

# DL05/06 Option Modules

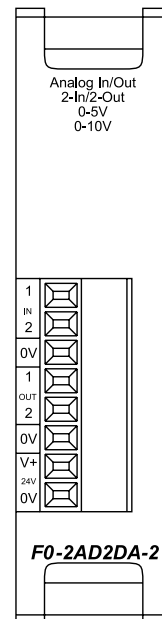
## F0-2AD2DA-2 \$264.00

**2-channel analog voltage input and  
2-channel analog voltage output module**

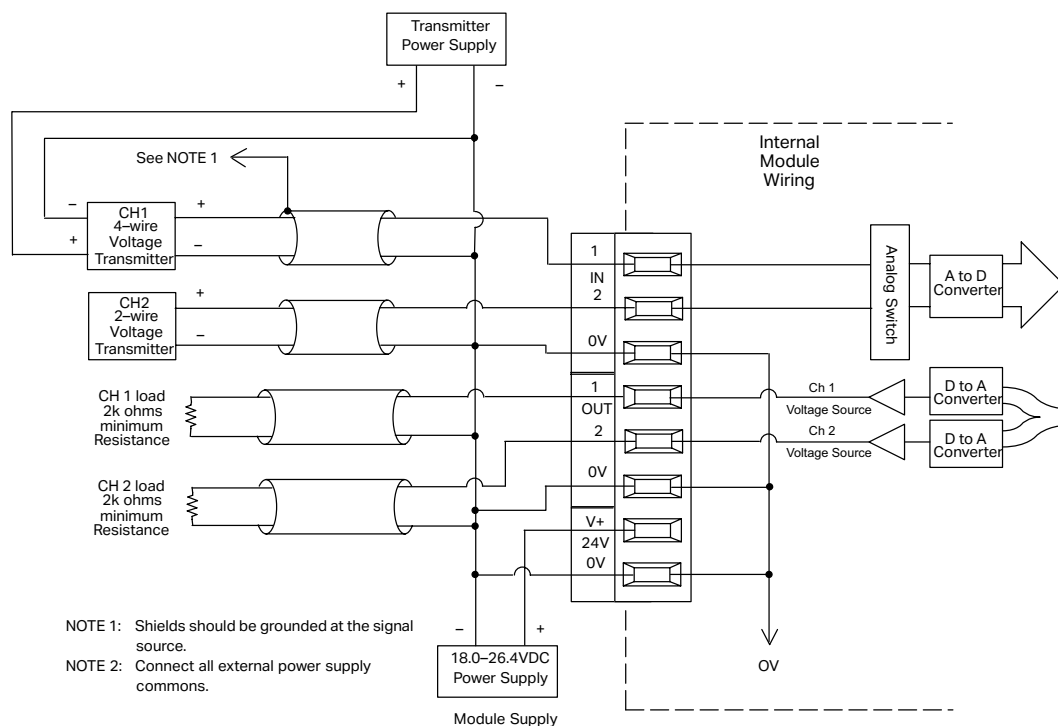
| F0-2AD2DA-2 Input Specifications    |                                                                            |
|-------------------------------------|----------------------------------------------------------------------------|
| <b>Number of Channels</b>           | 2, single ended (one common)                                               |
| <b>Input Range</b>                  | 0 to 5 VDC or<br>0 to 10 VDC<br>(jumper selectable)                        |
| <b>Resolution</b>                   | 12-bit (1 in 4096)                                                         |
| <b>Step Response</b>                | 10.0 ms to 95%<br>of full step change                                      |
| <b>Crosstalk</b>                    | 1/2 count<br>max (-80db)*                                                  |
| <b>Active Low-pass Filtering</b>    | -3dB at 300Hz<br>(-12dB per octave)                                        |
| <b>Input Impedance</b>              | >20k $\Omega$                                                              |
| <b>Absolute Max Ratings</b>         | $\pm 15V$                                                                  |
| <b>Linearity Error (end to end)</b> | $\pm 2$ counts (0.025%<br>of full scale) max*                              |
| <b>Input Stability</b>              | $\pm 1$ count*                                                             |
| <b>Gain Error</b>                   | $\pm 6$ counts max*                                                        |
| <b>Offset Error</b>                 | $\pm 2$ counts max*                                                        |
| <b>Max Inaccuracy</b>               | $\pm 0.3\%$ at 25-C<br>(77-F)<br>$\pm 0.6\%$ at 0 to 60-C (32<br>to 140-F) |
| <b>Accuracy vs. Temperature</b>     | $\pm 100$ ppm/-C typical                                                   |

