

# Relay Output Modules

D4-08TR Relay Output \$139.00	
<b>Outputs per Module</b>	8 relays
<b>Commons per Module</b>	2 (isolated)
<b>Operating Voltage</b>	5-30 VDC / 5-250 VAC
<b>Output Type</b>	Form A (SPST-NO)
<b>Peak Voltage</b>	30VDC / 256VAC
<b>AC Frequency</b>	47-63 Hz
<b>ON Voltage Drop</b>	N/A
<b>Max Current</b>	2A/point 5A/common
<b>Max Leakage Current</b>	0.1 mA @ 265VAC
<b>Max Inrush Current</b>	2A
<b>Minimum Load</b>	5mA
<b>Base Power Required 5V</b>	550mA max
<b>External DC Required</b>	None
<b>OFF to ON Response</b>	12ms
<b>ON to OFF Response</b>	12ms
<b>Terminal Type (included)</b>	Removable
<b>Status Indicators</b>	Logic side
<b>Weight</b>	9.1 oz. (260g)
<b>Fuses</b>	1 (8A) per common Non-replaceable

F4-08TRS-1 Relay Output \$190.00	
<b>Outputs per Module</b>	8 relays
<b>Commons per Module</b>	8 (isolated)
<b>Operating Voltage</b>	12-30 VDC/ 12-125 VAC *125-250 VAC
<b>Output Type</b>	4, Form C (SPST) 4, Form A (SPST-NO)
<b>Peak Voltage</b>	30VDC/ 250VAC @ 10A
<b>AC Frequency</b>	47-63 Hz
<b>ON Voltage Drop</b>	N/A
<b>Max Current (Resistive)</b>	10A/point 40A/module
<b>Max Leakage Current</b>	N/A
<b>Max Inrush Current</b>	10A
<b>Minimum Load</b>	100mA @ 12VDC
<b>Base Power Required 5V</b>	575mA max
<b>External DC Required</b>	None
<b>OFF to ON Response</b>	7ms
<b>ON to OFF Response</b>	9ms
<b>Terminal Type (included)</b>	Removable
<b>Status Indicators</b>	Logic side
<b>Weight</b>	13.2 oz. (374g)
<b>Fuses</b>	1 (10A) per common Non-replaceable

Maximum DC voltage rating is 120 VDC @ 0.5A @ 30,000 cycles typical. Motor starters up to and including NEMA size 4 can be used with this module.

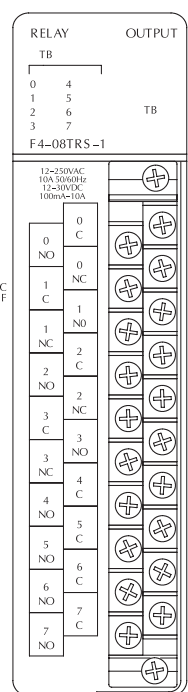
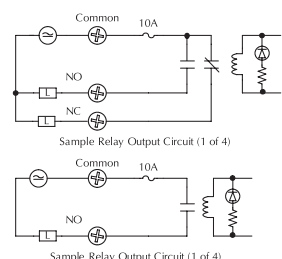
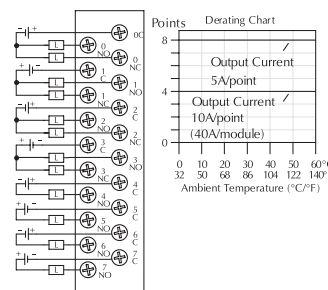
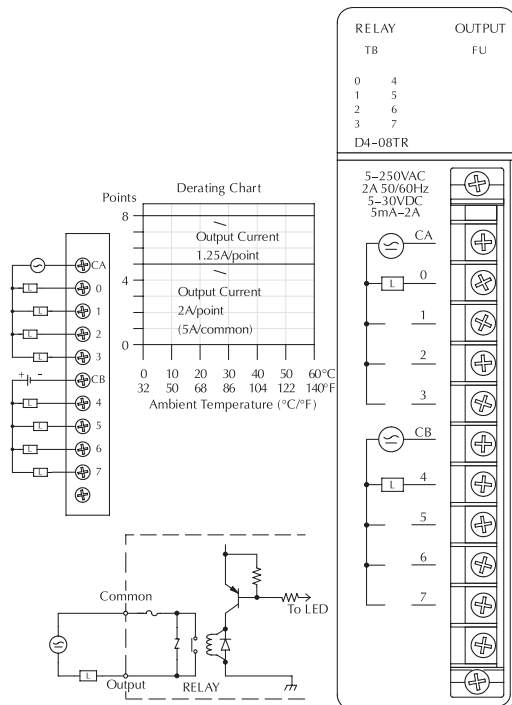
See Wiring Solutions for part numbers of ZIPLink cables and connection modules compatible with this I/O module.



