

# Analog Output Modules

## P3-04DA



### Voltage/Current Analog Output

The P3-04DA Voltage/Current Analog Output Module provides four channels of  $\pm 10$  VDC or 4 - 20mA sink/source selectable outputs.



Patent-pending LCD gives access to field signal values, as well as module and signal faults.

Terminal block sold separately; terminal block cover included with module.

| Output Specifications   |   |
|---|---|
| Output Channels   | 4   |
| Module signal output range  | $\pm 10$ V or 4-20mA sink or source selectable each channel   |
| Signal Resolution   | 16-bit  |
| Resolution Value of LSB (least significant bit)                   | $\pm 10$ V = 305 $\mu$ V/ count<br>4-20mA = 0.244 $\mu$ A/ count<br>1 LSB = 1 count   |
| Data Range  | 0 - 65535 counts uni-polar and -32768 to +32767 counts bi-polar   |
| Output Type   | Voltage outputs sourcing/sinking at 10mA max, or Current outputs sink or source at 20mA max.  |
| Output Value in Fault Mode  | Voltage outputs 0V or 0mA current outputs   |
| Load Impedance (Minimum External Power Supply)                    | >1000 $\Omega$ voltage outputs )(19.2 - 30 VDC)<br>0-755 $\Omega$ Sinking, 0-600 $\Omega$ Sourcing (19.2 VDC)<br>0-875 $\Omega$ Sinking, 0-700 $\Omega$ Sourcing (21.6 VDC)<br>0-1000 $\Omega$ Sinking, 0-855 $\Omega$ Sourcing (24.0 VDC)<br>0-1110 $\Omega$ Sinking, 0-970 $\Omega$ Sourcing (26.4 VDC)<br>0-1350 $\Omega$ Sinking, 0-1150 $\Omega$ Sourcing (30 VDC) |
| Maximum Capacitive Load   | .01 $\mu$ F maximum voltage outputs   |
| Maximum Inductive Load  | 1 mH 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) | $\pm 0.25\%$ of range maximum voltage outputs<br>$\pm 0.25\%$ of range maximum current outputs  |
| Accuracy vs. Temperature  | $\pm 25$ ppm/ $^{\circ}$ C max f.s. calibration change ( $\pm .0025\%$ of range / $^{\circ}$ C)   |
| Max Crosstalk   | -80 dB, 6 LSB   |
| Linearity Error (End to End)                                      | $\pm 16$ LSB maximum ( $\pm 0.025\%$ of full scale) Monotonic with no missing codes   |
| Output Stability and Repeatability                                | $\pm 10$ LSB after 10 minute warm-up (typical)  |
| Output Ripple   | .05% of Full Scale  |
| Output Settling Time  | 0.3 ms max, 5 $\mu$ s min (full scale change)   |
| All Channel Update Rate   | 0.6ms   |
| Maximum Continuous Overload                                       | Voltage Outputs current limited to 35mA typical. Current Outputs open circuit protected   |
| Type of Output Protection   | 15VDC Peak Output Voltage<br>Current outputs current limited to $\leq 20$ mA  |
| Output Signal (power-up, - down)                                  | 0V voltage outputs, 0mA current outputs   |
| External DC Power Required  | 94mA voltage operation 4 channels<br>126mA current operation 4 channels<br>24VDC -20% / + 25%   |

| Removable Terminal Block Specifications |   |
|---|---|
| Description                             | Part No. P3-RTB; 20 screw terminals   |
| Wire Range                              | 22-14 AWG (0.324 to 2.08 sq. mm)<br>Solid / stranded conductor<br>3/64 in. (1.2 mm) insulation maximum<br>"USE COPPER CONDUCTORS , 60 $^{\circ}$ C" or equivalent.      |
| Screw Driver Width                      | 1/4 inch (6.5 mm) maximum   |
| Screw Size                              | M3 size   |
| Screw Torque                            | Field terminals - 7 - 9 in./lb (.0882 - 1.02 Nm)<br>Self-jacking screws - 2.7 - 3.6 in./lb (0.3 - 0.4 Nm).<br>Do not overtighten screws when installing terminal block. |

We recommend using prewired ZIPLink cables and connection modules. See "Wiring Systems".

Terminal block cover included. If you wish to hand-wire your module, a removable terminal block is sold separately. Order part number P3-RTB.



