AUTOMATIONDIRECT.com

Productivity2000™

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 0-10VDC analog signals for use with the Productivity2000 System.

P2-04DAL-2

0-10V ANALOG OUT

COM
V1+
V2+
V3+
V4+

COM
COM
COM
COM
COM
COM
COM
0V
24V+

Removable Terminal Block Specifications

Part Number	P2-RTB	P2-RTB-1
Number of positions	18 Screw Terminals	18 Spring Clamp Terminals
Wire Range	30–16 AWG (0.051 – 1.31 mm²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Maximum 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 Maximum 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*	
Screw Size	M2	N/A
Screw Torque	2.5 lb·in (0.28 N·m)	N/A

*Recommended Screwdriver TW-SD-MSL-1

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).
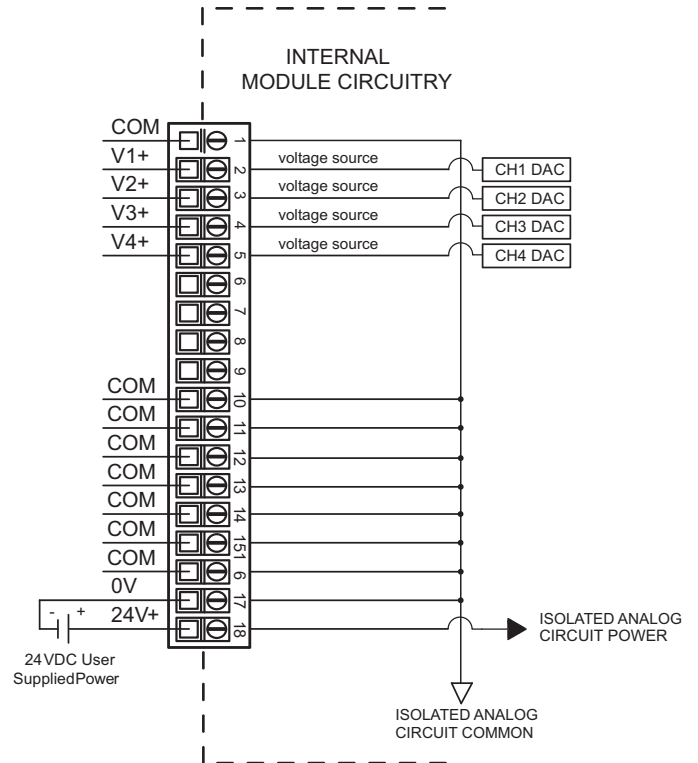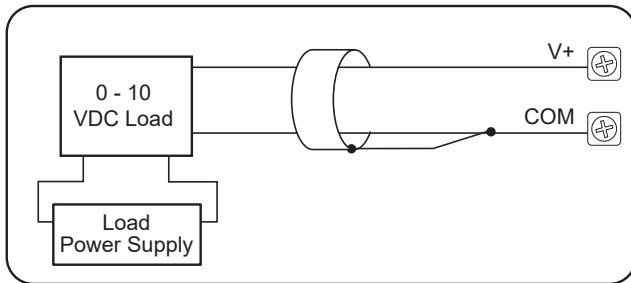
General Specifications

Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	> 10MΩ @ 500VDC
Heat Dissipation	3250mW
Enclosure Type	Open Equipment
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in a Productivity2000 System
Field Wiring	Removable terminal block. Optional *ZIP*Link wiring system See "Wiring Options" on page 5.
EU Directive	See the "EU Directive" topic in the Productivity Suite Help File. Information can also be obtained at: www.productivity2000.com
Connector Type (sold separately)	18-position removable terminal block
Weight	95g (3.4 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	4
Output Range	0-10 V
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	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)	±0.2% of range maximum
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	-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	0.300 µs max., 5µs 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
Output Signal at Power Up and Power Down	0V
External Power Supply Required	24VDC (-20% / +25%), 60mA

Voltage Output Circuits

INTERNAL
MODULE CIRCUITRY

COM	1	
V1+	2	voltage source → CH1 DAC
V2+	3	voltage source → CH2 DAC
V3+	4	voltage source → CH3 DAC
V4+	5	voltage source → CH4 DAC
	6	
	7	
	8	
	9	
COM	10	
COM	11	
COM	12	
COM	13	
COM	14	
COM	15	
0V	16	
24V+	17	
	18	

