20% / +25%), 30mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

Diagnosis/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

P2-08ADL-2 Voltage Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2000 meters 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	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1200mW
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Terminal Type	18-position Removable Terminal Block
Weight	100g (3.5 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)*

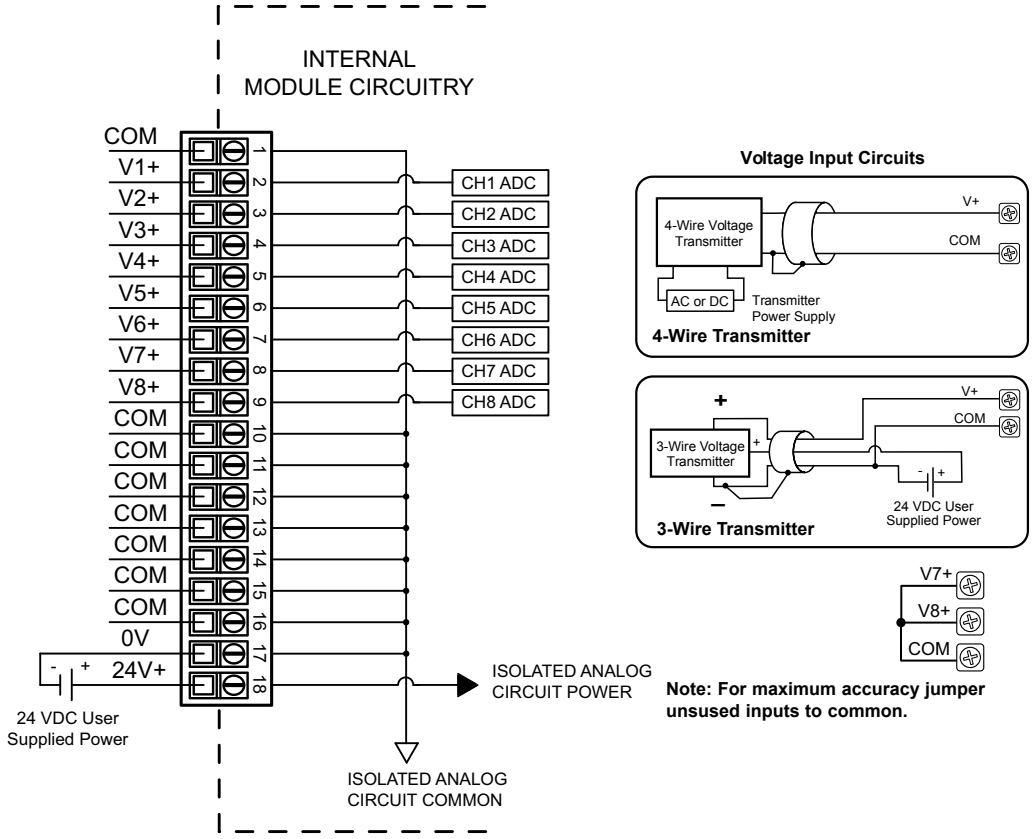
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

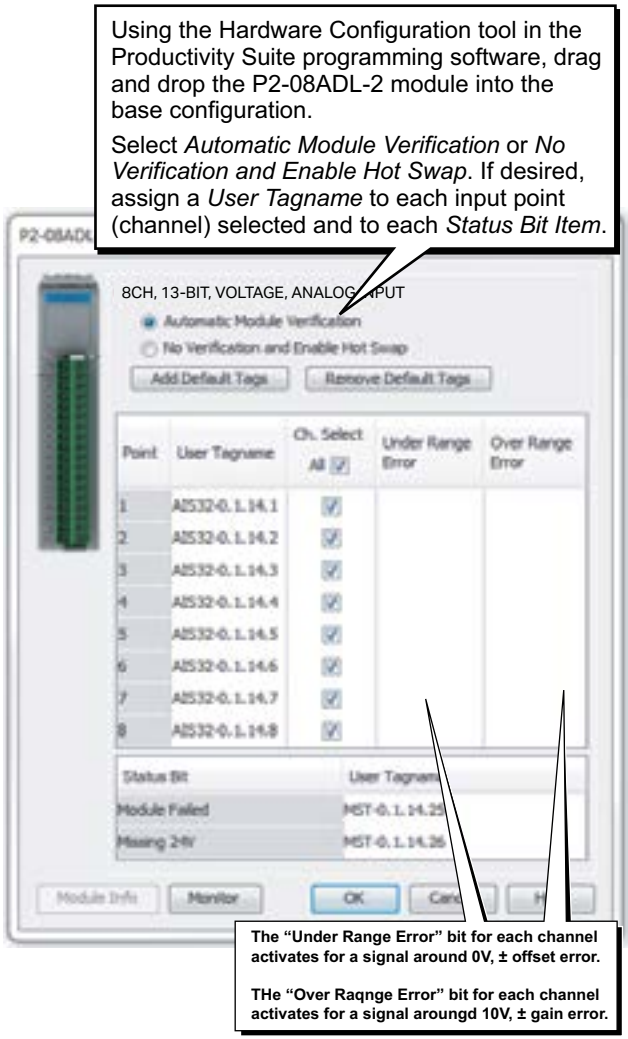
P2-08ADL-2 Voltage Analog Input (continued)

Wiring Diagrams



P2-08ADL-2 Voltage Analog Input (continued)

Module Configuration



P2-16AD-1 Current Analog Input

The P2-16AD-1 Current Analog Input Module provides sixteen channels for receiving 0–20mA input signals.

Input Specifications	
Input Channels	16 sinking
Module Signal Input Range	0–20mA
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–20 mA = 305µA per count (1 LSB = 1 count)
Data Range	0 to 65535 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	250Ω ±0.1% 1/4W
Filter Characteristics	Low Pass, -3dB @ 100Hz
Sample Duration Time	4ms per channel (does not include ladder scan time)
All Channel Update Rate	112ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs. Temperature	±25PPM / ºC 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	±0.015% of range (after 10 minute warmup)
Full Scale Calibration Error (not including offset)	±10 LSB
Offset Calibration Error	±10 LSB maximum (±0.015% of range)
Max Crosstalk	-76dB, ±10 LSB
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / +25%) 35mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16AD-1 Current Analog Input (continued)

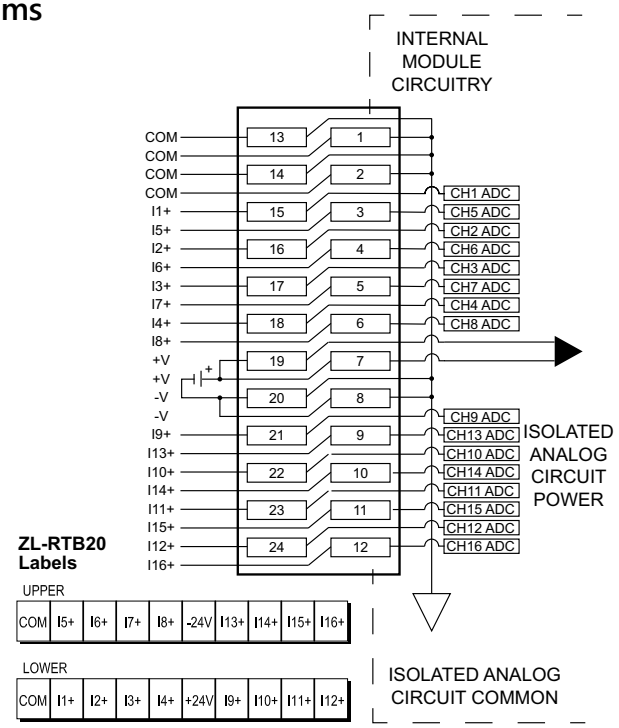
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2,000 meters, max.
Pollution Degree	2
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	800mW
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	ZIPLink wiring system ONLY. See "Wiring Options" in Chapter 5. Must use copper conductors 75ºC or equivalent.
Connector Type	24-Pin Molex Style 43025-2400
Weight	90g (3.2 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)*

** Meets EMC and Safety requirements. See the Declaration of Conformity for details.*

Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

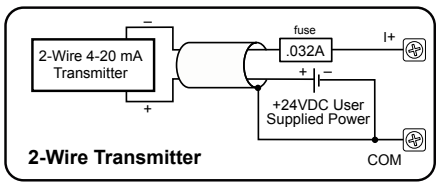
P2-16AD-1 Current Analog Input (continued)

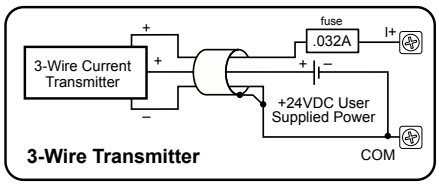
Wiring Diagrams

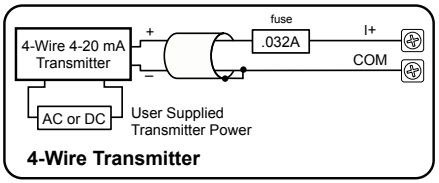


Current Input Circuits

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



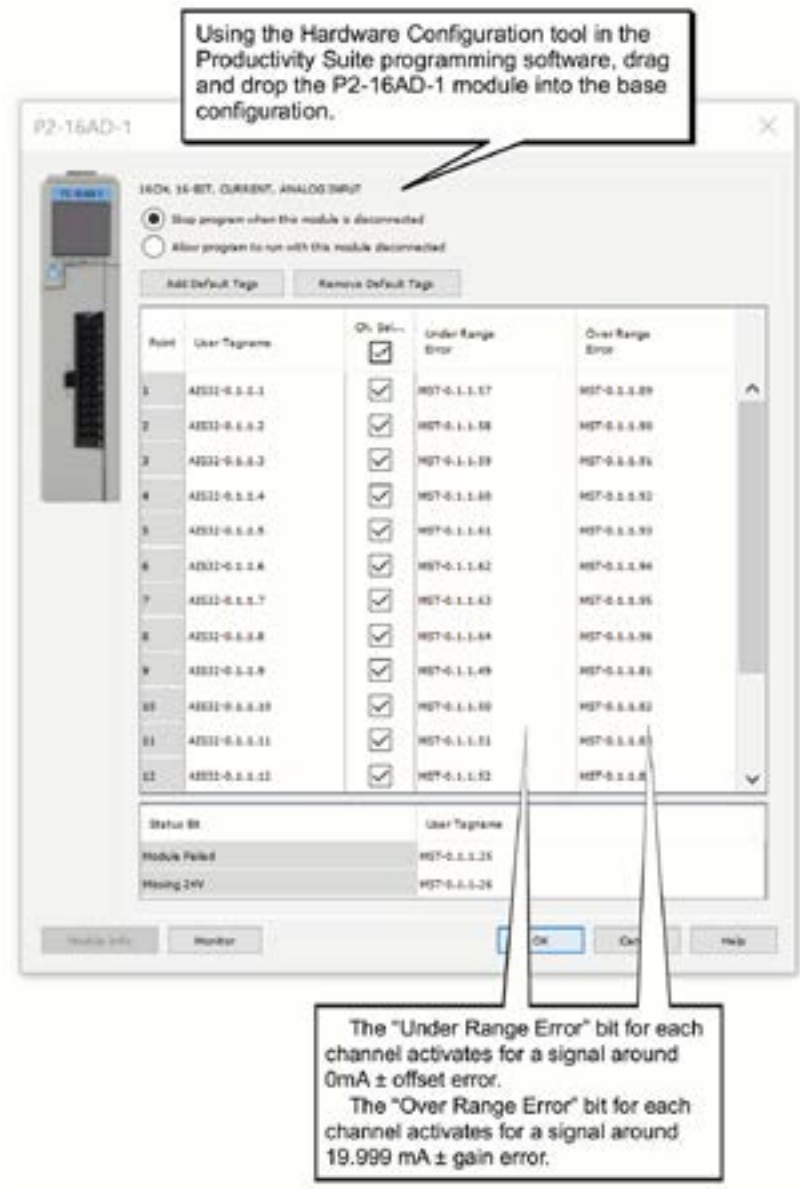




Note: Do not connect both ends of shield.

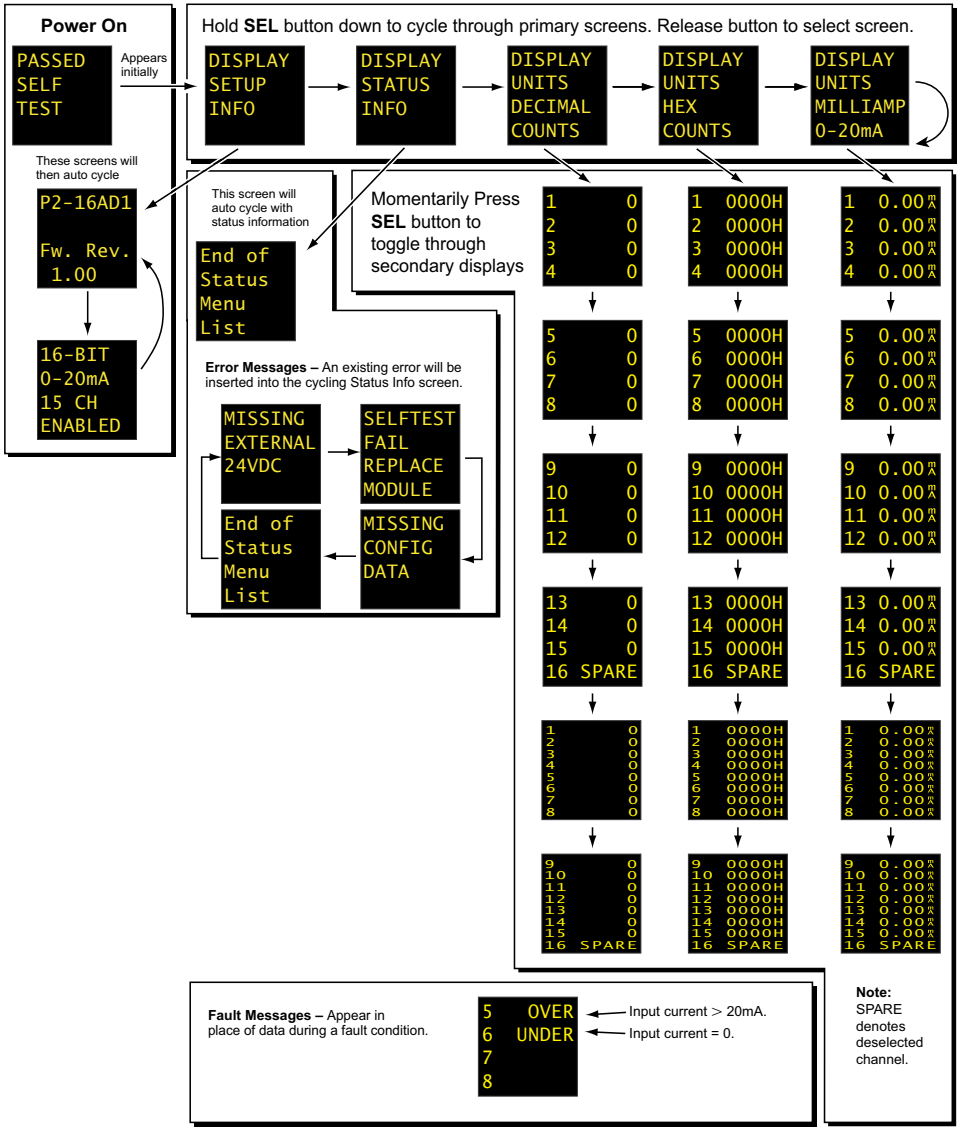
P2-16AD-1 Current Analog Input (continued)

Module Configuration



P2-16AD-1 Current Analog Input (continued)

OLED Panel Display



P2-16AD-2 Voltage Analog Input

The P2-16AD-2 Voltage Analog Input Module provides sixteen channels for receiving 0 to 10 VDC signals.

Input Specifications	
Input Channels	16
Module Signal Input Range	0–10 VDC
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0–10 VDC = 152µV per count (1 LSB = 1 count)
Data Range	0 to 65535 counts
Input Type	Single-ended (1 common)
Maximum Continuous Overload	±100V
Input Impedance	250kΩ (typical)
Filter Characteristics	Low Pass, -3dB @ 100Hz
Sample Duration Time	4ms per channel (does not include ladder scan time)
All Channel Update Rate	112ms
Open Circuit Detection Time	Zero reading within 1s
Conversion Method	Successive approximation
Accuracy vs. Temperature	±25PPM / ºC 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	-76dB, ±10 LSB
External DC Power Required	24VDC (-20% / +25%) 35mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16AD-2 Voltage Analog Input (continued)

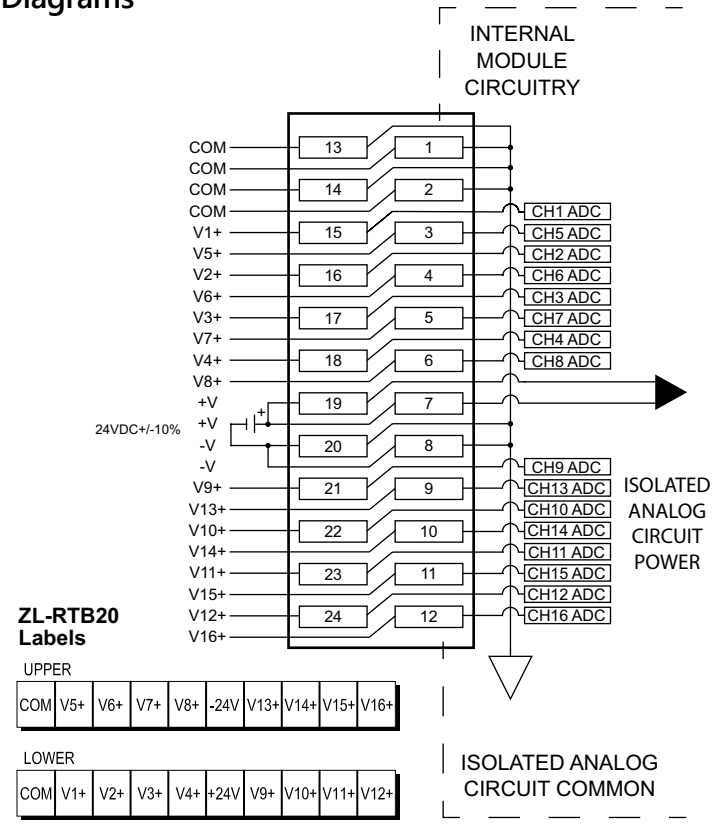
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	59mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	ZIPLink wiring system ONLY. See “Wiring Options” in Chapter 5. Must use copper conductors 75ºC or equivalent.
Connector Type	24-Pin Molex Style 43025-2400
Weight	90g (3.2 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)*

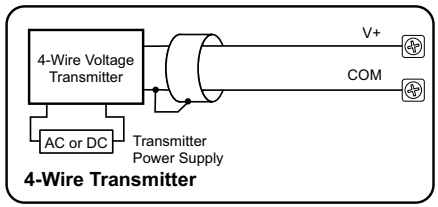
** Meets EMC and Safety requirements. See the Declaration of Conformity for details.*

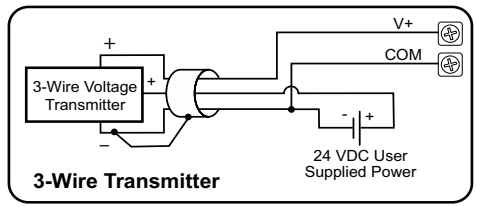
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16AD-2 Voltage Analog Input (continued)

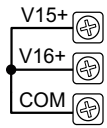
Wiring Diagrams







Note: For maximum accuracy jumper unused inputs to common.



P2-16AD-2 Voltage Analog Input (continued)

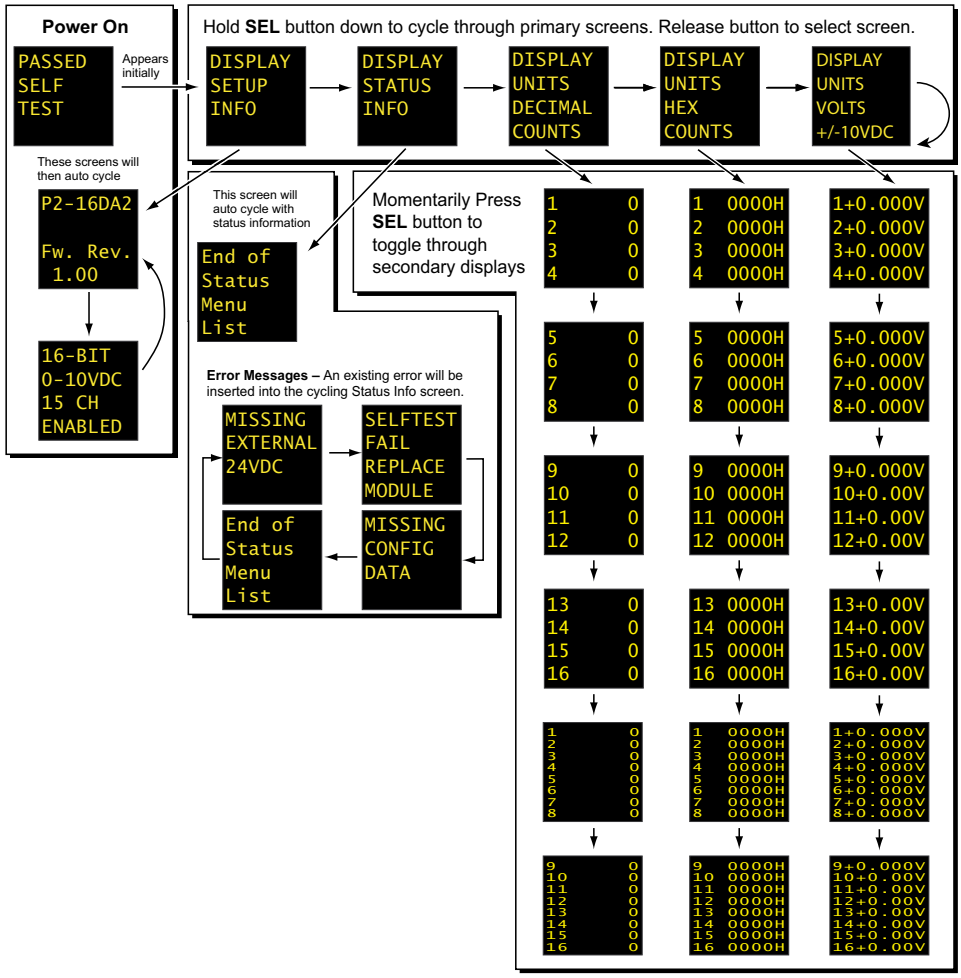
Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P2-16DA-2 module into the base configuration.

Select *Automatic Module Verification* or *No Verification and Enable Hot Swap*. If desired, assign a *User Tagname* to each output point (channel) selected and to each *Status Bit Item*.

P2-16AD-2 Voltage Analog Input (continued)

OLED Panel Display



P2-16ADL-1 Current Analog Input

The P2-16ADL-1 Low Resolution Current Analog Input Module provides sixteen channels for receiving 0–20 mA signals.

