Analog Input Modules

F3-04ADS 4-Channel Isolated Analog Input \$1,480.00			
Number of Channels	4, (isolated)		
Input Ranges	0–5 V, 0–10 V, 1–5 V, ±5V, ±10V, 0–20 mA, 4–20 mA		
Channels Individually Configured	Yes		
Resolution	12 bit (1 in 4096)		
Input Type	Differential		
Max. Common Mode Voltage ±750V peak continuous transformer i			
Noise Rejection Ratio	Common mode: -100dB at 60Hz		
Active Low-pass Filtering	-3dB at 10Hz, -12dB per octave		
Input Impedance	$250\Omega \pm 0.1\%$, 1/2W current input, 200k Ω voltage input		
Absolute Maximum Ratings	±40mA, current input ± 100V, voltage input		
Conversion Time	1 channel per scan, successive approximation, AD574		
Linearity Error	±1 counts max. (0.03% of full scale) unipolar ±2 counts max. (0.05% of full scale) bipolar		
Full Scale Calibration Error	±8 counts maximum		

Offset Calibration Error	±8 counts maximum		
Accuracy vs. Temperature	57ppm/ °C maximum full scale		
Recommended Fuse	0.032 A, Series 217 fast-acting, current inputs		
Power Budget Requirement	183mA @ 9VDC, 50mA @ 24VDC		
External Power Supply	None required		
Operating Temperature	32° to 140°F (-0° to 60°C)		
Storage Temperature	-4° to 158° F (-20° to 70°C)		
Relative Humidity	5 to 95% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	MIL STD 810C 514.2		
Shock	MIL STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

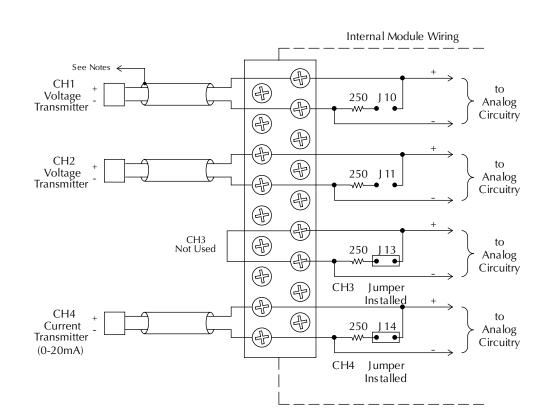
See page tDL3-26 for part numbers of Z/PLink cables and connection modules compatible with this I/O module.

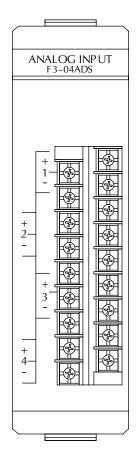


Note 1: Connect unused voltage or current inputs to 0VDC at terminal block or leave current jumper installed (see Channel 3).

- Note 2: A Series 217, 0.032A, fast-acting fuse is recommended for 4–20 mA current loops.
- Note 3: Transmitters may be 2, 3, or 4 wire type.
- Note 4: Transmitters may be powered from separate power sources.

Note 5: Terminate all shields of the cable at their respective signal source.





Analog Input Modules

F3-08AD-1 8-Channel Analog Input Retired (Replaces F3-08AD)				
Number of Channels 8, single ended (one common)				
Input Ranges	4–20 mA			
Resolution	12 bit (1 in 4096)			
Low Pass Filter	-3db @ 200Hz (-6db/octave)			
Input Impedance	250ohm ± 0.1%, 1/2W current input			
Absolute Maximum Ratings	±40mA			
Conversion Time	1 channel per CPU scan			
Converter Type	Successive approximation, MAX170			
Linearity Error	± 1 count (0.03% of full scale) maximum			
Input Stability	±0.05 count			
Maximum Inaccuracy	0.1% of full scale at 77°F (25°C)			
Accuracy vs. Temperature	57ppm/°C maximum full scale (including maximum offset change of 2 counts)			

Recommended Fuse	0.032 A, Series 217 fast-acting		
Power Budget Requirement	45mA @9 VDC, 55mA @ 24VDC		
External Power Supply	None required		
Operating Temperature	32° to 140°F (0° to 60°C)		
Storage Temperature	-4° to 158°F (-20° to 70°C)		
Relative Humidity	5 to 95% (non-condensing)		
Environmental air	No corrosive gases permitted		
Vibration	MIL STD 810C 514.2		
Shock	MIL STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