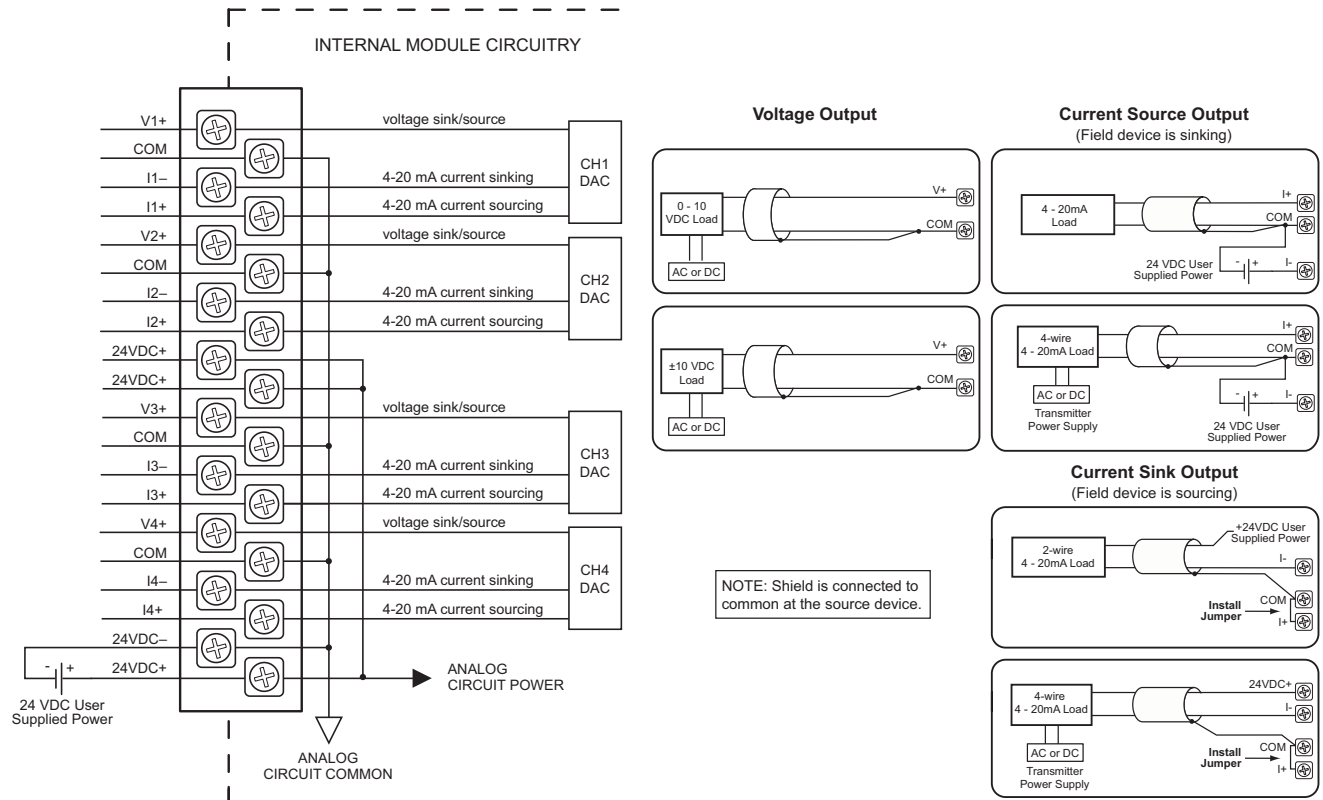
# Analog Output Modules

## P3-04DA (cont'd)

| 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         | >10MV @ 500 VDC  |
| Heat Dissipation              | 2.6 W voltage outputs<br>3.4 W current outputs   |
| Enclosure Type                | Open Equipment   |
| Agency Approvals              | UL508 file E157382, Canada & USA<br>UL1604 file E200031, Canada & USA<br>CE (EN61131-2*)<br>This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or non-hazardous locations only. |
| Module Keying to Backplane    | Electronic   |
| Module Location               | Any I/O slot in any local, expansion, or remote base in a Productivity3000 System.   |
| Field Wiring                  | Removable terminal block (not included). Use ZIPLink wiring system or optional terminal block. See "Wiring I/O Modules".   |
| EU Directive                  | See the "EU Directive" topic in the Productivity3000 Help File. Information can also be obtained at: <a href="http://www.productivitypac.com">www.productivitypac.com</a>                                    |
| Terminal Type (not included)  | 20-position removable terminal block   |
| Weight                        | 105g (3.73 oz)   |

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

**WARNING: Explosion hazard – Substitution of components may impair suitability for Class I, Division 2.**





## Specify your ZIPLink system

Use the Compatibility Matrix table below.

