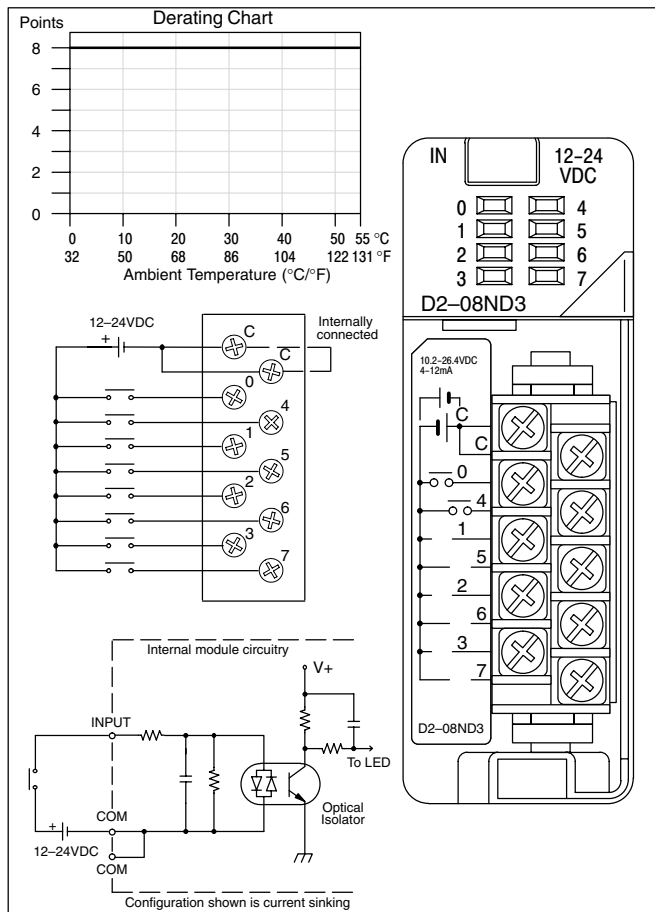


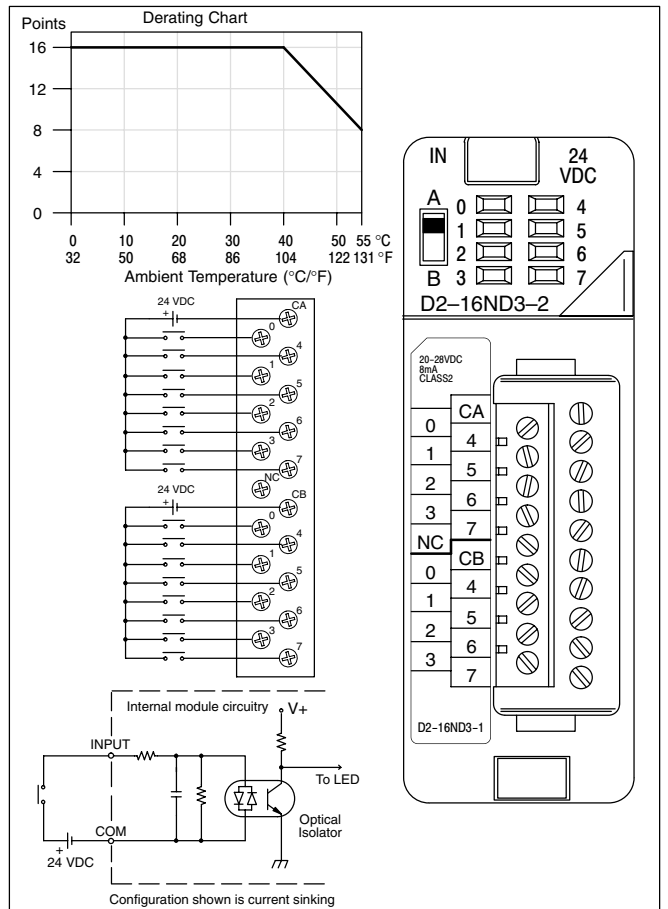
D2-08ND3 DC Input

Inputs per module	8 (sink/source)
Commons per module	1 (2 I/O terminal points)
Input voltage range	10.2–26.4 VDC
Peak voltage	26.4 VDC
AC frequency	n/a
ON voltage level	9.5 VDC minimum
OFF voltage level	3.5 VDC maximum
Input impedance	2.7 K
Input current	4.0 mA @ 12 VDC 8.5 mA @ 24 VDC
Minimum ON current	3.5 mA
Maximum OFF current	1.5 mA
Base power required	50 mA max
OFF to ON response	1 to 8 ms
ON to OFF response	1 to 8 ms
Terminal type	Removable
Status Indicator	Logic side
Weight	2.3 oz. (65 g)



D2-16ND3-2 DC Input

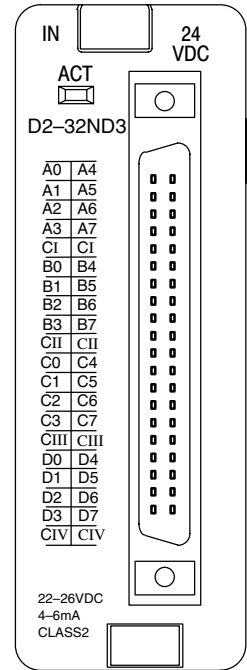
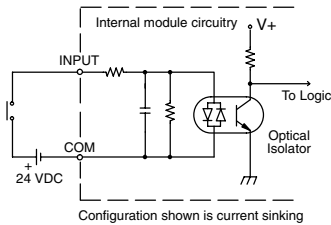
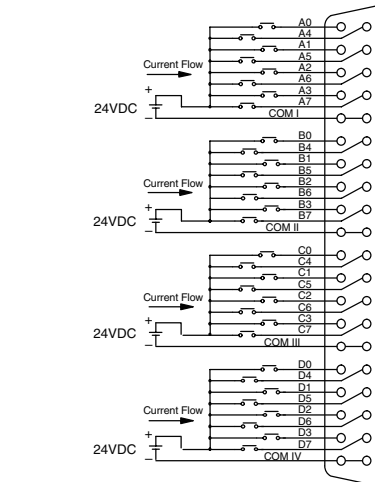
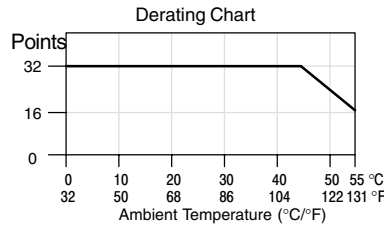
Inputs per module	16 (sink/source)
Commons per module	2 (isolated)
Input voltage range	20–28 VDC
Peak voltage	30 VDC (10 mA)
AC frequency	N/A
ON voltage level	19 VDC minimum
OFF voltage level	7 VDC maximum
Input impedance	3.9 K
Input current	6 mA @ 24 VDC
Minimum ON current	3.5 mA
Maximum OFF current	1.5 mA
Base power required	100 mA Max
OFF to ON response	3 to 9 ms
ON to OFF response	3 to 9 ms
Terminal type	Removable
Status Indicator	Logic side
Weight	2.3 oz. (65 g)



Installation, Wiring, and Specifications

D2-32ND3 DC Input

Inputs per module	32 (sink/source)
Commons per module	4 (8 I/O terminal points)
Input voltage range	20-28 VDC
Peak voltage	30 VDC
AC frequency	n/a
ON voltage level	19 VDC minimum
OFF voltage level	7 VDC maximum
Input impedance	4.8 K
Input current	8.0 mA @ 24 VDC
Minimum ON current	3.5 mA
Maximum OFF current	1.5 mA
Base power required	25 mA max
OFF to ON response	3 to 9 ms
ON to OFF response	3 to 9 ms
Terminal type	40-pin Connector
Status Indicator	Module Activity LED
Weight	2.1 oz. (60 g)



