WARNING: To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call Technical Support at 770-844-4200.

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P2-16DAL-1

4-20mA ANALOG OUT

P2-16DAL-1 Analog Output

The P2-16DAL-1 Low Resolution Current Analog Output Module provides sixteen channels of 4–20mA sourcing output signals for use with the Productivity2000 System.

Connector Specifications

Connector Type	24-pin Molex Style 43025-2400
Number of Pins	24
Pin Spacing	3x3 mm (0.118x0.118 in)

Terminal Block sold separately, (see wiring options on page 5).
Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.productivity2000.com for details).
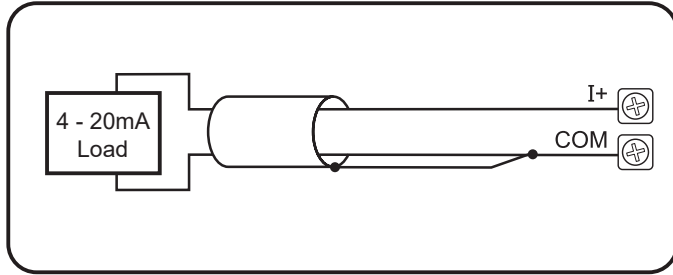
General Specifications

Operating Temperature	0º to 60ºC (32º to 140ºF)
Storage Temperature	-20º to 70ºC (-4º to 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 1 second
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 Productivity2000 System
Field Wiring	Use *ZIP*Link Wiring System ONLY. See "Wiring Options" on page 5. Must use copper conductors 75°C or equivalent.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity2000.com
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 and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)*

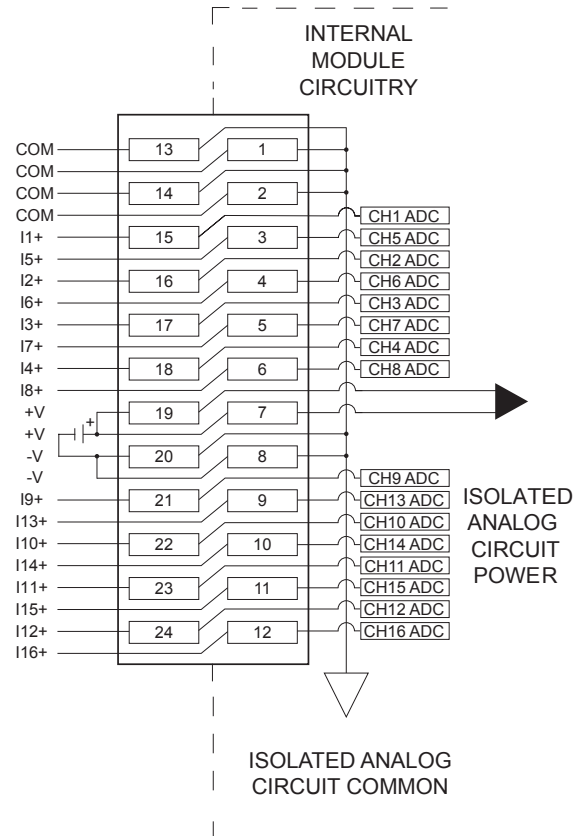*Meets EMC and Safety requirements. See the D.O.C. for details.

Output Specifications

|	
Output Channels	16
Module Signal Output Range	4–20 mA sourcing
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 (sourcing)	Current: 20mA max
Output Value in Fault Mode	Less than 4mA
Load Impedance	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: 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	0.3ms max., 5µs min. (full scale range)
All Channel Update Rate	1ms
Maximum Continuous Overload	Outputs open circuit protected
Field to Logic Side Isolation	1800VAC applied for 1 second (100% tested)
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 @ 410mA (includes loop power)

Current Source Output Circuit

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

INTERNAL MODULE CIRCUITRY

COM	13	1	
COM			
COM	14	2	
COM			
I1+	15	3	CH1 ADC / CH5 ADC
I5+			CH2 ADC
I2+	16	4	CH6 ADC
I6+			CH3 ADC
I3+	17	5	CH7 ADC
I7+			CH4 ADC
I4+	18	6	CH8 ADC
I8+			
+V	19	7	
+V			
-V	20	8	
-V			CH9 ADC
I9+	21	9	CH13 ADC / CH10 ADC
I13+			CH14 ADC
I10+	22	10	CH11 ADC
I14+			CH15 ADC
I11+	23	11	CH12 ADC
I15+			CH16 ADC
I12+	24	12	
I16+			

ISOLATED ANALOG CIRCUIT POWER

ISOLATED ANALOG CIRCUIT COMMON

Module Installation

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

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

2 rotate to seated position

1 Align with slot
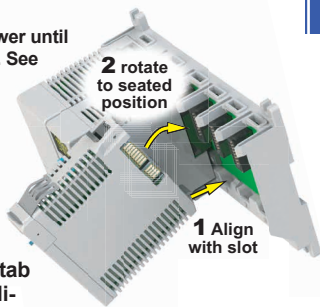
Step Two: Pull top locking tab toward module face. Click indicates lock is engaged.

