

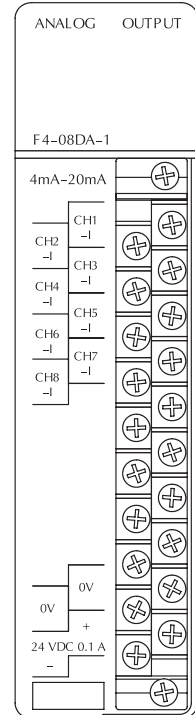
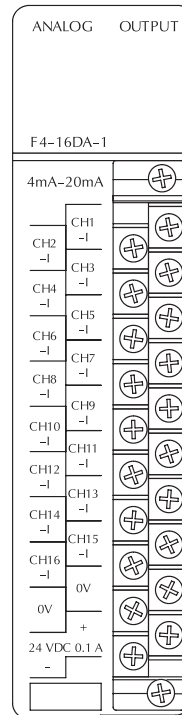
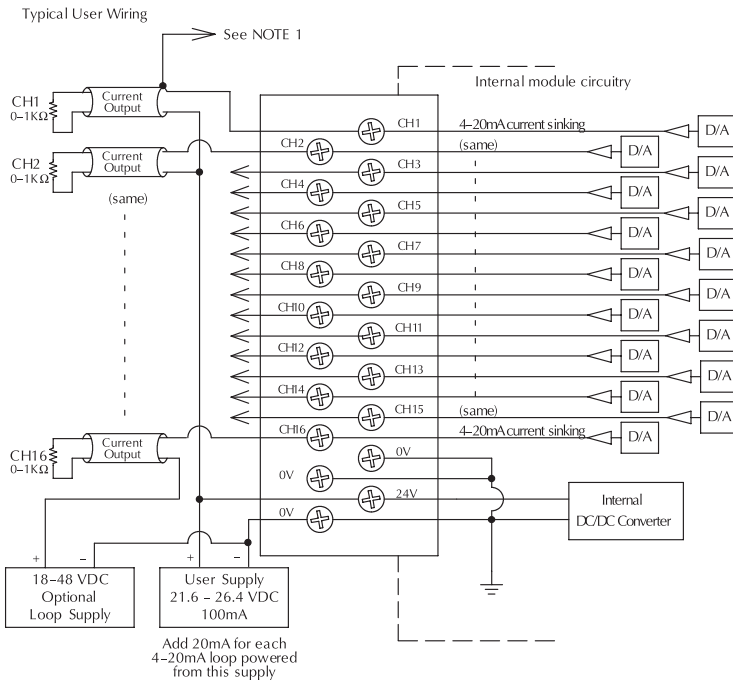
Analog Output Modules

F4-08DA-1 8-Channel Analog Current Output \$611.00 F4-16DA-1 16-Channel Analog Current Output \$737.00	
Number of Channels F4-08DA-1 F4-16DA-1	8, single ended (one common) 16, single ended (one common)
Output Ranges	4-20mA current
Resolution	12 bit (1 to 4095)
Output Type	Outputs sink 4-20mA from external supply
Peak Output Voltage	40VDC (no transient voltage suppression)
External Load Resistance	0-480Ω @ 18V, 220-740Ω @ 24V, 1550-1760Ω @ 48V
Maximum Loop Supply	48VDC (with load resistance in proper range)
Crosstalk	-70dB, ± 1 count maximum
Linearity Error (End-to-End) & Relative accuracy	± 1 count maximum
Full Scale Calibration Error (offset error included)	±8 counts max. (20.0mA at 25° C)
Offset Calibration Error	± 3 counts max. (4.0mA at 25° C)
Maximum Inaccuracy	±0.2% @ 77° F (25° C) ±0.4% @ 32 to 140° F (0 to 60° C)

Conversion Time	400µs maximum, for full scale change 2.25 to 4.5 ms for digital out to analog out
Digital Output Points Required	F4-08DA-1 16 (Y) output points (12 bits binary data, 3 bits channel select, 1bit output enable) F4-16DA-1 32 (Y) output points 2 sets each (12 bits binary data, 3 bits channel select, 1bit output enable)
Base Power Required 5V	90mA
Terminal Type (included)	Removable (D4-16IOCON)
External Power Supply	21.6-26.4VDC, 100mA, class 2 (add 20mA for each current loop used)
Accuracy vs. Temperature	± 57 ppm/°C full scale calibration range (including maximum offset change, 2 counts)
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

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4,096).
 NOTE 1: Shields should be connected to the 0V of the User Power Supply at the module terminal block.
 NOTE 2: Unused current outputs should remain open (no connections)

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



Check the Power Budget

Verify your power budget requirements

Your I/O configuration choice can be affected by the power requirements of the I/O modules you choose. When determining the types and quantity of I/O modules you will be using, it is important to remember there is a limited amount of power available from the power supply.