Installation, Wiring and Specifications

D2-32ND3-2 DC Input

Inputs per module	32 (sink/source)
Commons per module	4 (8 I/O terminal points)
Input voltage range	4.50 to 15.6VDC min to max
Peak voltage	16VDC
Input current	4mA @ 5VDC, 11mA @ 12VDC, 14mA @ 15VDC
Max input current	16mA @ 15.6VDC
Input impedance	1k ohms @ 5-15VDC
ON voltage level	4VDC
OFF voltage level	2VDC
Min ON current	3mA
Max OFF current	0.5mA
OFF to ON response	3 to 9ms
ON to OFF response	3 to 9ms
Status Indicators	Module activity LED
Terminal type	Removeable 40-pin connector
Base power required	5V/25mA max (all points on)
Weight	2.1oz (60g)

The technical diagrams include:

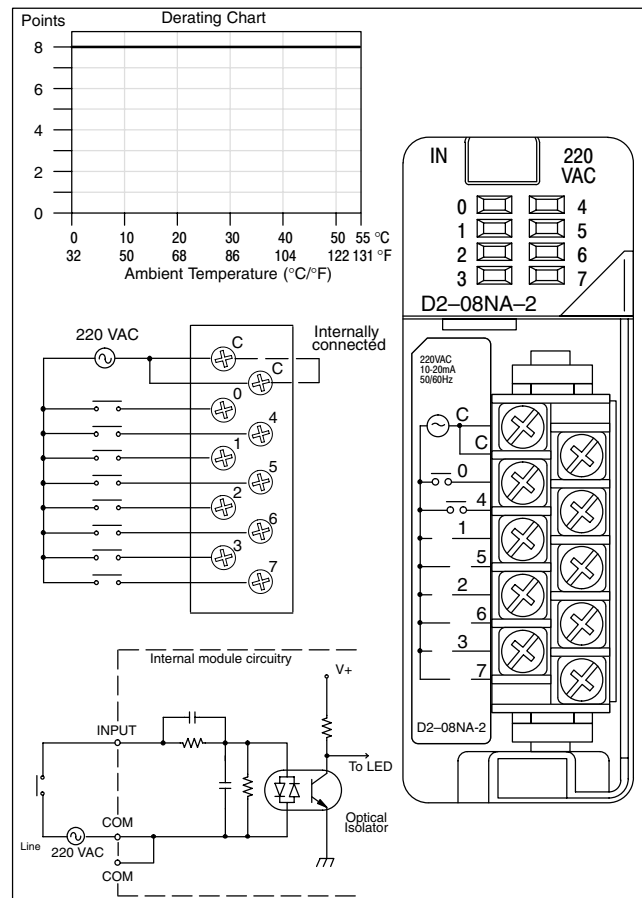
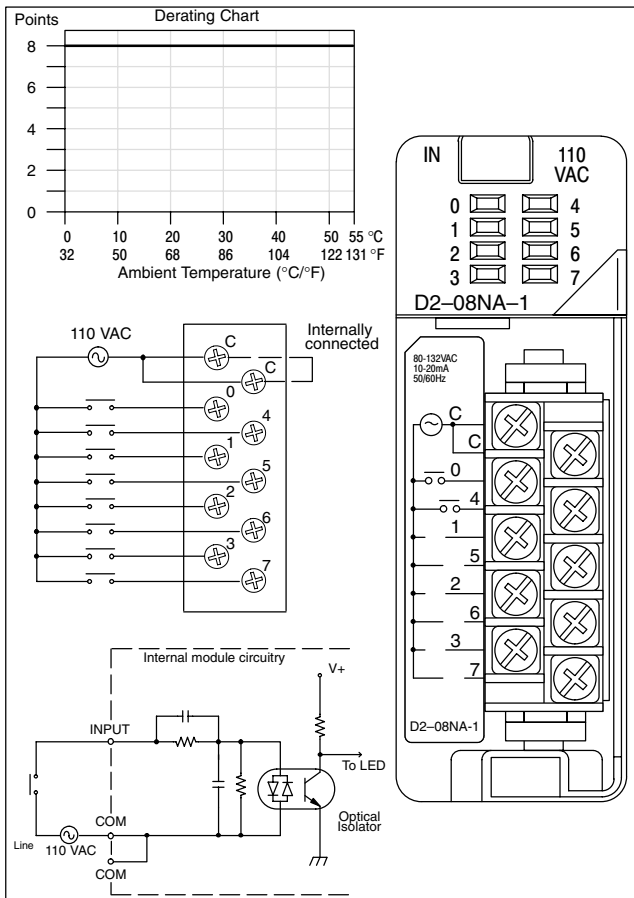
- Wiring Diagrams:** Four diagrams showing current flow for input groups A (A0-A7), B (B0-B7), C (C0-C7), and D (D0-D7). Each group has a 15VDC source connected to the input terminals and a common terminal (COM I, COM II, COM III, COM IV).
- Physical Module View:** Shows the 40-pin connector with labels for input groups (A0-A7, B0-B7, C0-C7, D0-D7), commons (COM I-IV), and an ACT (Activity) LED. The module is labeled D2-32ND3-2 and has a 24 VDC input.
- Internal Circuitry:** A schematic showing the input terminal connected to a resistor (W) and an optical isolator. The common terminal (COM) is connected to a 5-15VDC source. The output is labeled 'To Logic'.
- Derating Chart 1:** Input Voltage: 5VDC. Shows 32 points constant from 0°C to 55°C.
- Derating Chart 2:** Input Voltage: 12VDC and 15VDC. Shows 32 points constant at 12VDC until 30°C, then derating to 16 points at 55°C for both 12VDC and 15VDC.

D2-08NA-1 AC Input

Inputs per module	8
Commons per module	1 (2 I/O terminal points)
Input voltage range	80–132 VAC
Peak voltage	132 VAC
AC frequency	47–63 Hz
ON voltage level	75 VAC minimum
OFF voltage level	20 VAC maximum
Input impedance	12K @ 60 Hz
Input current	13mA @ 100VAC, 60Hz 11mA @ 100VAC, 50Hz
Minimum ON current	5 mA
Maximum OFF current	2 mA
Base power required	50 mA Max
OFF to ON response	5 to 30 ms
ON to OFF response	10 to 50 ms
Terminal type	Removable
Status indicator	Logic side
Weight	2.5 oz. (70 g)

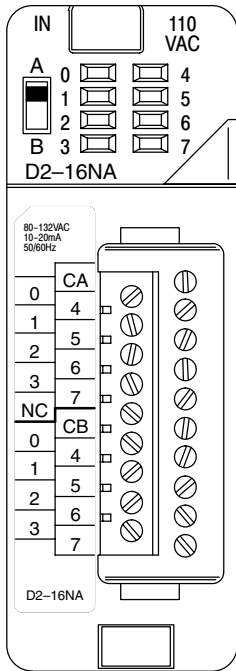
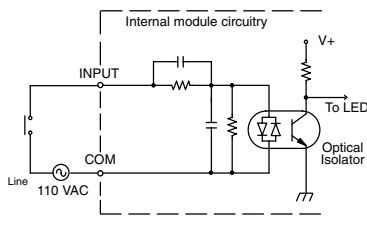
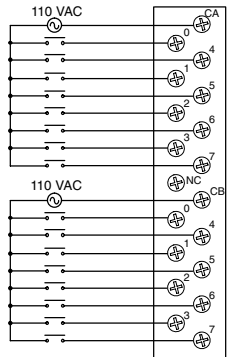
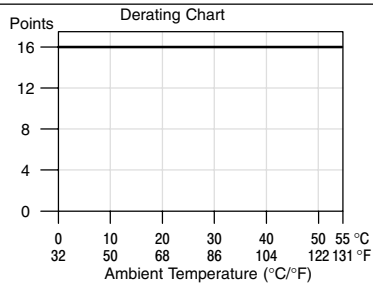
D2-08NA-2 AC Input