Input Specifications	
Input Channels	16 sinking
Module Signal Input Range	0–20mA
Signal Resolution	13-bit
Resolution Value of LSB (least significant bit)	0–20mA = 2.44 µA per count (1 LSB = 1 count)
Data Range	0–8191 counts
Input Type	Sinking, Single-ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	124Ω, ±0.5% 1/2W Current Input
Filter Characteristics	Low Pass, -3dB @ 120Hz
Sample Duration Time	2ms per channel (does not include ladder scan time)
All Channel Update Rate	25ms
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 changes)
Linearity Error (end to end)	±0.036% count maximum Monotonic with no missing codes
Input Stability and Repeatability	±0.024% of range
Full Scale Calibration Error (including offset)	±0.097% of range
Offset Calibration Error	±0.097% of range
Max Crosstalk at DC, 50Hz and 60Hz	4 counts / 0.048% of range
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / +25%) @ 35mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16ADL-1 Current Analog Input (continued)

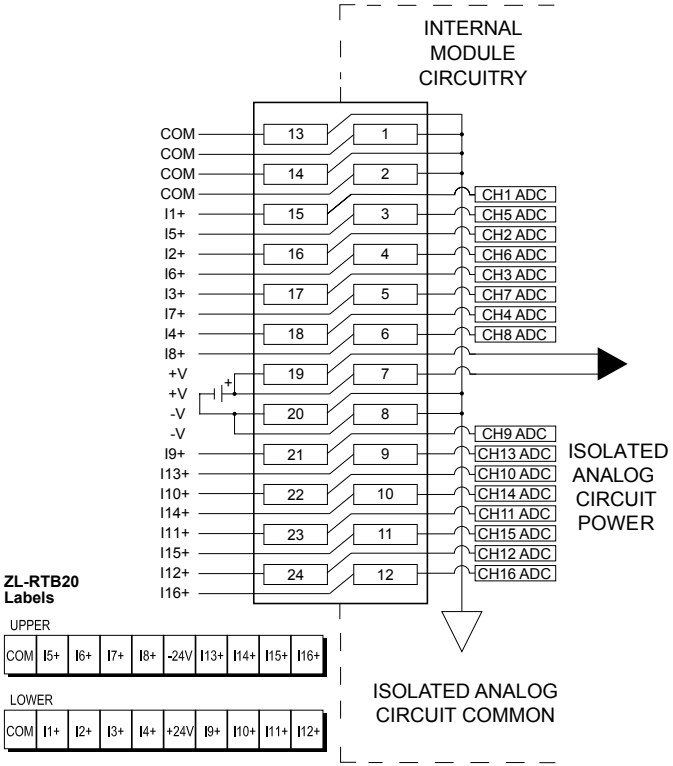
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2,000 meters, max.
Pollution Degree	2
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1100mW maximum
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See "Wiring Options" in Chapter 5. Must use copper conductors 75°C or equivalent.
Terminal Type	24-Pin Molex Style 43025-2400
Weight	100g (3.5 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)*

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

Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

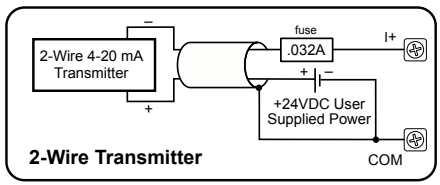
P2-16ADL-1 Current Analog Input (continued)

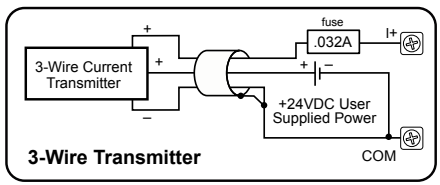
Wiring Diagrams

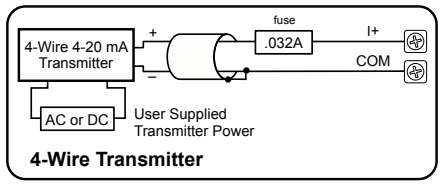


Current Input Circuits

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



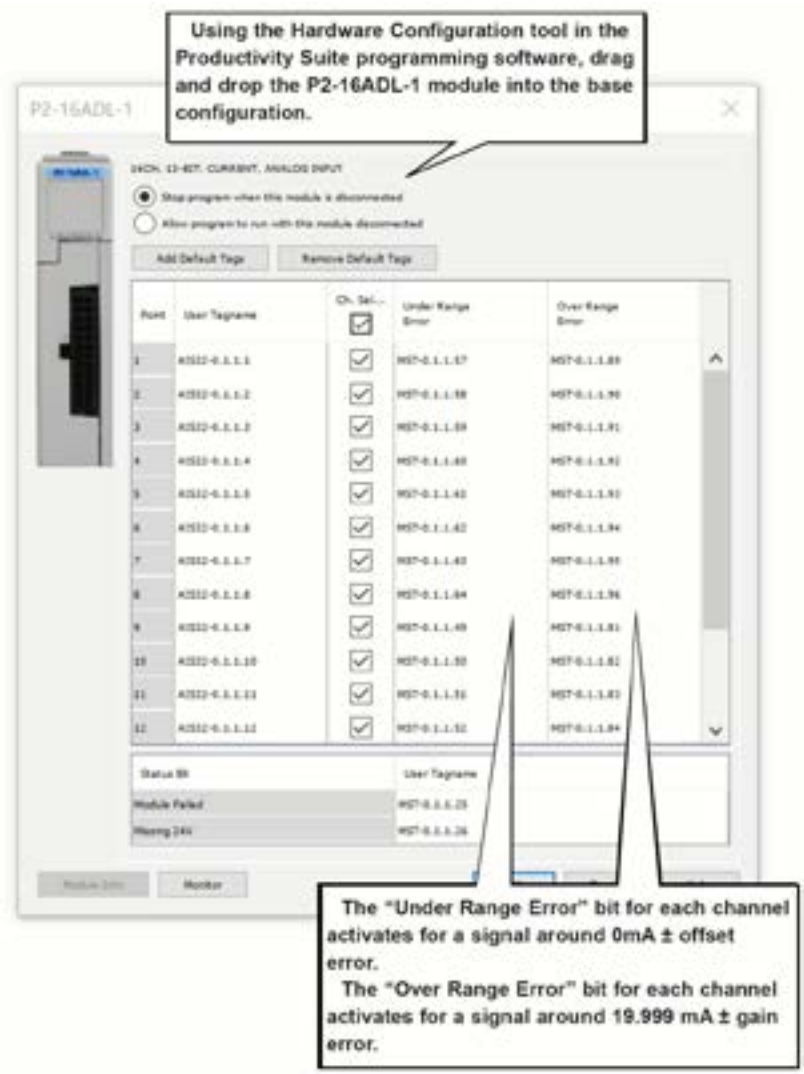




Note: Do not connect both ends of shield.

P2-16ADL-1 Current Analog Input (continued)

Module Configuration



P2-16ADL-2 Voltage Analog Input

The P2-16ADL-2 Low Resolution Voltage Analog Input Module provides sixteen channels for receiving 0–10 VDC signals.

Input Specifications	
Input Channels	16
Module Signal Input Range	0–10 VDC
Signal Resolution	13-bit
Resolution of LSB (least significant bit)	0–10 VDC = 1.22 mV per count (1LSB = 1 count)
Data Range	0–8191 counts
Input Type	Single-ended (1 common)
Maximum Continuous Overload	±100VDC
Input Impedance	>150kΩ
Filter Characteristics	Low Pass, -3dB @ 500Hz
Sample Duration Time	6.25ms per channel (does not include ladder scan time)
All Channel Update Rate	25ms
Accuracy vs. Temperature	±75PPM / ºC maximum
Conversion Method	Successive approximation
Maximum Inaccuracy	0.5% of range (including temperature drift)
Linearity Error (end to end)	±0.036% count maximum Monotonic with no missing codes
Input Stability and Repeatability	±0.024% of range
Full Scale Calibration Error (including offset)	±0.097% of range
Offset Calibration Error	±0.097% of range
Max Crosstalk	4 counts / 0.048% of range
External 24VDC Power Required	24VDC (-20% / +25%), 35mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

Diagnosis/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

P2-16ADL-2 Voltage Analog Input (continued)

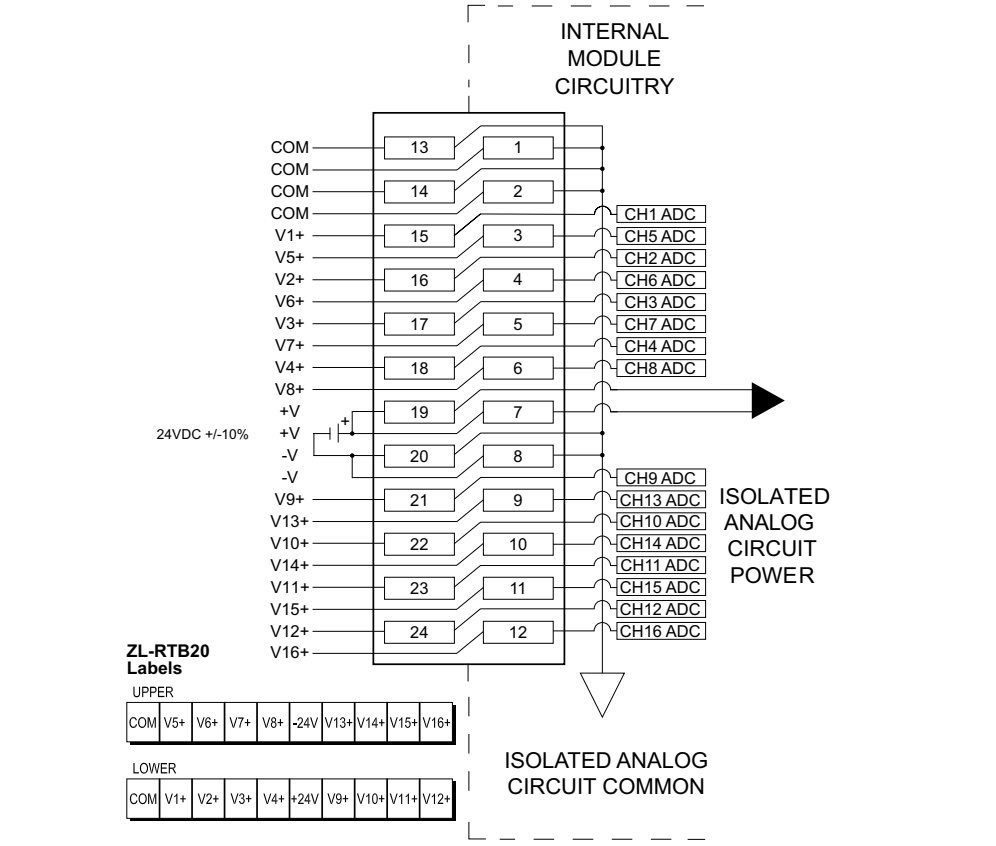
General Specifications	
Surrounding Air Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2000 meters max.
Pollution Degree	2
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1100mW max
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	ZIPLink wiring system ONLY. See “Wiring Options” in Chapter 5. Must use copper conductors 75ºC or equivalent.
Terminal Type	24-Pin Molex Style 43025-2400
Weight	102g (3.6 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)*

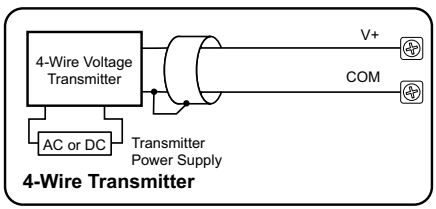
** Meets EMC and Safety requirements. See the D.O.C. for details.*

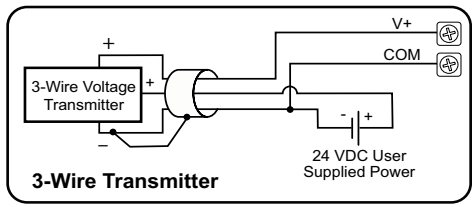
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16ADL-2 Voltage Analog Input (continued)

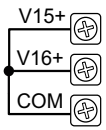
Wiring Diagrams





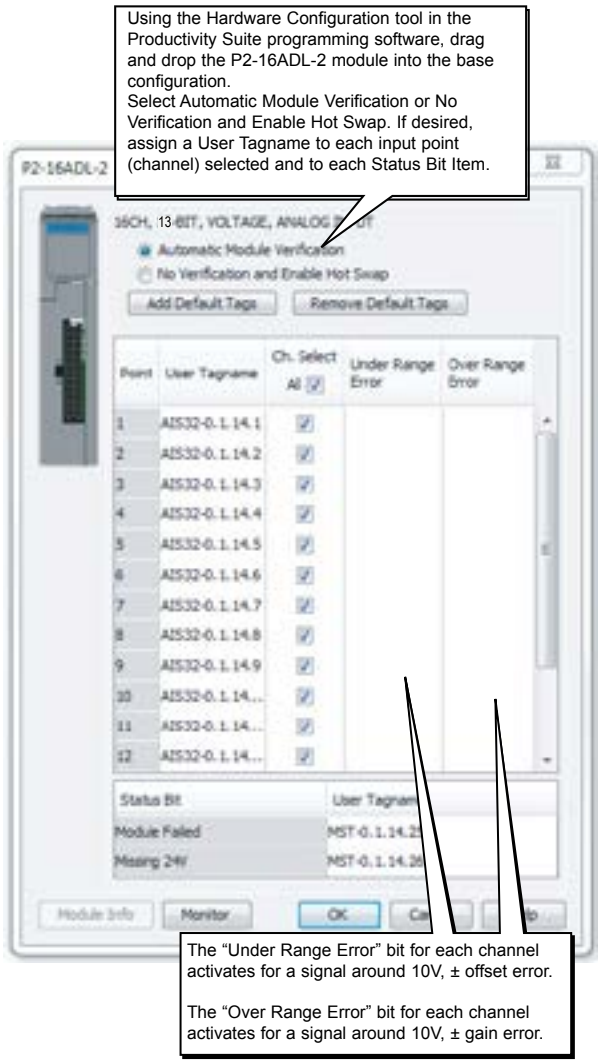


Note: For maximum accuracy jumper unused inputs to common.



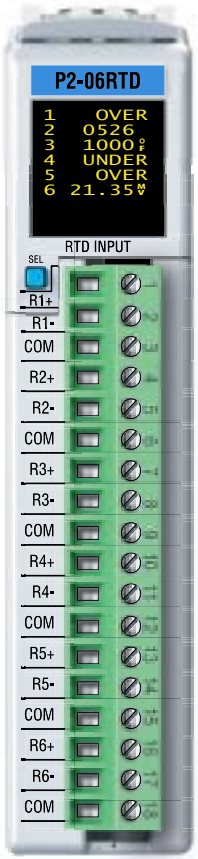
P2-16ADL-2 Voltage Analog Input (continued)

Module Configuration



P2-06RTD Analog Input

The P2-06RTD input module provides six differential channels for receiving RTD and resistance input signals.



Terminal Block Included. Not Compatible with ZIPLink. Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.productivity2000.com for details).

RTD Input Specifications

Input Channels	6 Differential	
Max. Common Mode Voltage	5VDC	
Data Format	Floating Point	
Common Mode Rejection	-90dB min. @ DC, -150dB min. @ 50/60 Hz	
Absolute Maximum Ratings	Fault protected input, ±50V	
Internal Resolution	16-bit, ±0.1°C or °F (up to 100Hz filter)	
Input Ranges (RTD Types)	Pt100 Pt1000 JPt100 10Ω Cu. 25Ω Cu. 120Ω Ni.	-200°C/850°C (-328°F/1562°F) -200°C/595°C (-328°F/1103°F) -100°C/450°C (-148°F/842°F) -200°C/260°C (-328°F/500°F) -200°C/260°C (-328°F/500°F) -80°C/260°C (-112°F/500°F)
RTD Linearization	Automatic	
Excitation Current (all ranges)	200µA	
Accuracy vs. Temperature	±5PPM per °C (maximum)	
Full Scale Calibration	±1°C	
Offset Calibration Error	±1 count (negligible)	
Linearity Error (end to end)	±0.5°C maximum, ±0.01°C typical, Monotonic with no missing codes	
Maximum Inaccuracy	±1°C maximum (excluding RTD error) (including temperature drift)	
Warm-up Time	2 minutes for ±0.2% repeatability	
Sample Duration (Single channel update rate)	Dependent on digital Filter Settings – 488ms @ 10Hz, 88ms @ 50Hz, 75ms @ 60Hz, 56ms @ 100Hz, 48ms @ 250Hz	
Filter Characteristics	Digital filter cutoff frequencies: 10Hz, 50Hz, 60Hz, 100Hz, or 250Hz	
All Channel Update Rate	Single channel update rate times the number of enabled channels	
Open Circuit Detection Time	Positive full scale reading within 2s	
Conversion Method	Sigma-Delta	
External DC Power Required	None	

P2-06RTD Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Heat Dissipation	300mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Removable terminal block (included). The P2-06RTD module is not compatible with the ZIPLink wiring system.
Connector Type (Included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

** Meets EMC and Safety requirements. See the Declaration of Conformity for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

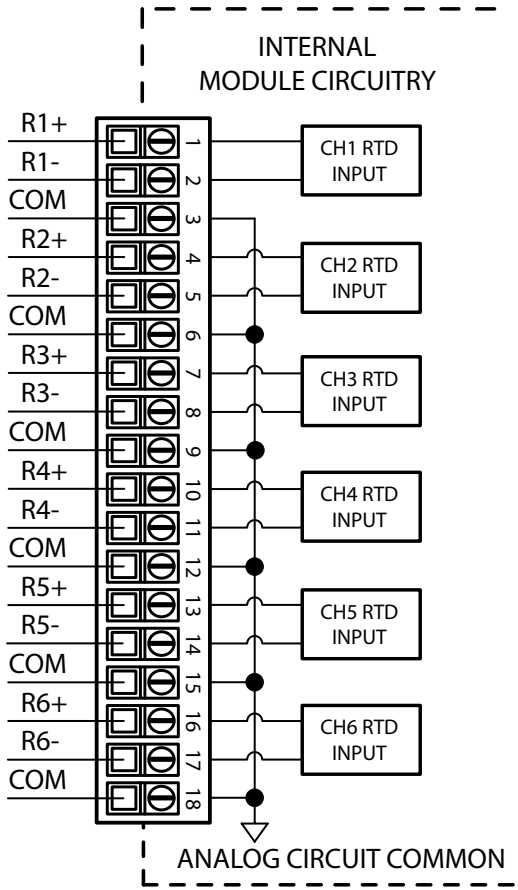
P2-06RTD Analog Input (continued)

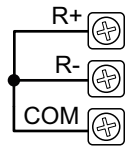
Resistance Input Specifications	
Internal Resolution	16 bit, .0015% of full scale range in ohms (up to 100Hz filter)
Resistance Input Ranges and CPU Resolution	0–10,000V, Resolution 1V 0–6,250V, Resolution 0.1 V 0–3,125V, Resolution 0.1 V 0–1,562.5 V, Resolution 0.1 V 0–781.25 V, Resolution 0.1 V 0–390.625 V, Resolution .01 V 0–195.3125 V, Resolution .01 V
Accuracy vs. Temperature	±25PPM per °C (maximum)
Full Scale Calibration	± 0.02% of full scale range
Offset Calibration Error	± 0.0015% of full scale range in ohms
Linearity Error (end to end)	± 0.0015% of full scale range maximum at 25°C, Monotonic with no missing codes
Maximum Inaccuracy	± 0.10% of full scale range

Diagnostics	
Module Diagnostics Failure	1 bit per module
Module Not Ready	1 bit per module
Channel Burn-out (RTD only)	1 bit per channel
Under-range (RTD only)	1 bit per channel
Over-range	1 bit per channel

P2-06RTD Analog Input (continued)

Wiring Diagrams

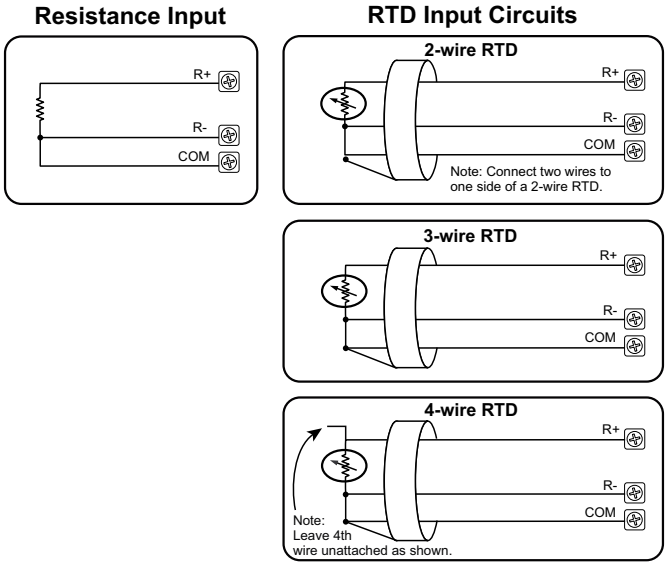




Note: Jumper unused inputs to common.

P2-06RTD Analog Input (continued)

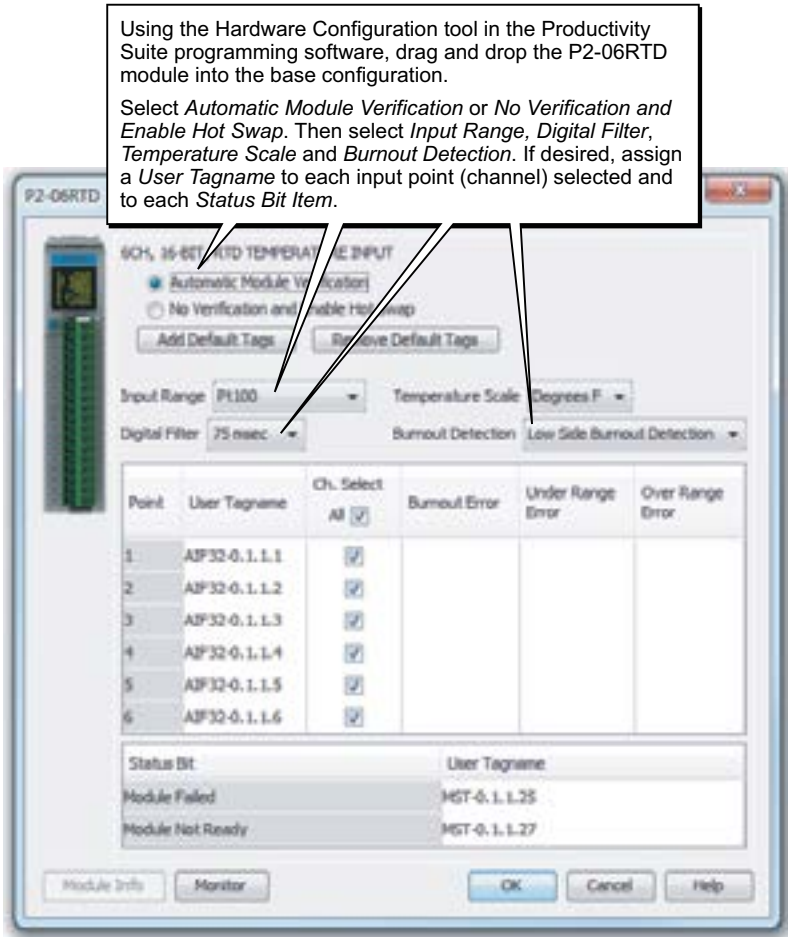
Wiring Diagrams



Notes:
For maximum accuracy follow these guidelines.
1. For 2-wire RTD, attach third wire to module common.
2. R+, R-, and COM wires to an RTD must be equal length and type. Refer to RTD manufacturer's recommendations.
3. Do not use cable shield as sensing wire.
4. When applicable, connect shield to RTD common only, otherwise connect to module common only. Do not connect shield at both ends.

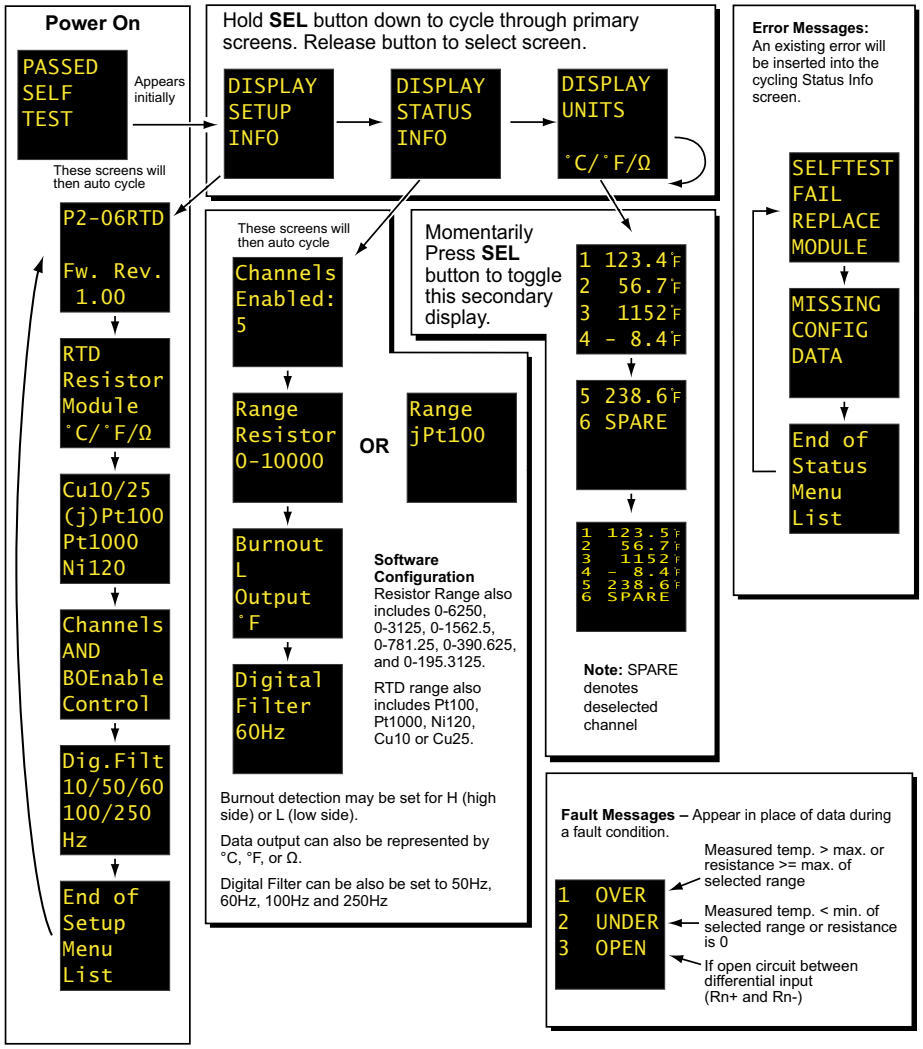
P2-06RTD Analog Input (continued)

Module Configuration



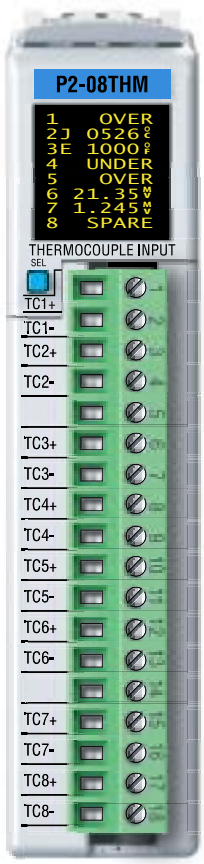
P2-06RTD Analog Input (continued)

OLED Panel Display



P2-08THM Analog Input

The P2-08THM Thermocouple Input Module provides eight differential channels for receiving thermocouple and voltage input signals.