Typical Relay Life (Operations)			
Maximum Resistive or Inductive Inrush Load Current	Operating Voltage		
	30 VDC	120 VAC	250 VAC
<b>2A resistive</b>	100K	300K	200K
<b>2A inductive</b>	100K	80K	60K
<b>0.5A resistive</b>	800K	1M	800K
<b>0.5A inductive</b>	300K	300K	200K

Typical Relay Life (Operations)			
Maximum Resistive or Inductive Inrush Load Current	Operating Voltage		
	28 VDC	120 VAC	250 VAC
<b>1/4HP</b>		25K	
<b>10.0A</b>	50K	50K	
<b>5.0A</b>	200K	100K	
<b>3.0A</b>	325K	125K	50K
<b>0.05A</b>	>50M		

**Caution:** the ZIPLink wiring system is rated at 2 Amps per I/O point and 4 Amps per common, therefore the F4-08TRS-1 relay outputs are derated to 2 Amps per point and 4 Amps per common when used with the ZIPLink wiring system.



# 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 Slave</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	+120	+100
	<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>2820</b>	<b>100</b>
<b>F</b>	<b>Remaining Current Available</b>		<b>3700-2820=880</b>	<b>400-100=300</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 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 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 slave 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					
<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>
D4-454 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					
<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 D4-06B-1 D4-08B-1	80 80 80	NONE NONE NONE	F4-16AD-1 F4-16AD-2 F4-04DA-1 F4-04DA-2 F4-04DAS-1 F4-08DA-1 F4-08DA-2 F4-16DA-1 F4-16DA-2 F4-08RTD F4-08THM-n F4-08THM	75 75 70 90 60 90 80 90 80 80 120 110	100 100 75+20 per circuit 90 60 per circuit 100+20 per circuit 150 100+20 per circuit 25 max. NONE 50 60
<i>DC Input Modules</i>			<i>Remote I/O</i>		
D4-16ND2 D4-16ND2F D4-32ND3-1 D4-64ND2	150 150 150 300 max.	NONE NONE NONE NONE	H4-ERM100 H4-ERM-F D4-RM	320(300) 450 300	NONE NONE NONE
<i>AC Input Modules</i>			<i>Communications and Networking</i>		
D4-08NA D4-16NA	100 150	NONE NONE	H4-ECOM100 D4-DCM F4-MAS-MB	300 500 235	NONE NONE NONE
<i>AC/DC Input Modules</i>			<i>CoProcessors</i>		
D4-16NE3	150	NONE	F4-CP128-1	305	NONE
<i>DC Output Modules</i>			<i>Specialty Modules</i>		
D4-16TD1 D4-16TD2 D4-32TD1 D4-32TD2 D4-64TD1	200 400 250 350 800	125 NONE 140 120 (4A max including loads) NONE	H4-CTRIO D4-16SIM F4-4LTC	400 150 280	NONE NONE 75
<i>AC Output Modules</i>			<i>Programming</i>		
D4-08TA D4-16TA	250 450	NONE NONE	D4-HPP-1 (Handheld Prog.)	320	NONE
<i>Relay Output Modules</i>			<i>Operator Interface</i>		
D4-08TR F4-08TRS-1 F4-08TRS-2 D4-16TR	550 575 575 1000	NONE NONE NONE NONE	DV-1000 C-more Micro-Graphic	150 210	NONE NONE
<i>Analog Modules</i>					
F4-04AD F4-04ADS F4-08AD	150 370 75	100 120 90			