Inputs per module	8
Commons per module	2 (internally connected)
Input voltage range	170–265 VAC
Peak voltage	265 VAC
AC frequency	47–63 Hz
ON voltage level	150 VAC minimum
OFF voltage level	40 VAC maximum
Input impedance	18K @ 60 Hz
Input current	9mA @ 220VAC, 50Hz 11mA @ 265VAC, 60Hz 10mA @ 220VAC, 60Hz 12mA @ 265VAC, 60Hz
Minimum ON current	10 mA
Maximum OFF current	2 mA
Base power required	100 mA Max
OFF to ON response	5 to 30 ms
ON to OFF response	10 to 50 ms
Terminal type	Removable
Status indicator	Logic side
Weight	2.5 oz. (70 g)



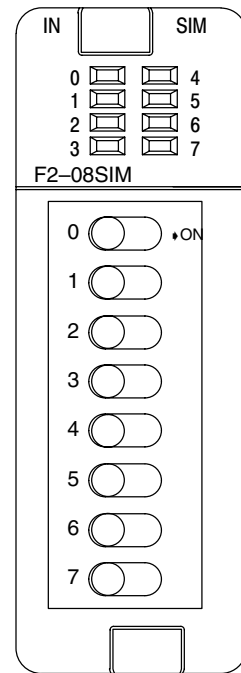
D2-16NA AC Input

Inputs per module	16
Commons per module	2 (isolated)
Input voltage range	80-132 VAC
Peak voltage	132 VAC
AC frequency	47-63 Hz
ON voltage level	70 VAC minimum
OFF voltage level	20 VAC maximum
Input impedance	12K @ 60 Hz
Input current	11mA @ 100VAC, 50Hz 13mA @ 100VAC, 60Hz 15mA @ 132VAC, 60Hz
Minimum ON current	5 mA
Maximum OFF current	2 mA
Base power required	100 mA Max
OFF to ON response	5 to 30 ms
ON to OFF response	10 to 50 ms
Terminal type	Removable
Status indicator	Logic side
Weight	2.4 oz. (68 g)



F2-08SIM Input Simulator

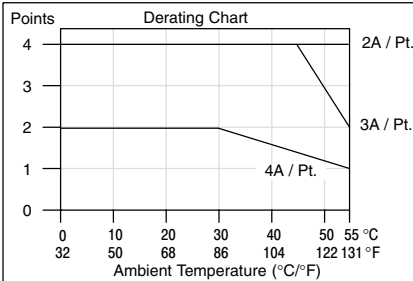
Inputs per module	8
Base power required	50 mA Max
Terminal type	None
Status indicator	Switch side
Weight	2.65 oz. (75 g)



D2-04TD1 DC Output

Outputs per module	4 (current sinking)
Output Points Consumed	8 points (only 1st 4 pts. used)
Commons per module	1 (4 I/O terminal points)
Operating voltage	10.2-26.4 VDC
Output type	NMOS FET (open drain)
Peak voltage	40 VDC
AC frequency	n/a
ON voltage drop	0.72 VDC maximum
Max load current (resistive)	4A / point 8A / common
Max leakage current	0.1mA @ 40 VDC

Max inrush current	6A for 100ms, 15A for 10 ms
Minimum load	50mA
Base power required 5v	60mA Max
OFF to ON response	1 ms
ON to OFF response	1 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.8 oz. (80 g)
Fuses	4 (1 per point) (6.3A slow blow, replaceable) Order D2-FUSE-3, 5/pack

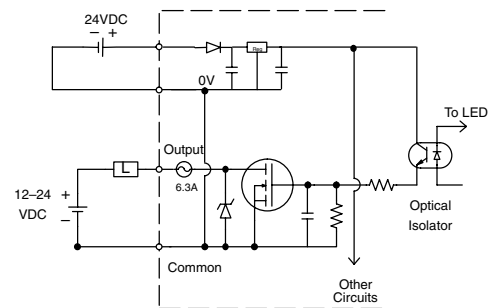
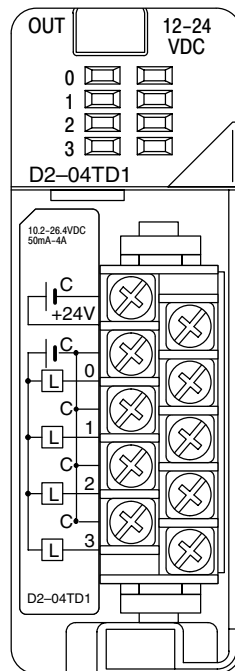
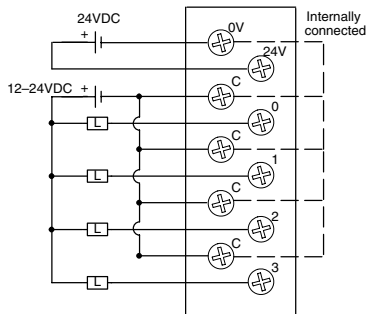


Inductive Load
Maximum Number of Switching Cycles per Minute

Load Current	Duration of output in ON state		
	7ms	40ms	100ms
0.1A	8000	1400	600
0.5A	1600	300	120
1.0A	800	140	60
1.5A	540	90	35
2.0A	400	70	-
3.0A	270	-	-
4.0A	200	-	-

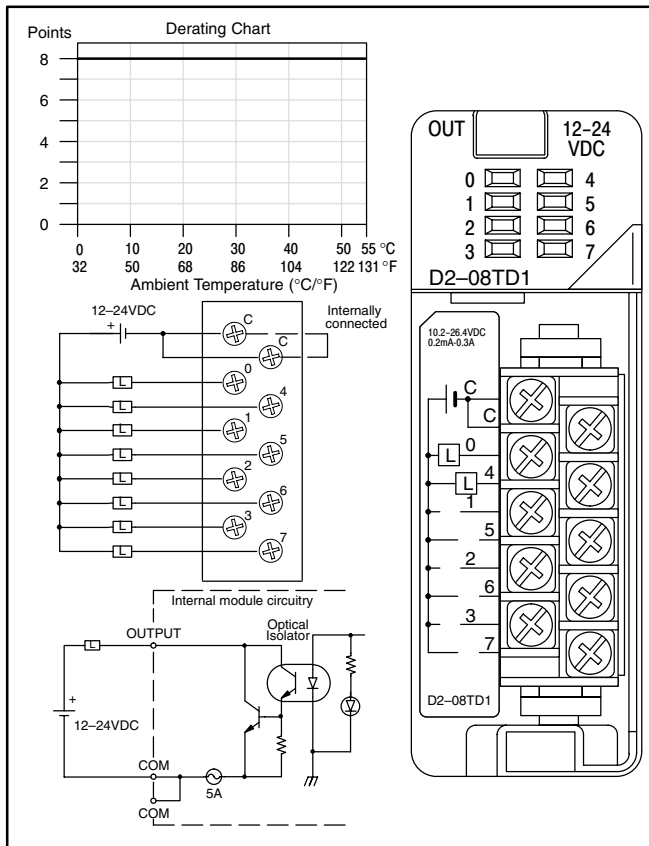
At 40ms duration, loads of 3.0A or greater cannot be used.
At 100ms duration, loads of 2.0A or greater cannot be used.

Here's how to use the table. Find the load current you expect to use and the duration that the output is ON. The number at the intersection of the row and column represents the switching cycles per minute. For example, a 1A inductive load that is on for 100ms can be switched on and off a maximum of 60 times per minute. To convert this to duty cycle percentage use: (Duration x cycles) / 60. Our example would be (60x.1) / 60 = .1 (10% duty cycle).