Terminal Block Included. Not Compatible with ZIPLink. Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.productivity2000.com for details).

Thermocouple Input Specifications

Input Channels	8 Differential
Data Format	Floating Point
Common Mode Range	±1.25 V
Common Mode Rejection	100dB @ DC and 130dB @ 60Hz
Input Impedance	>5MΩ
Maximum Ratings	Fault protected inputs to ±50V
Resolution	16-bit, ±0.1°C or °F
Thermocouple Input Ranges	Type J -190° to 760°C (-310° to 1400°F); Type E -210° to 1000°C (-346° to 1832°F); Type K -150° to 1372°C (-238° to 2502°F); Type R 65° to 1768°C (149° to 3214°F); Type S 65° to 1768°C (149° to 3214°F); Type T -230° to 400°C (-382° to 752°F); Type B 529° to 1820°C (984° to 3308°F); Type N -70° to 1300°C (-94° to 2372°F); Type C 65° to 2320°C (149° to 4208°F);
Cold Junction Compensation	Automatic
Thermocouple Linearization	Automatic
Accuracy vs. Temperature	±50PPM per °C (maximum)
Linearity Error	±1°C maximum (±0.5°C typical) Monotonic with no missing codes.
Maximum Inaccuracy	±3°C maximum (including temperature drift but excluding thermocouple error).
Warm-up Time	30 minutes for ±1% repeatability 2 minutes to reach voltage specifications
Sample Duration Time	270ms
All Channel Update Rate	2.16 s
Open Circuit Detection Time	Within 2s
Conversion Method	Sigma-Delta
External DC Power Required	None

Voltage Input Specifications

Linear mV Device Input Ranges	0–39.0625 mVDC, ±39.0625 mVDC, ±78.125 mVDC, 0–156.25 mVDC, ±156.25 mVDC, 0–1250 mVDC
Max Voltage Input Offset Error	0.05% @ 0°– 60°C, typical 0.04% @ 25°C
Max Voltage Input Gain Error	0.06% @ 25°C
Max Voltage Input Linearity Error	0.05% @ 0°– 60°C, typical 0.03% @ 25°C
Max Voltage Input Impedance	0.2% @ 0°– 60°C, typical 0.06% @ 25°C

P2-08THM Analog Input (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Heat Dissipation	500mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Removable terminal block (included). The P2-08THM module is not compatible with the ZIPLink wiring system.
Connector Type (Included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

Configuration/Diagnostics	
Burn-out Detection: High Side/Disable	1 bit per module
°C/°F (T/C Only)	1 bit per module
Module Diagnostics Failure	1 bit per module
Burn-out (on if T/C input is open – no connection between TCn+ and TCn-)	1 bit per channel
Channel Under-range (T/C only)	1 bit per channel
Channel Over-range (T/C only)	1 bit per channel

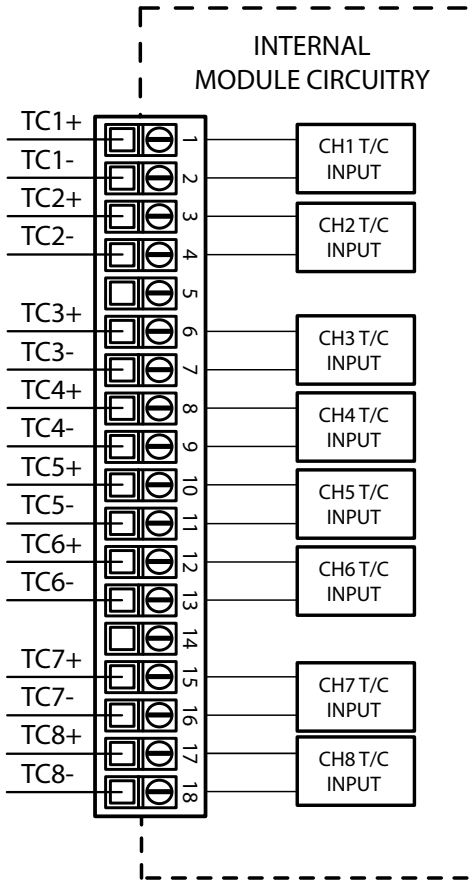
P2-08THM Analog Input (continued)

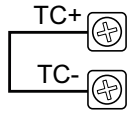
Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 1/4 in (6–7 mm) strip length	28–16 AWG (0.081–1.31 mm²) Solid/stranded 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

P2-08THM Analog Input (continued)

Wiring Diagrams

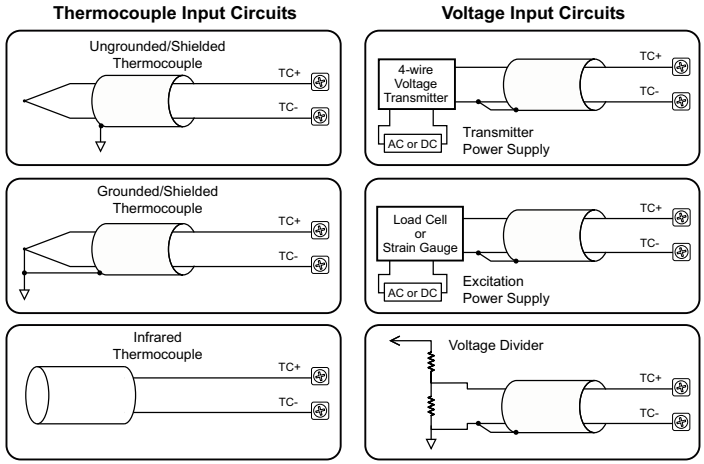


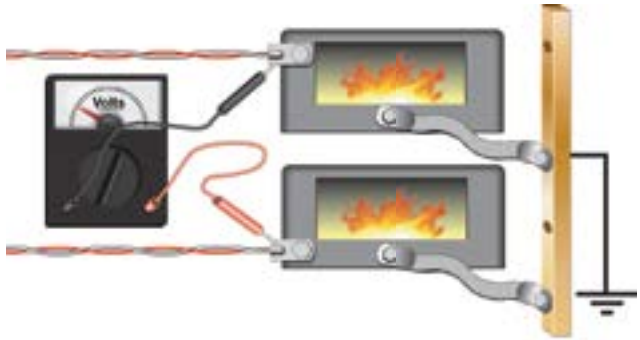


NOTE: Install jumper wire on each unused input; TC+ to TC-.

P2-08THM Analog Input (continued)

Wiring Diagrams





NOTES:

1. Connect shield to thermocouple signal/ground only. Do not connect to both ends.

2. With grounded thermocouples, take precautions to prevent having a voltage potential between thermocouple tips. A voltage of 1.25V or greater between tips will skew measurements.

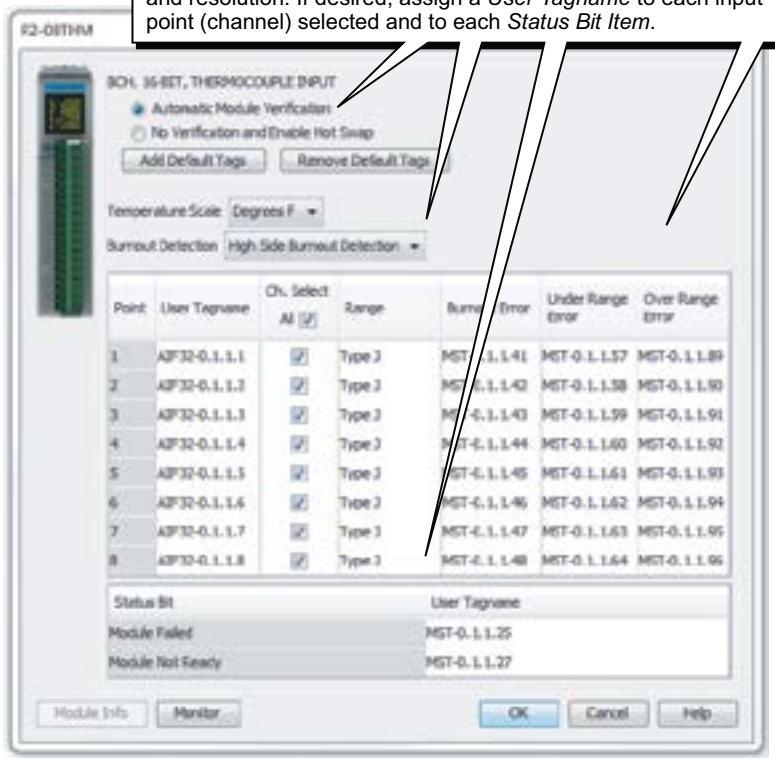
3. Use shielded, twisted thermocouple extension wire that matches the thermocouple type. Use thermocouple-compatible junction blocks.

P2-08THM Analog Input (continued)

Module Configuration

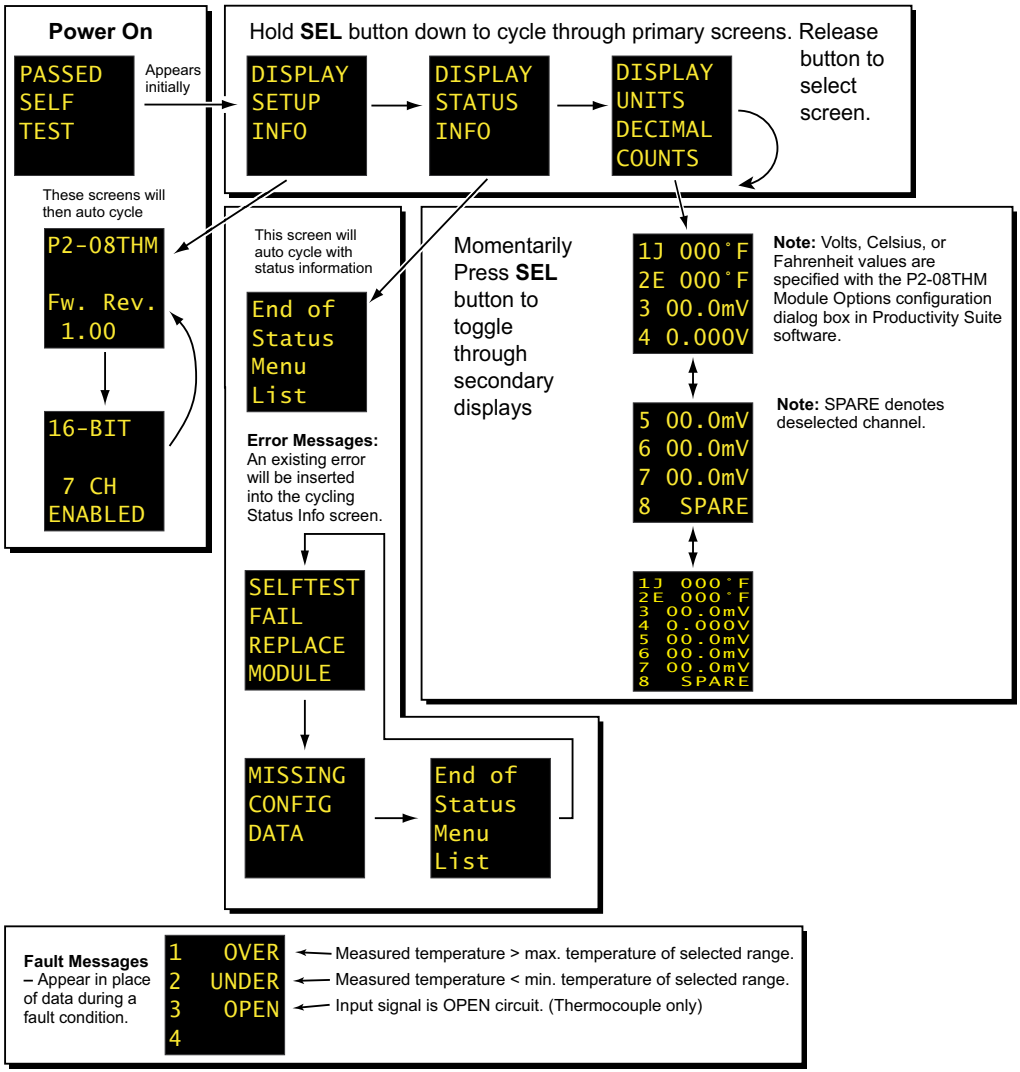
Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P2-08THM module into the base configuration.

Select *Automatic Module Verification* or *No Verification and Enable Hot Swap.* Specify *Temperature Scale* and *Burnout Detection*, and use the drop down menu to select module range and resolution. If desired, assign a *User Tagname* to each input point (channel) selected and to each *Status Bit Item*.



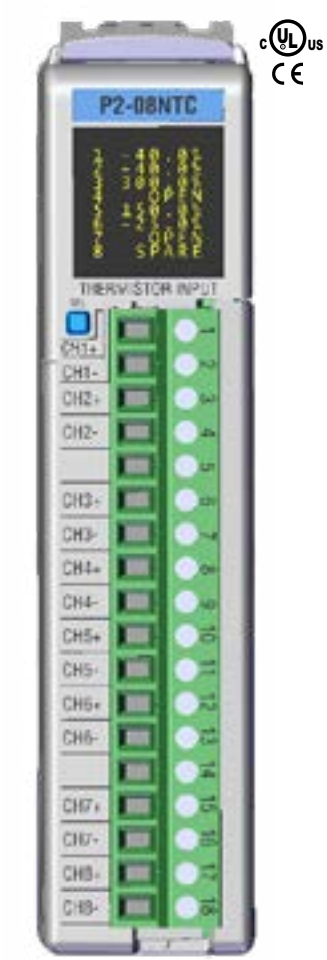
P2-08THM Analog Input (continued)

OLED Panel Display



P2-08NTC Thermistor

The P2-08NTC Thermistor Module provides eight channels for receiving thermistor input signals.



Terminal Block Included.
Not Compatible with ZIPLink.
Warranty: Thirty-day money-back guarantee.
Two-year limited replacement.
(See www.productivity2000.com for details).

NTC Input Specifications

Input Channels	8 Single Ended (Temperature only)	
Data Format	Floating Point	
Common Mode Rejection	-97dB @ DC, >50dB @ 50/60Hz	
Input Impedance	>5MΩ	
Maximum Ratings	Fault protected inputs to ±50V	
Resolution	16-bit, ±0.1°C or °F	
Thermistor Input Ranges	2252 10K-AN Type 3 10K-CP Type 2 5K 3K 1.8K	-40° to 150°C (-40° to 302°F)
Thermistor Linearizion	Automatic	
Maximum Inaccuracy	±0.5°C maximum (8, 16 and 33Hz) ±1°C maximum (123 and 470Hz) (Excluding thermistor error; Including temperature drift)	
Excitation Current	10uA–210uA autoscaling	
Accuracy vs. Temperature	±35PPM per °C (maximum)	
Linearity Error	Non-linear	
Warm-up Time	30 minutes for ±1°C repeatability	
Sample Duration Time (Single channel update rate)	Dependent on digital filter settings 61ms @ 33Hz, 16ms @123Hz, 4ms @ 470Hz	
Filter Characteristics*	Digital filter cutoff frequencies: 33Hz, 123Hz, or 470Hz.	
All Channel Update Rate	2.2 s @ 33Hz	
Open Circuit Detection Time	Within 2s @ 33Hz	
Conversion Method	Sigma-Delta	
External DC Power Required	None	

** Frequencies <123Hz, Display push button may need to be pressed / held >2 seconds..*

Diagnostics

Module Diagnostics Failure	1 bit per module
Module Not Ready	1 bit per module
Channel Burn-out (Thermistor only)	1 bit per channel
Under-range (Thermistor only)	1 bit per channel
Over-range	1 bit per channel

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-08NTC Thermistor (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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	1000VDC
Heat Dissipation	500mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Removable terminal block (included). The P2-08NTC module is not compatible with the ZIPLink wiring system.
Connector Type (included)	18-position removable terminal block
Weight	136g (4.8 oz)
Agency Approvals**	UL508 File E139594, Canada & USA CE (EN61131-2*)

**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.*

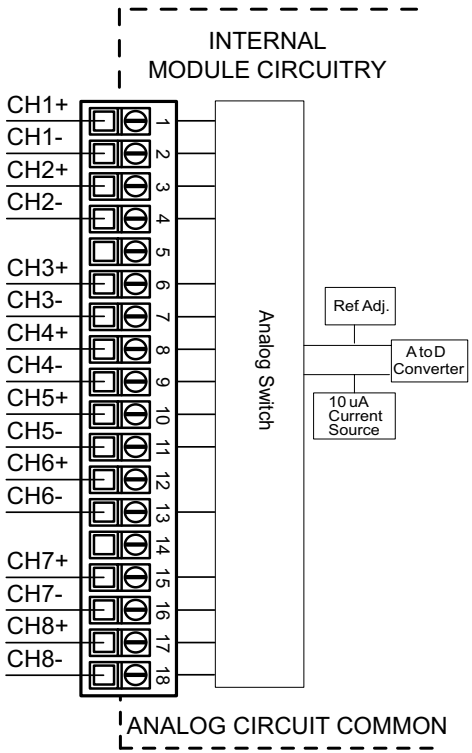
Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 1/4 in (6–7 mm) strip length	28–16 AWG (0.081–1.31 mm²) Solid/stranded 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

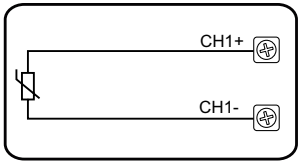
P2-08NTC Thermistor (continued)

Wiring Diagrams

NOTE: *At module power-up Channel 1 must have a functional Thermistor connected so internal automatic calibration is performed.*



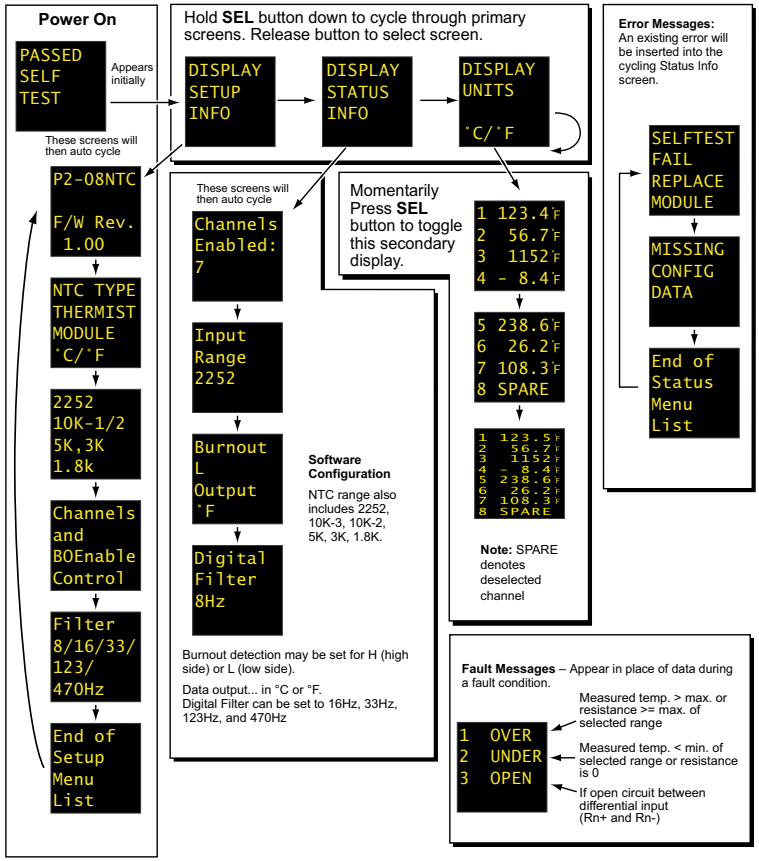
Thermistor Input



NOTE: Install jumper wire on each unused inputs. CH1+ to CH1-

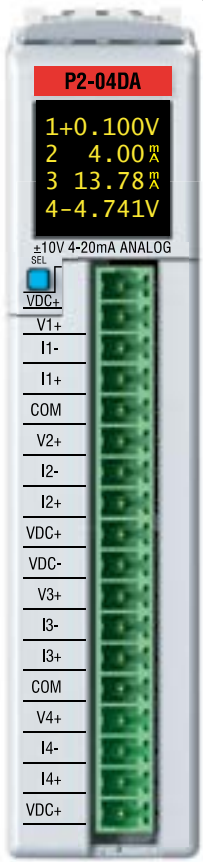
P2-08NTC Thermistor (continued)

OLED Panel Display



P2-04DA Analog Output

The P2-04DA Voltage/Current Analog Output Module provides four channels of ±10VDC or 4–20 mA sinking/sourcing selectable outputs.