0 - 10
VDC Load

V+

COM

Load
Power Supply

- + 24V+

24 VDC User
Supplied Power
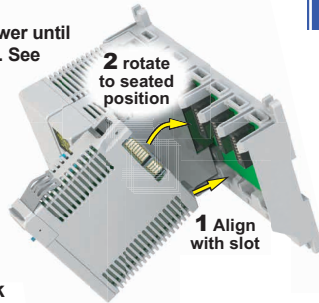
ISOLATED ANALOG
CIRCUIT POWER

ISOLATED ANALOG
CIRCUIT COMMON

Module Installation

WARNING: Do not apply field power until the following steps are completed. See hot-swapping procedure for exceptions.
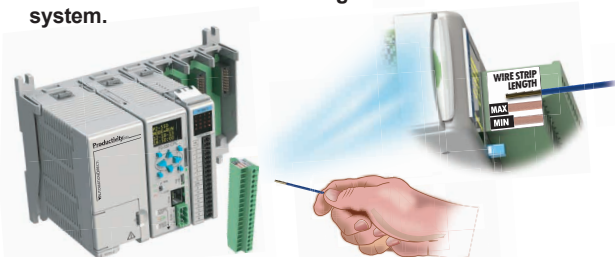
Step One: Align module catch with base slot and rotate module into connector.

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
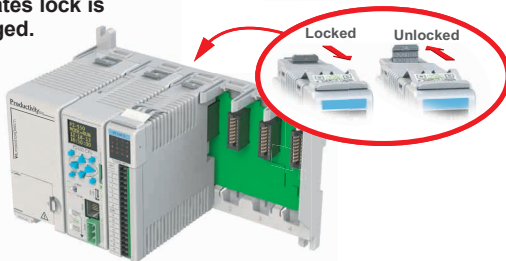
Step Three: Attach field wiring using the removable terminal block or *ZIP*Link wiring system.

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 supports hot-swap! Individual modules can be taken offline, removed, and replaced while the rest of the 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

ZIPLink Feed Through *Modules and Cables*[1]
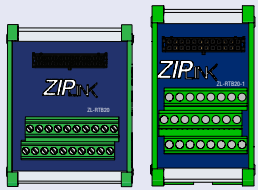
1		
		ZL-RTB20
		ZL-RTB20-1
	0.5 m (1.6 ft) cable	ZL-P2-CBL18
	1.0 m (3.3 ft) cable	ZL-P2-CBL18-1
	2.0 m (6.6 ft) cable	ZL-P2-CBL18-2

2 Terminal Block with pigtail cable

	1.0 m (3.3 ft) cable	ZL-P2-CBL18-1P
	2.0 m (6.6 ft) cable	ZL-P2-CBL18-2P

3 Screw Terminal Block only
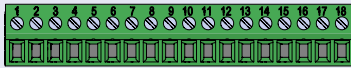
	P2-RTB (Quantity 1)

4 Spring Clamp Terminal Block only
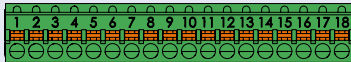
	P2-RTB-1 (Quantity 1)

5 Accessories[2]
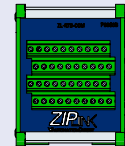
	ZL-RTB-COM
	TW-SD-SL-1
	TW-SD-MSL-1

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 P2-04DAL-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*. A *Stop Mode Value* may also be assigned.

P2-04DAL-2

4CH, 12-BIT, VOLTAGE, ANALOG OUTPUT

- ● Automatic Module Verification
- ○ No Verification and Enable Hot Swap

[Add Default Tags] [Remove Default Tags]

Point	User Tagname	Stop Mode Value
1	AOS32-0.1.5.1	0
2	AOS32-0.1.5.2	0
3	AOS32-0.1.5.3	0
4	AOS32-0.1.5.4	0
		0
		0
		0
		0

Status Bit	User Tagname
Module Failed	MST-0.1.5.25
Missing 24V	MST-0.1.5.26

[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

max

min

min   max

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
6.5	5
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

7
6
5
4
3
2
1
0
    1 2 3 4 5 6 7