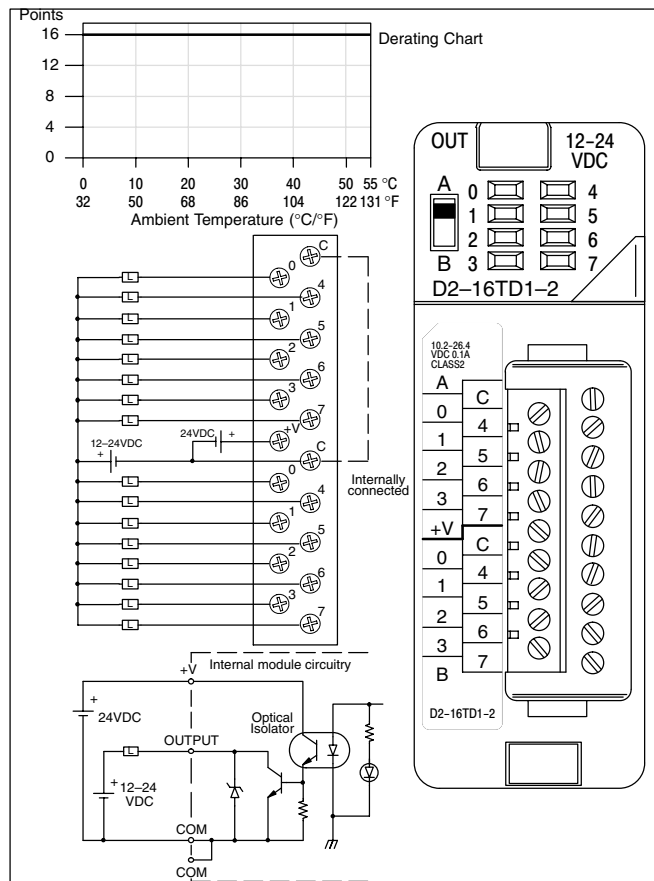
D2-08TD1 DC Output

Outputs per module	8 (current sinking)
Commons per module	1 (2 I/O terminal points)
Operating voltage	10.2–26.4 VDC
Output type	NPN open collector
Peak voltage	40 VDC
AC frequency	n/a
ON voltage drop	1.5 VDC maximum
Max load current	0.3A / point 2.4A / common
Max leakage current	0.1mA @ 40 VDC
Max inrush current	1A for 10 ms
Minimum load	0.5mA
Base power required 5v	100mA Max
OFF to ON response	1 ms
ON to OFF response	1 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.3 oz. (65 g)
Fuses	1 per common 5A fast blow, replaceable Order D2-FUSE-2 (5 per pack)



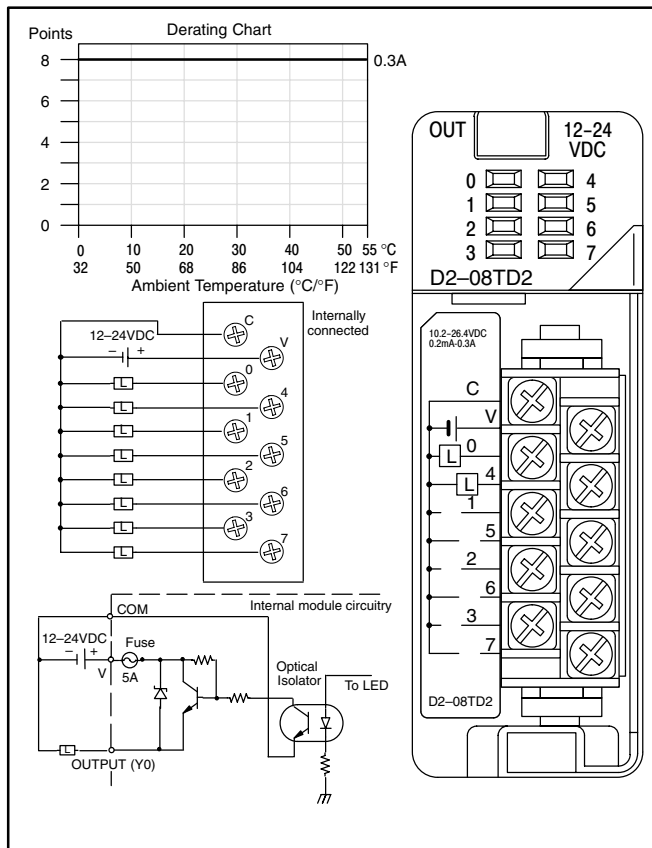
D2-16TD1-2 DC Output

Outputs per module	16 (current sinking)
Commons per module	1 (2 I/O terminal points)
Operating voltage	10.2–26.4 VDC
Output type	NPN open collector
Peak voltage	30 VDC
AC frequency	N/A
ON voltage drop	0.5 VDC maximum
Max load current	0.1A / point 1.6A / common
Max leakage current	0.1mA @ 30 VDC
Max inrush current	150mA for 10 ms
Minimum load	0.2mA
Base power required	200mA Max
OFF to ON response	0.5 ms
ON to OFF response	0.5 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.3 oz. (65 g)
Fuses	none
External DC required	24VDC ±4V @ 80mA max



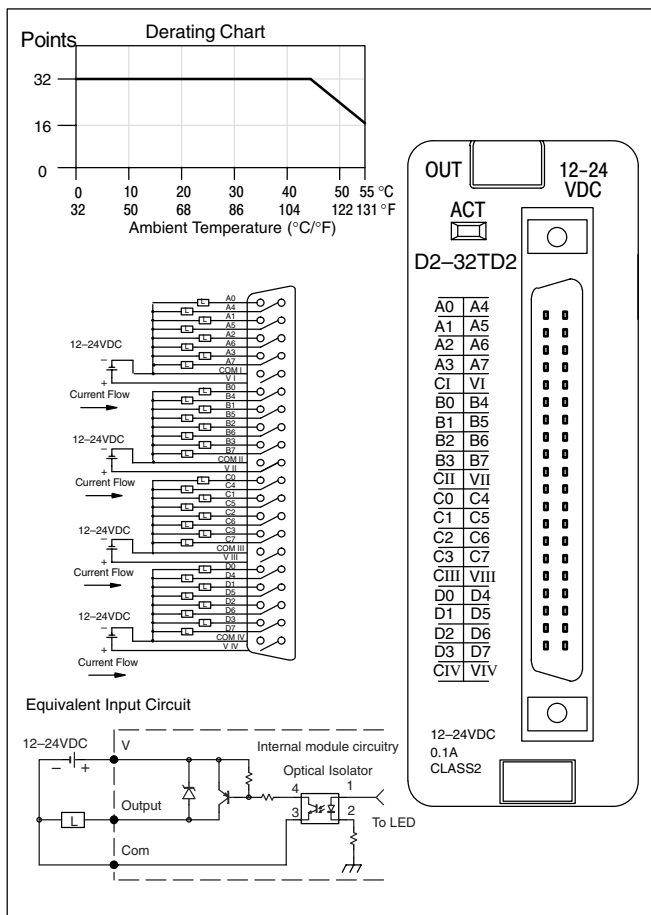
D2-08TD2 DC Output

Outputs per module	8 (current sinking)
Commons per module	1
Output voltage	10.8–26.4VDC
Operating voltage range	12–24VDC
Peak voltage	40VDC
AC frequency	n/a
ON voltage drop	1.5 VDC
Max output current	0.3A / point, 2.4A / common
Max leakage current	0.1mA @ 40VDC
Max inrush current	1mA for 10ms
OFF to ON response	1ms
ON to OFF response	1ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.3 oz. (65 g)
Fuse	5A/250V fast blow, replaceable Order D2-FUSE-2 (5 per pack)
Base power required	5V/100mA max