Terminal blocks sold separately

Output Specifications

Output Channels	4
Module Signal Output Ranges	1) ±10VDC 2) 4–20mA (sinking or sourcing per channel)
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	±10V = 305µV/count 4–20 mA = 0.244 µA/count 1 LSB = 1 count
Data Range	0 to 65535 counts uni-polar and -32768 to +32767 counts bi-polar
Output Type	Voltage outputs sourcing/sinking at 10mA max, or Current outputs sinking or sourcing at 20mA max.
Output Value in Fault Mode	Voltage outputs 0V or 0mA current outputs
Load Impedance (Minimum External Power Supply)	>1000Ω voltage outputs (19.2–30 VDC) 0–755Ω sinking, 0–600Ω Sourcing (19.2 VDC) 0–875Ω sinking, 0–700Ω Sourcing (21.6 VDC) 0–1000Ω sinking, 0–855Ω Sourcing (24VDC) 0–1110Ω Sinking, 0–970Ω Sourcing (26.4 VDC) 0–1350 Ω Sinking, 0–1150Ω Sourcing (30VDC)
Maximum Capacitive Load	0.01 µF maximum voltage outputs
Maximum Inductive Load	1mH maximum current outputs
Allowed Load Type	Grounded
Maximum Inaccuracy (% of range)	0.1% voltage, 0.1% current (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum voltage outputs ±0.025% of range maximum current outputs
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale, calibration change (±0.0025% of range/°C)
Max Crosstalk	-80dB, 6 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 LSB after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	0.3 ms max, 5µs min (full scale change)
All Channel Update Rate	0.6 ms
Maximum Continuous Overload	Voltage Outputs current limited to 35mA typical Current Outputs open circuit protected
Type of Output Protection	15VDC Peak Output Voltage Current outputs current limited to <=20mA
Output Signal (power-up,-down)	0V voltage outputs, 0mA current outputs
External DC Power Required	94mA voltage operation 4 channels 130mA current operation 4 channels 24VDC -20% / +25%

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-04DA Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	3.6 W
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

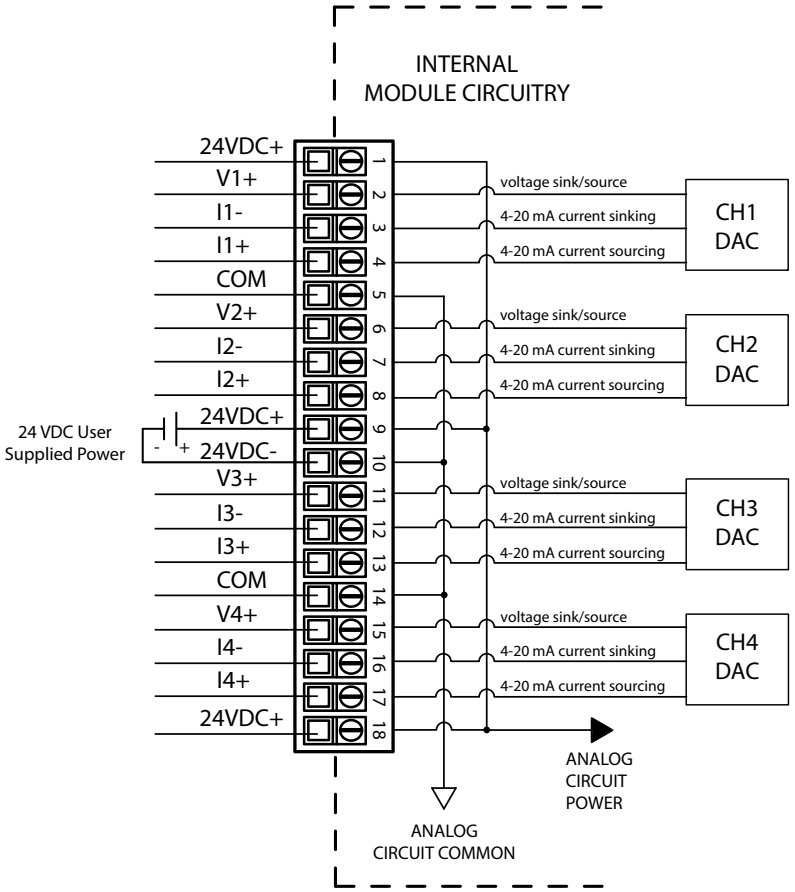
Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release terminals
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid/stranded conductor 3/64 in (1.2 mm) insulation max. 1/4 in (6–7 mm) strip length	28–16 AWG (0.081–1.31 mm²) Solid/stranded 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-04DA Analog Output (continued)

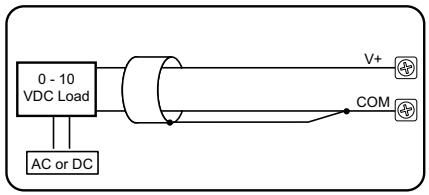
Wiring Diagrams

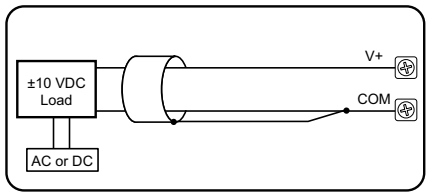


P2-04DA Analog Output (continued)

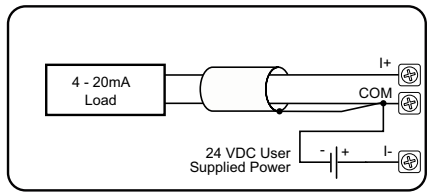
Wiring Diagrams (continued)

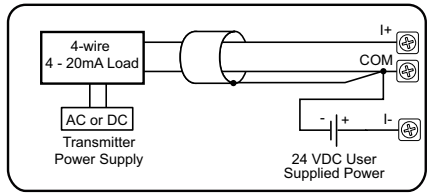
Voltage Output





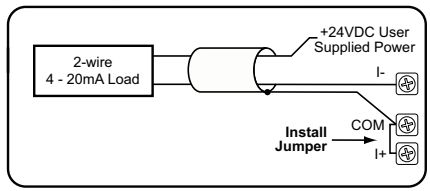
Current Source Output
(Field device is sinking)

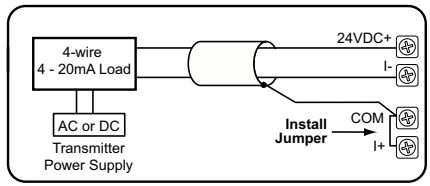




NOTE: Shield is connected to common at the source device.

Current Sink Output
(Field device is sourcing)



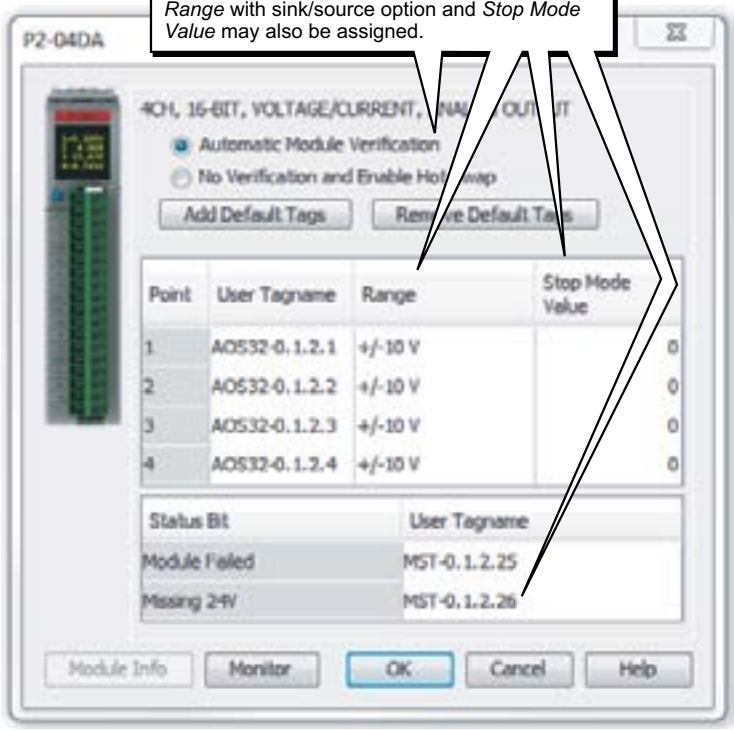


P2-04DA Analog Output (continued)

Configuration Settings

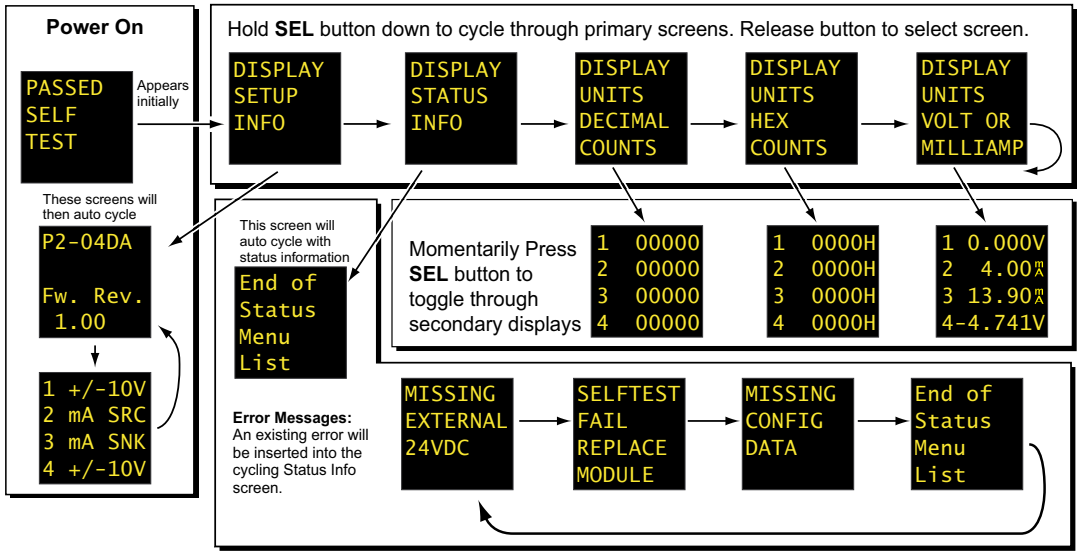
Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P2-04DA module into the base configuration.

Select *Automatic Module Verification* or *No Verification and Enable Hot Swap*. If desired, assign a *User Tagname* to each output point (channel) selected and to each *Status Bit Item*. *Range* with sink/source option and *Stop Mode Value* may also be assigned.



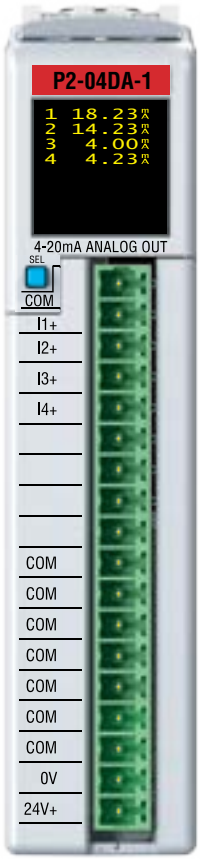
P2-04DA Analog Output (continued)

OLED Panel Display



P2-04DA-1 Analog Output

The P2-04DA-1 Current Analog Output Module provides four channels of 4–20 mA outputs for use with the Productivity2000 system.



Terminal blocks sold separately

Output Specifications	
Output Channels	4
Output Range	4–20mA
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	4–20 mA = 0.244 µA/count 1 LSB = 1 count
Data Range	0 to 65535 counts
Output Type (sourcing)	Current: 20mA max.
Output Value in Fault Mode	Near 0mA
Load Impedance (Minimum External Power Supply)	0–570 Ω (19.2 VDC) 0–690 Ω (21.6 VDC) 0–810 Ω (24VDC) 0–930 Ω (26.4 VDC) 0–1100 Ω (30VDC) Minimum load 0–125 Ω @ 0–45°C 250–715 Ω @ 0–60°C
Maximum Inductive Load (Current Output)	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25ppm/°C max full scale, calibration change (±0.0025% of range/°C)
Maximum Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 LSB after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	600µs
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal (power-up,-down)	4mA
External Power Supply Required	24VDC (-20% / +25%) @ 120mA (loop power included)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-04DA-1 Analog Output (continued)

General Specifications	
Operating Temperature	0ºC–60ºC (32ºF–140ºF)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	3100mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	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)*

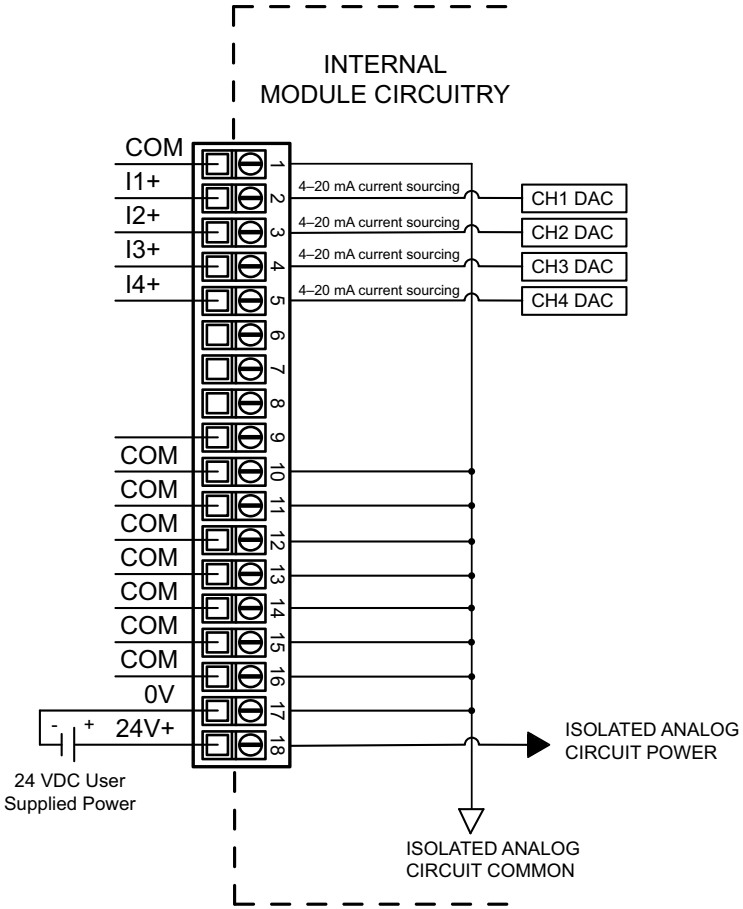
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

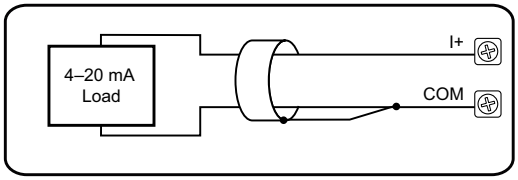
** Recommended screwdriver TW-SD-MSL-1*

P2-04DA-1 Analog Output (continued)

Wiring Diagrams



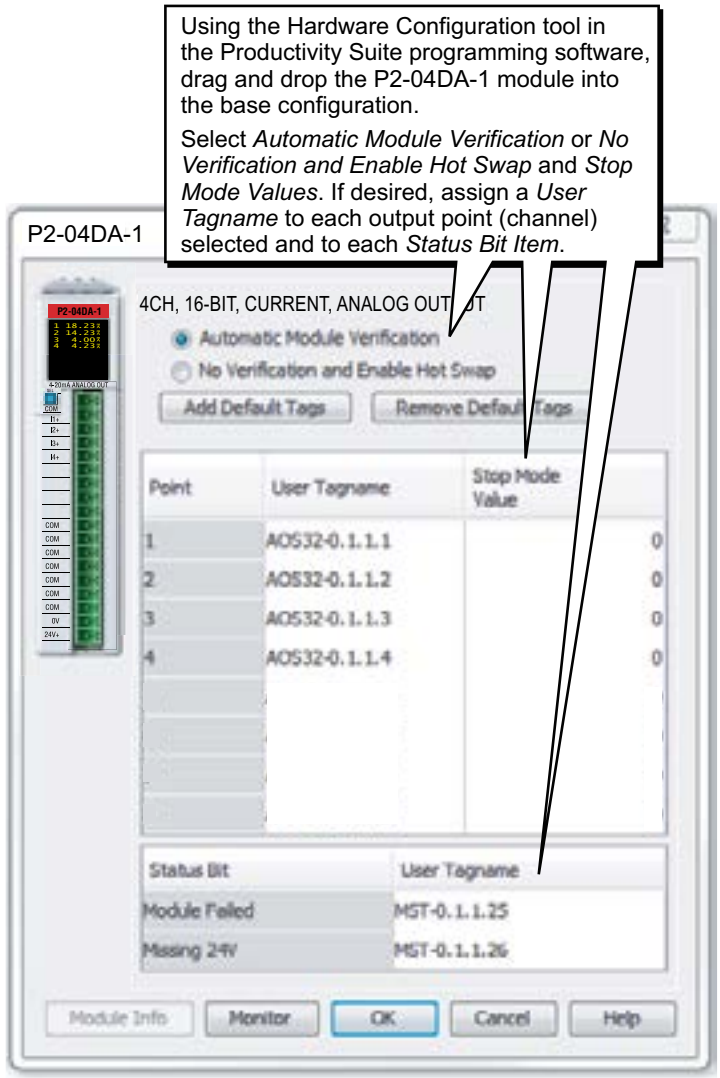
Current Output Circuit



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

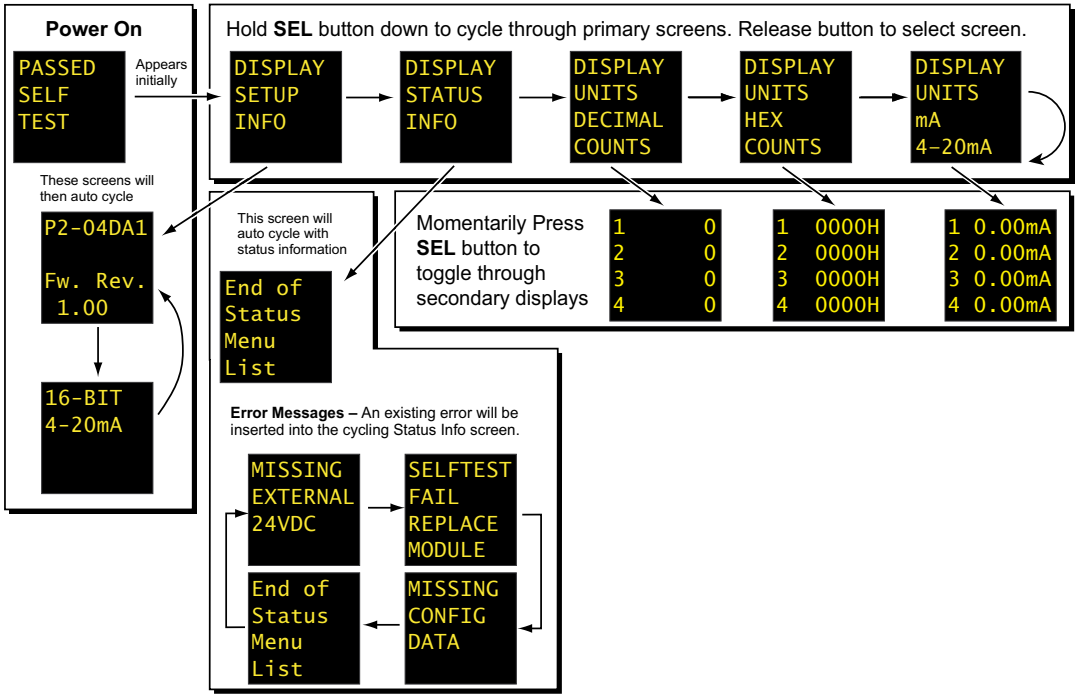
P2-04DA-1 Analog Output (continued)

Configuration Settings



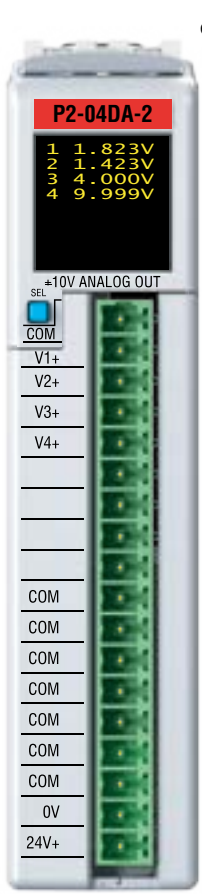
P2-04DA-1 Analog Output (continued)

OLED Panel Display



P2-04DA-2 Analog Output

The P2-04DA-2 Voltage Analog Output Module provides four channels of ±10VDC outputs for use with the Productivity2000 system.



Terminal blocks sold separately.

Output Specifications

Output Channels	4
Module Signal Output Ranges	±10VDC
Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	±10V = 305µV/count 1 LSB = 1 count
Data Range	-32768 to +32767 counts
Output Type	Voltage 10mA max
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load (Current Output)	0.01 µF
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (including temperature drift)
Maximum Full Scale Calibration Error	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale, calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 LSB after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs current limited to 40mA typical Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 µF transient suppressor
Output Signal (power-up,-down) or at power up or power down	0V
External DC Power Required	24VDC (-20% / +25%), 75mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-04DA-2 Analog Output (continued)

General Specifications	
Operating Temperature	0°C to 60°C (32°F–140°F)
Storage Temperature	-20ºC to 70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	2200mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	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)*

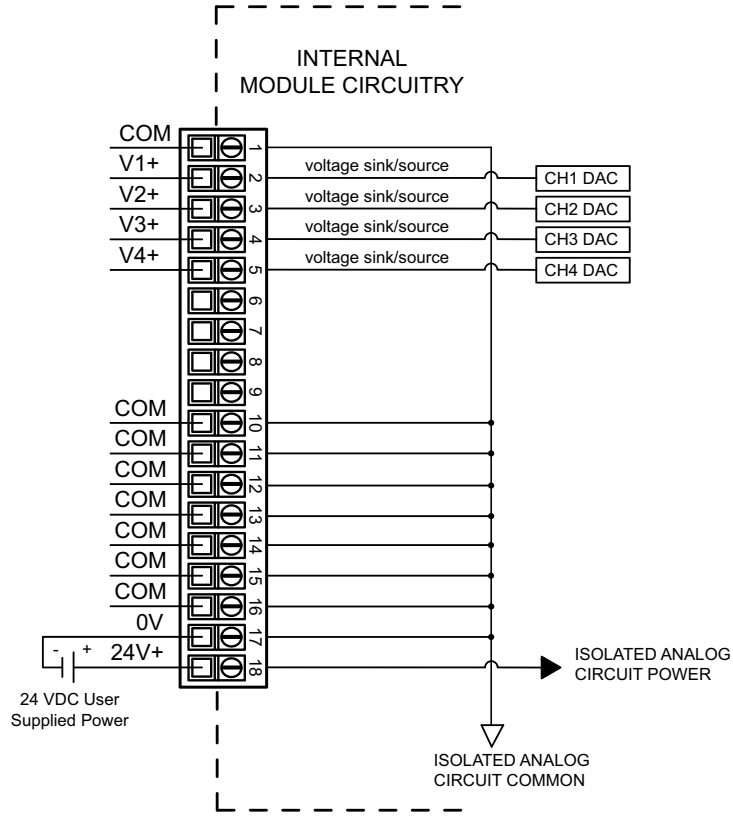
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

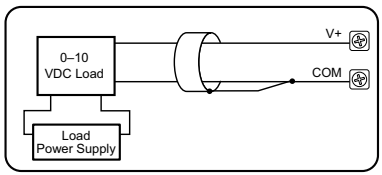
** Recommended screwdriver TW-SD-MSL-1*

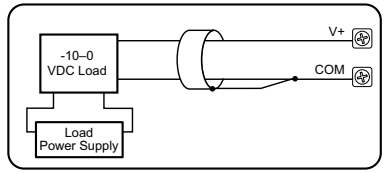
P2-04DA-2 Analog Output (continued)

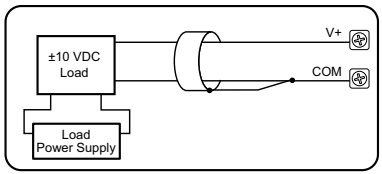
Wiring Diagrams



Voltage Output Circuit





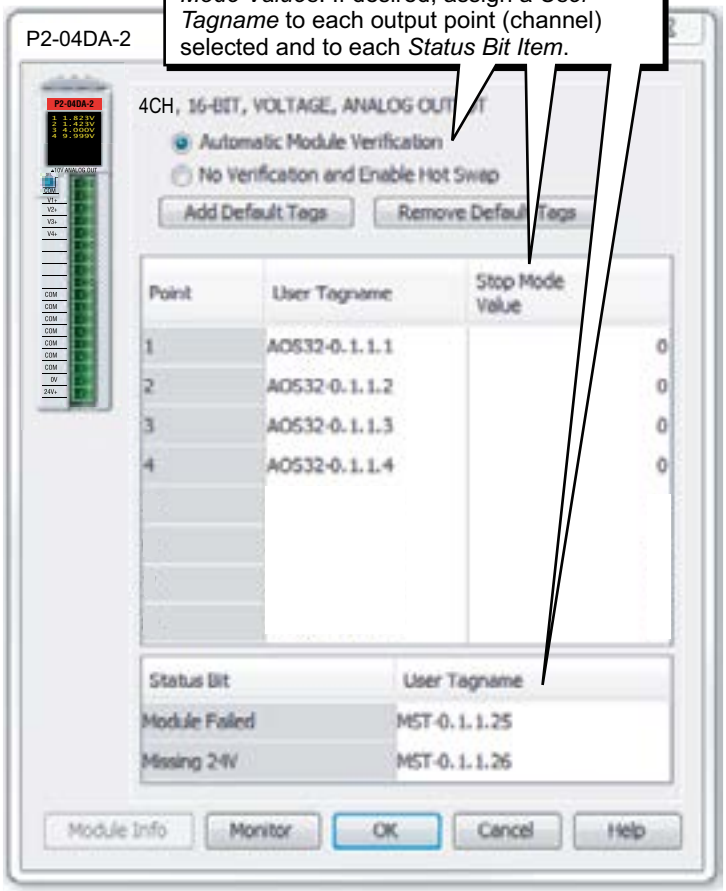


P2-04DA-2 Analog Output (continued)

Configuration Settings

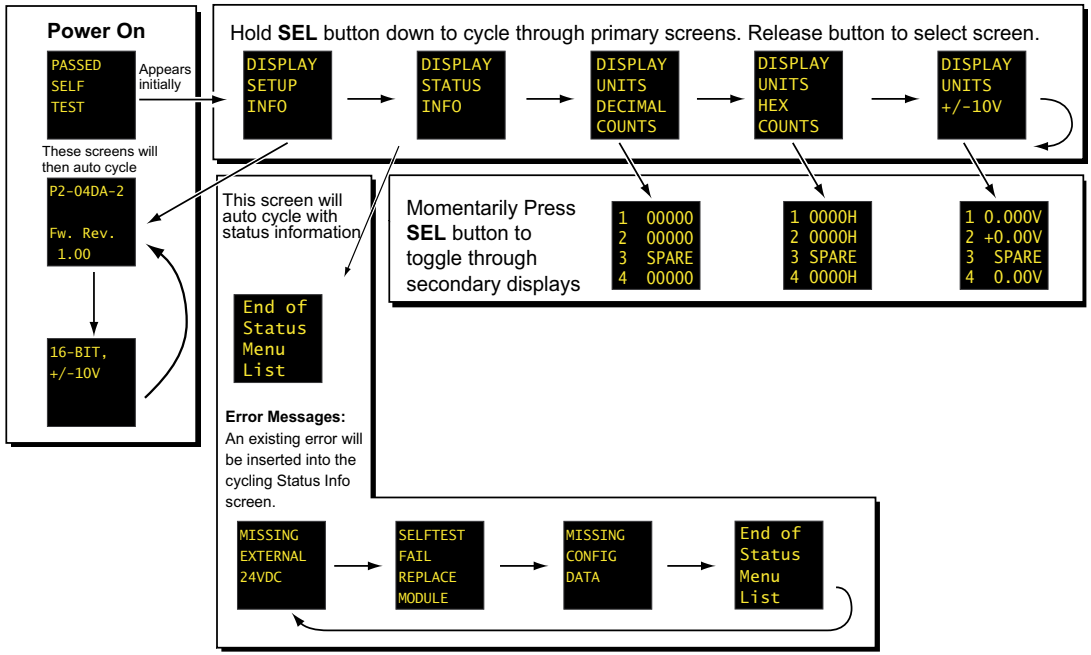
Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P2-04DA-2 module into the base configuration.