The chart on the opposite page indicates the power supplied and used by each DL405 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 supply, you can resolve the problem by shifting some of the modules to an expansion base or remote I/O base (if you are using remote I/O).

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.

Use ZIPLinks to reduce power requirements

If your application requires a lot of relay outputs, consider using the ZipLink 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 Wiring System for DL405 PLCs later in this section 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.



Calculating your power usage

The following example shows how to calculate the power budget for the DL405 system. The example is constructed around a single 8-slot base using the devices shown. It is recommended you construct a similar table for each base in your system.

A				
	Base Number 0	Device Type	5 VDC (mA)	External 24 VDC Power (mA)
B	CURRENT SUPPLIED			
	CPU/Expansion Unit /Remote Slave	D4-440 CPU	3700	400
C	CURRENT REQUIRED			
	SLOT 0	D4-16ND2	+150	+0
	SLOT 1	D4-16ND2	+150	+0
	SLOT 2	F4-04DA	+120	+100
	SLOT 3	D4-08ND3S	+100	+0
	SLOT 4	D4-08ND3S	+100	+0
	SLOT 5	D4-16TD2	+100	+0
	SLOT 6	D4-16TD2	+100	+0
	SLOT 7	D4-16TR	+1000	+0
D	OTHER			
	BASE	D4-08B-1	+80	+0
	Handheld Programmer	D4-HPP-1	+320	+0
E	Maximum Current Required		2820	100
F	Remaining Current Available		3700-2820=880	400-100=300
	1. Using a chart similar to the one above, fill in column 2. 2. Using the tables on the opposite page, enter the current supplied and used by each device (columns 3 and 4). Pay special attention to the current supplied by the CPU, Expansion Unit, and Remote Slave since they differ. Devices which fall into the "Other" category (Row D) are devices such as the Base and the Handheld programmer, which also have power requirements, but do not plug directly into the base. 3. Add the current used by the system devices (columns 3 and 4) starting with Slot 0 and 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 Available" (Row F). 5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your I/O configuration. Note the auxiliary 24 VDC power supply does not need to supply all the external power. If you need more than the 400mA supplied, you can add an external 24VDC power supply. This will help keep you within your power budget for external power.			

DL405 CPU power supply specifications and power requirements

Specification	AC Powered Units	24 VDC Powered Units	125 VDC Powered Units
Part Numbers	D4-454, D4-450, D4-440, D4-EX (expansion base unit), D4-RS (remote slave unit)	D4-454DC-1, D4-440DC-1, (expansion base unit), (remote slave unit) D4-EXDC D4-RSDC	D4-450DC-2
Voltage Withstand (dielectric)	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay		
Insulation Resistance	> 10MΩ at 500VDC		
Input Voltage Range	85-132 VAC (110 range) 170-264 VAC (220 range)	20-28 VDC (24 VDC) with less than 10% ripple	90-146 VDC (125 VDC) with less than 10% ripple
Maximum Inrush Current	20 A	20 A	20 A
Maximum Power	50 VA	38 W	30 W