D2-32TD2 DC Output

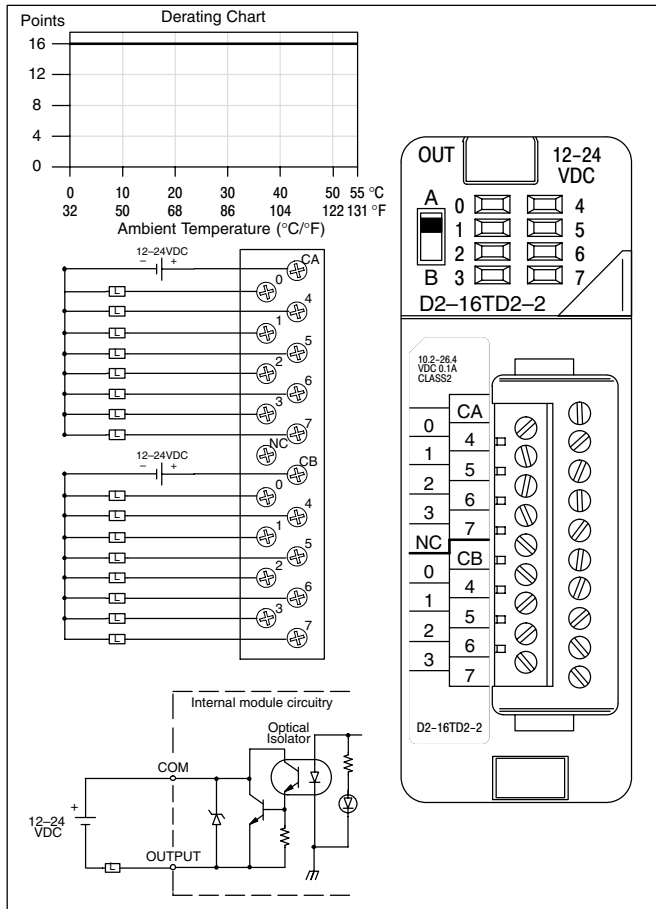
Outputs per module	32 (current sourcing)
Commons per module	4, 8 points / common (isolated)
Operating voltage	12 to 24VDC
Peak voltage	30VDC
Max load current	0.1A / point, 0.8A / common
Min load	0.2mA
Max leakage current	0.1mA @ 30VDC
ON voltage drop	0.5 VDC @ 0.1A
Max inrush current	150mA @ 10ms
OFF to ON response	0.5ms
ON to OFF response	0.5ms
Status indicators	Module activity: green LED I/O Status: none
Terminal type	Removable 40-pin connector (connector sold separately)
Weight	2.1oz. (60g)
Fuses	none
Base power required	5V/350mA max (all points on)



Installation, Wiring and Specifications

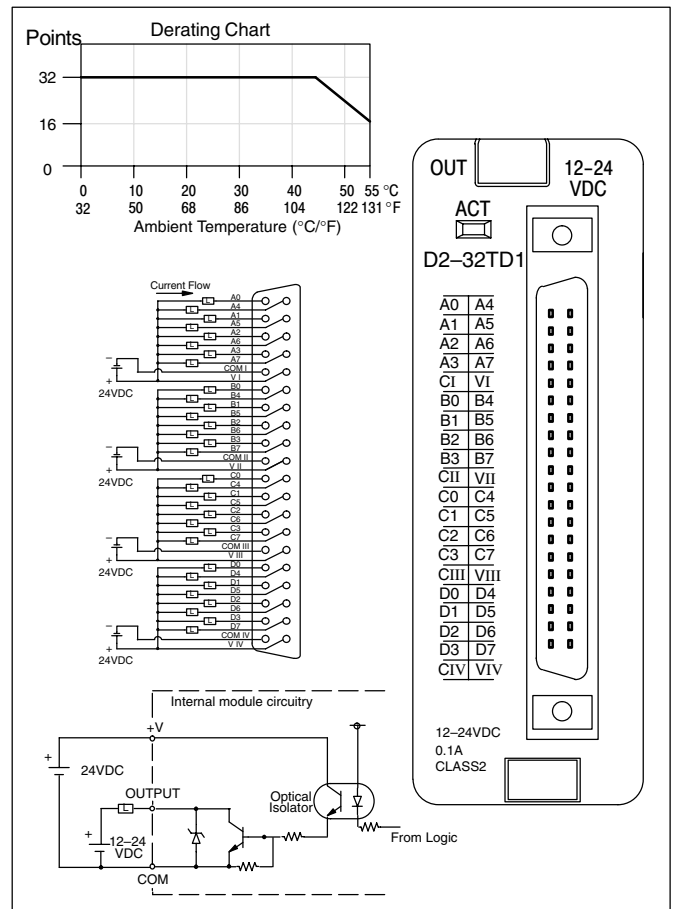
D2-16TD2-2 DC Output

Outputs per module	16 (current sourcing)
Commons per module	2
Operating voltage	10.2-26.4 VDC
Output type	NPN open collector
Peak voltage	30 VDC
AC frequency	N/A
ON voltage drop	1.0 VDC maximum
Max load current	0.1A / point 1.6A / common
Max leakage current	0.1mA @ 30 VDC
Max inrush current	150 mA for 10 ms
Minimum load	0.2mA
Base power required	200mA Max
OFF to ON response	0.5 ms
ON to OFF response	0.5 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.8 oz. (80 g)
Fuses	none



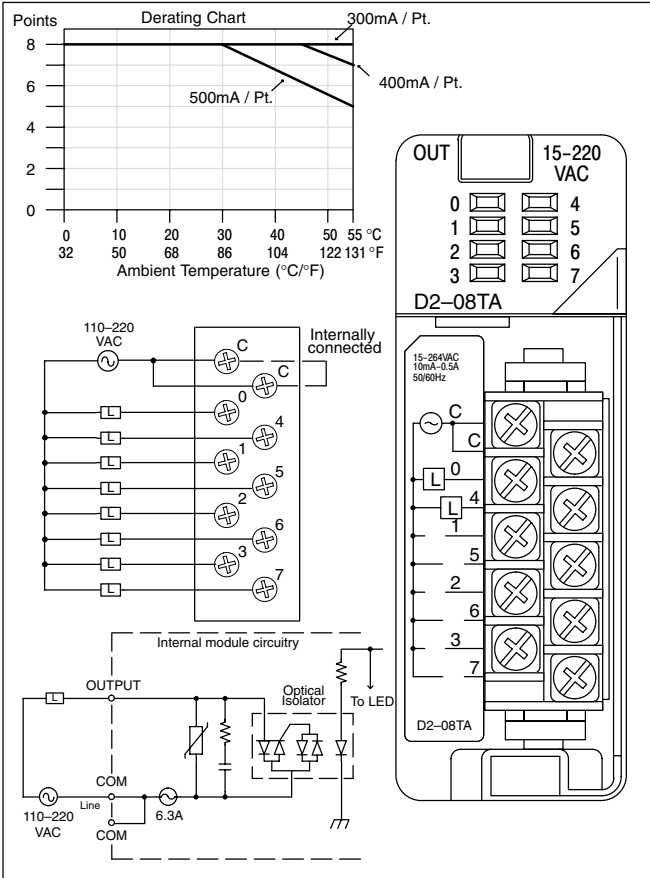
D2-32TD1 DC Output

Outputs per module	32 (current sinking)
Commons per module	4 (8 I/O terminal points)
Operating voltage	12-24 VDC
Output type	NPN open collector
Peak voltage	30 VDC
AC frequency	N/A
ON voltage drop	0.5 VDC maximum
Max load current	0.1A / point
Max leakage current	0.1mA @ 30 VDC
Max inrush current	150 mA for 10 ms
Minimum load	0.2mA
Base power required	350mA Max
OFF to ON response	0.5 ms
ON to OFF response	0.5 ms
Terminal type	40-pin connector (see page NO TAG)
Status indicators	Module Activity
Weight	2.1 oz. (60 g)
Fuses	none