Select *Automatic Module Verification* or *No Verification and Enable Hot Swap* and *Stop Mode Values*. If desired, assign a *User Tagname* to each output point (channel) selected and to each *Status Bit Item*.



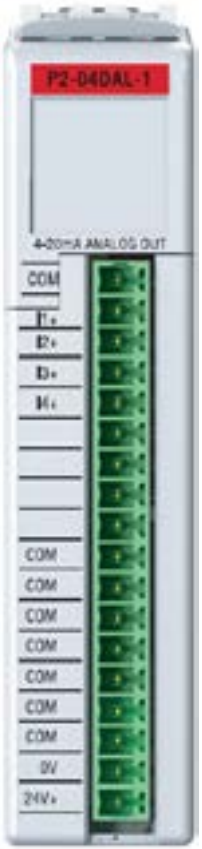
P2-04DA-2 Analog Output (continued)

OLED Panel Display Menu



P2-04DAL-1 Analog Output

The P2-04DAL-1 Low Resolution Current Output Module provides four channels for converting a digital value of 0 to 4095 (12-bit) to 4–20 mA analog signals for use with the Productivity®2000 system.



Terminal blocks sold separately

Output Specifications	
Output Channels	4
Output Range	4–20 mA
Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	4–20 mA = 3.9 µA/count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type	Current sourcing @ 20mA max.
Output Value in Fault Mode	Less than 4mA
Load Impedance (Minimum External Power Supply)	0–570 Ω (19.2 VDC) 0–690 Ω (21.6 VDC) 0–810 Ω (24VDC) 0–930 Ω (26.4 VDC) 0–1100 Ω (30.0 VDC) Minimum load 0Ω @ 0–45°C 125Ω @ 45–60°C ambient temperature
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	1% of range (including temperature drift)
Maximum Full Scale Calibration Error, including offset	±0.2% of range minimum
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75ppm / °C max full scale calibration change (±0.005% of range / °C)
Max Crosstalk	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB maximum (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2% LSB after 10 minute warm-up (typical)
Output Ripple	0.1% of full scale
Output Setting Time	0.3 ms max, 5µs min (full scale change)
All Channel Update Rate	1ms
Maximum Continuous Overload	Electronically current limited to 20mA or less.
Type of Output Protection	Outputs short circuit protected
Output Signal (power-up,-down)	4mA
External DC Power Required	24VDC (-20% / +25%), 120mA(loop power included)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-04DAL-1 Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	6000mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (Sold separately). See “Wiring Options” in Chapter 5.
Connector Type (Sold separately)	18-position removable terminal block
Weight	95.3 g (3.3 oz)
Agency Approvals**	UL61010-2-201 File E139594, Canada & USA CE (EMC: EN61131-2*, SAFETY: EN61010-2-201)

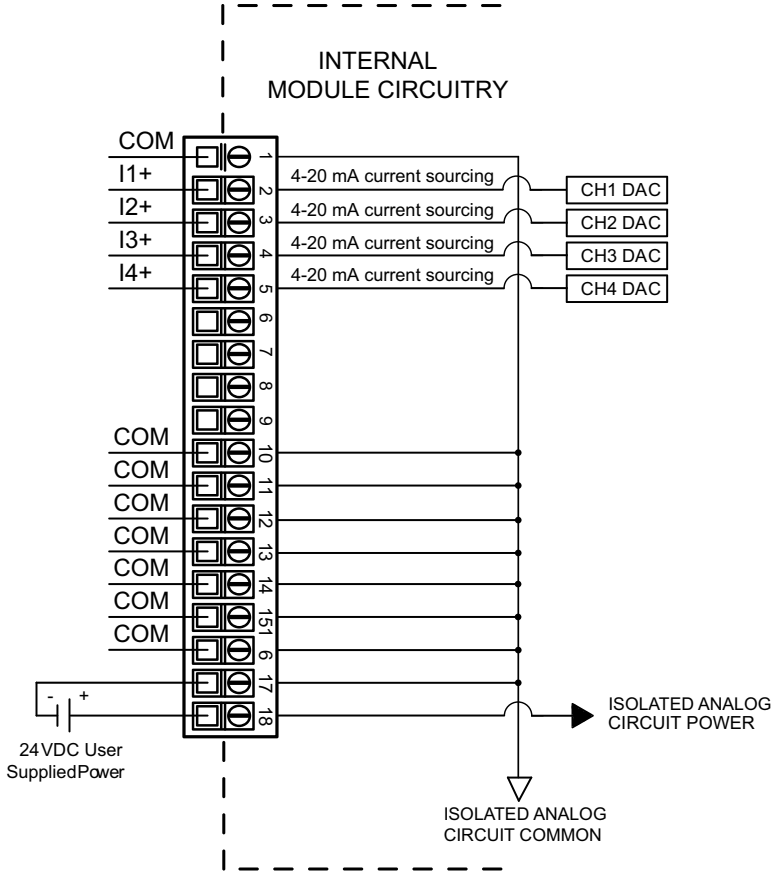
**Meets EMC and Safety requirements. See the Declaration of Conformity for details.*
***To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific component part number web page.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

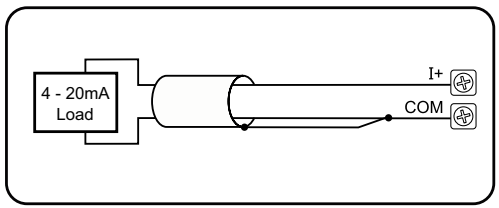
** Recommended screwdriver TW-SD-MSL-1*

P2-04DAL-1 Analog Output (continued)

Wiring Diagrams



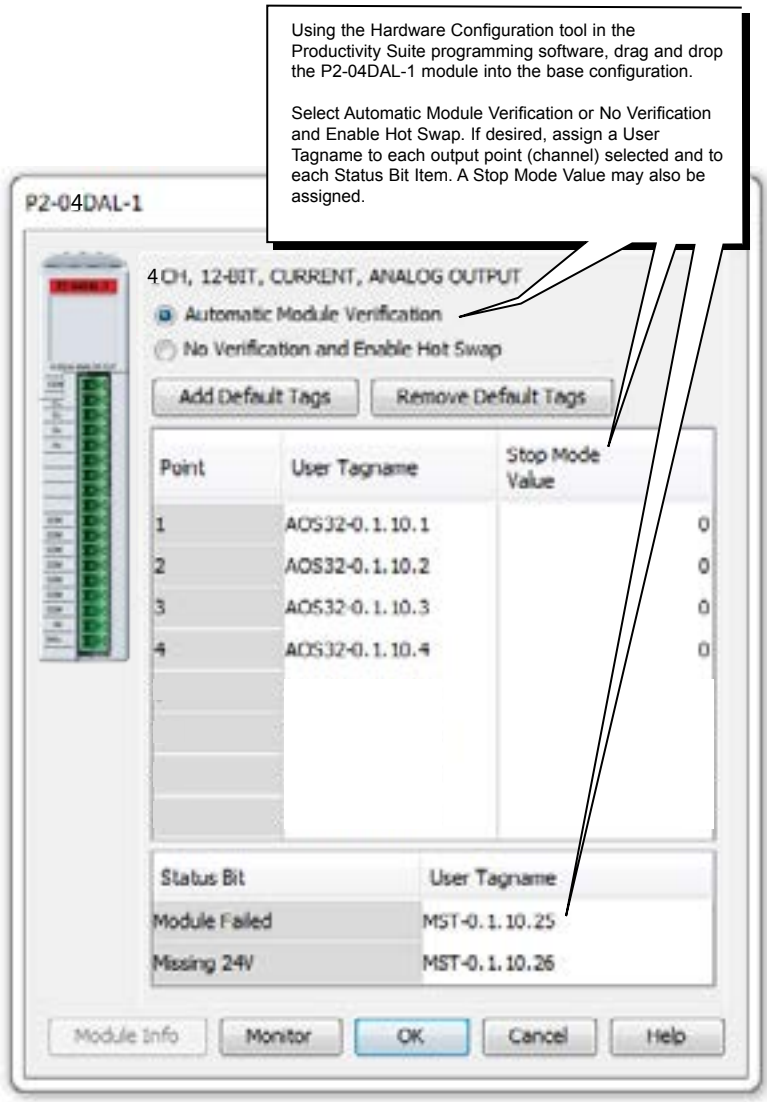
Current Source Output Circuit



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

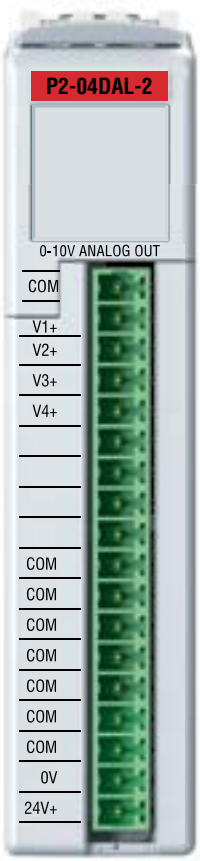
P2-04DAL-1 Analog Output (continued)

Configuration Settings



P2-04DAL-2 Analog Output

The P2-04DAL-2 Low Resolution Voltage Output Module provides four channels for converting a digital value of 0 to 4095 (12-bit) to 0–10 VDC analog signals for use with the Productivity® 2000 system.



Terminal blocks sold separately

Output Specifications	
Output Channels (Commons)	4
Module Signal Output Range	0–10 VDC
Output Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	0–10 V = 2.44 mV per count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type (sourcing/sinking)	Voltage sourcing at 10mA
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load	0.01 µF
Allowed Load Type	Grounded
Maximum Inaccuracy	0.5% of range (Including temperature drift)
Maximum Full Scale Calibration Error (Not including offset error)	±0.2% of range maximum
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75ppm / °C max full-scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB maximum (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2% LSB after 10 minute warm-up (typical)
Output Ripple	±0.1% of full scale
Output Setting Time	0.300 µs max., 5µs min. (full scale change)
All Channel Update Rate	1ms
Maximum Continuous Overload	Output current limited to 40mA typical Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 µF transient suppressor
Output Signal (power-up,-down)	0V
External DC Power Required	24VDC (-20% / +25%), 60mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-04DAL-2 Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	3250mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Removable terminal block. Optional ZIPLink wiring system. See “Wiring Options” in Chapter 5.
Connector Type (Sold separately)	18-position removable terminal block
Weight	95g (3.4 oz)
Agency Approvals**	UL 61010 File E139594, Canada & USA CE (EMC: EN61131-2*, SAFETY: EN61010-2-201)

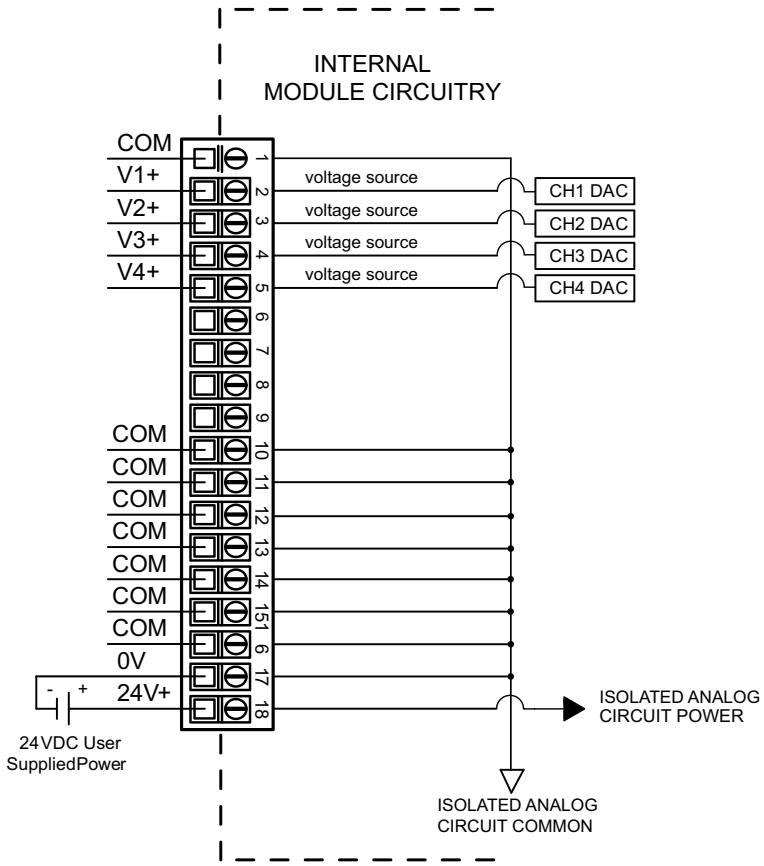
**Meets EMC and Safety requirements. See the Declaration of Conformity for details.*
***To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific component part number web page.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

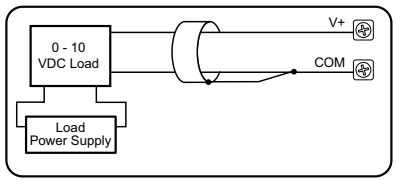
** Recommended screwdriver TW-SD-MSL-1*

P2-04DAL-2 Analog Output (continued)

Wiring Diagrams



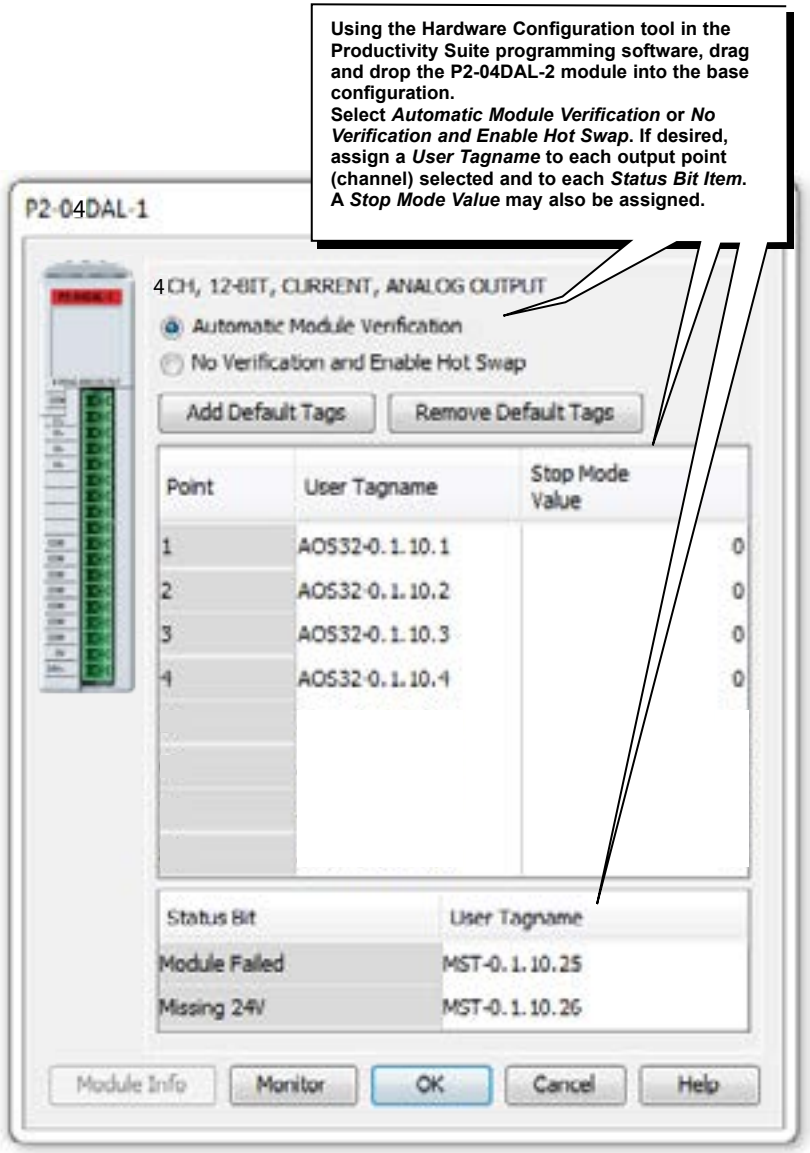
Voltage Output Circuits



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

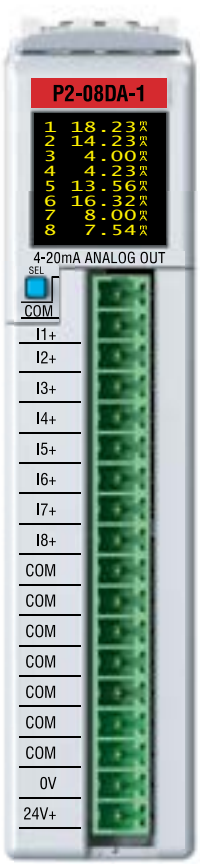
P2-04DAL-2 Analog Output (continued)

Configuration Settings



P2-08DA-1 Current Analog Output

The P2-08DA-1 Current Analog Output Module provides eight channels of 4 to 20mA outputs.



Terminal blocks sold separately

Output Specifications	
Output Channels (Commons)	8
Module Signal Output Range	4–20mA
Output Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	4–20mA = 0.244 µA/count 1 LSB = 1 count
Data Range	0 to 65535 counts
Output Type (sourcing)	Current: 20mA max
Output Value in Fault Mode	Near 0mA
Load Impedance (Minimum External Power Supply)	0–570Ω (19.2 VDC) 0–690Ω (21.6 VDC) 0–810Ω (24VDC) 0–930Ω (26.4 VDC) 0–1100Ω (30VDC) Minimum load 0–125Ω @ 0–45°C 250–715Ω @ 0–60°C
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (Counts TBD) (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 count after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	600µs
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal (power-up,-down)	4mA
External DC Power Required	24VDC @ 220mA(loop power included)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-08DA-1 Current Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	700mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

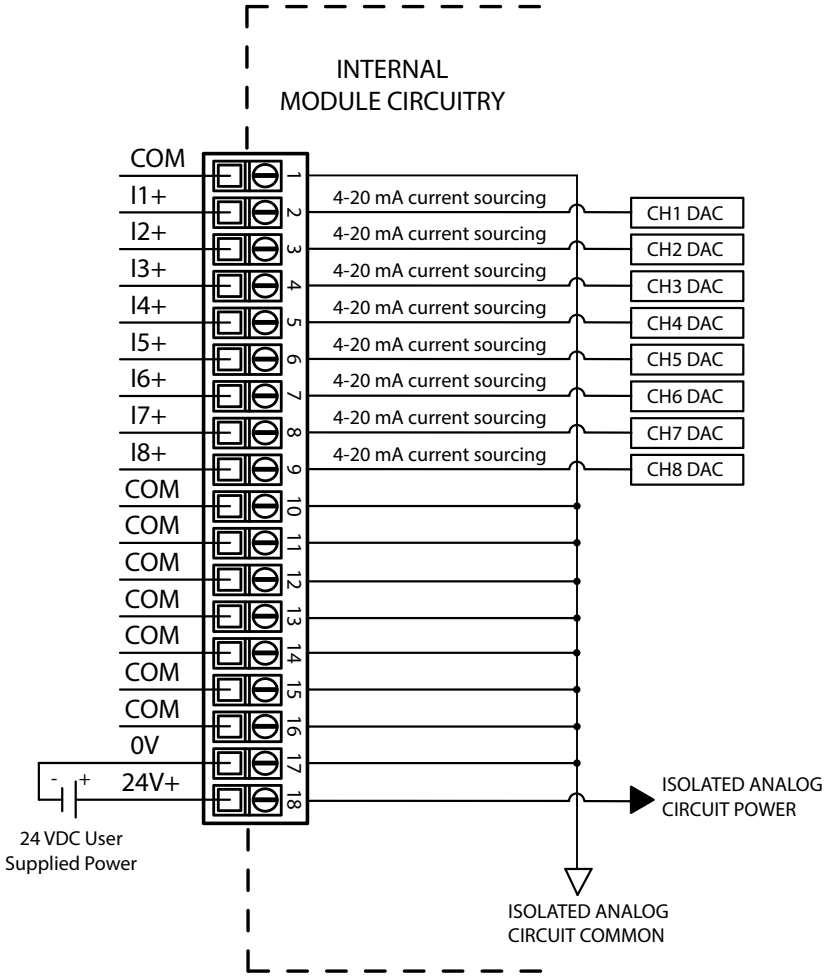
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

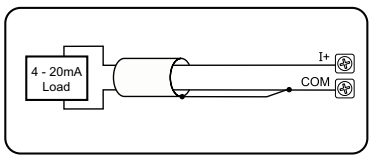
** Recommended screwdriver TW-SD-MSL-1*

P2-08DA-1 Current Analog Output (continued)

Wiring Diagrams



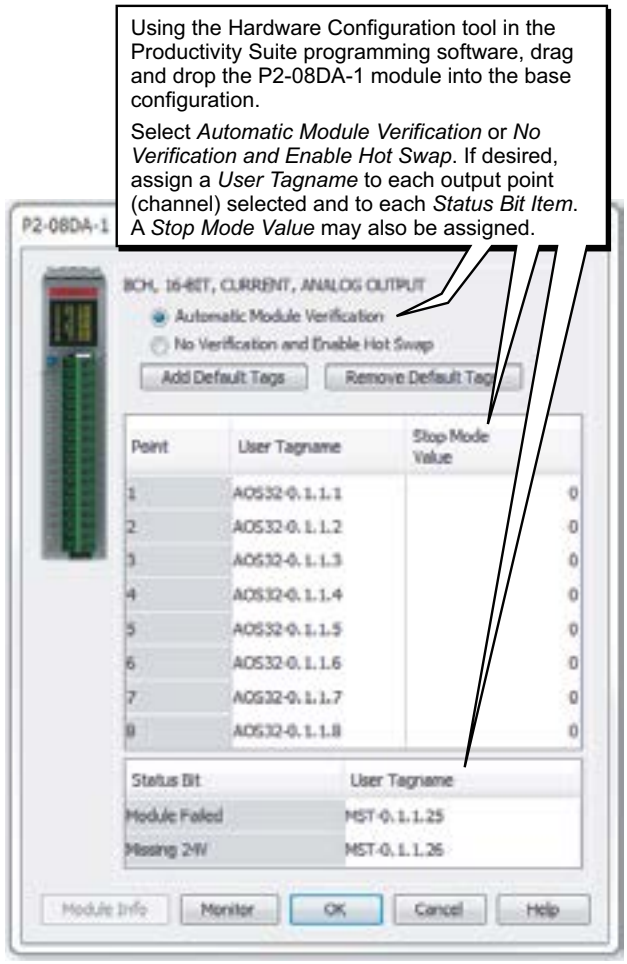
Current Source Output Circuit



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

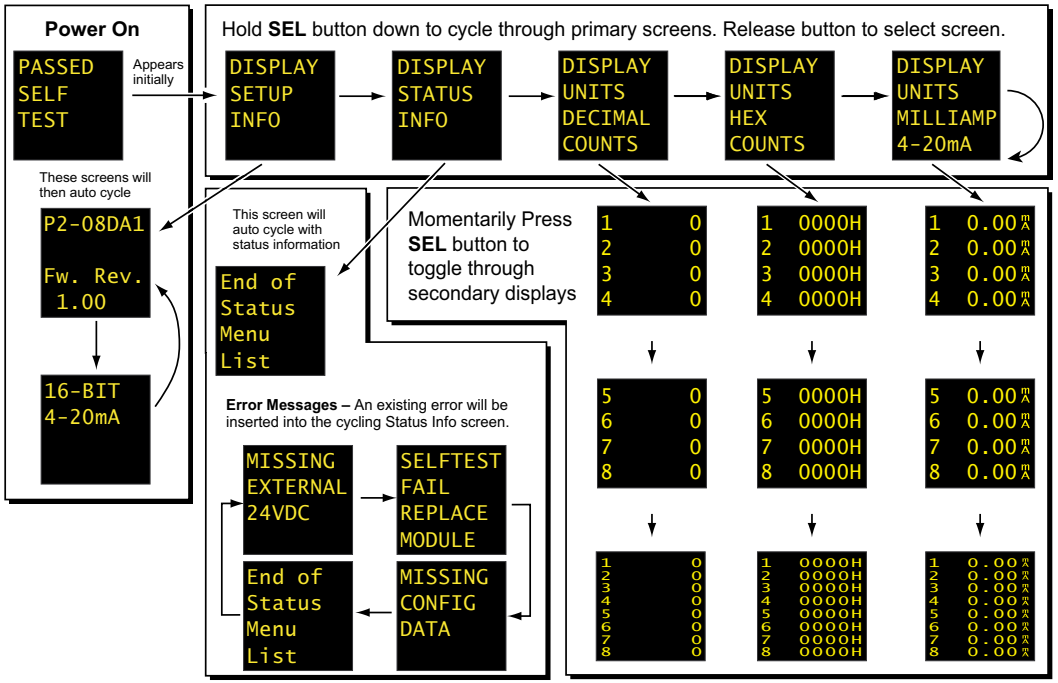
P2-08DA-1 Current Analog Output (continued)

Module Configuration



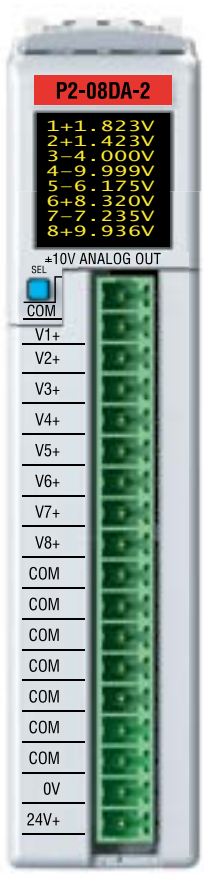
P2-08DA-1 Current Analog Output (continued)

OLED Panel Display



P2-08DA-2 Voltage Analog Output

The P2-08DA-2 Voltage Analog Output Module provides eight channels of ±10 VDC outputs for use with the Productivity®2000 Ssystem.