\* One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096)

| F0-2AD2DA-2 Output Specifications   |                                                     |
|-------------------------------------|-----------------------------------------------------|
| <b>Number of Channels</b>           | 2, single ended (one common)                        |
| <b>Output Range</b>                 | 0 to 5 VDC or<br>0 to 10 VDC<br>(jumper selectable) |
| <b>Resolution</b>                   | 12-bit (1 in 4096)                                  |
| <b>Conversion Settling Time</b>     | 50 $\mu$ s<br>for full scale change                 |
| <b>Crosstalk</b>                    | 1/2 count max<br>(-80db)*                           |
| <b>Peak Output Voltage</b>          | $\pm$ supply limited)                               |
| <b>Offset Error</b>                 | 0.1% of range                                       |
| <b>Gain Error</b>                   | 0.4% of range                                       |
| <b>Linearity Error (end to end)</b> | $\pm 1$ counts (0.075%<br>of full scale) max*       |
| <b>Output Stability</b>             | $\pm 2$ counts*                                     |
| <b>Load Impedance</b>               | 2k $\Omega$ min                                     |
| <b>Load Capacitance</b>             | 0.01 $\mu$ F max                                    |
| <b>Terminal Type (Included)</b>     | Removable: F0-IOCON                                 |
| <b>Accuracy vs. Temperature</b>     | $\pm 50$ ppm / $^{\circ}$ C typical                 |



See Wiring Solutions for part numbers of ZIPLink cables and connection modules compatible with this I/O module.





# Wiring Solutions

## Wiring Solutions using the ZIPLink Wiring System

**ZIPLink**s eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end.

Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the **ZIPLink** System ranging from

PLC I/O-to-**ZIPLink** Connector Modules that are ready for field termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of **ZIPLink** modules are provided with **ZIPLink** cables. See the following solutions to help determine the best **ZIPLink** system for your application.

### **Solution 1: DirectLOGIC I/O Modules to ZIPLink Connector Modules**

When looking for quick and easy I/O-to-field termination, a **ZIPLink** connector module used in conjunction with a prewired **ZIPLink** cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.

Using the PLC I/O Modules to **ZIPLink** Connector Modules selector tables located in this section,

1. Locate your I/O module/PLC.
2. Select a **ZIPLink** module.
3. Select a corresponding **ZIPLink** cable.



### **Solution 2: DirectLOGIC I/O Modules to 3rd Party Devices**

For connecting I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the **ZIPLink** Pigtail Cables. **ZIPLink** Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.

Using the I/O Modules to 3rd Party Devices selector tables located in this section,

1. Locate your PLC I/O module.
2. Select a **ZIPLink** pigtail cable that is compatible with your 3rd party device.



### **Solution 3: GS Series and DuraPulse Drives Communication Cables**

Need to communicate via Modbus RTU to a drive or a network of drives?

**ZIPLink** cables are available in a wide range of configurations for connecting to PLCs and SureServo, SureStep, Stellar soft starters and AC drives. Add a **ZIPLink** communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,

1. Locate your drive and type of communications.
2. Select a **ZIPLink** cable and other associated hardware.





# Wiring Solutions

## **Solution 4: Serial Communications Cables**

**ZIPLink** offers communications cables for use with DirectLOGIC, CLICK, and Productivity3000 CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the Serial Communications Cables selector table located in this section,

1. Locate your connector type.
2. Select a cable.



## **Solution 5: Specialty ZIPLink Modules**

For additional application solutions, **ZIPLink** modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

Using the **ZIPLink** Specialty Modules selector table located in this section,

1. Locate the type of application.
2. Select a **ZIPLink** module.



## **Solution 6: ZIPLink Connector Modules to 3rd Party Devices**

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible **ZIPLink** connector modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the Universal Connector Modules and Pigtail Cables table located in this section,

