# AC Output Modules

| D4-08TA AC Output | $286.00 |
|---|---|
| Outputs per Module | 8 |
| Commons per Module | 2 (isolated) |
| Operating Voltage | 15–265 VAC |
| Output Type | SSR (triac) |
| Peak Voltage | 265VAC |
| AC Frequency | 47–63 Hz |
| ON Voltage Drop | 1.5 VAC @ 2A |
| Max Current | 2A/point<br>5A/common @ 30° C<br>2A/common @ 60° C |
| Max Leakage Current | 5mA @ 265VAC |
| Max Inrush Current | 30A for 10ms<br>10A for 100ms |
| Minimum Load | 10mA |
| Base Power Required 5V | 250mA max |
| OFF to ON Response | 1ms |
| ON to OFF Response | 1ms + 1/2 cycle |
| Terminal Type (included | Removable |
| Status Indicators | Logic side |
| Weight | 11.6 oz. (330g) |
| Fuses | 1 (8A) per common, non-replaceable |

| D4-16TA AC Output | $349.00 |
|---|---|
| Outputs per Module | 16 |
| Commons per Module | 2 (isolated) |
| Operating Voltage | 15–265 VAC |
| Output Type | SSR (triac) |
| Peak Voltage | 265VAC |
| AC Frequency | 47–63 Hz |
| ON Voltage Drop | 1.5 VAC @ 0.5A |
| Max Current | 0.5 A/point<br>3A/common @ 45° C<br>2A/common @ 60° C |
| Max Leakage Current | 4mA @ 265VAC |
| Max Inrush Current | 15A for 10ms<br>10A for 100ms |
| Minimum Load | 10mA |
| Base Power Required 5V | 450mA max |
| OFF to ON Response | 1ms |
| ON to OFF Response | 1ms + 1/2 cycle |
| Terminal Type (included) | Removable |
| Status Indicators | Logic Side |
| Weight | 12.2 oz. (350g) |
| Fuses | 1 (5A) per common, non-replaceable |

See Wiring Solutions for part numbers of *ZIP*Link cables
and connection modules compatible with this I/O module.
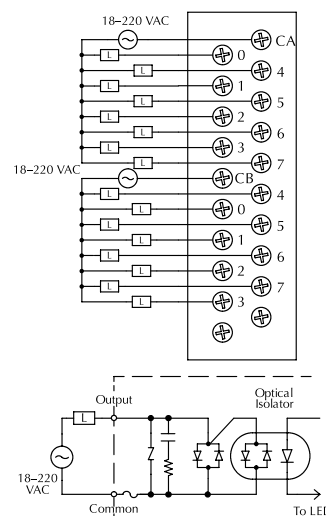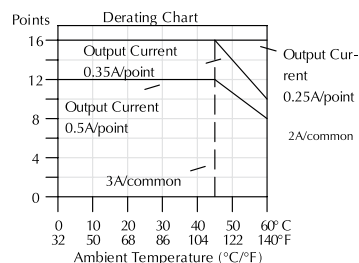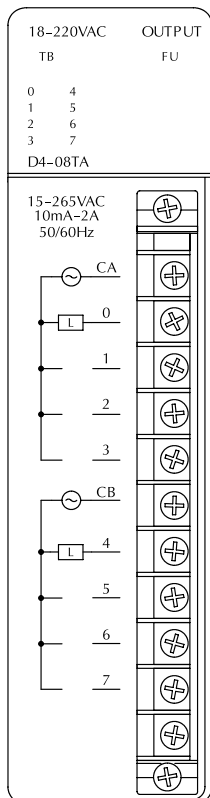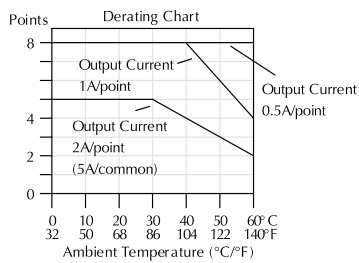
Note: When used with the ZIPLink wiring system, relay outputs are
derated not to exceed 2 Amps per point max.

# 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 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 | | | 5 VDC (mA) | External 24 VDC Power (mA) |
|---|---|---|---|---|
| | Base Number 0 | Device Type | 5 VDC (mA) | External 24 VDC Power (mA) |
| B | CURRENT SUPPLIED | | | |
| | CPU/Expansion Unit /Remote Server | D4-454 CPU | 3700 | 400 |
| C | CURRENT REQUIRED | | | |
| | SLOT 0 | D4-16ND2 | +150 | +0 |
| | SLOT 1 | D4-16ND2 | +150 | +0 |
| | SLOT 2 | F4-04DA-2 | +90 | +90 |
| | SLOT 3 | D4-08NA | +100 | +0 |
| | SLOT 4 | D4-08NA | +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 | | 2190 | 90 |
| F | Remaining Current Available | | 3700-2190=1510 | 400-90=310 |

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 Server 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 24VDC 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 |
|---|---|---|
| Part Numbers | D4-454, D4-EX (expansion base unit), D4-RS (remote Server unit) | D4-454DC-1, D4-EXDC (expansion base unit) |
| 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 (110V range) 170-264 VAC (220V range) | 20-28 VDC (24VDC) with less than 10% ripple |
| Maximum Inrush Current | 20A | 20A |
| Maximum Power | 50VA | 38W |

# Power Requirements

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