Terminal blocks sold separately

Output Specifications	
Output Channels (Commons)	8
Module Signal Output Range	±10VDC
Output Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	±10V = 305µV/count 1 LSB = 1 count
Data Range	-32768 to +32767 counts
Output Type (sourcing/sinking)	Voltage: 10mA max
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load	0.01 µF
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 LSB after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs current limited to 40mA typical Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 µF transient suppressor
Output Signal (power-up,-down)	0V
External DC Power Required	24VDC @ 150mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-08DA-2 Voltage Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	150mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

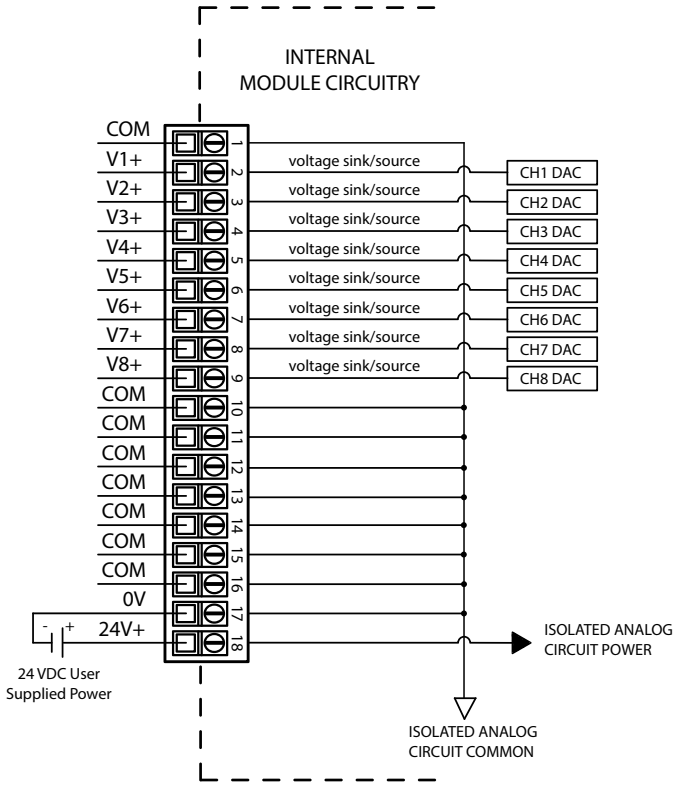
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

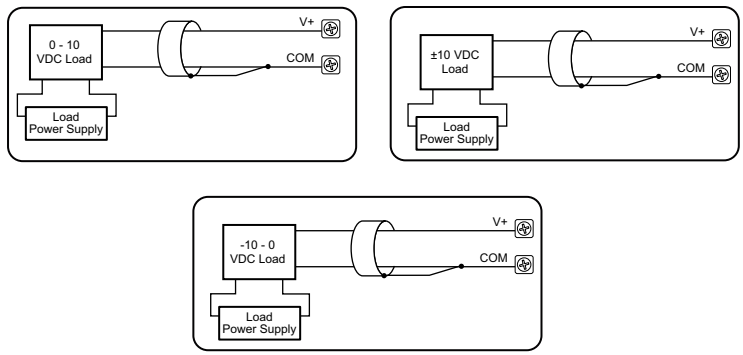
** Recommended screwdriver TW-SD-MSL-1*

P2-08DA-2 Voltage Analog Output (continued)

Wiring Diagrams

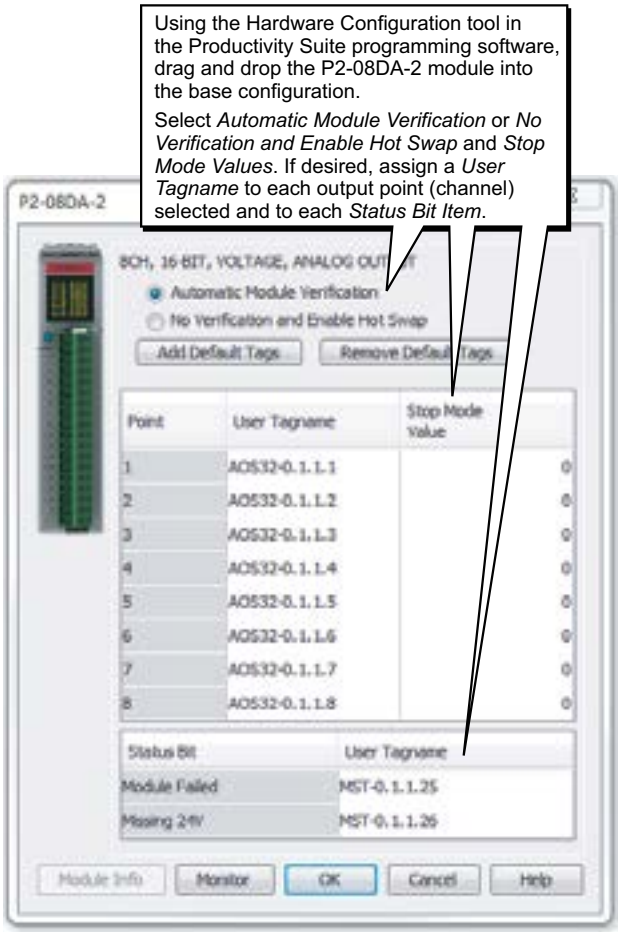


Voltage Output Circuits



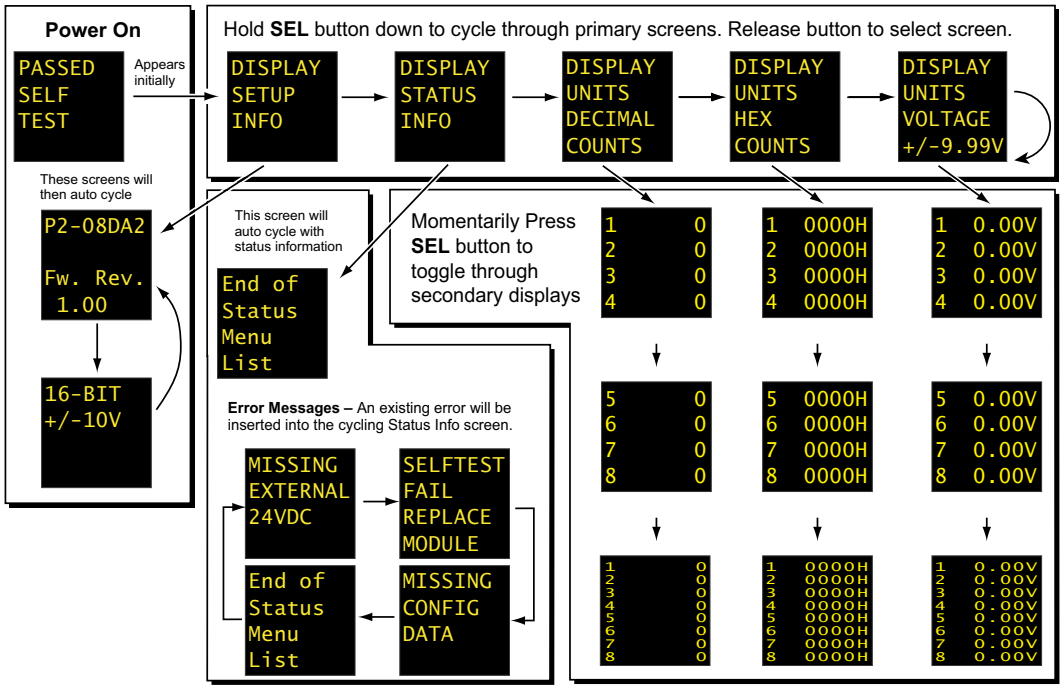
P2-08DA-2 Voltage Analog Output (continued)

Module Configuration



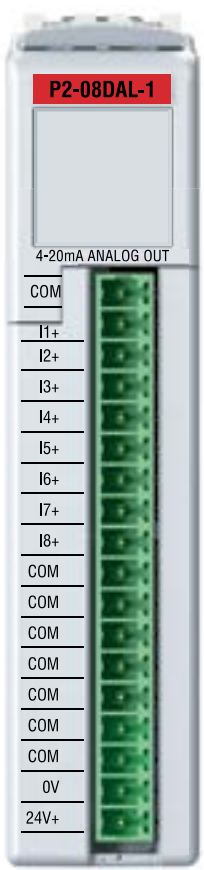
P2-08DA-2 Voltage Analog Output (continued)

OLED Panel Display



P2-08DAL-1 Current Analog Output

The P2-08DAL-1 Low Resolution Current Analog Output Module provides eight channels of 4–20 mA output signals.



Terminal blocks sold separately

Output Specifications	
Output Channels	8
Module Signal Output Range	4–20mA
Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	4–20mA = 3.9 µA / count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type (sourcing)	Current sourcing at 20mA max
Output Value in Fault Mode	Less than 4mA
Load Impedance	0–570Ω (19.2 VDC), 0–690Ω (21.6 VDC), 0–810Ω (24VDC), 0–930Ω (26.4 VDC), 0–1100Ω (30VDC) Minimum Load: 0Ω @ 0–45°C 125Ω @ 45-60°C ambient temperature
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	1% of range
Maximum Full Scale Calibration Error (Including Offset)	±0.2% of range minimum
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75PPM / °C maximum full-scale calibration change (±0.005% of range / °C)
Max Crosstalk at DC, 50/60Hz	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB max., (±0.1% of full scale)
Output Stability and Repeatability	±2 count after 10 min. warm up (typical)
Output Ripple	±0.1% of full scale
Output Settling Time	300µs max., 5µs min. (full scale range)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal at Power Up and Power Down	4mA
External DC Power Required	24VDC (-20% / +25%) @ 220mA (Loop Power Included)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-08DAL-1 Current Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–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)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	6000mW Maximum(loop power included)
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Terminal Type (not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

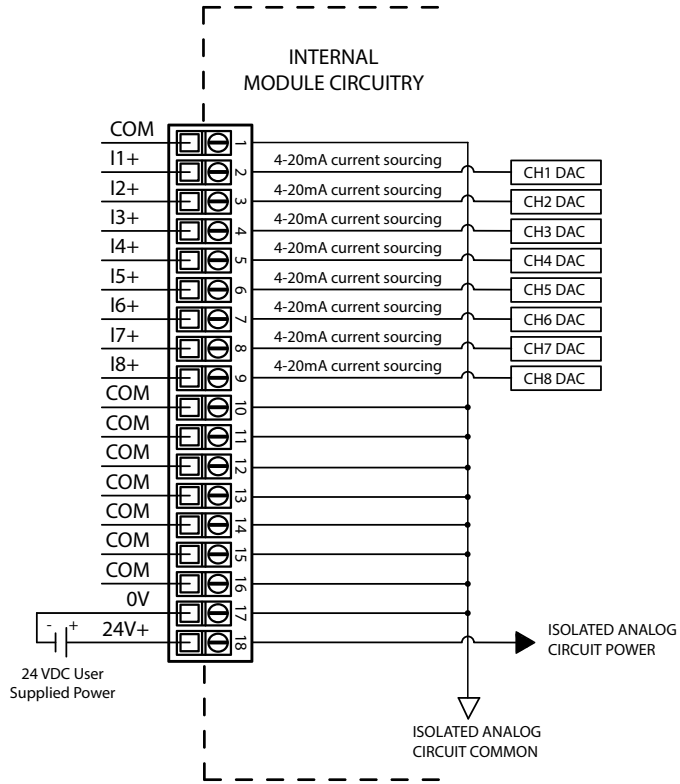
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

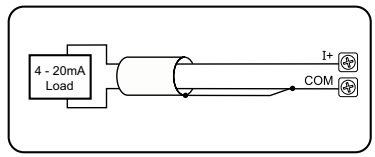
** Recommended screwdriver TW-SD-MSL-1*

P2-08DAL-1 Current Analog Output (continued)

Wiring Diagrams



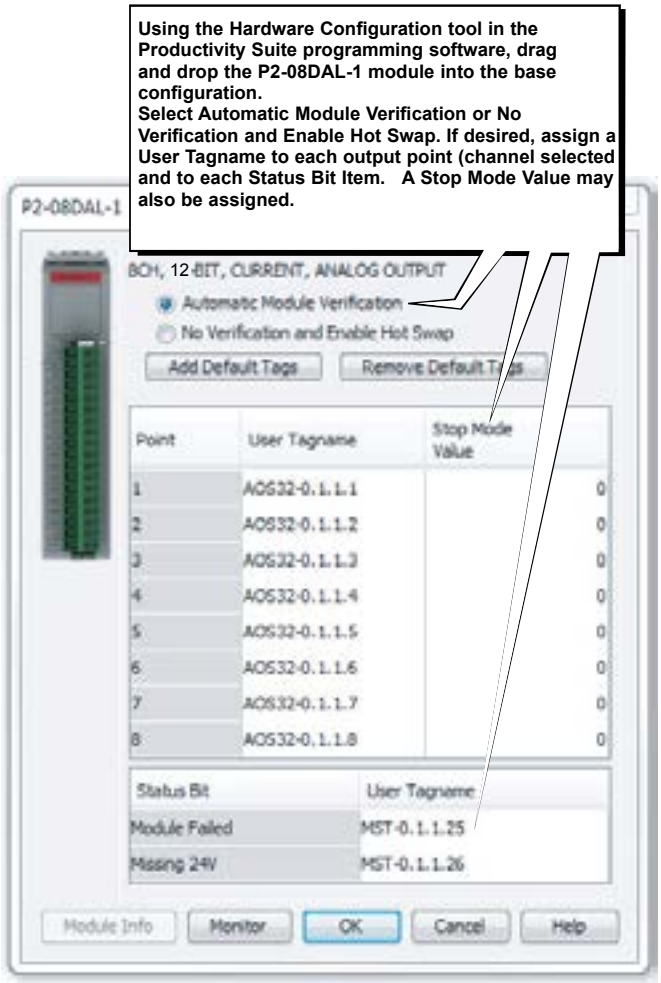
Current Source Output Circuit



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

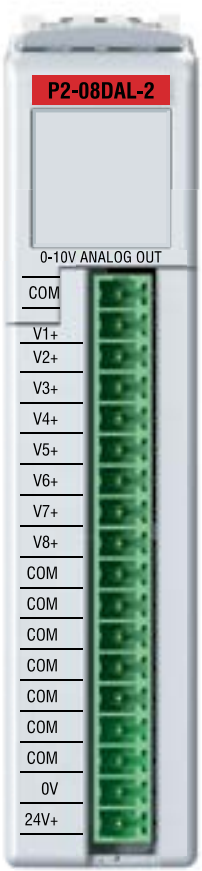
P2-08DAL-1 Current Analog Output (continued)

Module Configuration



P2-08DAL-2 Voltage Analog Output

The P2-08DAL-2 Low Resolution Voltage Analog Output Module provides eight channels of 0–10 VDC output signals.



Terminal blocks sold separately

Output Specifications

Output Channels	8
Module Signal Input Range	0–10V
Output Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	0–10V = 2.44 mV per count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type (Sinking/Sourcing)	Voltage: 10mA max
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load	0.01 µF
Allowed Load Type	Grounded
Maximum Inaccuracy	0.5% of range (including temperature drift)
Maximum Full Scale Calibration Error (Not Including Offset)	±0.2% of range maximum
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75PPM / °C maximum full-scale calibration change (±0.0025% of range / °C)
Max Crosstalk	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB maximum, (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2% LSB after 10 min. warm up (typical)
Output Ripple	±0.1% of full scale
Output Settling Time	300µs max., 5µ min. (full scale range)
All Channel Update Rate (typical)	1ms
Maximum Continuous Overload	Outputs current limited to 40mA typical Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 µF transient suppressor
Output Signal at Power Up and Power Down	0V
External 24VDC Power Required	24VDC (-20% / +25%), 150mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-08DAL-2 Voltage Analog Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	3250mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

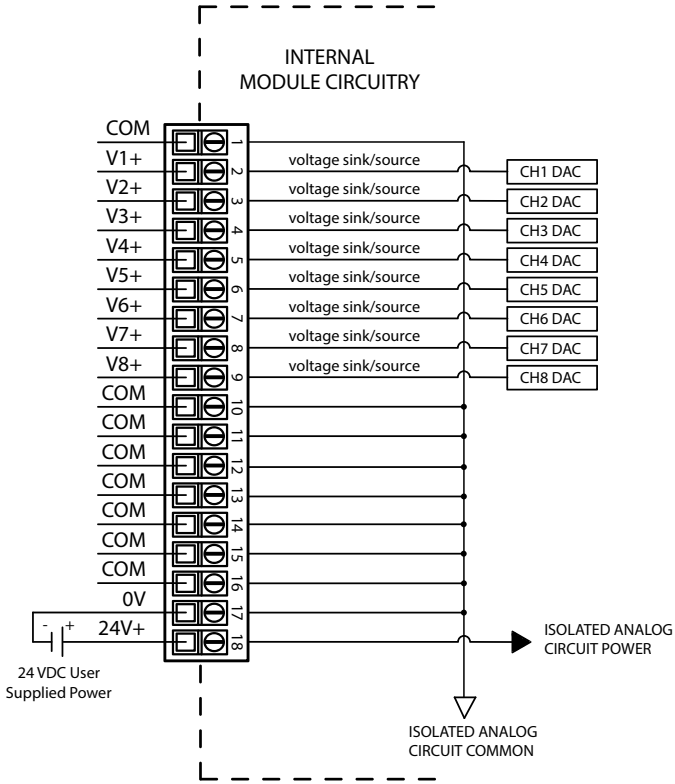
** Meets EMC and Safety requirements. See the D.O.C. for details.*

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

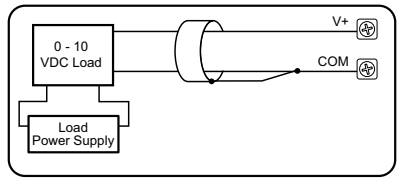
** Recommended screwdriver TW-SD-MSL-1*

P2-08DAL-2 Voltage Analog Output (continued)

Wiring Diagrams

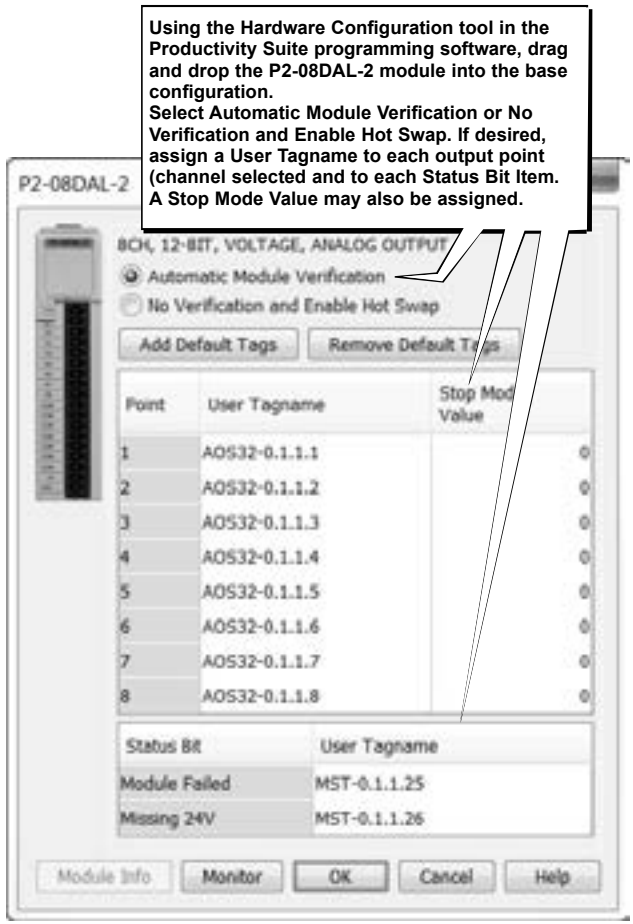


Voltage Output Circuits



P2-08DAL-2 Voltage Analog Output (continued)

Module Configuration



P2-16DA-1 Current Analog Output

The P2-16DA-1 Current Analog Output Module provides sixteen channels of 4–20 mA sourcing output.