Power Requirements

Power Supplied					
<i>CPUs/Remote Units/ Expansion Units</i>	<i>5 VDC Current Supplied in mA</i>	<i>24V Aux Power Supplied in mA</i>	<i>CPUs/Remote Units/ Expansion Units</i>	<i>5V Current Supplied in mA</i>	<i>24V Aux Power Supplied in mA</i>
D4-440 CPU	3700	400	D4-EX	4000	400
D4-440DC-1 CPU	3700	NONE	D4-EXDC	4000	NONE
D4-450 CPU	3700	400	D4-RS	3700	400
D4-454 CPU	3100	400	D4-RSDC	3700	NONE
D4-450DC-2 CPU	3100	NONE	H4-EBC	3470	400
D4-454DC-1	3100	NONE	H4-EBC-F	3300	400
Power Consumed					
<i>Power-consuming Device</i>	<i>5V Current Consumed</i>	<i>External 24VDC Current Required</i>	<i>Power-consuming Device</i>	<i>5V Current Consumed</i>	<i>External 24VDC Current Required</i>
<i>I/O Bases</i>			<i>Analog Modules (continued)</i>		
D4-04B-1	80	NONE	F4-16AD-1	75	100
D4-06B-1	80	NONE	F4-16AD-2	75	100
D4-08B-1	80	NONE	F4-04DA-1	70	75+20per circuit
			F4-04DA-2	90	90
			F4-04DAS-1	60	60 per circuit
			F4-04DAS-2	60	60 per circuit
			F4-08DA-1	90	100+20 per circuit
			F4-08DA-2	80	150
			F4-16DA-1	90	100+20 per circuit
			F4-16DA-2	80	25 max.
			F4-08RTD	80	NONE
			F4-08THM-n	120	50
			F4-08THM	110	60
<i>DC Input Modules</i>			<i>Remote I/O</i>		
D4-08ND3S	100	NONE	H4-ERM100	320(300)	NONE
D4-16ND2	150	NONE	H4-ERM-F	450	NONE
D4-16ND2F	150	NONE	D4-RM	300	NONE
D4-32ND3-1	150	NONE			
D4-64ND2	300 max.	NONE			
<i>AC Input Modules</i>			<i>Communications and Networking</i>		
D4-08NA	100	NONE	H4-ECOM100	300	NONE
D4-16NA	150	NONE	D4-DCM	500	NONE
			F4-MAS-MB	235	NONE
			FA-UNICON	NONE	65
<i>AC/DC Input Modules</i>			<i>CoProcessors</i>		
D4-16NE3	150	NONE	F4-CP128-1	305	NONE
F4-08NE3S	90	NONE	F4-CP128-T	350	NONE
<i>DC Output Modules</i>			<i>Specialty Modules</i>		
F4-08TD1S	295	NONE	H4-CTRIO	400	NONE
D4-16TD1	200	125	D4-INT	100	NONE
D4-16TD2	400	NONE	F4-16PID	160	NONE
D4-32TD1	250	140	F4-8MPI	225	170
D4-32TD1-1	250	140 (15V)	D4-16SIM	150	NONE
D4-32TD2	350	120 (4A max including loads)	F4-4LTC	280	75
D4-64TD1	800	NONE			
<i>AC Output Modules</i>			<i>Programming</i>		
D4-08TA	250	NONE	D4-HPP-1 (Handheld Prog.)	320	NONE
D4-16TA	450	NONE			
<i>Relay Output Modules</i>			<i>Operator Interface</i>		
D4-08TR	550	NONE	DV-1000	150	NONE
F4-08TRS-1	575	NONE			
F4-08TRS-2	575	NONE	C-more Micro-Graphic	210	NONE
D4-16TR	1000	NONE			
<i>Analog Modules</i>					
F4-04AD	150	100			
F4-04ADS	370	120			
F4-08AD	75	90			



Wiring Solutions

Wiring Solutions using the ZIPLink 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 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

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 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 Starter 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.



ZIPLINK™ Wiring Solutions

AUTOMATIONDIRECT®

Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with *Direct*LOGIC, 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.

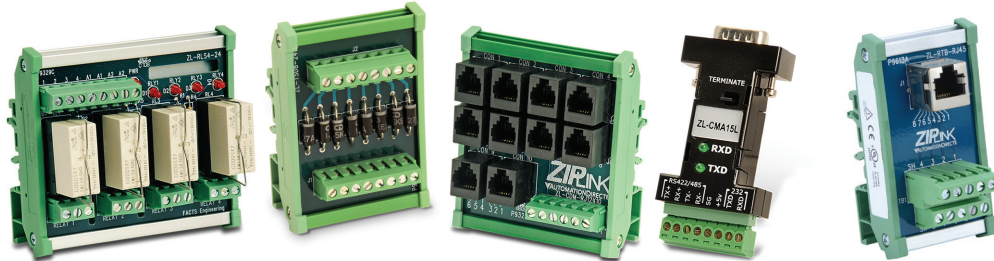


Solution 5: Specialty ZIPLink Modules

For additional application solutions, ZIPLink modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub, RJ12 and RJ45 feedthrough modules, communication port adapter and distribution modules, and *Sure*Servo 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 - DL405