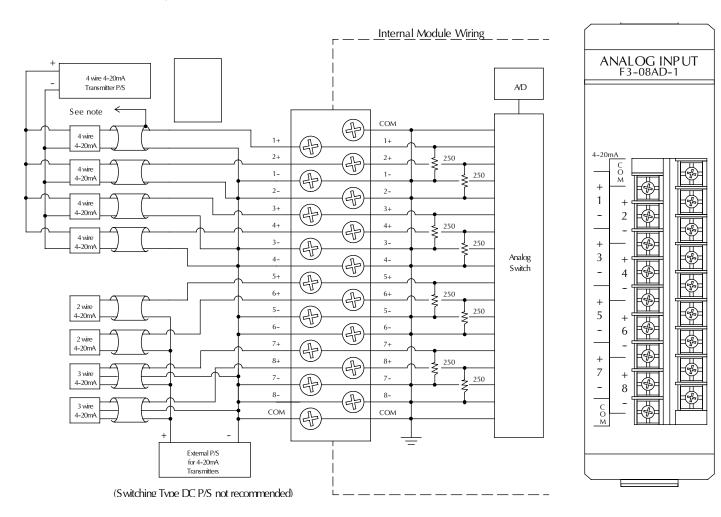
See page tDL3-26 for part numbers of Z/PLink cables and connection modules compatible with this I/O module.



Note 1: Terminate all shields at their respective signal source.

- Note 2: To avoid "ground loop" errors, the following transmitter types are recommended: 2 and 3 wire: Isolation between input signal and P/S
 - 4 wire: Full isolation between input signal, P/S and output signal.

Note 3: A Series 217 0.032A fast-acting fuse is recommended for 4-20mA applications.



Analog Input Modules

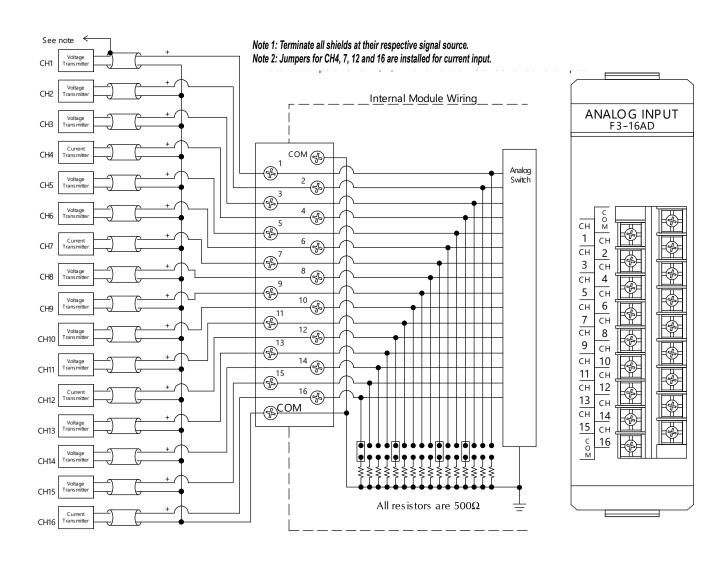
F3-16AD 16-Channel Analog Input Retired				
Number of Channels	16, single ended (one common)			
Input Ranges	±5V, ±10V, 0–5 V1, 0–10 V, 0–20 mA, 4–20 mA2			
Channels Individually Configured	Range is selected for all channels. Each channel can be wired for voltage or current.			
Resolution	12 bit (1 in 4096)			
Input Impedance	2M ohm, voltage input, 500ohm ±1% current input			
Absolute Maximum Ratings	±25mA, voltage input ±30mA, current input			
Conversion Time	35µs per channel, 1 channel per CPU scan			
Converter Type	Successive Approximation, AD574			
Linearity Error	±1 count maximum			
Maximum Inaccuracy at 77°F (25°C)	0.25% of full scale, voltage input 1.25% of full scale, current input			
Accuracy vs. Temperature	57ppm /°C maximum full scale			

Recommended Fuse	0.032 A, Series 217 fast-acting, current inputs		
Power Budget Requirement	55mA @ 9VDC, 65mA @ 24VDC		
External Power Supply	None required		
Operating Temperature	32° to 140°F (0° to 60 C)		
Storage Temperature	-4° to 158°F (-20° to 70°C)		
Relative Humidity	5 to 95% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	MIL STD 810C 514.2		
Shock	MIL STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		
Requires gain adjustment with potentiometer.			

Resolution is 3275 counts (instead of 4096). Allows easier broken transmitter detection.

See page tDL3-26 for part numbers of Z/PLink cables and connection modules compatible with this I/O module.





