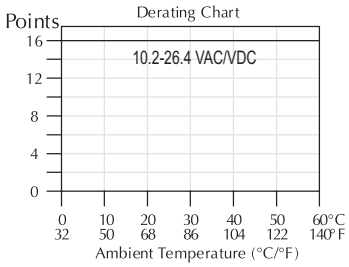
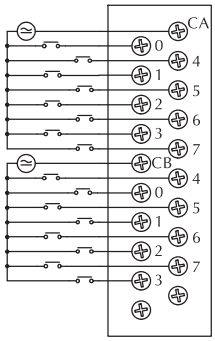
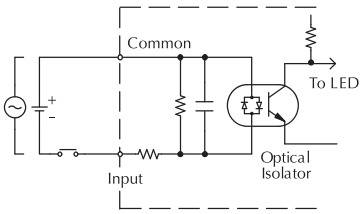
AC and AC/DC Input Modules

D4-16NE3 AC/DC Input <--->	
Inputs per Module	16 (sink/source)
Commons per Module	2 (isolated)
Input Voltage Range	10.2-26.4VAC/VDC
Peak Voltage	37.5VAC/VDC
AC Frequency	47-63Hz
ON Voltage Level	>9.5V
OFF Voltage Level	<3.0V
Input Impedance	3.2 KΩ @ 12V 2.9 KΩ @ 24V
Input Current	3.8mA @ 12V 8.3mA @ 24V
Minimum ON Current	4mA
Maximum OFF Current	1.5mA
Base Power Required 5V	150mA max
OFF to ON Response	5-40ms
ON to OFF Response	10-50ms
Terminal Type (included)	Removable (D4-16IOCON)
Status Indicators	Logic side
Weight	8.8oz. (250g)

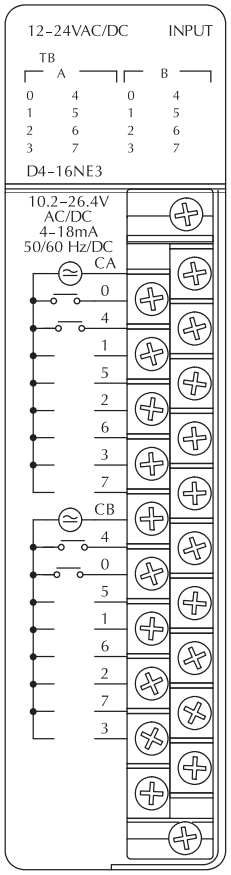
See Wiring Solutions for part numbers of *ZIP*Link cables and connection modules compatible with this I/O module.







Current sourcing configuration shown



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 *ZIP*Links 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 *ZIP*Link 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	+80	+0
	Handheld Programmer	D4-HPP	+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 3one 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	D4-450, D4-440, D4-430, D4-EX (expansion base unit), D4-RS (remote slave unit)	D4-450DC-1, D4-440DC-1, D4-EXDC (expansion base unit), D4-RSDC (remote slave unit)	D4-450DC-2 D4-440DC-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

CPUs/Remote Units/ Expansion Units	5 VDC Current Supplied in mA	24V Aux Power Supplied in mA	CPUs/Remote Units/Expansion Units	5V Current Supplied in mA	24VAux. Power Supplied in mA
D4-430 CPU	3700	400	D4-EX	4000	400
D4-440 CPU	3700	400	D4-EXDC	4000	NONE
D4-440DC-1 CPU	3700	NONE	D4-EXDC-2	3700	NONE
D4-440DC-2 CPU	3700	NONE	D4-RS	3700	400
D4-450 CPU	3100	400	D4-RSDC	3700	NONE
D4-450DC-1 CPU	3100	NONE	H4-EBC	3470	400
D4-450DC-2 CPU	3100	NONE	H4-EBC-F	3300	400

Power Consumed

Power-consuming Device	5V Current Consumed	External 24VD Current Required
I/O Bases		
D4-04B-1	80	NONE
D4-06B-1	80	NONE
D4-08B-1	80	NONE
DC Input Modules		
D4-08ND3S	100	NONE
D4-16ND2	150	NONE
D4-16ND2F	150	NONE
D4-32ND3-1	150	NONE
D4-32ND3-2	150	NONE
D4-64ND2	300 max.	NONE
AC Input Modules		
D4-08NA	100	NONE
D4-16NA	150	NONE
AC/DC Input Modules		
D4-16NE3	150	NONE
F4-08NE3S	90	NONE
DC Output Modules		
D4-08TD1	150	35
F4-08TD1S	295	NONE
D4-16TD1	200	125
D4-16TD2	400	NONE
D4-32TD1	250	140
D4-32TD1-1	250	140 (15V)
D4-32TD2	350	120 (4A max including loads)
D4-64TD1	800	NONE
AC Output Modules		
D4-08TA	250	NONE
D4-16TA	450	NONE
Relay Output Modules		
D4-08TR	550	NONE
F4-08TRS-1	575	NONE
F4-08TRS	575	NONE
D4-16TR	1000	NONE
Analog Modules		
F4-04AD	85	100
F4-04ADS	270	120
F4-08AD	75	90

