

# 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				
	<b>Base Number</b> 0	<b>Device Type</b>	<b>5 VDC (mA)</b>	<b>External 24 VDC Power (mA)</b>
<b>B</b>	<b>CURRENT SUPPLIED</b>			
	<b>CPU/Expansion Unit /Remote Server</b>	D4-454 CPU	3700	400
<b>C</b>	<b>CURRENT REQUIRED</b>			
	<b>SLOT 0</b>	D4-16ND2	+150	+0
	<b>SLOT 1</b>	D4-16ND2	+150	+0
	<b>SLOT 2</b>	F4-04DA-2	+90	+90
	<b>SLOT 3</b>	D4-08NA	+100	+0
	<b>SLOT 4</b>	D4-08NA	+100	+0
	<b>SLOT 5</b>	D4-16TD2	+100	+0
	<b>SLOT 6</b>	D4-16TD2	+100	+0
	<b>SLOT 7</b>	D4-16TR	+1000	+0
<b>D</b>	<b>OTHER</b>			
	<b>BASE</b>	D4-08B-1	+80	+0
	<b>Handheld Programmer</b>	D4-HPP-1	+320	+0
<b>E</b>	<b>Maximum Current Required</b>		<b>2190</b>	<b>90</b>
<b>F</b>	<b>Remaining Current Available</b>		<b>3700-2190=1510</b>	<b>400-90=310</b>
	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
<b>Part Numbers</b>	D4-454, D4-EX (expansion base unit), D4-RS (remote Server unit)	D4-454DC-1, D4-EXDC (expansion base unit)
<b>Voltage Withstand (dielectric)</b>	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay	
<b>Insulation Resistance</b>	> 10MΩ at 500VDC	
<b>Input Voltage Range</b>	85-132 VAC (110V range) 170-264 VAC (220V range)	20-28 VDC (24VDC) with less than 10% ripple
<b>Maximum Inrush Current</b>	20A	20A
<b>Maximum Power</b>	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 D4-454DC-1	3100 3100	400 NONE	D4-EX D4-EXDC D4-RS H4-EBC	4000 4000 3700 3470	400 NONE 400 400
Power Consumed					
Power-consuming Device	5V Current Consumed	External 24VDC Current Required	Power-consuming Device	5V Current Consumed	External 24VDC Current Required
<b>I/O Bases</b>			<b>Analog Modules (continued)</b>		
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	F4-08DA-1	70	75+20 per circuit
<b>DC Input Modules</b>			F4-08DA-2	90	90
D4-16ND2	150	NONE	F4-04DAS-1	60	60 per circuit
D4-16ND2F	150	NONE	F4-08DA-1	90	100+20 per circuit
D4-32ND3-1	150	NONE	F4-08DA-2	80	150
D4-64ND2	300 max.	NONE	F4-16DA-1	90	100+20 per circuit
<b>AC Input Modules</b>			F4-16DA-2	80	25 max.
D4-08NA	100	NONE	F4-08RTD	80	NONE
D4-16NA	150	NONE	F4-08THM-J(-n)	120	50
<b>AC/DC Input Modules</b>			F4-08THM	110	60
D4-16NE3	150	NONE	<b>Remote I/O</b>		
<b>DC Output Modules</b>			H4-ERM100	320(300)	NONE
D4-16TD1	200	125	H4-ERM-F	450	NONE
D4-16TD2	400	NONE	D4-RM	300	NONE
D4-32TD1	250	140	<b>Communications and Networking</b>		
D4-32TD2	350	120 (4A max including loads)	H4-ECOM100	300	NONE
D4-64TD1	800	NONE	D4-DCM	500	NONE
<b>AC Output Modules</b>			F4-MAS-MB	235	NONE
D4-08TA	250	NONE	<b>CoProcessors</b>		
D4-16TA	450	NONE	F4-CP128-1	305	NONE
<b>Relay Output Modules</b>			<b>Specialty Modules</b>		
D4-08TR	550	NONE	H4-CTRIO	400	NONE
F4-08TRS-1	575	NONE	D4-16SIM	150	NONE
F4-08TRS-2	575	NONE	F4-4LTC	280	75
D4-16TR	1000	NONE	<b>Programming</b>		
<b>Analog Modules</b>			D4-HPP-1 (Handheld Prog.)	320	NONE
F4-04AD	150	100	<b>Operator Interface</b>		
F4-04ADS	370	120	C-more Micro-Graphic	210	NONE
F4-08AD	75	90			