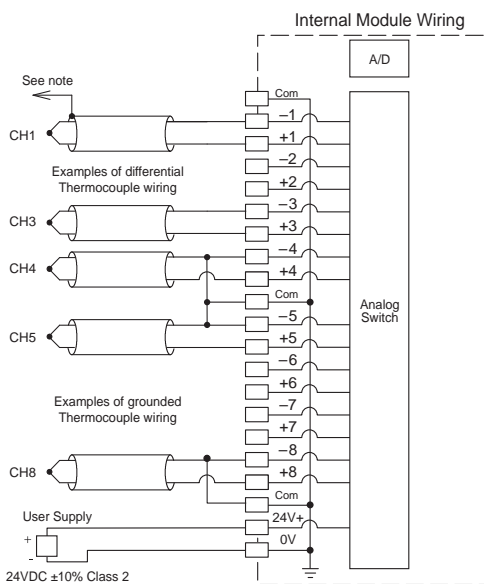
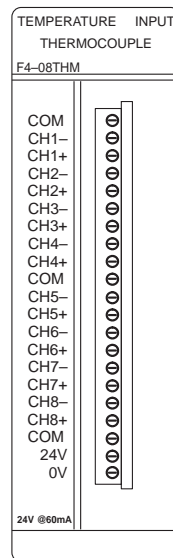
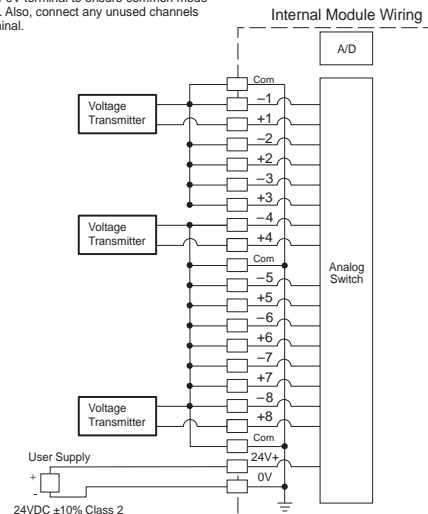


Temperature Input Modules

F4-08THM 8-Channel Thermocouple Input <--->	
General Specifications	
Number of Channels	8, differential
Common Mode Range	± 5VDC
Common Mode Rejection	90dB min. @ DC, 150dB min. @ 50/60Hz.
Input Impedance	1M Ω
Absolute Maximum Ratings	Fault-protected inputs to ± 50VDC
Accuracy vs. Temperature	± 5ppm/°C maximum full scale calibration (including maximum offset change)
PLC Update Rate	8 channels per scan max
Digital Inputs	16 binary data bits, 2 channel ID bits, 4 diagnostic bits
Input Points Required	32 points (X) input module
Terminal Type (included)	Removable (D4-16IOCON)
External Power Supply	60mA maximum, 18 to 26.4VDC
Power Budget Requirements	110mA max., 5VDC (supplied to base)
Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
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
Thermocouple Specifications	
Input Ranges*	Type J -190 to 760°C -310 to 1400°F
	Type E -210 to 1000°C -346 to 1832°F
	Type K -150 to 1372°C -238 to 2502°F
	Type R 65 to 1768°C 149 to 3214°F
	Type S 65 to 1768°C 149 to 3214°F
	Type T -230 to 400°C -382 to 752°F
	Type B 529 to 1820°C 984 to 3308°F
	Type N -70 to 1300°C -94 to 2372°F
Type C 65 to 2320°C 149 to 4208°F	
Display Resolution	± 0.1°C or ± 0.1°F
Cold Junction Compensation	Automatic
Conversion Time	100ms per channel
Warm-Up Time	30 minutes typically ± 1°C repeatability
Linearity Error (End to End)	± .05°C maximum, ± .01°C typical
Maximum Inaccuracy	± 3°C (excluding thermocouple error)
Voltage Input Specifications	
Voltage Ranges	0-5V, ± 5V, 0-156.25mV, ± 156.25mVDC
Resolution	16 bit (1 in 65535)
Full Scale Calibration Error (Offset error Included)	± 13 counts typical, ± 33 maximum
Offset Calibration Error	± 1 count maximum, @ 0V input
Linearity Error (End to End)	± 1 count maximum
Maximum Inaccuracy	± 0.2% @ 25°C (77°F)
NOTE 1: Terminate shields at the respective signal source NOTE 2: Leave unused channels open (no connection) *Thermocouple type is selected by setting internal jumpers NOTE 3: This module is not compatible with the ZIPLink wiring system.	

