

Analog Output Modules

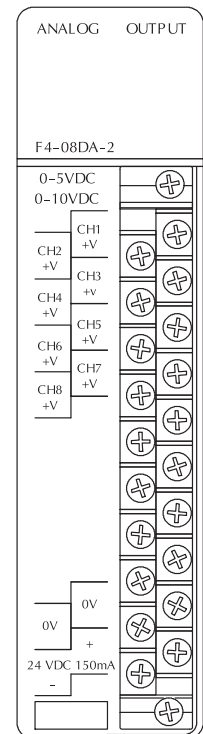
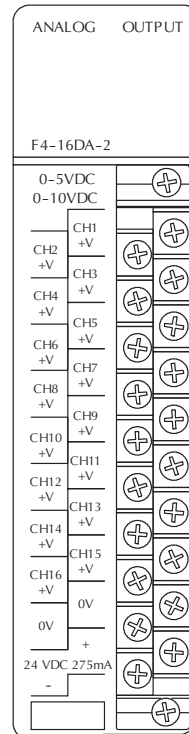
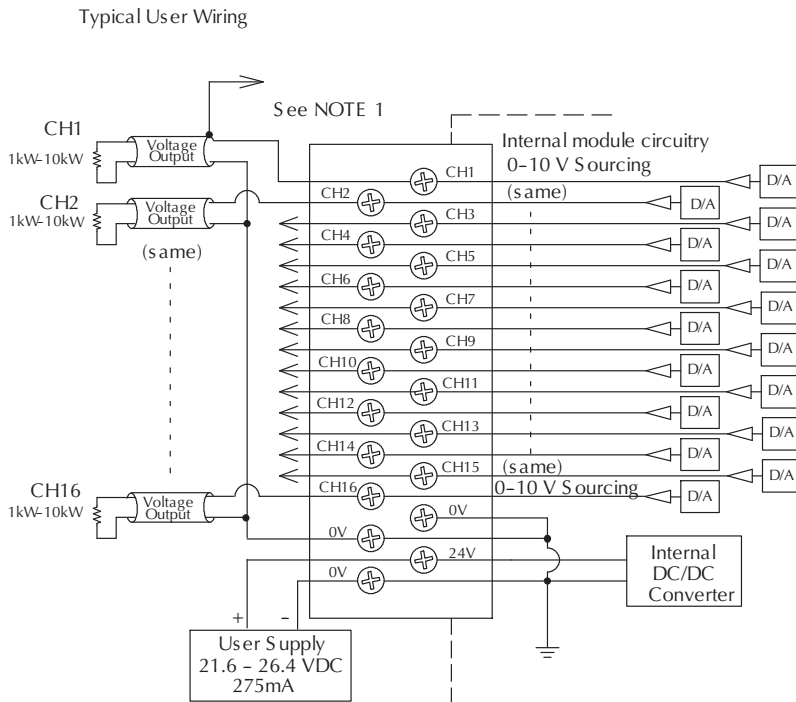
| F4-08DA-2 8-Channel Analog Voltage Output <---> F4-16DA-2 16-Channel Analog Voltage Output <---> | |
|---|---|
| Number of Channels F4-08DA-2 F4-16DA-2 | 8, single ended (one common) 16, single ended (one common) |
| Output Range | 0-5VDC, 0-10VDC |
| Resolution | 12 bit (1 to 4095) |
| Output Type | Voltage Sourcing 10mA max. |
| External Load Resistance | 1K Ω max./10K Ω min. (example: 10volts@ 1K Ω = 10mA load) |
| Crosstalk | -70dB, \pm 1 count maximum |
| Linearity Error (End-to-End) and Relative Accuracy | \pm 1 count maximum (10VDC at 25°C) |
| Full Scale Calibration Error (Offset Error Included) | \pm 6 counts max. (10VDC at 25°C) |
| Offset Calibration Error | \pm 3 counts max. (0VDC at 25°C) |
| Maximum Inaccuracy | \pm 0.2% @ 77°F (25°C) \pm 0.4% @ 32 to 140°F (0 to 60°C) |

See page 6-58 for part numbers of ZIPLink cables and connection modules compatible with this I/O module.



| | |
|---------------------------------------|--|
| Conversion Time | 400 μ s maximum, for full scale change 4.5 to 9ms for digital out to analog out |
| Digital Output Points Required | F4-08DA-2 16 (Y) output points 12 bits binary data, 3 bits channel select, 1 bit output enable) F4-16DA-2 32 (Y) output points (two sets each of 12 bits binary data, 3 bits channel select, 1 bit output enable) |
| Power Budget Require | 80mA @ 5VDC (base power) |
| Terminal Type (included) | Removable (D4-1610CON) |
| External Power Supply | 21.6-26.4VDC, 150mA, class 2 |
| Accuracy vs. Temperature | \pm 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.