Temperature Input Modules

F3-08THM-J 8-Channel Thermocouple Input \$1,175.00				
Note: When you order the module, replace the "n" with the type of thermocouple needed. For example, to order a Type J thermocouple module, order part number F3-08THM-J; J is a stock item.				
Input Ranges	Type J: -210/760°C, -350/1390°F -1: 0–50 mV -2: 0–100 mV			
Resolution	12 bit (1 in 4096)			
Input Impedance	27K ohm DC			
Absolute Maximum Ratings	Fault protected input, 130 Vrms or 100VDC			
Cold Junction Compensation	Automatic			
Conversion Time	15ms per channel, minimum 1 channel per CPU scan			

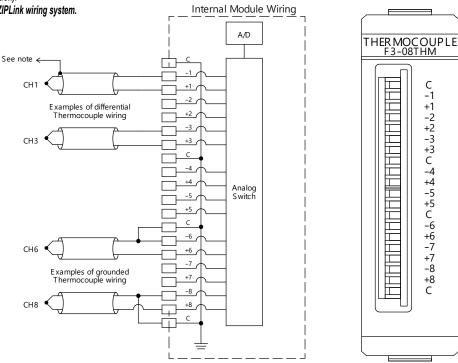
Converter Type	Successive approximation, AD574		
Linearity Error	±1 count (0.03% of full scale) maximum		
Maximum Inaccuracy at 77°F (25°C)	0.35% of full scale		
Accuracy vs. Temperature	57ppm/°C maximum full scale		
Power Budget Requirement	50mA @ 9VDC, 34mA @ 24VDC		
External Power Supply	None required		
Operating Temperature	32° to 140°F (0° to 60°C)		
Storage Temperature	-4° to 158°F (-20° to 70°C)		
Relative Humidity	5 to 95% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	MIL STD 810C 514.2		
Shock	MIL STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Notes:

1. Terminate shields at the respective signal source.

2. Leave unused channel open (no connection).

3. This module is not compatible with the ZIPLink wiring system.



Power Budget

Managing your power resource

The I/O configuration depends on your choice of I/O modules, bases and I/O location. When determining the types and quantity of I/O modules you will be using, it's important to remember there is a limited amount of power available from the power supply.

The chart on the next page indicates the power supplied and used by each DL305

Example: How to calculate your power usage

The following example shows how to calculate the power budget for the DL305 system. The examples are constructed around a single 5-slot base using the devices shown. It is recommended you construct a similar table for each base in your DL305 system.

- 1. Using a chart similar to the one below, fill in column 2.
- Using the tables on the opposite page, enter the current supplied and used by each device (columns 3, 4, and 5). Devices which fall into the "Other" category (Row D) are devices such as the Handheld Programmer or a Data Communication Unit, which also have power requirements, but do not directly plug into the base.

Use **ZIP**Links to reduce power requirements

If your application requires a lot of relay outputs, consider using the **ZIP**Link AC or DC relay output modules. These modules can switch high current (10A) loads without putting a load on your base power budget. Refer to the Wiring Solutions section in this catalog for more information.

This logo is placed next to I/O modules that are supported by the ZipLink connection systems. See the I/O module specifications at the end of this section.



device. The adjacent chart shows an example of how to calculate the power used by your particular system. These two charts should make it easy for you to determine if the devices you have chosen fit within the power budget of your system configuration.

If the I/O you have chosen exceeds the maximum power available from the power

- 3. Add the current used by the system devices (columns 3, 4, and 5), starting with Slot 1, then put the total in the row labeled "Maximum Current Required" (Row E).
- 4. Subtract the row labeled "Maximum Current Required" (Row E), from the row labeled "Current Supplied" (Row B). Place the difference in the row labeled "Remaining Current" (Row F).
- 5. If "Maximum Current Required" is greater than "Current Supplied" in columns 3, 4 or 5, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your I/O configuration.

supply, you can resolve the problem by shifting some of the modules to an expansion base.

WARNING: IT IS EXTREMELY IMPORTANT TO CALCULATE THE POWER BUDGET CORRECTLY. IF YOU EXCEED THE POWER BUDGET, THE SYSTEM MAY OPERATE IN AN UNPREDICTABLE MANNER, WHICH MAY RESULT IN A RISK OF PERSONAL INJURY OR EQUIPMENT DAMAGE.

Example of System Power Requirements Calculation

A	Column 1	Column 2	Column 3	Column 4	Column 5	
	Base # 0	Device Type	5 VDC (mA)	9VDC (mA)	24V(mA)	
B		Cu	rrent Supplied			
	5-slot Base	D3-05BDC	1400	800	500	
C		Cu	rrent Required			
	CPU Slot	<u>D3-350</u>	500	0	0	
	Slot 0	D3-16NE3	0	130	0	
	Slot 1	D3-16NE3	0	130	0	
	Slot 2	F3-08TRS-1	0	296	0	
	Slot 3	F3-04DAS	0	183	0	
D	Other					
	Handheld prog D2-HPP		200	0	0	
Ε	Maximum Current Required		700	739	0	
F	Remaining Current		700	61	500	

DL305 Power Requirements

This section shows the amount of power supplied by the base power supplies and the amount of power used by each DL305 device. Note the base power supplies provide three internal voltages (5V, 9V, 24V). The chart shows how much power from each of these power sources is required for each DL305 device. Use this information when calculating the power budget for your system.