Thermocouple Input Wiring Diagram

Voltage Input Wiring Diagram


Note 3: When using 0-156mV and 5V ranges, connect CH- terminal to Com or 0V terminal to ensure common mode range acceptance. Also, connect any unused channels to Com or 0V terminal.

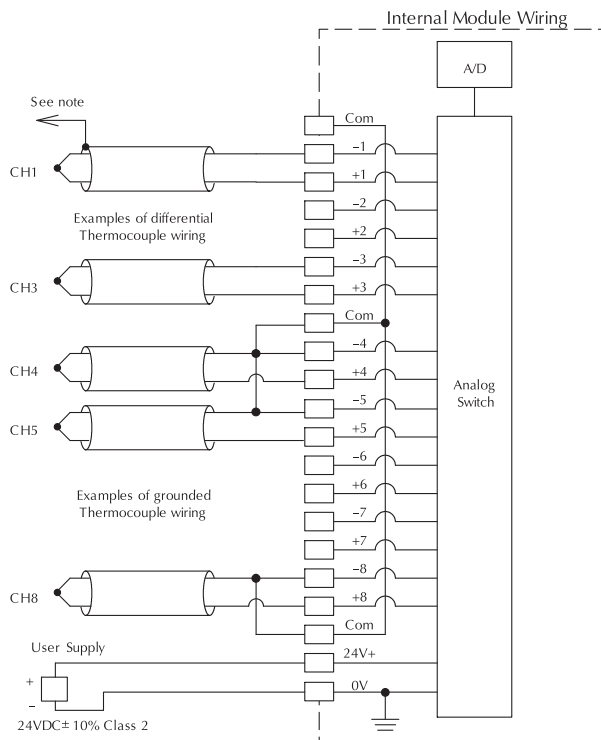


Temperature Input Modules

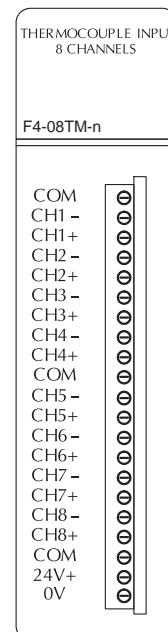
F4-08THM-n 8-Channel Thermocouple Input <--->																																		
When you order the module, replace the "n" with the type of Thermocouple needed. For example, to order a Type J thermocouple module, order part number F4-08THM-J or part number F4-08THM-K for a Type K module.																																		
Number of channels	8, differential inputs																																	
Input Ranges	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Type B</td> <td>529/1820°C</td> <td>984/3308°F</td> </tr> <tr> <td>Type C</td> <td>65/2320°C,</td> <td>149/4208°F</td> </tr> <tr> <td>Type E</td> <td>270/1000°C,</td> <td>-450/1832°F</td> </tr> <tr> <td>Type J</td> <td>-210/760°C,</td> <td>-350/1390°F</td> </tr> <tr> <td>Type K</td> <td>-270/1372°C,</td> <td>-450/2502°F</td> </tr> <tr> <td>Type R</td> <td>0/1768°C,</td> <td>32/3214°F</td> </tr> <tr> <td>Type S</td> <td>0/1768°C,</td> <td>32/3214°F</td> </tr> <tr> <td>Type T</td> <td>-270/400°C,</td> <td>-450/752°F</td> </tr> <tr> <td></td> <td>-1: 0-50 mV</td> <td></td> </tr> <tr> <td></td> <td>-2: 0-100 mV</td> <td></td> </tr> <tr> <td></td> <td>-3: 0-25mV</td> <td></td> </tr> </table>	Type B	529/1820°C	984/3308°F	Type C	65/2320°C,	149/4208°F	Type E	270/1000°C,	-450/1832°F	Type J	-210/760°C,	-350/1390°F	Type K	-270/1372°C,	-450/2502°F	Type R	0/1768°C,	32/3214°F	Type S	0/1768°C,	32/3214°F	Type T	-270/400°C,	-450/752°F		-1: 0-50 mV			-2: 0-100 mV			-3: 0-25mV	
Type B	529/1820°C	984/3308°F																																
Type C	65/2320°C,	149/4208°F																																
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Type S	0/1768°C,	32/3214°F																																
Type T	-270/400°C,	-450/752°F																																
	-1: 0-50 mV																																	
	-2: 0-100 mV																																	
	-3: 0-25mV																																	
Resolution	12 bit (1 in 4,096)																																	
Input Impedance	27KΩ																																	
Absolute Maximum Ratings	Fault protected input, 130 Vrms or 100VDC																																	
Cold Junction Compensation	Automatic																																	
Conversion Time	15ms per channel, minimum 1 channel per CPU scan																																	
Converter Type	Successive Approximation, 574																																	