Power-consuming Device	5V Current Consumed	External 24VDC Current Required
Analog Modules (continued)		
F4-16AD-1	75	100
F4-16AD-2	75	100
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
Remote I/O		
H4-ERM	320	NONE
H4-ERM-F	450	NONE
D4-RM	300	NONE
Communications and Networking		
H4-ECOM100	300	NONE
H4-ECOM-F	670	NONE
D4-DCM	500	NONE
F4-MAS-MB	235	NONE
FA-UNICON	NONE	65
CoProcessors		
F4-CP128-1	305	NONE
Specialty Modules		
H4-CTRIO	400	NONE
D4-INT	100	NONE
D4-HSC	300	NONE
F4-16PID	160	NONE
F4-8MPI	225	170
D4-16SIM	150	NONE
F4-4LTC	280	75
Programming		
D4-HPP-1 (Handheld Prog.)	320	NONE
Operator Interface		
DV-1000	150	NONE
C-more Micro-Graphic	210	NONE

Wiring Solutions

Wiring Solutions using the *ZIP*Link Wiring System

*ZIP*Links 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, CLICK and Productivity3000 I/O Modules to *ZIP*Link 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: *Direct*LOGIC, CLICK and Productivity3000 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?

*ZIP*Link cables are available in a wide range of configurations for connecting to PLCs and *Sure*Servo, *Sure*Step, 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.

Wiring Solutions

Solution 4: Serial Communications Cables

*ZIP*Link 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 *ZIP*Link 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 *Sure*Servo 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 ZIPLink module.

Solution 6: *ZIP*Link 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 *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 *ZIP*Link Connector Modules - DL405

DL405 PLC Input Module *ZIP*Link Selector				
PLC		*ZIP*Link		
Input Module	*# of Terms*	*Component*	*Module Part No.*	*Cable Part No.*
D4-08ND3S	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
D4-16ND2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Sensor	ZL-LTB16-24	ZL-D4-CBL20*
D4-16ND2F	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Sensor	ZL-LTB16-24	ZL-D4-CBL20*
D4-32ND3-1[2]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Sensor	ZL-LTB32-24	
D4-32ND3-2[2]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Sensor	ZL-LTB32-24	
D4-64ND2[1]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Sensor	ZL-LTB32-24	
D4-08NA[3]	11	See Note 3		
D4-16NA	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
D4-16NA-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
D4-16NE3	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Sensor	ZL-LTB16-24	ZL-D4-CBL20*
F4-08NE3S	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*

DL405 PLC Analog Module *ZIP*Link Selector				
PLC		*ZIP*Link		
Analog Module	*# of Terms*	*Component*	*Module*	*Cable*
F4-04AD	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-04ADS	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-08AD	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-16AD-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-16AD-2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-04DA-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-04DA-2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-08DA-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-16DA-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-08DA-2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-16DA-2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-04DAS-1	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-04DAS-2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-08THM[3]	T/C Wire Only	See Note 3		
F4-08THM-n[3]	T/C Wire Only	See Note 3		
F4-08RTD[3]	T/C Wire Only	See Note 3		

NOTE: ZIPLINK CONNECTOR MODULES AND ZIPLINK CABLES SPECIFICATIONS ARE IN THE ZIPLINK CATALOG SECTION.

DL405 PLC Output Module *ZIP*Link Selector				
PLC		*ZIP*Link		
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	ZL-RTB20	ZL-D4-CBL20*
		Fuse	ZL-RFU20[6]	ZL-D4-CBL20*
D4-16TD2	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Fuse	ZL-RFU20[6]	ZL-D4-CBL20*
		Relay	ZL-RRL16-24-2	ZL-D4-CBL20*
D4-32TD1[2]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Fuse	ZL-RFU40[6]	
D4-32TD1-1	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Fuse	ZL-RFU40[6]	
D4-32TD2[2]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Fuse	ZL-RFU40[6]	
D4-64TD1[1]	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40* ZL-D24-CBL40*X
		Fuse	ZL-RFU40[6]	
D4-08TA[3]	11	See Note 3		
D4-16TA	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Fuse	ZL-RFU20[6]	ZL-D4-CBL20*
D4-08TR[3]	11	See Note 3		
F4-08TRS-1[5]	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
F4-08TRS-2[5]	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
D4-16TR[4]	20	Feedthrough	ZL-RTB20	ZL-D4-CBL20*
		Fuse	ZL-RFU20[6]	ZL-D4-CBL20*

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

[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 realy outpus 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.