1. Select module type.
2. Select the number of pins.
3. Select cable.





# PLC I/O Modules to ZIPLink Connector Modules - DL05/06

| DL05/06 PLC Input Module ZIPLink Selector |                   |                  |                        |                              |
|-------------------------------------------|-------------------|------------------|------------------------|------------------------------|
| PLC                                       |                   | ZIPLink          |                        |                              |
| <i>Input Module</i>                       | <i># of Terms</i> | <i>Component</i> | <i>Module Part No.</i> | <i>Cable Part No.</i>        |
| <u><b>DO-10ND3</b></u>                    | 13                | Feedthrough      | ZL-RTB20               | <u><b>ZL-D0-CBL13</b></u>    |
| <u><b>DO-10ND3F</b></u>                   | 13                | Feedthrough      |                        | <u><b>ZL-D0-CBL24-L</b></u>  |
| <u><b>DO-16ND3</b></u>                    | 24                | Feedthrough      | ZL-LTB16-24-1          | <u><b>ZL-D0-CBL24-1L</b></u> |
|                                           |                   | Sensor           |                        | <u><b>ZL-D0-CBL24-2L</b></u> |
| <u><b>FO-08NA-1</b></u>                   | 10                | See Note 2       |                        |                              |

| DL05/06 PLC Combo In/Out Module ZIPLink Selector |            |             |                 |                |
|--------------------------------------------------|------------|-------------|-----------------|----------------|
| PLC                                              |            | ZIPLink     |                 |                |
| Combo Module                                     | # of Terms | Component   | Module Part No. | Cable Part No. |
| <b>DO-07CDR</b>                                  | 10         | See Note 2  |                 |                |
| <b>DO-08CDD1</b>                                 | 13         | Feedthrough | ZL-RTB20        | ZL-D0-CBL13    |

| DL05/06 PLC Analog Module ZIPLink Selector |              |             |          |             |
|--------------------------------------------|--------------|-------------|----------|-------------|
| PLC                                        |              | ZIPLink     |          |             |
| Analog Module                              | # of Terms   | Component   | Module   | Cable       |
| <b>FO-04AD-1</b>                           | 8            | See Note 2  |          |             |
| <b>FO-04AD-2</b>                           | 8            |             |          |             |
| <b>FO-08ADH-1</b>                          | 13           | Feedthrough | ZL-RTB20 | ZL-D0-CBL13 |
| <b>FO-08ADH-2</b>                          | 13           |             |          |             |
| <b>FO-04DAH-1</b>                          | 13           |             |          |             |
| <b>FO-08DAH-1</b>                          | 13           |             |          |             |
| <b>FO-04DAH-2</b>                          | 13           |             |          |             |
| <b>FO-08DAH-2</b>                          | 13           |             |          |             |
| <b>FO-2AD2DA-2</b>                         | 8            | See Note 2  |          |             |
| <b>FO-4AD2DA-1</b>                         | 8            |             |          |             |
| <b>FO-4AD2DA-2</b>                         | 8            |             |          |             |
| <b>FO-04RTD</b>                            | Matched Only |             |          |             |
| <b>FO-04THM</b>                            | Matched Only |             |          |             |