Linearity Error	± 1 count (0.03% of full scale) maximum
Full Scale Calibration Error	± 0.35% of full scale
Maximum Inaccuracy*	± 1°C for type E, J, K, and T ± 3°C for type B, C, R, and S
PLC Update Rate	1 ch. per scan min., 8 per scan max.
Digital Input Points Required	16 (X) input points (12 binary data bits, 3 channel ID bits, 1 sign bit)
Base Power Required 5V	120mA
Terminal Type (included)	Non-removable
External Power Supply	24VDC ±10%, 50mA current
Operating Temperature	32 to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Accuracy vs Temperature*	57 ppm/°C maximum full scale
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

Note 1: Terminate shields at the respective signal source
 Note 2: Leave unused channels open (no connection)
 Note 3: This module is not compatible with the ZIPLink wiring system.



*Max. inaccuracy is not guaranteed for temperatures lower than:
 -220°C for types E & T
 -200°C for types J & K
 +100°C for types R & S

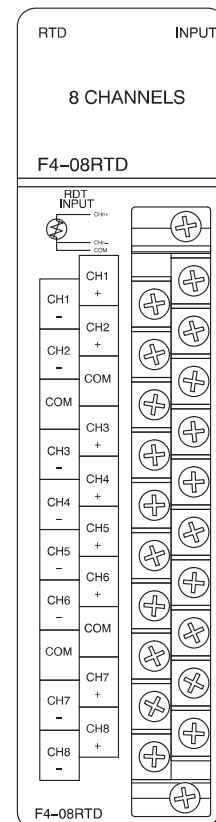
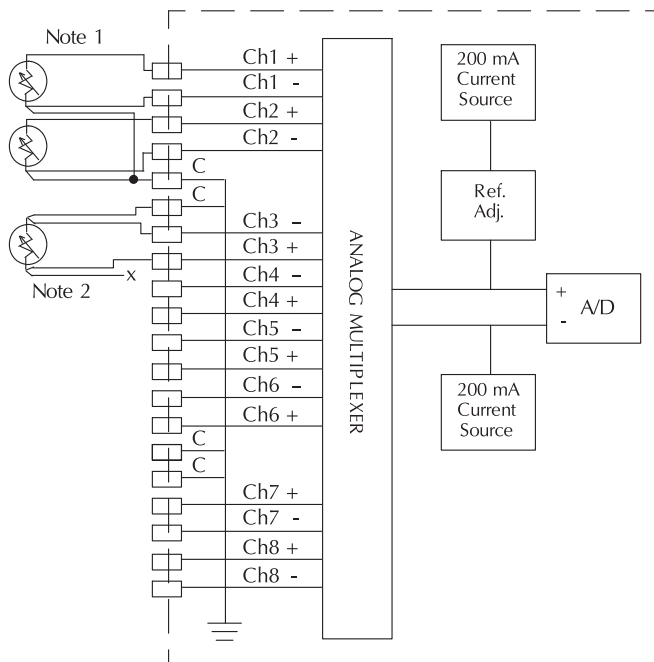