Locked   Unlocked
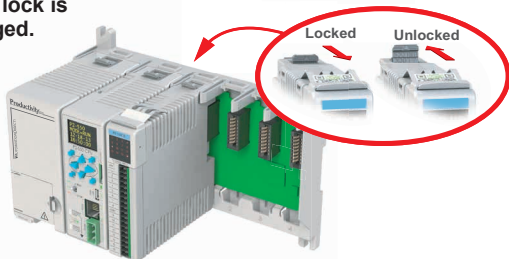
Step Three: Attach field wiring using the removable terminal block or ZIPLink wiring system.

WIRE STRIP LENGTH
MAX
MIN

QR Code

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

Caution: *If possible, remove field power prior to proceeding. If not, then **EXTREME** care **MUST** be taken to prevent damage to the module, or even personal injury due to a short circuit from the live terminal block.*
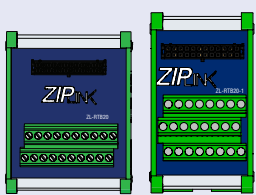
Important Hot-Swap Information

The Productivity2000 PAC supports hot-swap! Individual modules can be taken offline, removed, and replaced while the rest of the PAC system continues controlling your process. Before attempting to use the hot-swap feature, be sure to read the hot-swap topic in the programming software's help file or our online documentation at AutomationDirect.com for details on how to plan your installation for use of this powerful feature.

Wiring Options

1	***ZIP*Link Feed Through *Modules and Cables[1]***	**ZIP**LINK ▼AUTOMATIONDIRECT®
		ZL-RTB20
		ZL-RTB20-1
	0.5 m (1.6 ft) cable	ZL-P2-CBL24
	1.0 m (3.3 ft) cable	ZL-P2-CBL24-1
	2.0 m (6.6 ft) cable	ZL-P2-CBL24-2
2	*Terminal Block with pigtail cable*	
	1.0 m (3.3 ft) cable	ZL-P2-CBL24-1P
	2.0 m (6.6 ft) cable	ZL-P2-CBL24-2P
3	*Accessories[2]*	
		ZL-RTB-COM
		TW-SD-SL-1
		TW-SD-MSL-1

1. Cable + ***ZIP*Link Module = Complete System**
2. ZL-RTB-COM provides a common connection point for power or ground

Module Configuration

Using the Hardware Configuration tool in the Productivity Suite programming software, drag and drop the P2-16DAL-1 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*. A *Stop Mode Value* may also be assigned.

P2-16DA

16CH, 12-BIT, CURRENT, ANALOG OUTPUT
- ◉ Automatic Module Verification
- ○ No Verification and Enable Hot Swap

Add Default Tags   Remove Default Tags

Point	User Tagname	Stop Mode Value
1	AOS32-0.1.1.1	
2	AOS32-0.1.1.2	
3	AOS32-0.1.1.3	
4	AOS32-0.1.1.4	
5	AOS32-0.1.1.5	0
6	AOS32-0.1.1.6	0
7	AOS32-0.1.1.7	0
8	AOS32-0.1.1.8	0
9	AOS32-0.1.1.9	0
10	AOS32-0.1.1.10	0
11	AOS32-0.1.1.11	0
12	AOS32-0.1.1.12	0

Status Bit	User Tagname
Module Failed	MST-0.1.1.25
Missing 24V	MST-0.1.1.26

Module Info   Monitor   OK   Cancel   Help

Linear Scaling

Non-Linear Scaling

The Scale (Linear) function can be used to:

• **Convert analog field input signals from the range which is native to the analog input module to an application specific range.**

• **Make other linear conversions in ranges appropriate to the application.**

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

Scale (Linear) (SCL)

Input: Tank Level
Output: Control Valve

In Min: 220
In Max: 12500
Out Min: 0
Out Max: 4095

☐ Show Instruction Comment

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

Scale (Non Linear) (SCLN)

Input: Level Transmitter
Output: Tank Level

Input value	Desired Output
0	0
1	.5
2	1
3	1.55
4	2.25
5	3
6	4.55
6.5	6.75
7	7
0	0
0	0
0	
0	
0	
0	
0	

☐ Show Instruction

Enter values for each breakpoint in the table. Each breakpoint will define a segment of the non-linear scaling.

OK   Cancel   Help