**Note:** ZIPLink Connector Modules and ZIPLink Cables specifications are in the ZIPLink catalog section.

| DL05/06 PLC Output Module ZIPLink Selector |            |                  |                       |                |
|--------------------------------------------|------------|------------------|-----------------------|----------------|
| PLC                                        |            | ZIPLink          |                       |                |
| Output Module                              | # of Terms | Component        | Module Part No.       | Cable Part No. |
| <b>DO-10TD1</b>                            | 13         | Feedthrough      | ZL-RTB20              | ZL-D0-CBL13    |
| <b>DO-16TD1</b>                            | 24         | Feedthrough      | ZL-RTB20              | ZL-D0-CBL24 *  |
|                                            |            | Fuse             | ZL-RFU20 <sup>3</sup> | ZL-D0-CBL24 *  |
|                                            |            | Relay (sinking)  | ZL-RRL16-24-1         | ZL-D0-CBL24 *  |
| <b>DO-10TD2</b>                            | 13         | Feedthrough      | ZL-RTB20              | ZL-D0-CBL13    |
| <b>DO-16TD2</b>                            | 24         | Feedthrough      | ZL-RTB20              | ZL-D0-CBL24 *  |
|                                            |            | Fuse             | ZL-RFU20 <sup>3</sup> | ZL-D0-CBL24 *  |
|                                            |            | Relay (sourcing) | ZL-RRL16-24-2         | ZL-D0-CBL24 *  |
| <b>DO-08TR</b>                             | 10         | See Note 2       |                       |                |
| <b>FO-04TRS<sup>1</sup></b>                | 13         | Feedthrough      | ZL-RTB20              | ZL-D0-CBL13    |

| DL05/06 PLC Fixed I/O ZIPLink Selector |                       |             |                 |                |
|----------------------------------------|-----------------------|-------------|-----------------|----------------|
| PLC                                    |                       | ZIPLink     |                 |                |
| PLC                                    | # of Terms            | Component   | Module Part No. | Cable Part No. |
| <b>DL05</b>                            | 18                    | See Note 2  |                 |                |
| <b>DL06</b>                            | 20 (Input side only)  | Feedthrough | ZL-RTB20        | ZL-D06X-CBL20  |
|                                        | 20 (Output side only) | Feedthrough | ZL-RTB20        | ZL-D06Y-CBL20  |

\* Select the cable length by replacing the \* with: Blank = 0.5 m, -1 = 1.0 m, or -2 = 2.0 m.

<sup>1</sup> Caution: The FO-04TRS relay outputs are derated not to exceed 2A per point when used with the ZIPLink wiring system.

<sup>2</sup> These modules are not supported by the ZIPLink wiring system.

<sup>3</sup> Note: Fuses (5 x 20 mm) are not included. See Edison Electronic Fuse section for (5 x 20 mm) fuse. S500 and GMA electronic circuit protection for fast-acting maximum protection. S506 and GMC electronic circuit protection for time-delay performance. Ideal for inductive circuits.

To ensure proper operation, do not exceed the voltage and current rating of ZIPLink module. ZL-RFU20 = 2A per circuit; ZL-RFU40 = 400mA per circuit.



# Power Budgeting for the DL06

The DL06 has four option module slots. To determine whether the combination of modules you select will have sufficient power, you will need to perform a power budget calculation.

## Power supplied

Power is supplied from two sources: the internal base unit power supply and, if required, an external supply (customer furnished). The D0-06xx (AC powered) PLCs supply a limited amount of 24VDC power. The 24VDC output can be used to power external devices.

For power budgeting, start by considering the power supplied by the base unit. All DL06 PLCs supply the same amount of 5VDC power. Only the AC units offer 24VDC auxiliary power.

Be aware of the trade-off between 5VDC power and 24VDC power. The amount of 5 VDC power available depends on the amount of 24VDC power being used, and the amount of 24VDC power available depends on the amount of 5VDC power consumed. Determine the amount of internally supplied power from the table to the right.

## Power required by base unit

Because of the different I/O configurations available in the DL06 family, the power consumed by the base unit itself varies from model to model. Subtract the amount of power required by the base unit from the amount of power supplied by the base unit. Be sure to subtract 5VDC and 24VDC amounts.

## Power required by option modules

Next, subtract the amount of power required by the option modules you are planning to use. Again, remember to subtract both 5VDC and 24VDC.