DL405 PLC Input Module ZIPLink Selector					
PLC	ZIPLink				
Input Module	# of Terms	Component	Module Part No.	Cable Part No.	
D4-08ND3S	20	Feedthrough	ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2	
D4-16ND2		Feedthrough			
D4-16ND2F		Sensor	ZL-LTB16-24-1		
		Feedthrough	ZL-RTB20 (-1)		
D4-32ND3-1 ²	40	Feedthrough	ZL-RTB40 (-1)	straight conn: ZL-D24-CBL40 ZL-D24-CBL40-1 ZL-D24-CBL40-2	
		Sensor	ZL-LTB32-24-1		
D4-32ND3-2 ²		Feedthrough	ZL-RTB40 (-1)		45 deg conn: ZL-D24-CBL40-X ZL-D24-CBL40-1X ZL-D24-CBL40-2X
		Sensor	ZL-LTB32-24-1		
D4-64ND2 ^{1,2}		Feedthrough	ZL-RTB40 (-1)		
D4-08NA ³	11	See Note 3			
D4-16NA	20	Feedthrough	ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2	
D4-16NA-1		Feedthrough			
D4-16NE3		Sensor	ZL-LTB16-24-1 ZL-RRL16W-24-1 ZL-RRL16F-24-1 ZL-RRL16HDF-24-1		
		Feedthrough	ZL-RTB20 (-1)		
F4-08NE3S		Feedthrough	ZL-RTB20 (-1)		

DL405 PLC Output Module ZIPLink Selector					
PLC	ZIPLink				
Output Module	# of Terms	Component	Module Part No.	Cable Part No.	
D4-08TD1 ³	11	See Note 3			
F4-08TD1S ³	20	See Note 3			
D4-16TD1	20	Feedthrough	Feedthrough ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2	
		Fuse			Fused ZL-RFU20 ⁶
		Feedthrough	ZL-RRL16-24-2 ZL-RRL16W-24-2 ZL-RRL16F-24-2 ZL-RRL16HDF-24-2		
		Fuse			
D4-16TD2	40	Relay			
D4-32TD1 ²	40	Feedthrough	Feedthrough ZL-RTB40 (-1)	straight conn: ZL-D24-CBL40 ZL-D24-CBL40-1 ZL-D24-CBL40-2	
D4-32TD1-1 ²		Fuse			
		Feedthrough			Fused ZL-RFU40 ⁶
D4-32TD2 ²		Fuse			
		D4-64TD1 ^{1,2}	Feedthrough		
		Fuse			
D4-08TA ³	11	See Note 3			
D4-16TA	20	Feedthrough	ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2	
		Fuse	ZL-RFU20 ⁶		
D4-08TR ³	11	See Note 3			
F4-08TRS-1 ⁵	20	Feedthrough	ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2	
F4-08TRS-2 ⁵		Feedthrough			
D4-16TR ⁴		Fuse	ZL-RFU20 ⁶		

DL405 PLC Analog Module ZIPLink Selector				
PLC	ZIPLink			
Analog Module	# of Terms	Component	Module	Cable
F4-04AD	20	Feedthrough	ZL-RTB20 (-1)	ZL-D4-CBL20 ZL-D4-CBL20-1 ZL-D4-CBL20-2
F4-04ADS				
F4-08AD				
F4-16AD-1				
F4-16AD-2				
F4-04DA-1				
F4-04DA-2				
F4-08DA-1				
F4-16DA-1				
F4-08DA-2				
F4-16DA-2				
F4-04DAS-1				
F4-04DAS-2				
F4-08THM ³				
F4-08THM-n ³				
F4-08RTD ³	Matched Only			

Tables Footnotes:

- ¹ The D4-64ND2 and D4-64TD1 modules have two 32-point connectors and require two ZIPLink cables and two ZIPLink connector modules.
- ² To make a custom cable for the 32 or 64-point modules, use: Ribbon-style Connector ZL-D24-CON-R, Solder-style 180° connector ZL-D24-CON or Solder-style 45° connector ZL-D24-CON-X
- ³ These modules are not supported by the ZIPLink wiring system.
- ⁴ Caution: The D4-16TR really outputs are derated not to exceed 2 Amps per point and 4 Amps per common when used with the ZIPLink wiring system.
- ⁵ The F4-08TRS-1 and F4-08TRS-2 are derated not to exceed 2 Amps per point and 2 Amps per common when used with the ZIPLink wiring system.
- ⁶ 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 = 400 mA per circuit.



NOTE: ZIPLINK CONNECTOR MODULE SPECIFICATIONS FOLLOW THE COMPATIBILITY MATRIX TABLES. ZIPLINK CABLES SPECIFICATIONS ARE AT THE END OF THIS ZIPLINK SECTION.