|  |   |
|--|---|
| <b>Step 1</b>  | Locate the I/O module part number.  |
| <b>Step 2</b>  | Locate Connector Module Type. (Feedthrough Module, Fuse Module, etc...)                                 |
| <b>Step 3</b>  | Select the cable length by replacing the # symbol with: Blank = 0.5m, -1 = 1.0m, -2 = 2.0m <sup>1</sup> |
| <sup>1</sup> Note: Cable part number denotes compatibility between Connector Module and I/O Modules. |   |

| Productivity3000 ZIPLink Wiring System Compatibility Matrix |                     |                     |           |               |           |              |                   |                |
|---|---------------------|---------------------|-----------|---------------|-----------|--------------|-------------------|----------------|
| Step 2: Connector Module Type                               |                     | Feedthrough Modules |           | Fuse Modules  |           | Relay Module | Sensor Input Mod. | Pigtail Cable  |
| Step 1: I/O Module  | Number of Terminals | ZL-RTB20            | ZL-RTB40  | ZL-RFU20      | ZL-RFU40  | ZL-RRL16-24  | ZL-LTB16-24       |                |
|   |                     | Step 3: Cables      |           |               |           |              |                   |                |
| <b>Inputs</b>   |                     |                     |           |               |           |              |                   |                |
| P3-08NAS  | 20                  | ZL-P3-CBL20#        |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08ND3S   | 20                  | ZL-P3-CBL20#        |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16NA   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16ND3  | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-32ND3  | 40                  |                     | ZL-CBL40# |               |           |              | ZL-P3-CBL40#      |                |
| P3-64ND3*   | 40                  |                     | ZL-CBL40# |               |           |              | ZL-P3-CBL40#      |                |
| <b>Outputs</b>  |                     |                     |           |               |           |              |                   |                |
| P3-08TAS  | 20                  | ZL-P3-CBL20#        |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08TD1S   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08TD2S   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08TRS  | 20                  | ZL-P3-CBL20#        |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16TA   | 20                  | ZL-P3-CBL20#        |           | ZL-P3-CBL20L# |           |              |                   | ZL-P3-CBL20-#P |
| P3-16TD1  | 20                  | ZL-P3-CBL20#        |           | ZL-P3-CBL20#  |           | ZL-P3-CBL20# |                   | ZL-P3-CBL20-#P |
| P3-16TD2  | 20                  | ZL-P3-CBL20#        |           | ZL-P3-CBL20#  |           |              |                   | ZL-P3-CBL20-#P |
| P3-16TR   | 20                  | ZL-P3-CBL20#        |           | ZL-P3-CBL20#  |           |              |                   | ZL-P3-CBL20-#P |
| P3-08TRS-1***   | 20                  | ZL-P3-CBL20#        |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-32TD1  | 40                  |                     | ZL-CBL40# |               | ZL-CBL40# |              |                   |                |
| P3-32TD2  | 40                  |                     | ZL-CBL40# |               | ZL-CBL40# |              |                   |                |
| P3-64TD1*   | 40                  |                     | ZL-CBL40# |               | ZL-CBL40# |              |                   |                |
| P3-64TD2*   | 40                  |                     | ZL-CBL40# |               | ZL-CBL40# |              |                   |                |
| <b>Analog In</b>  |                     |                     |           |               |           |              |                   |                |
| P3-04ADS  | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08AD   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16AD-1   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16AD-2   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08RTD**  | Matched Only        |                     |           |               |           |              |                   |                |
| P3-08THM**  | T/C Wire Only       |                     |           |               |           |              |                   |                |
| <b>Analog Out</b>   |                     |                     |           |               |           |              |                   |                |
| P3-04DA   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08DA-1   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-08DA-2   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-06DAS-1  | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-06DAS-2  | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16DA-1   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-16DA-2   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| <b>Analog Combo</b>   |                     |                     |           |               |           |              |                   |                |
| P3-8AD4DA-1   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |
| P3-8AD4DA-2   | 20                  | ZL-P3-CBL20L#       |           |               |           |              |                   | ZL-P3-CBL20-#P |

\*The P3-64ND3, P3-64TD1, and P3-64TD2 modules have two 32-point connectors and require 2 ZIPLink cables and 2 ZIPLink connector modules.

\*\*These modules are not supported by the ZIPLink wiring system. Removable terminal block P3-RTB included.

\*\*\*The P3-08TRS-1 output module is derated, not to exceed 2A per point maximum when used with the ZIPLink wiring system.

# I/O Modules

A variety of discrete and analog I/O modules are available for use in local, expansion, and remote I/O bases. Specifications for each module are on the following pages.

A filler module is available for unused I/O module slots (part number P3-FILL).



## Discrete Input Modules

| Productivity3000 Discrete Input Modules |                  |                                    |       |
|---|------------------|------------------------------------|-------|
| Part Number                             | Number of Inputs | Description                        | Price |
| P3-16SIM                                | 16               | Input Simulator Module             | <---> |
| P3-08ND3S                               | 8                | Isolated Sinking/Sourcing DC Input | <---> |
| P3-16ND3                                | 16               | Sinking/Sourcing DC Input          | <---> |
| P3-32ND3*                               | 32               | Sinking/Sourcing DC Input          | <---> |
| P3-64ND3*                               | 64               | Sinking/Sourcing DC Input          | <---> |
| P3-08NAS                                | 8                | Isolated AC Input                  | <---> |
| P3-16NA                                 | 16               | AC Input                           | <---> |

\*ZIPLink required.