D2-08TA AC Output

Outputs per module	8
Commons per module	1 (2 I/O terminal points)
Operating voltage	15-264 VAC
Output type	SSR (Triac)
Peak voltage	264 VAC
AC frequency	47 to 63 Hz
ON voltage drop	< 1.5 VAC (> 0.1A) < 3.0 VAC (< 0.1A)
Max load current	0.5A / point 4A / common
Max leakage current	4mA (264VAC, 60Hz) 1.2mA (100VAC, 60Hz) 0.9mA (100VAC, 50Hz)
Max inrush current	10A for 10 ms
Minimum load	10 mA
Base power required	20 mA / ON pt. 250 mA max
OFF to ON response	1 ms
ON to OFF response	1 ms + 1/2 cycle
Terminal type	Removable
Status indicators	Logic Side
Weight	2.8 oz. (80 g)
Fuses	1 per common, 6.3A slow blow

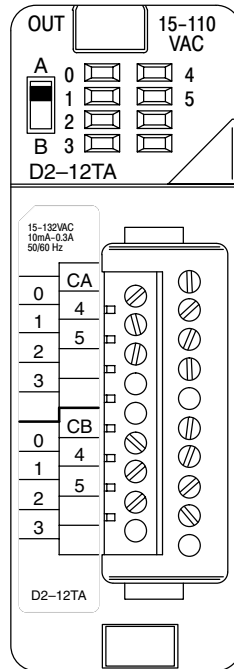
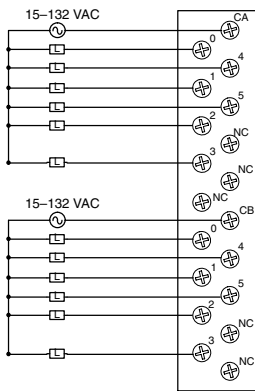
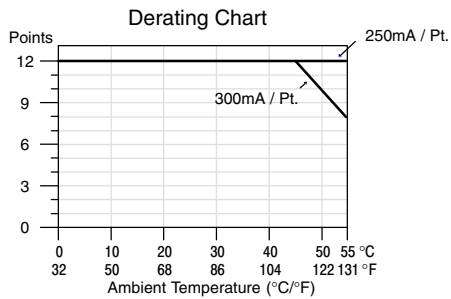


D2-12TA AC Output

Outputs per module	12
Output Points Consumed	16 (4 unused, see chart below)
Commons per module	2 (isolated)
Operating voltage	15-132 VAC
Output type	SSR (Triac)
Peak voltage	132 VAC
AC frequency	47 to 63 Hz
ON voltage drop	< 1.5 VAC (> 50mA) < 4.0 VAC (< 50mA)
Max load current	0.3A / point, 1.8A / common

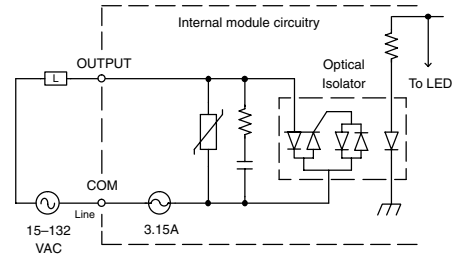
Max leakage current	2mA (132VAC, 60Hz)
Max inrush current	10A for 10 ms
Minimum load	10 mA
Base power required	350 mA Max
OFF to ON response	1 ms
ON to OFF response	1 ms + 1/2 cycle
Terminal type	Removable
Status indicators	Logic Side
Weight	2.8 oz. (80 g)
Fuses	(2) 1 per common 3.15A slow blow, replaceable Order D2-FUSE-1 (5 per pack)

Installation, Wiring, and Specifications



Addresses Used			
Points	Used?	Points	Used?
Yn+0	Yes	Yn+10	Yes
Yn+1	Yes	Yn+11	Yes
Yn+2	Yes	Yn+12	Yes
Yn+3	Yes	Yn+13	Yes
Yn+4	Yes	Yn+14	Yes
Yn+5	Yes	Yn+15	Yes
Yn+6	No	Yn+16	No
Yn+7	No	Yn+17	No

n is the starting address



D2-04TRS Relay Output

Outputs per module	4
Commons per module	4 (isolated)
Output Points Consumed	8 (only 1st 4pts. are used)
Operating voltage	5-30VDC / 5-240VAC
Output type	Relay, form A (SPST)
Peak voltage	30VDC, 264VAC
AC frequency	47-63 Hz
ON voltage drop	0.72 VDC maximum
Max load current (resistive)	4A / point 8A / module (resistive)
Max leakage current	0.1mA @ 264VAC

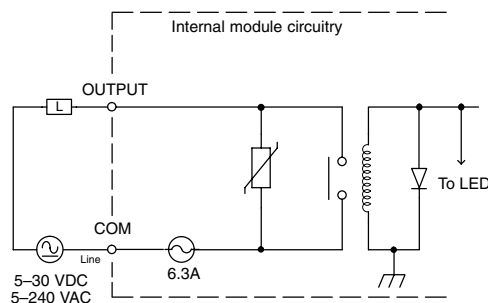
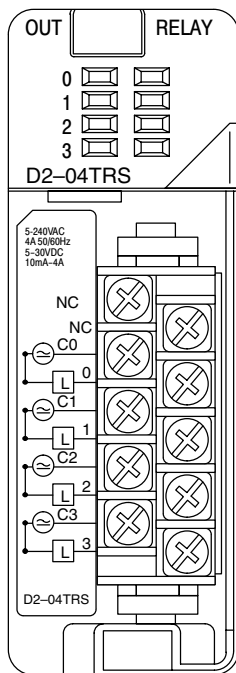
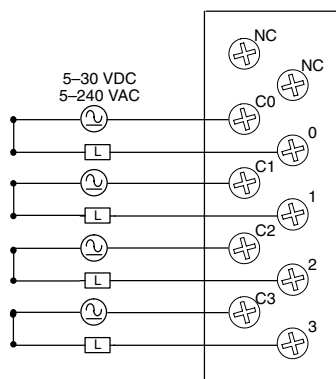
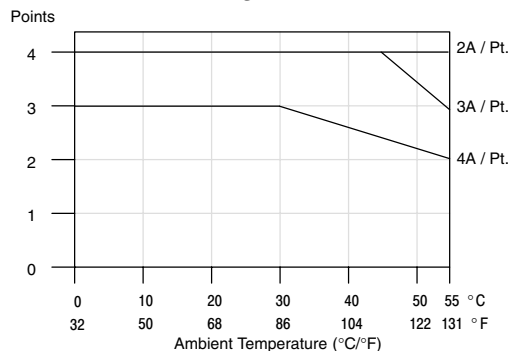
Max inrush current	5A for < 10ms
Minimum load	10mA
Base power required 5v	250mA Max
OFF to ON response	10 ms
ON to OFF response	10 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	2.8 oz. (80 g)
Fuses	1 per point 6.3A slow blow, replaceable Order D2-FUSE-3 (5 per pack)

Typical Relay Life (Operations)

Voltage & Type of Load	Load Current			
	1A	2A	3A	4A
24 VDC Resistive	500K	200K	100K	50K
24 VDC Solenoid	100K	40K	-	-
110 VAC Resistive	500K	250K	150K	100K
110 VAC Solenoid	200K	100K	50K	-
220 VAC Resistive	350K	150K	100K	50K
220 VAC Solenoid	100K	50K	-	-

At 24 VDC, solenoid (inductive) loads over 2A cannot be used.
 At 110 VAC, solenoid (inductive) loads over 3A cannot be used.
 At 220 VAC, solenoid (inductive) loads over 2A cannot be used.