Temperature Input Modules

F4-08RTD 8-Channel RTD Input <--->	
Number of Channels	8
Input Ranges	Type Pt100: -200/850°C, -328/1562°F Type Pt1000: -200/595°C, -328/1103°F Type jPT100: -38/450°C, -36/842°F Type CU-10/25W: -200/260°C, -328/500°F
Resolution	16 bit (1 in 65535)
Input Impedance	27K Ω
Display Resolution	± 0.1°C, ±0.1°F (±3276.7)
RTD Excitation Current	200μA
Input Type	Differential
Notch Filter	>100db notches at 50/60Hz -3db=13.1 Hz
Maximum Settling Time	100msec (full-scale step input)
Common Mode Range	0-5 VDC

Absolute Maximum Ratings	Fault protected inputs to ±50 VDC
Converter Type	Charge Balancing
Linearity Error	± 1°C maximum, ±0.1°C typical
Full Scale Calibration Error	± 1°C
PLC Update Rate	1 ch. per scan min., 8 per scan max.
Digital Input Points Required	32 (X) input points (15 binary data bits, 3 channel ID bits, 1 sign bit, 8 fault bits)
Base Power Required 5V	80mA @ 5VDC
Terminal Type (included)	Removable (D4-16IOCON)
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

Notes:
 1. the three wires connecting the RTD to the module must be the same type and length. Do not use the shield or drain wire for the third connection.
 2. If an RTD sensor has 4 wires, the plus sense wire should be left unconnected as shown.
 3. This module is not compatible with the **ZiLink** 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			
<i>Base Number</i>	<i>Device Type</i>	<i>5 VDC (mA)</i>	<i>External 24 VDC Power (mA)</i>
0			
B CURRENT SUPPLIED			
<i>CPU/Expansion Unit /Remote Slave</i>	D4-440 CPU	3700	400
C CURRENT REQUIRED			
<i>SLOT 0</i>	D4-16ND2	+150	+0
<i>SLOT 1</i>	D4-16ND2	+150	+0
<i>SLOT 2</i>	F4-04DA	+120	+100
<i>SLOT 3</i>	D4-08ND3S	+100	+0
<i>SLOT 4</i>	D4-08ND3S	+100	+0
<i>SLOT 5</i>	D4-16TD2	+100	+0
<i>SLOT 6</i>	D4-16TD2	+100	+0
<i>SLOT 7</i>	D4-16TR	+1000	+0
D OTHER			
<i>BASE</i>	D4-08B	+80	+0
<i>Handheld Programmer</i>	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 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.			

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



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/Lights

Process

Relays/Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Safety

Appendix

Product Index

Part # Index

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			
			F4-16DA-2	80	25 max.			
			F4-08RTD	80	NONE			
			F4-08THM-n	120	50			
			F4-08THM	110	60			
AC Input Modules			Remote I/O					
D4-08NA	100	NONE	H4-ERM	320	NONE			
D4-16NA	150	NONE	H4-ERM-F	450	NONE			
AC/DC Input Modules			D4-RM	300	NONE			
			Communications and Networking					
D4-16NE3	150	NONE	DC Output Modules					
F4-08NE3S	90	NONE						
DC Output Modules						H4-ECOM100	300	NONE
						H4-ECOM-F	670	NONE
						D4-DCM	500	NONE
						F4-MAS-MB	235	NONE
			FA-UNICON	NONE	65			
			AC Output Modules			CoProcessors		
						F4-CP128-1	305	NONE
D4-08TA	250	NONE	Specialty Modules					
D4-16TA	450	NONE						
Relay Output Modules			H4-CTRIO	400	NONE			
			D4-INT	100	NONE			
			D4-HSC	300	NONE			
			F4-16PID	160	NONE			
			F4-8MPI	225	170			
D4-08TR	550	NONE	D4-16SIM	150	NONE			
F4-08TRS-1	575	NONE	F4-4LTC	280	75			
F4-08TRS	575	NONE	Programming					
D4-16TR	1000	NONE						
Analog Modules			Operator Interface					
			F4-04AD	85	100	D4-HPP-1 (Handheld Prog.)	320	NONE
			F4-04ADS	270	120	C-more Micro-Graphic		
F4-08AD	75	90						
Operator Interface			DV-1000	150	NONE			
			C-more Micro-Graphic			210	NONE	