Output Specifications

Output Channels	16
Module Signal Output Range	4–20mA (Sourcing)
Output Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	4–20mA = 0.244 µA/count 1 LSB = 1 count
Data Range	0 to 65535 counts
Output Type (sourcing)	Current: 20mA max
Output Value in Fault Mode	Near 0mA
Load Impedance (Minimum External Power Supply)	0–570Ω (19.2 VDC) 0–690Ω (21.6 VDC) 0–810Ω (24VDC) 0–930Ω (26.4 VDC) 0–1100Ω (30VDC) Minimum Load 0Ω @ 0–45°C 125Ω @ 45–60°C
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 count after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	3ms
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal (power-up,-down)	4mA
External DC Power Required	24VDC @ 410mA (includes loop power)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16DA-1 Current Analog Output (continued)

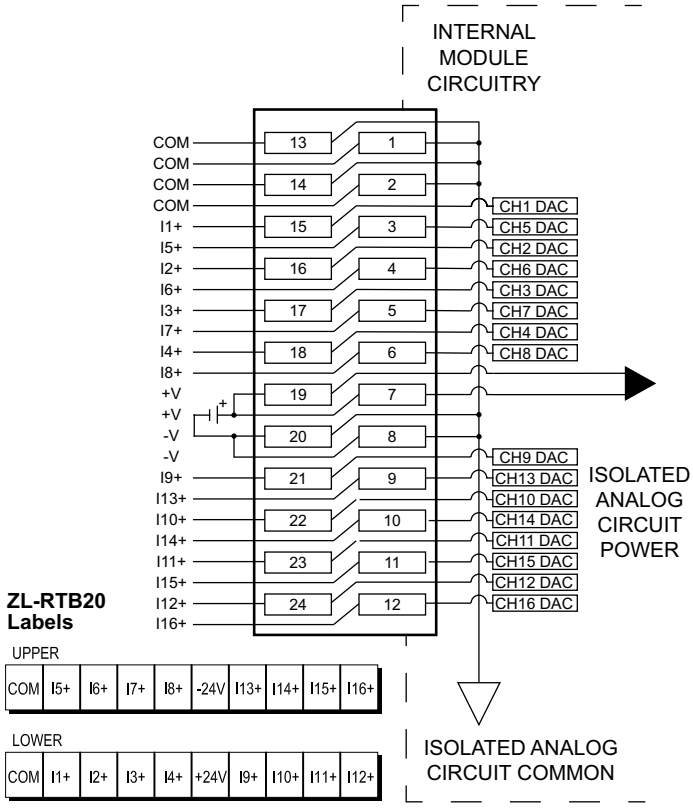
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	96mW
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See "Wiring Options" in Chapter 5. Must use copper conductors 75ºC or equivalent.
Connector Type	24-Pin Molex Style 43025-2400
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

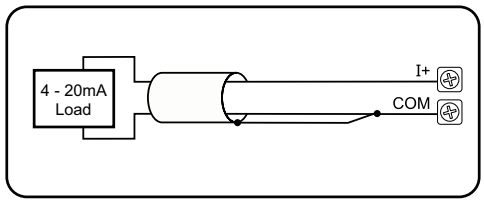
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16DA-1 Current Analog Output (continued)

Wiring Diagrams



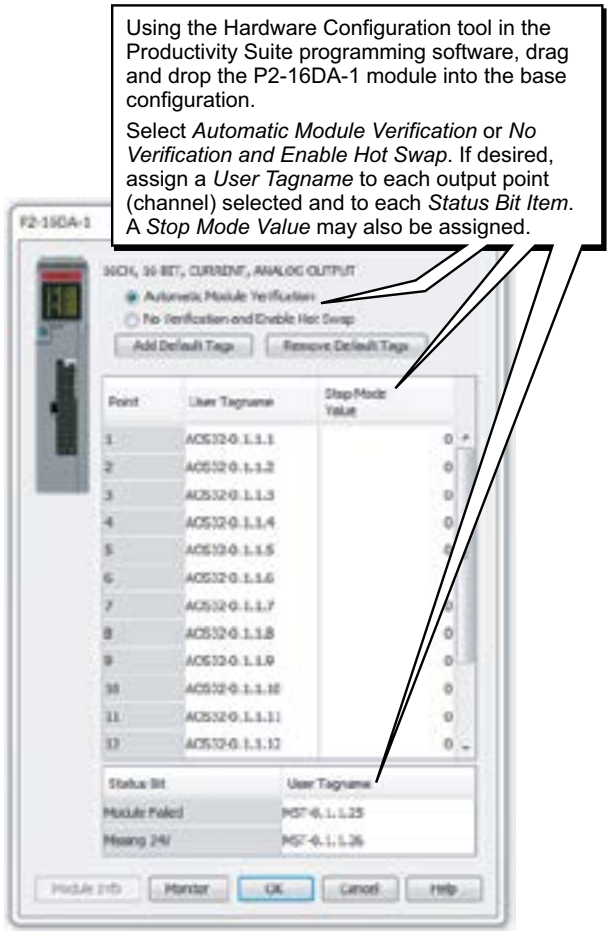
Current Sourcing Output Circuit



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

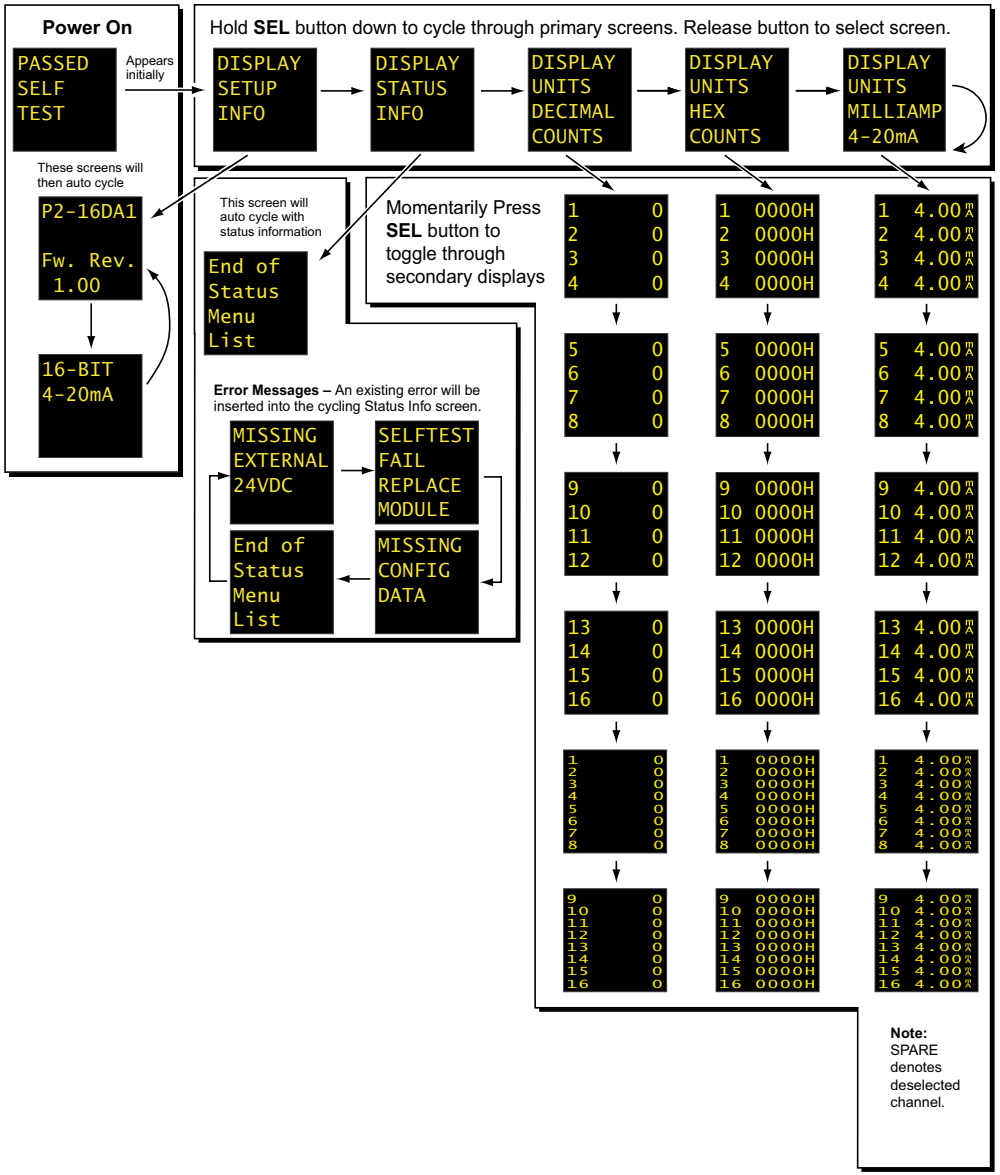
P2-16DA-1 Current Analog Output (continued)

Module Configuration



P2-16DA-1 Current Analog Output (continued)

OLED Panel Display



P2-16DA-2 Voltage Analog Output

The P2-16DA-2 Voltage Analog Output Module provides sixteen channels of ±10VDC outputs.

Output Specifications	
Output Channels	16
Module Signal Output Range	±10VDC
Output Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	±10VDC = 305µV/count 1 LSB = 1 count
Data Range	-32768 to 32767 counts
Output Type (sourcing/sinking)	Voltage: 10mA max current
Output Value in Fault Mode	0V
Load Impedance	≥1000Ω
Maximum Capacitive Load	0.01 µF maximum
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range (including temperature drift)
Maximum Full Scale Calibration Error (not including offset error)	±0.025% of range maximum
Maximum Offset Calibration Error	±0.025% of range maximum
Accuracy vs. Temperature	±25PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±16 LSB maximum (±0.025% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±10 LSB after 10 minute warm-up (typical)
Output Ripple	0.05% of full scale
Output Setting Time	300µs max, 5µs min (full scale change)
All Channel Update Rate	3ms
Maximum Continuous Overload	Outputs current limited to 40mA typical. Continuous overloads on multiple output can damage the module.
Type of Output Protection	0.1 µF transient suppressor
External DC Power Required	24VDC (-20% / +25%), 265mA

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16DA-2 Voltage Analog Output (continued)

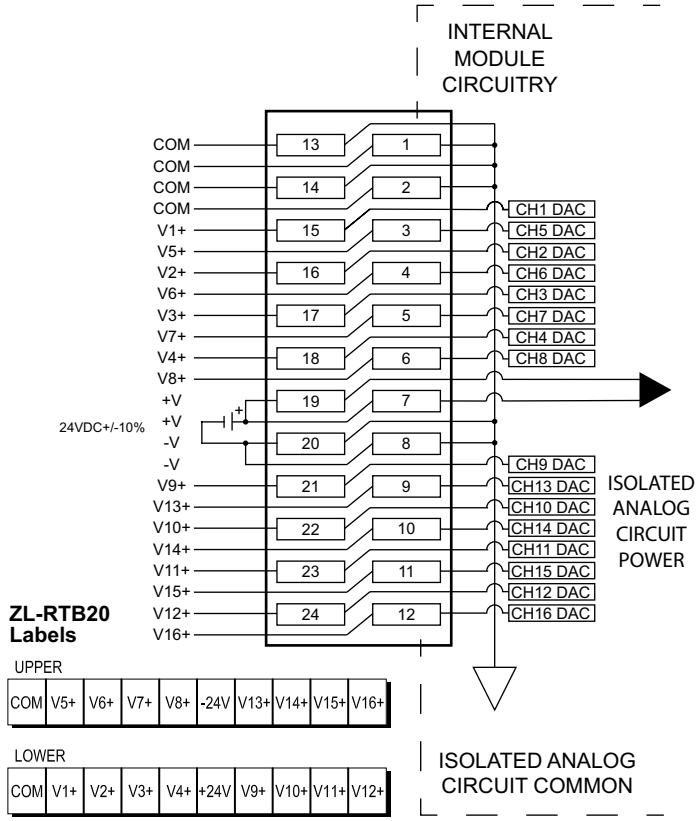
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	6.4 W
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See "Wiring Options" in Chapter 5. Must use copper conductors 75ºC or equivalent.
Connector Type	24-Pin Molex Style 43025-2400
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

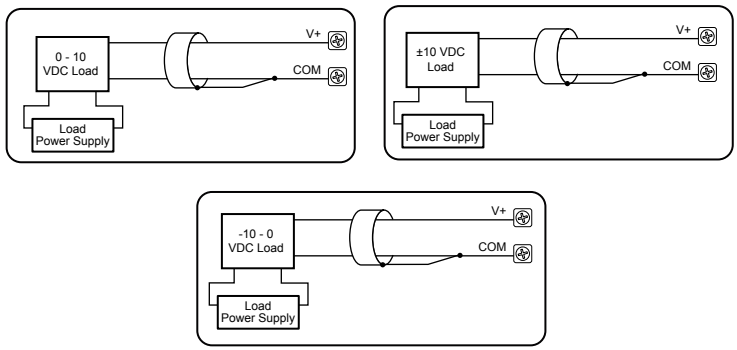
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16DA-2 Voltage Analog Output (continued)

Wiring Diagrams

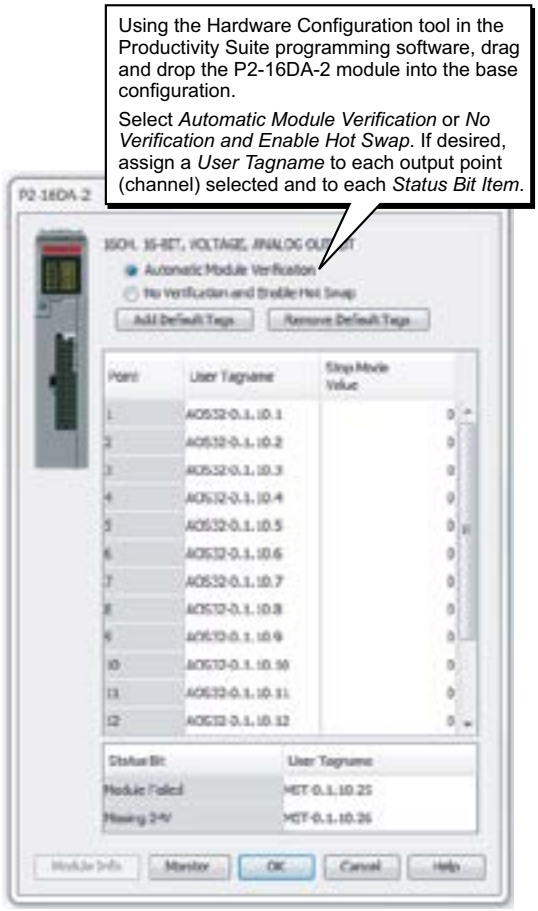


Voltage Output Circuits



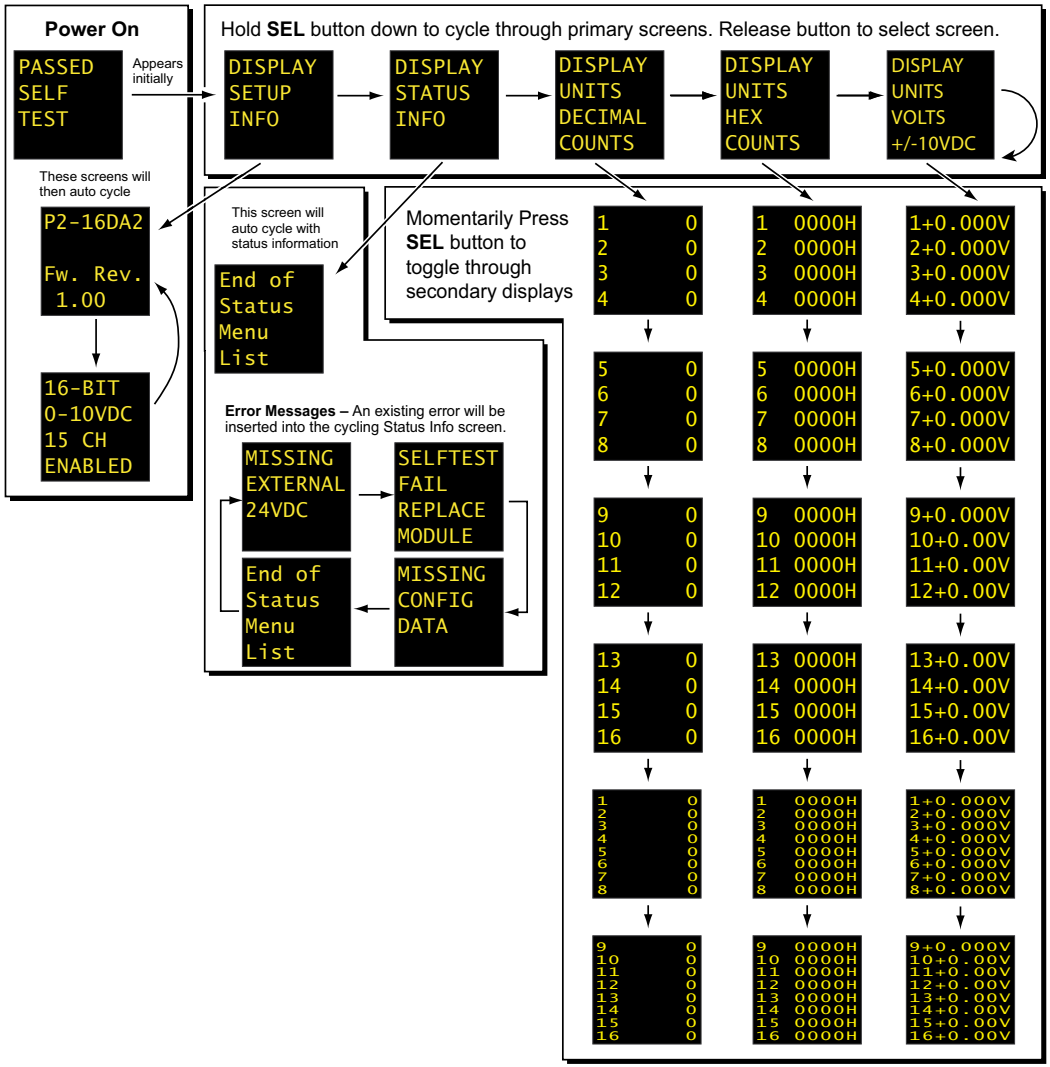
P2-16DA-2 Voltage Analog Output (continued)

Module Configuration



P2-16DA-2 Voltage Analog Output (continued)

LCD Panel Display



P2-16DAL-1 Current Analog Output

The P2-16DAL-1 Low Resolution Current Analog Output Module provides sixteen channels of 4–20mA sourcing output signals for use with Productivity® 2000 system.

Output Specifications	
Output Channels	16
Module Signal Output Range	4–20mA Sourcing
Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	4–20mA = 3.9 µA / count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type (sourcing)	Current: 20mA max
Output Value in Fault Mode	Less than 4mA
Load Impedance	0–570Ω (19.2 VDC), 0–690Ω (21.6 VDC), 0–810Ω (24VDC), 0–930Ω (26.4 VDC), 0–1100Ω (30VDC) Minimum Load: 0Ω @ 0–45°C 125Ω @ 45–60°C ambient temperature
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	1% of range (including temperature drift)
Maximum Full Scale Calibration Error (Including Offset)	±0.2% of range minimum
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75 PPM / °C maximum full-scale calibration change (±0.005% of range / °C)
Max Crosstalk at DC, 50/60Hz	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB max., (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2 count after 10 min. warm up (typical)
Output Ripple	±0.1% of full scale
Output Settling Time	0.3 ms max., 5µ min. (full scale range)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal at Power Up and Power Down	4mA
External DC Power Required	24VDC @ 380mA (Loop Power Included)

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

P2-16DAL-1 Current Analog Output (continued)

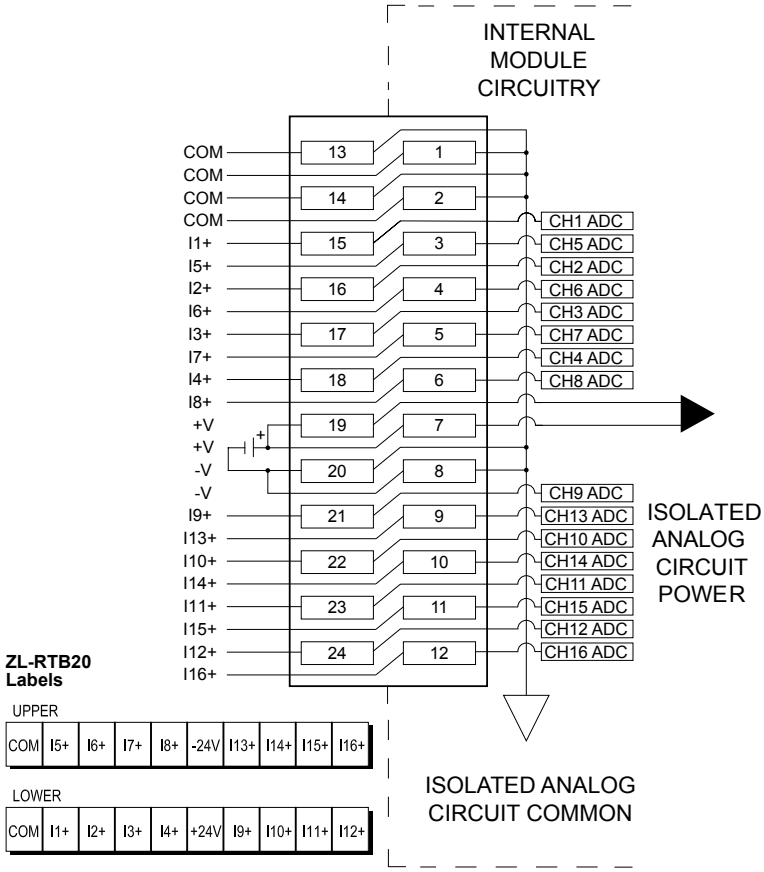
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	10000mW (loop power included)
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See “Wiring Options” in Chapter 5. Must use copper conductors 75ºC or equivalent.
Connector Type	24-Pin Molex Style 43025-2400
Weight	90g (3.2 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

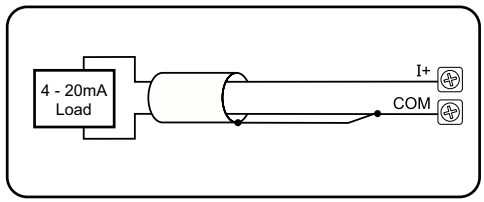
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16DAL-1 Current Analog Output (continued)

Wiring Diagrams



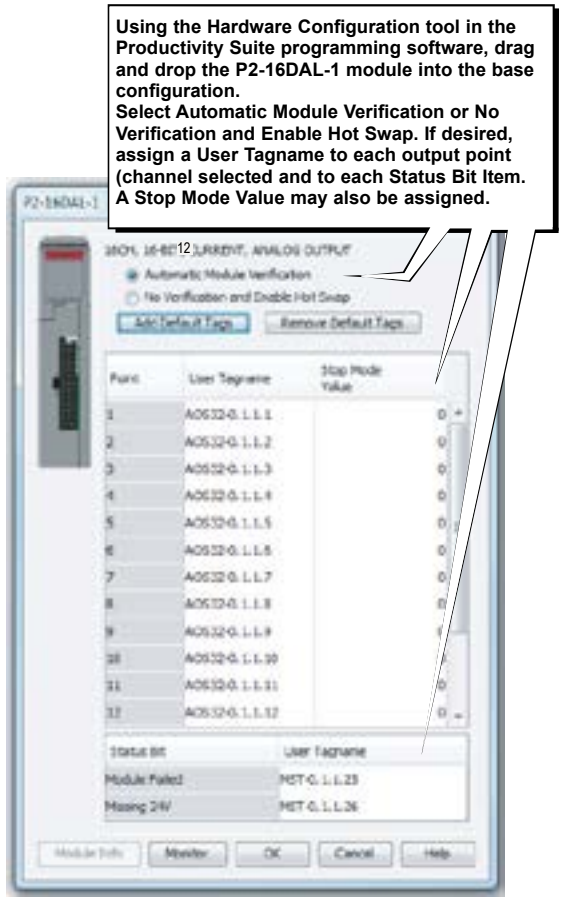
Current Sourcing Output Circuit



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

P2-16DAL-1 Current Analog Output (continued)

Module Configuration



P2-16DAL-2 Voltage Analog Output

The P2-16DAL-2 Low Resolution Voltage Analog Output Module provides sixteen channels of 0–10 VDC outputs for use with Productivity®2000 system.

Output Specifications	
Output Channels	16
Module Signal Input Range	0–10V
Output Signal Resolution	12-bit
Resolution Value of LSB (least significant bit)	0–10V = 2.44 mV per count 1 LSB = 1 count
Data Range	0 to 4095 counts
Output Type	Voltage sourcing at 10mA max. (1 common)
Output Value in Fault Mode	0V
Output Impedance	0.2 Ω typical
Maximum Capacitive Load	0.01 µF maximum
Allowed Load Type	Grounded
Maximum Inaccuracy	0.5% of range (including temperature drift)
Maximum Full Scale Calibration Error	±0.2% of range maximum voltage
Maximum Offset Calibration Error	±0.2% of range maximum
Accuracy vs. Temperature	±75 PPM / °C maximum full-scale calibration change (±0.0025% of range / °C)
Max Crosstalk at DC, 50/60Hz	-72dB, 1 LSB
Linearity Error (End to End)	±4 LSB maximum, (±0.1% of full scale) Monotonic with no missing codes
Output Stability and Repeatability	±2% LSB after 10 min. warm up period
Output Ripple	±0.1% of full scale
Output Settling Time	300µs max., 5µ min. (full scale range)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs current limited to 40mA typical; Continuous overloads on multiple outputs can damage the module.
Type of Output Protection	0.1 µF transient suppressor
External 24VDC Power Required	24VDC (-20% / + 25%), 265mA

NOTE: *The most recent Productivity Suite software and firmware versions may be required to support new modules and new features.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5. Module connector type is a 24-pin Molex Style 43025-2400.