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

| ZipLink Wiring System Compatibility Matrix for DL405 PLCs Continued | | | | | | | | | | |
|---|---------------------|---------------------|--------------|--------------|----------|---------------|--------------|---------------|-------------|--|
| Step 2: Connector Module Type | | Feedthrough Modules | | Fuse Modules | | Relay Modules | | Pigtail Cable | | |
| Step 1: I/O Module | Number of Terminals | ZL-RTB20 | ZL-RTB40 | ZL-RFU20 | ZL-RFU40 | ZL-RRL16-24 | ZL-RRL16-120 | ZL-LTB16-24 | ZL-LTB32-24 | |
| Step 3: Cables | | | | | | | | | | |
| Analog | | | | | | | | | | |
| I/O Module | F4-04AD | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-04ADS | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-08AD | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-16AD-1 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-16AD-2 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-04DA-1 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-04DA-2 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-08DA-1 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-16DA-1 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-08DA-2 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-16DA-2 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-04DAS-1 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-04DAS-2 | 20 | ZL-D4-CBL20# | | | | | | | |
| | F4-08THM* | 21 | | | | | | | | |
| | F4-08THM-n* | 21 | | | | | | | | |
| | F4-08RTD* | 20 | | | | | | | | |

* The F4-08THM, F4-08THM-n and F4-08RTD modules are not supported by the ZIPLink wiring system. These modules require wire specific to the signal type.

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 page 6-57 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 | Device Type | 5 VDC (mA) | External 24 VDC Power (mA) |
| 0 | | | |
| 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 |
| <p>1. Using a chart similar to the 3 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.</p> | | | |

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 24VDC Current Required | Power-consuming Device | 5V Current Consumed | External 24VDC Current Required | | | | | | | | | | | | |
| I/O Bases | | | Analog Modules (continued) | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | |
| DC Input Modules | | | 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 | | | | | | | | | | | | |
| D4-08ND3S | 100 | NONE | F4-16DA-2 | 80 | 25 max. | | | | | | | | | | | | |
| D4-16ND2 | 150 | NONE | F4-08RTD | 80 | NONE | | | | | | | | | | | | |
| D4-16ND2F | 150 | NONE | F4-08THM-n | 120 | 50 | | | | | | | | | | | | |
| D4-32ND3-1 | 150 | NONE | F4-08THM | 110 | 60 | | | | | | | | | | | | |
| D4-32ND3-2 | 150 | NONE | Remote I/O | | | | | | | | | | | | | | |
| D4-64ND2 | 300 max. | NONE | | | | | | | | | | | | | | | |
| AC Input Modules | | | | | | | | | | | | | | | | | |
| D4-08NA | 100 | NONE | H4-ERM | 320 | NONE | | | | | | | | | | | | |
| D4-16NA | 150 | NONE | H4-ERM-F | 450 | NONE | | | | | | | | | | | | |
| | | | D4-RM | 300 | NONE | | | | | | | | | | | | |
| AC/DC Input Modules | | | Communications and Networking | | | | | | | | | | | | | | |
| D4-16NE3 | 150 | NONE | H4-ECOM100 300 H4-ECOM 530 H4-ECOM-F 670 D4-DCM 500 F4-MAS-MB 235 FA-UNICON 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 | | | CoProcessors | | | | | | | | | | | | | | |
| D4-08TA | 250 | NONE | F4-CP128-1 305 | | | | | | | | | | | | | | |
| D4-16TA | 450 | NONE | | | | | | | | | | | | | | | |
| Relay Output Modules | | | Specialty Modules | | | | | | | | | | | | | | |
| D4-08TR 550 F4-08TRS-1 575 F4-08TRS 575 D4-16TR 1000 | | | H4-CTRIO 400 D4-INT 100 D4-HSC 300 F4-16PID 160 F4-8MPI 225 D4-16SIM 150 F4-4LTC 280 | | | | | | | | | | | | | | |
| | | | | | | NONE NONE NONE NONE NONE NONE | | | | | | | | | | | |
| | | | | | | | | | NONE NONE NONE NONE NONE NONE | | | | | | | | |
| | | | | | | | | | | | | NONE NONE NONE NONE NONE NONE | | | | | |
| | | | | | | | | | | | | | | | NONE NONE NONE NONE NONE NONE | | |
| | | | | | | | | | | | | | | | | | |
| Analog Modules | | | Programming | | | | | | | | | | | | | | |
| F4-04AD 85 F4-04ADS 270 F4-08AD 75 | | | D4-HPP-1 (Handheld Prog.) 320 NONE | | | | | | | | | | | | | | |
| | | | Operator Interface | | | | | | | | | | | | | | |
| | | | DV-1000 150 NONE | | | | | | | | | | | | | | |
| | | | C-more Micro-Graphic 210 NONE | | | | | | | | | | | | | | |