Derating Chart



Installation, Wiring and Specifications

D2-08TR Relay Output

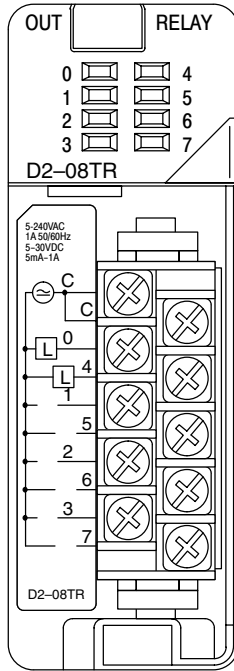
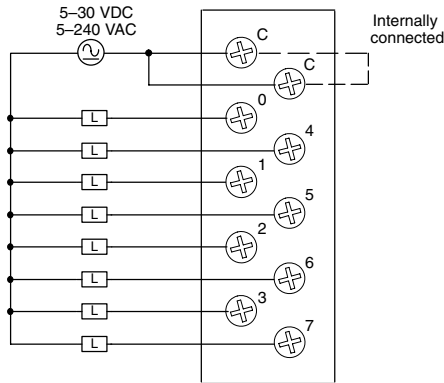
Outputs per module	8
Commons per module	1 (2 I/O terminal points)
Operating voltage	5-30VDC / 5-240VAC
Output type	Relay, form A (SPST)
Peak voltage	30VDC / 264VAC
AC frequency	47 to 60 Hz
ON voltage drop	N/A
Max current (resistive)	1A / point 4A / common
Max leakage current	0.1mA @ 265 VAC
Max inrush current	Output: 3A for 10 ms Common: 10A for 10ms

Minimum load	5mA @ 5VDC
Base power required	250mA max
OFF to ON response	12 ms
ON to OFF response	10 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	3.9 oz. (110 g)
Fuses	1 6.3A slow blow, replaceable Order D2-FUSE-3 (5 per pack)

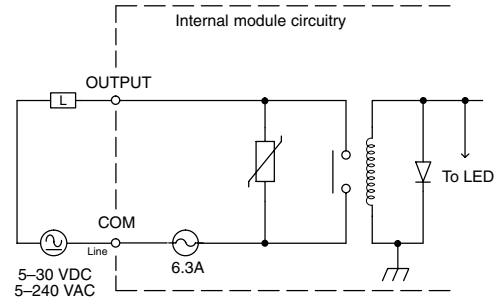
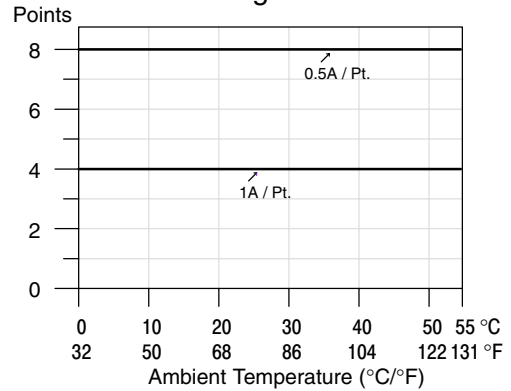
Installation, Wiring, and Specifications

Typical Relay Life (Operations)

Voltage / Load	Current	Closures
24VDC Resistive	1A	500K
24VDC Solenoid	1A	100K
110VAC Resistive	1A	500K
110VAC Solenoid	1A	200K
220VAC Resistive	1A	350K
220VAC Solenoid	1A	100K



Derating Chart



F2-08TR Relay Output

Outputs per module	8
Commons per module	2 (isolated)
Output Points Consumed	8
Operating voltage	12-28VDC, 12-250VAC, 10A 120VDC, 0.5A
Output type	8 Form A (SPST normally open)
Peak voltage	150VDC, 265VAC
AC frequency	47-63 Hz
ON voltage drop	N/A
Max load current (resistive)	10A/common (subject to derating)

Max leakage current	N/A
Max inrush current	12A
Minimum load	10mA @ 12VDC
Base power required 5v	670mA Max
OFF to ON response	15 ms (typical)
ON to OFF response	5 ms (typical)
Terminal type	Removable
Status indicators	Logic Side
Weight	5.5 oz. (156g)
Fuses	None

Typical Relay Life¹ (Operations) at Room Temperature

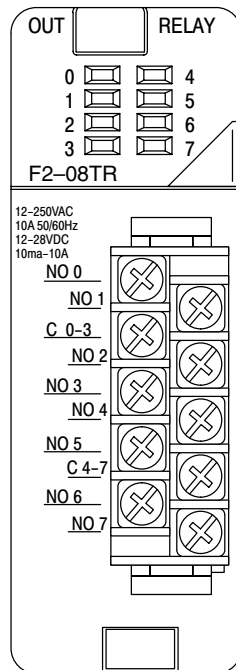
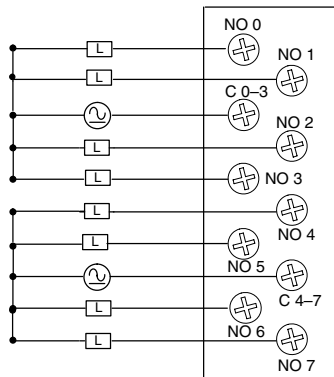
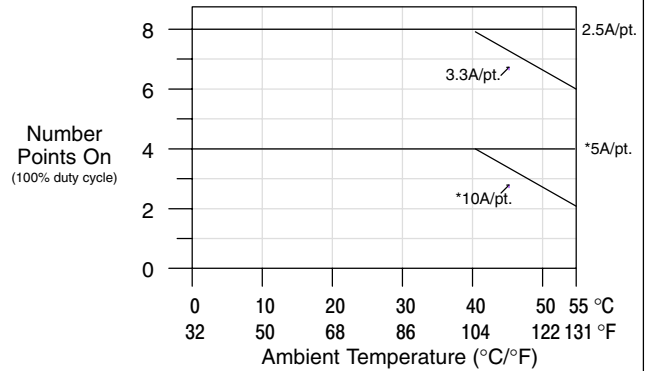
Voltage & Type of Load ²	Load Current		
	50mA	5A	7A
24 VDC Resistive	10M	600K	300K
24 VDC Solenoid	-	150K	75K
110 VAC Resistive	-	600K	300K
110 VAC Solenoid	-	500K	200K
220 VAC Resistive	-	300K	150K
220 VAC Solenoid	-	250K	100K

1 Contact life may be extended beyond those values shown by the use of arc suppression techniques described in the 205 User Manual. Since these modules have no leakage current, they do not have a built in snubber. For example, if you place a diode across a 24VDC inductive load, you can significantly increase the life of the relay.

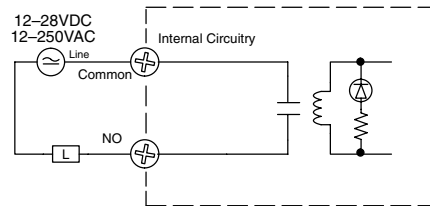
2 At 120 VDC 0.5A resistive load, contact life cycle is 200K cycles.