## Analog I/O Modules

| Productivity3000 Analog Input Modules |                    |                           |       |
|---------------------------------------|--------------------|---------------------------|-------|
| Part Number                           | Number of Channels | Description               | Price |
| P3-04ADS                              | 4                  | Isolated Analog Input     | <---> |
| P3-08AD                               | 8                  | Analog Input              | <---> |
| P3-16AD-1                             | 16                 | Analog Input (Current)    | <---> |
| P3-16AD-2                             | 16                 | Analog Input (Voltage)    | <---> |
| P3-08RTD                              | 8                  | Analog RTD Input          | <---> |
| P3-08THM                              | 8                  | Analog Thermocouple Input | <---> |

| Productivity3000 Analog Output Modules |                    |                                  |       |
|--|--------------------|----------------------------------|-------|
| Part Number                            | Number of Channels | Description                      | Price |
| P3-04DA                                | 4                  | Analog Output                    | <---> |
| P3-08DA-1                              | 8                  | Analog Output (Current)          | <---> |
| P3-08DA-2                              | 8                  | Analog Output (Voltage)          | <---> |
| P3-06DAS-1                             | 6                  | Isolated Analog Output (Current) | <---> |
| P3-06DAS-2                             | 6                  | Isolated Analog Output (Voltage) | <---> |
| P3-16DA-1                              | 16                 | Analog Output (Current)          | <---> |
| P3-16DA-2                              | 16                 | Analog Output (Voltage)          | <---> |

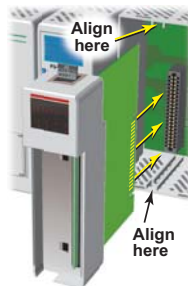
| Productivity3000 Analog Input/Output Modules |                    |                               |       |
|--|--------------------|-------------------------------|-------|
| Part Number                                  | Number of Channels | Description                   | Price |
| P3-8AD4DA-1                                  | 8/4                | Analog Input/Output (Current) | <---> |
| P3-8AD4DA-2                                  | 8/4                | Analog Input/Output (Voltage) | <---> |

## Discrete Output Modules

| Productivity3000 Discrete Output Modules |                   |                          |       |
|--|-------------------|--------------------------|-------|
| Part Number                              | Number of Outputs | Description              | Price |
| P3-08TD1S                                | 8                 | Isolated Sinking Output  | <---> |
| P3-08TD2S                                | 8                 | Isolated Sourcing Output | <---> |
| P3-16TD1                                 | 16                | Sinking Output           | <---> |
| P3-16TD2                                 | 16                | Sourcing Output          | <---> |
| P3-32TD1*                                | 32                | Sinking Output           | <---> |
| P3-32TD2*                                | 32                | Sourcing Output          | <---> |
| P3-64TD1*                                | 64                | Sinking Output           | <---> |
| P3-64TD2*                                | 64                | Sourcing Output          | <---> |
| P3-08TAS                                 | 8                 | Isolated AC Output       | <---> |
| P3-16TA                                  | 16                | AC Output                | <---> |
| P3-08TRS                                 | 8                 | Isolated Relay Output    | <---> |
| P3-16TR                                  | 16                | Relay Output             | <---> |
| P3-08TRS-1                               | 8                 | Isolated Relay Output    | <---> |

\*ZIPLink required.

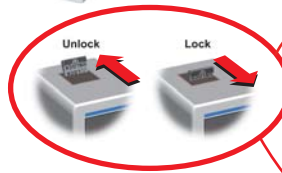
## Module Installation Procedure



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

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

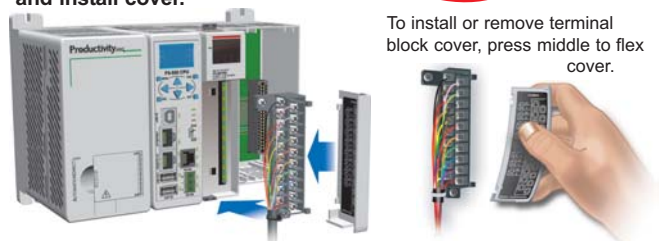
**Step Two:** Pull top and bottom locking tabs toward module face. Click indicates lock is engaged.



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



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



**WARNING:** Explosion hazard – Do not connect or disconnect connectors or operate switches while circuit is live unless the area is known to be non-hazardous. Do not hot-swap modules unless the area is known to be non-hazardous.