P2-16DAL-2 Voltage Analog Output (continued)

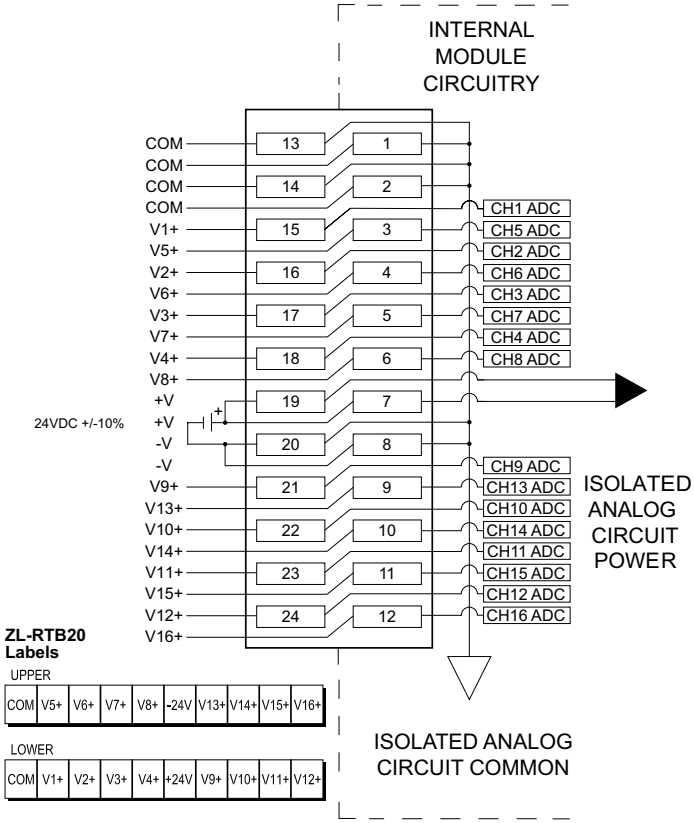
General Specifications	
Surrounding Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	8W
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system ONLY. See “Wiring Options” in Chapter 5. Must use copper conductors 75ºC or equivalent.
Terminal Type	24-Pin Molex Style 43025-2400
Weight	100g (3.5 oz)
Agency Approvals	UL508 File E139594, Canada & USA CE (EN61131-2*)

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

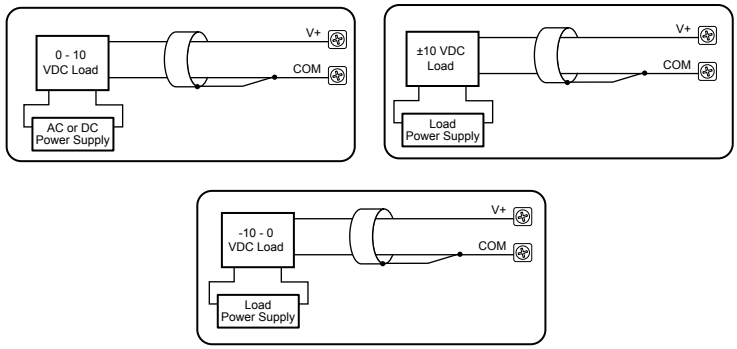
Connector Specifications	
Connector Type	24-Pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118 x 0.118 in)

P2-16DAL-2 Voltage Analog Output (continued)

Wiring Diagrams

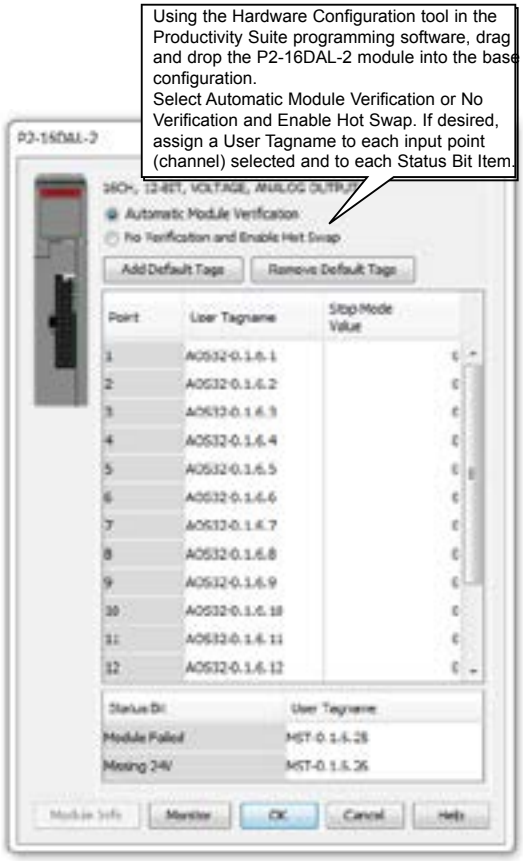


Voltage Output Circuits



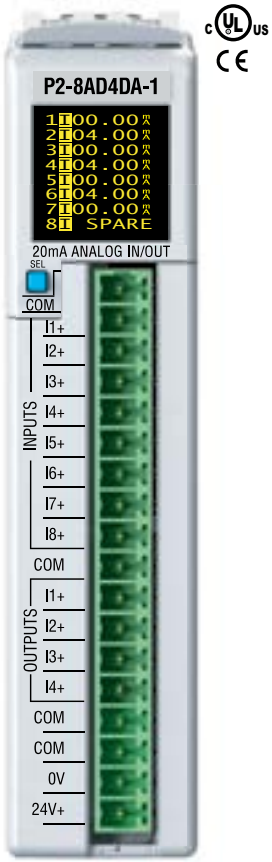
P2-16DAL-2 Voltage Analog Output (continued)

Module Configuration



P2-8AD4DA-1 Current Analog Input/Output

The P2-8AD4DA-1 Current Analog Input/Output Module provides eight channels of current sinking 0–20 mA inputs and four channels of current sourcing 4–20 mA outputs.



Terminal blocks sold separately

Input Specifications

Input Channels	8 (1 common)
Module Signal Input Range	0–20mA (Sinking)
Signal Resolution	12–16 bit, depending on input resolution
Input Resolution & Update Rate (See Note 1)	Fine: 8ms, 0.305 µA, 16 bit Medium: 2ms, 1.22 µA, 14 bit Coarse: 700µs, 4.88 µA, 12 bit
Data Range	0–65535 counts
Input Type	Single Ended (1 common)
Maximum Continuous Overload	±31mA
Input Impedance	250Ω ±0.1%, 1/4 W
Hardware Filter Characteristics	Low pass 1st order, -3dB @ 48Hz
All Channel Update Rate (See Note 2)	Fine 57ms Medium: 17ms Coarse: 7ms
Open Circuit Detection Time	Zero reading within 1s
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	±0.015% of range (after 10 minute warm-up)
Full Scale Calibration Error (not including offset)	±0.05% of range maximum
Offset Calibration Error	±0.05% of range maximum
Maximum Crosstalk	-96dB ±1 -0.015% of full scale maximum
Recommended Fuse (external)	Edison S500-32-R, 0.032 A fuse
External DC Power Required	24VDC (-20% / +25%), 145mA

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.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-8AD4DA-1 Current Analog Input/Output (continued)

Output Specifications	
Output Channels	4 (1 common)
Module Signal Output Range	4–20mA Sourcing
Output Signal Resolution	16-bit
Resolution Value of LSB (least significant bit)	0.244 µA / count 1 LSB = 1 count
Data Range	0–65535 counts
Output Type	Current sourcing: 20mA max
Output Value in Fault Mode	≤ 4mA
Load Impedance (Minimum External Power Supply)	0–480 Ω (19.2 VDC) 0–600 Ω (21.6 VDC) 0–715 Ω (24VDC) 0–840 Ω (26.4 VDC) 0–1010 Ω (30VDC)
Maximum Inductive Load	1mH
Allowed Load Type	Grounded
Maximum Inaccuracy	0.1% of range
Maximum Full Scale Calibration Error (not including offset error)	±0.065% of full scale
Maximum Offset Calibration Error	±0.065% of full scale
Accuracy vs. Temperature	±15PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±0.015% of range maximum Monotonic with no missing codes
Output Stability and Repeatability	±0.015% after 10 minute warm-up typical
Output Ripple	0.01% of full scale at 50/60 Hz
Output Setting Time	Rising Time 200µs Falling Time 135µs (full scale change)
All Channel Update Rate	3.55 ms
Maximum Continuous Overload	Outputs open circuit protected
Type of Output Protection	Electronically current limited to 20mA or less
Output Signal (power-up, -down)	≤4mA

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

P2-8AD4DA-1 Current Analog Input/Output (continued)

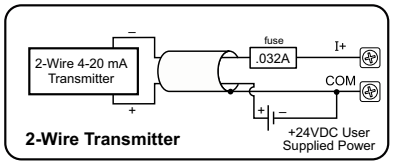
General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
Humidity	5 to 95% (non-condensing)
Altitude	2,000 meters, max.
Pollution Degree	2
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1s
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	2.47 W
Overvoltage Category	II
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (Not included)	18-position removable terminal block
Weight	90g (3.2 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)*

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

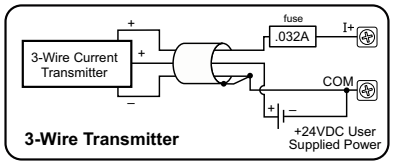
P2-8AD4DA-1 Current Analog Input/Output (continued)

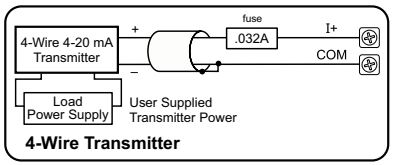
Wiring Diagrams

Current Input Circuits



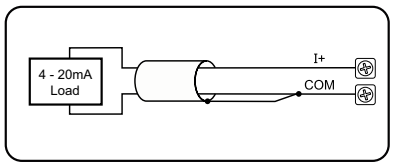
An Edison S500-32-R 0.032 A fast-acting fuse is recommended for all 4-20 mA current loops.



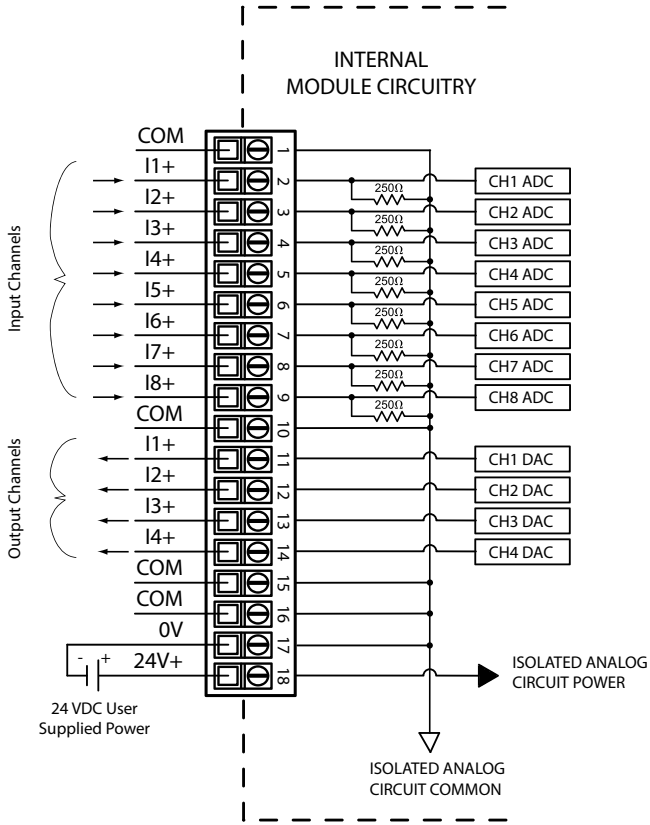


Note: Do not connect both ends of shield.

Current Output Circuits



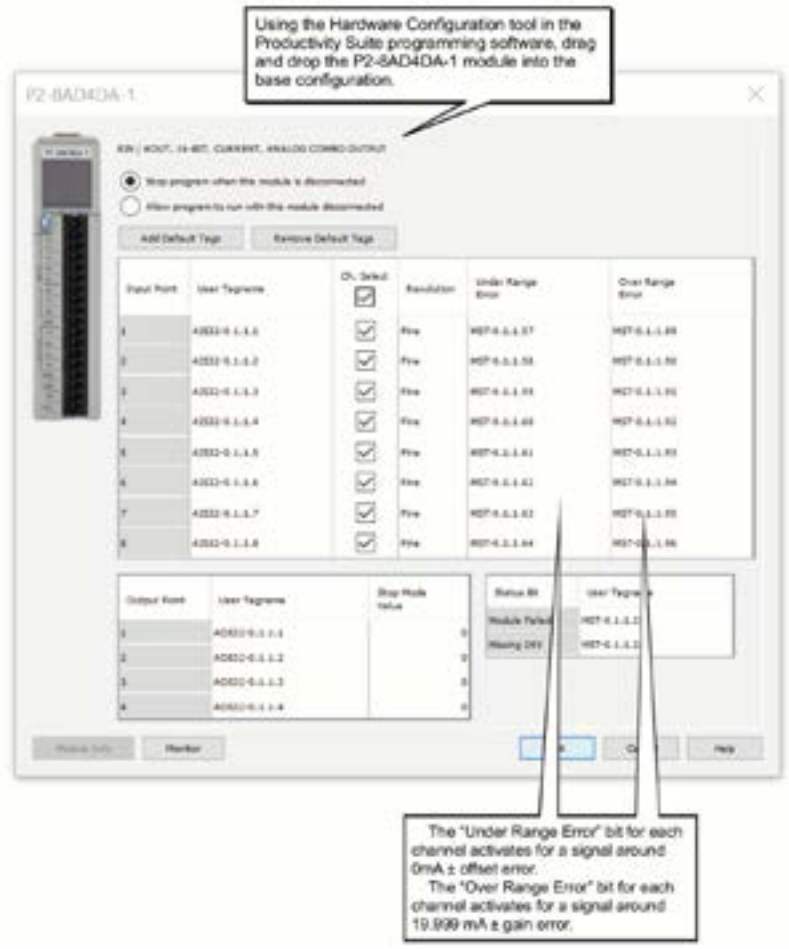
Note: Shield is connected to common at the source device.



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

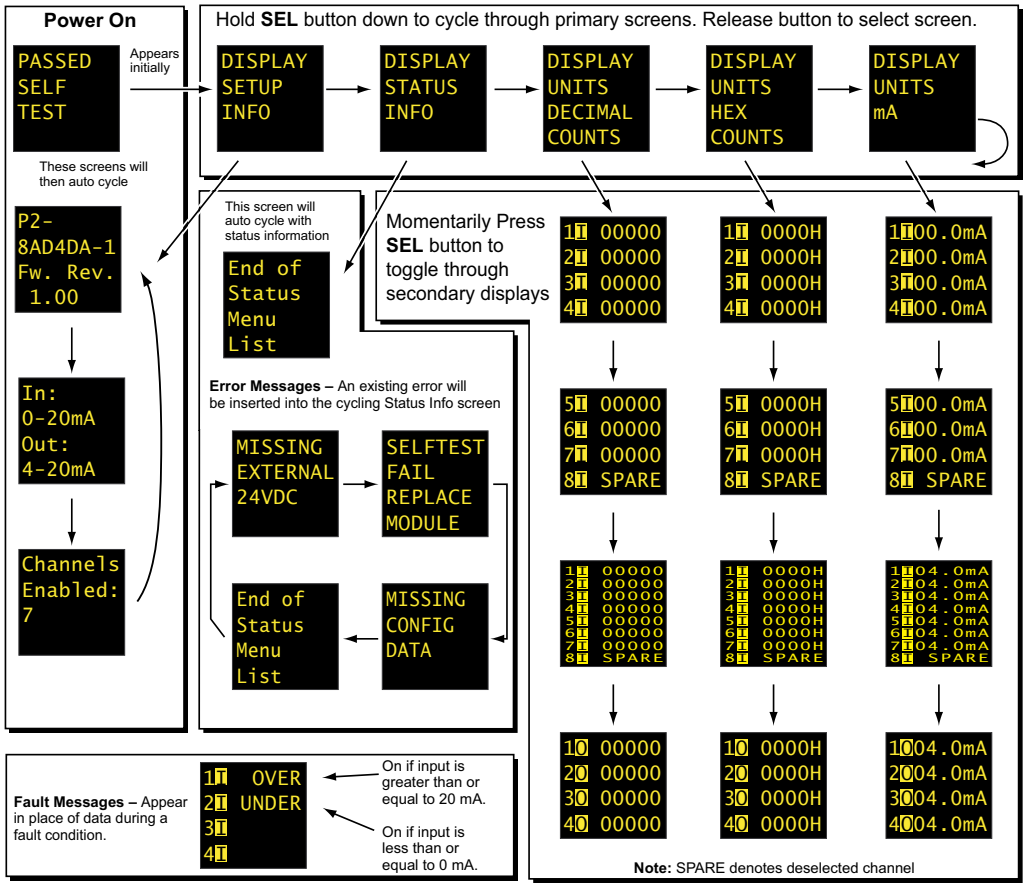
P2-8AD4DA-1 Current Analog Input/Output (continued)

Module Configuration



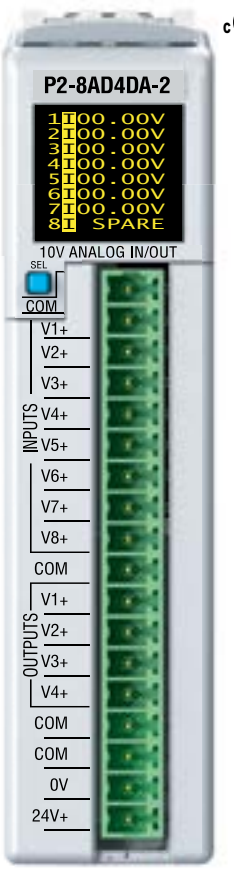
P2-8AD4DA-1 Current Analog Input/Output (continued)

OLED Panel Display



P2-8AD4DA-2 Voltage Analog Input/Output

The P2-8AD4DA-2 Voltage Analog Input/Output Module provides eight channels of 0–10 VDC inputs and four channels of 0–10 VDC outputs.



Terminal blocks sold separately

Input Specifications	
Input Channels	8 inputs (1 common)
Input Ranges	0–5 VDC, 0–10 VDC
Signal Resolution	12–16 bit, depending on input resolution
0–5V Input Resolution & Update Rate (See Note 1)	Fine: 7.1 ms, 76µV, 16 bit Medium: 1.78 ms, 305µV, 14 bit Coarse: 444µs, 1.22 mV, 12 bit
0–10V Input Resolution & Update Rate (See Note 1)	Fine: 7.1 ms, 152µV, 16 bit Medium: 1.78 ms, 610µV, 14 bit Coarse: 444µs, 2.44 mV, 12 bit
Data Range	0–65535 counts
Maximum Continuous Overload	±100V, voltage input
Input Impedance	1MΩ (±10%) voltage input
Hardware Filter Characteristics	Low pass 1st order, -3dB @ 80Hz
All Channel Update Rate (See Note 2)	Fine 56.8 ms Medium: 14.24 ms Coarse: 3.55 ms
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 minute warm-up)
Full Scale Calibration Error (not including offset)	±0.05% of range maximum
Offset Calibration Error	±0.05% of range maximum
Maximum Crosstalk	-96dB, 1LSB
External DC Power Required	24VDC (-20% / +25%), 130mA

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.*

We recommend using pre-wired ZIPLink cables and connection modules. See Chapter 5.
If you wish to hand-wire your module, removable terminal blocks are sold separately. Order part number P2-RTB or P2-RTB-1

P2-8AD4DA-2 Voltage Analog Input/Output (continued)

Output Specifications	
Output Channels	4 (1 common)
Module Signal Output Range	0–10 VDC, 0–5 VDC
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 maximum
Output Value in Fault Mode	0V
Load Impedance	≥1.5 kΩ
Maximum Capacitive Load	0.01 µF
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	±25PPM/°C max full scale calibration change (±0.0025% of range/°C)
Max Crosstalk	-96dB, 1 LSB
Linearity Error (End to End)	±0.015% of full scale Monotonic with no missing codes
Output Stability and Repeatability	±0.015% after 10 minute warm-up typical
Output Ripple	0.01% of full scale at 50/60 Hz
Output Setting Time	500µs max, 5µs 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

Removable Terminal Block Specifications		
Part Number	**P2-RTB**	**P2-RTB-1**
Number of positions	18 screw terminals	18 push release 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 Width	0.1 in. (2.5 mm) maximum	NA
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

** Recommended screwdriver TW-SD-MSL-1*

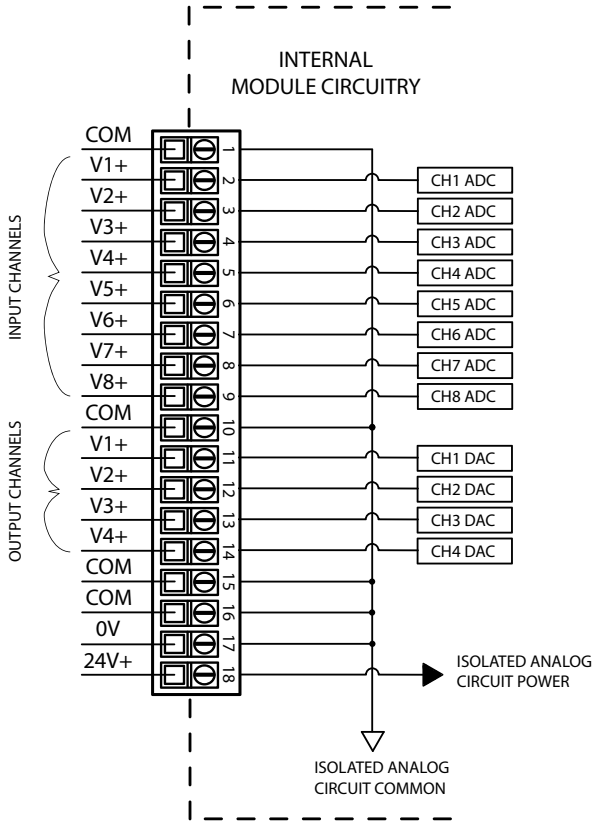
P2-8AD4DA-2 Voltage Analog Input/Output (continued)

General Specifications	
Operating Temperature	0°C– 60°C (32°F–140°F)
Storage Temperature	-20ºC–70ºC (-4ºF–158ºF)
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 1s
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	1.95 W
Enclosure Type	Open equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity®2000 system
Field Wiring	Use ZIPLink wiring system or removable terminal block (not included). See “Wiring Options” in Chapter 5.
Connector Type (not included)	18-position removable terminal block
Weight	90g (3.2 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)*

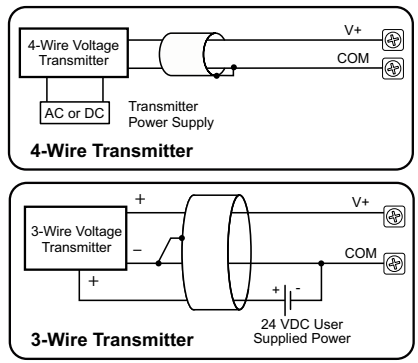
** Meets EMC and Safety requirements. See the D.O.C. for details.*

P2-8AD4DA-2 Voltage Analog Input/Output (continued)

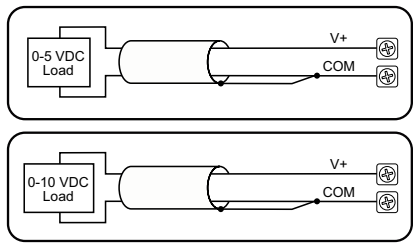
Wiring Diagrams



Voltage Input Circuits



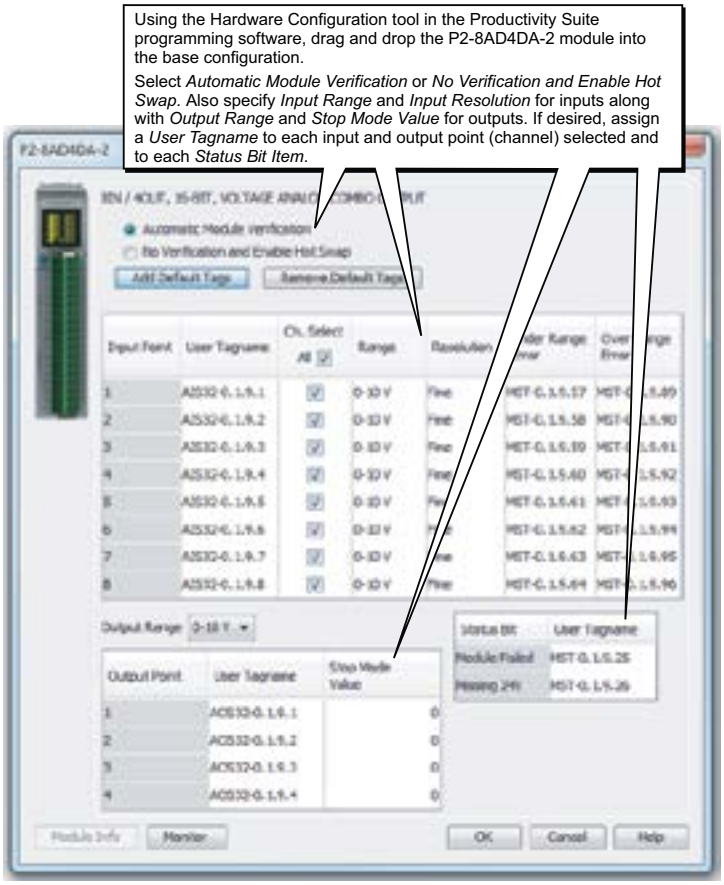
Voltage Output Circuits



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

P2-8AD4DA-2 Voltage Analog Input/Output (continued)

Module Configuration



P2-8AD4DA-2 Voltage Analog Input/Output (continued)

OLED Panel Display