If your power budget analysis shows surplus power available, you should have a workable configuration.

| DL06 Power Supplied by Base Units |            |             |
|-----------------------------------|------------|-------------|
| Part Number                       | 5 VDC (mA) | 24 VDC (mA) |
| D0-06xx                           | 1500mA     | 300mA       |
|                                   | 2000mA     | 200mA       |
| D0-06xx-D                         | 1500mA     | none        |

| DL06 Base Unit Power Required |            |             |
|-------------------------------|------------|-------------|
| Part Number                   | 5 VDC (mA) | 24 VDC (mA) |
| D0-06AA                       | 800mA      | none        |
| D0-06AR                       | 900mA      | none        |
| D0-06DA                       | 800mA      | none        |
| D0-06DD1                      | 600mA      | 280mA*      |
| D0-06DD2                      | 600mA      | none        |
| D0-06DR                       | 950mA      | none        |
| D0-06DD1-D                    | 600mA      | none        |
| D0-06DD2-D                    | 600mA      | none        |
| D0-06DR-D                     | 950mA      | none        |

\* Only if auxiliary 24VDC power is connected to V+ terminal.

| DL06 Power Consumed by Other Devices |            |             |
|--------------------------------------|------------|-------------|
| Part Number                          | 5 VDC (mA) | 24 VDC (mA) |
| D0-06LCD                             | 50mA       | none        |
| D2-HPP                               | 200mA      | none        |
| DV-1000                              | 150mA      | none        |
| C-more Micro-Graphic                 | 210mA      | none        |

| Power Budgeting Example      |   |                 |                  |
|------------------------------|---|-----------------|------------------|
| Power Source                 |   | 5VDC power (mA) | 24VDC power (mA) |
| D0-06DD1 (select row A or B) | A | 1500mA          | 300mA            |
|                              | B | 2000mA          | 200mA            |
| Current Required             |   | 5VDC power (mA) | 24VDC power (mA) |
| D0-06DD1                     |   | 600mA           | 280mA*           |
| D0-16ND3                     |   | 35mA            | 0                |
| D0-10TD1                     |   | 150mA           | 0                |
| D0-08TR                      |   | 280mA           | 0                |
| F0-4AD2DA-1                  |   | 100mA           | 0                |
| D0-06LCD                     |   | 50mA            | 0                |
| Total Used                   |   | 1215mA          | 280mA            |
| Remaining                    | A | 285mA           | 20mA             |
|                              | B | 785mA           | note 1           |

\* Auxiliary 24 VDC used to power V+ terminal of D0-06DD1 sinking outputs.

Note 1: If the PLC's auxiliary 24 VDC power source is used to power the sinking outputs, use power choice A, above.

| DL05/06 Power Consumed by Option Modules |            |             |
|------------------------------------------|------------|-------------|
| Part Number                              | 5 VDC (mA) | 24 VDC (mA) |
| D0-07CDR                                 | 130mA      | none        |
| D0-08CDD1                                | 100mA      | none        |
| D0-08TR                                  | 280mA      | none        |
| D0-10ND3                                 | 35mA       | none        |
| D0-10ND3F                                | 35mA       | none        |
| D0-10TD1                                 | 150mA      | none        |
| D0-10TD2                                 | 150mA      | none        |
| D0-16ND3                                 | 35mA       | none        |
| D0-16TD1                                 | 200mA      | none        |
| D0-16TD2                                 | 200mA      | none        |
| F0-04TRS                                 | 250mA      | none        |
| F0-08NA-1                                | 5mA        | none        |
| F0-04AD-1                                | 50mA       | none        |
| F0-04AD-2                                | 75mA       | none        |
| F0-08ADH-1                               | 25mA       | 25mA        |
| F0-08ADH-2                               | 25mA       | 25mA        |
| F0-04DAH-1                               | 25mA       | 150mA       |
| F0-08DAH-1                               | 25mA       | 220mA       |
| F0-04DAH-2                               | 25mA       | 30mA        |
| F0-08DAH-2                               | 25mA       | 30mA        |
| F0-2AD2DA-2                              | 50mA       | 30mA        |
| F0-4AD2DA-1                              | 100mA      | 40mA        |
| F0-4AD2DA-2                              | 100mA      | none        |
| F0-04RTD                                 | 70mA       | none        |
| F0-04THM                                 | 30mA       | none        |
| D0-DEVNETS                               | 45mA       | none        |
| H0-CTRIO2                                | 250mA      | none        |
| H0-ECOM100                               | 300mA      | none        |
| F0-08SIM                                 | 1mA        | none        |
| D0-DCM                                   | 250 mA     | none        |
| F0-CP128                                 | 150 mA     | none        |
| F0-08SIM                                 | 1 mA       | none        |