In addition to the three internal power sources, the DL305 bases provide an external power connection. There is 24VDC available from the 24VDC output terminals on the bases (except D3-05BDC and D3-10BDC).

The 24VDC can be used to power external devices or DL305 modules that require external 24VDC. The power used from this external 24VDC output reduces the internal system 24VDC that is available to the modules by an equal amount. When using the 24VDC output at the base terminal, it is recommended that 100mA not be exceeded.

Power Consumed					
Device 5V(mA) 9V(mA) 24V(mA)					
	CPUs				
D3-350	500	0	0	0	
	DC Input Modules				
F3-16ND3F	0	148	68	0	
AC/DC Input Modules					
<u>D3-16NE3</u>	0	130	0	0	

Power Supplied						
Device	5V(mA)	9V(mA)	24V(mA)	24 V (mA)		
<u>D3-05BDC</u> D3-10BDC	900 900	2000 2000	500 500	None None		
	I	Power Con	sumed			
Device	5V(mA)	9V(mA)	24V(mA)	External required		
	Re	lay Output	Modules			
<u>F3-08TRS-1</u> <u>F3-08TRS-2</u>	0 0	296 296	0 0	0 0		
Analog	Analog Temperature and Thermocouple Modules					
<u>F3-04ADS</u> <u>F3-08AD-1</u> F3-08THM-n	0 0 0	183 45 50	50 55 34	0 0 0		
<u>F3-16AD</u>	0	55	65 n d Networki i	0		
	Commun	Programi		iy		
D2-HPP	200	0	0	0		
Specialty CPUs						
<u>F3-0MUX-1</u> * <u>F3-0MUX-2</u> <u>F3-PMUX-1</u>	409 262 455	0 0 0	0 150 0	0 0 0		
Operator Interface						
C-more Micro-Graphic	210	0	0	0		

* F3-OMUX-1 -As of 3/2021 CPU is no longer available.



Wiring Solutions



Wiring Solutions using the **ZIP**Link Wiring System

ZIPLinks 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 **ZIP**Link System ranging from PLC I/O-to-**ZIP**Link 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 **ZIP**Link modules are provided with **ZIP**Link cables. See the following solutions to help determine the best **ZIP**Link 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 **ZIP**Link connector module used in conjunction with a prewired **ZIP**Link 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 **ZIP**Link Connector Modules selector tables located in this section,

- 1. Locate your I/O module/PLC.
- 2. Select a **ZIP**Link Module.
- 3. Select a corresponding **ZIP**Link Cable.



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

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the **ZIP**Link Pigtail Cables. **ZIP**Link 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 **ZIP**Link 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 Starter and AC drives. Add a **ZIP**Link 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 **ZIP**Link cable and other associated hardware.



For the latest prices, please check AutomationDirect.com.

1-800-633-0405



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, 15pin 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, **ZIP**Link 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 **ZIP**Link Specialty Modules selector table located in this section,

- 1. Locate the type of application.
- 2. Select a **ZIP**Link 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 colorcoded soldered-tip wires are a good solution. Used in conjunction with any compatible **ZIP**Link 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 - DL305

DL305 PLC Input Module ZIPLink Selector					
PI	LC	ZIPLink			
Input Module	# of Terms	Component	Module Part No.	Cable Part No.	
<u>F3-16ND3F</u>	18	See Note 1			

DL305 PLC Analog Module ZIPLink Selector							
PLC		ZIPLink					
Analog Module	# of Terms	Component	Module	Cable			
F3-04ADS	18	See Note 2					
<u>F3-08AD-1</u>	18						
<u>F3-16AD</u>	18						
<u>F3-08THM-J</u>	T/C Wire Only						

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Note: See the Compatibility Matrix tables under the **ZIP**Link Connector Modules catalog section.

DL305 PLC Output Module <i>ZIP</i> Link Selector							
PLC		ZIPLink					
Output Module	# of Terms	Component	Module Part No.	Cable Part No.			
F3-08TRS-1	18	See Note 2					
<u>F3-08TRS-2</u>	18						

1These I/O modules have non-removable terminal blocks which can be terminated using the <u>ZL-CBL24-1P</u> or 2P pigtail cable and the <u>ZL-RTB20</u> module of the ZIPLink wiring system. 2 Module is not supported by the ZIPLink wiring system



DL305 System with ZIPLink Module and ZIPLink Cable



ZL-CBL24-1P