Derating Chart

(*Use separate commons)



Typical Circuit all points



F2-08TRS Relay Output

Outputs per module	8
Commons per module	8 (isolated)
Output Points Consumed	8
Operating voltage	12-28VDC, 12-250VAC, 7A 120VDC, 0.5A
Output type	3, Form C (SPDT) 5, Form A (SPST normally open)
Peak voltage	150VDC, 265VAC
AC frequency	47-63 Hz
ON voltage drop	N/A
Max load current (resistive)	7A/points (subject to derating)

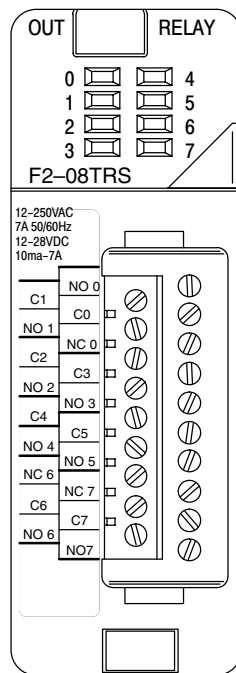
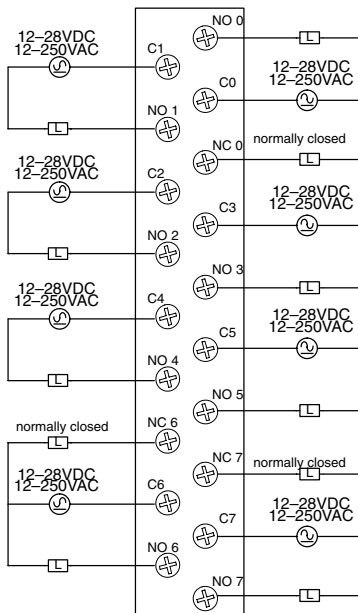
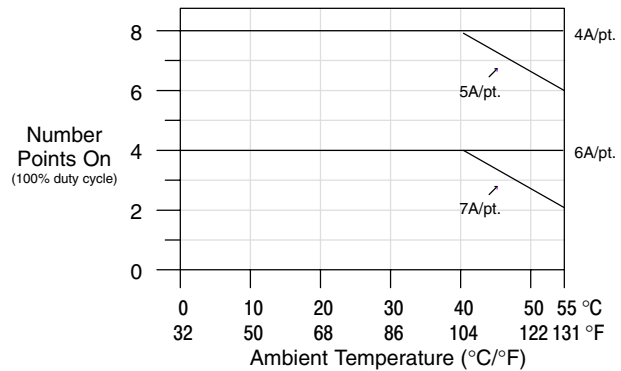
Max leakage current	N/A
Max inrush current	12A
Minimum load	10mA @ 12VDC
Base power required 5v	670mA Max
OFF to ON response	15 ms (typical)
ON to OFF response	5 ms (typical)
Terminal type	Removable
Status indicators	Logic Side
Weight	5.5 oz. (156g)
Fuses	None

Typical Relay Life¹ (Operations) at Room Temperature

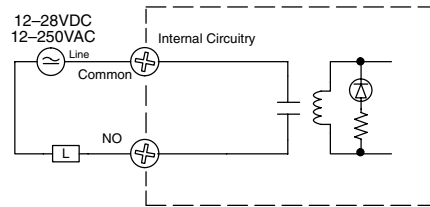
Voltage & Type of Load ²	Load Current ³		
	50mA	5A	7A
24 VDC Resistive	10M	600K	300K
24 VDC Solenoid	-	150K	75K
110 VAC Resistive	-	600K	300K
110 VAC Solenoid	-	500K	200K
220 VAC Resistive	-	300K	150K
220 VAC Solenoid	-	250K	100K

- At 120 VDC 0.5A resistive load, contact life cycle is 200K cycles.
- Normally closed contacts have 1/2 the current handling capability of the normally open contacts.

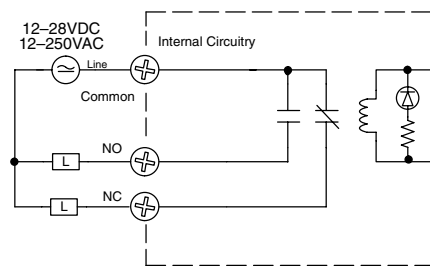
Derating Chart



Typical Circuit (points 1,2,3,4,5)



Typical Circuit (Points 0, 6, & 7 only)



Installation, Wiring, and Specifications

D2-12TR Relay Output

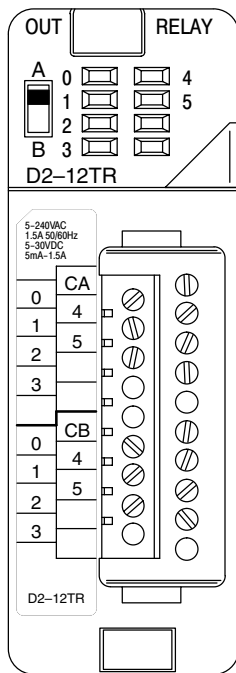
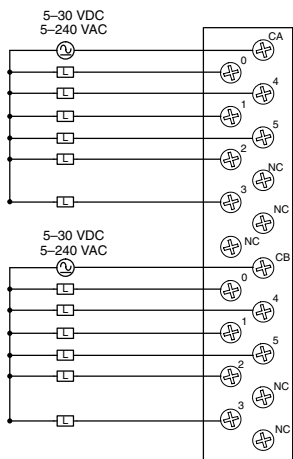
Outputs per module	12
Outputs Consumed	16 (4 unused, see chart below)
Commons per module	2 (6pts. per common)
Operating voltage	5-30VDC / 5-240VAC
Output type	Relay, form A (SPST)
Peak voltage	30VDC / 264VAC
AC frequency	47 to 60 Hz
ON voltage drop	N/A
Max current (resistive)	1.5A / point 3A / common
Max leakage current	0.1mA @ 265 VAC

Max inrush current	Output: 3A for 10 ms Common: 10A for 10ms
Minimum load	5mA @ 5VDC
Base power required	450mA max
OFF to ON response	10 ms
ON to OFF response	10 ms
Terminal type	Removable
Status indicators	Logic Side
Weight	4.6 oz. (130 g)
Fuses	2 4A slow blow, replaceable Order D2-FUSE-4 (5 per pack)

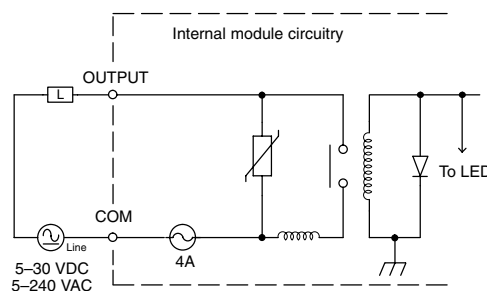
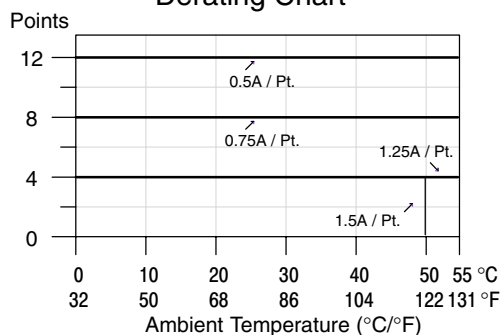
Installation, Wiring and Specifications

Typical Relay Life (Operations)

Voltage / Load	Current	Closures
24VDC Resistive	1A	500K
24VDC Solenoid	1A	100K
110VAC Resistive	1A	500K
110VAC Solenoid	1A	200K
220VAC Resistive	1A	350K
220VAC Solenoid	1A	100K



Derating Chart



Addresses Used

Points	Used?	Points	Used?
Yn+0	Yes	Yn+10	Yes
Yn+1	Yes	Yn+11	Yes
Yn+2	Yes	Yn+12	Yes
Yn+3	Yes	Yn+13	Yes
Yn+4	Yes	Yn+14	Yes
Yn+5	Yes	Yn+15	Yes
Yn+6	No	Yn+16	No
Yn+7	No	Yn+17	No

n is the starting address

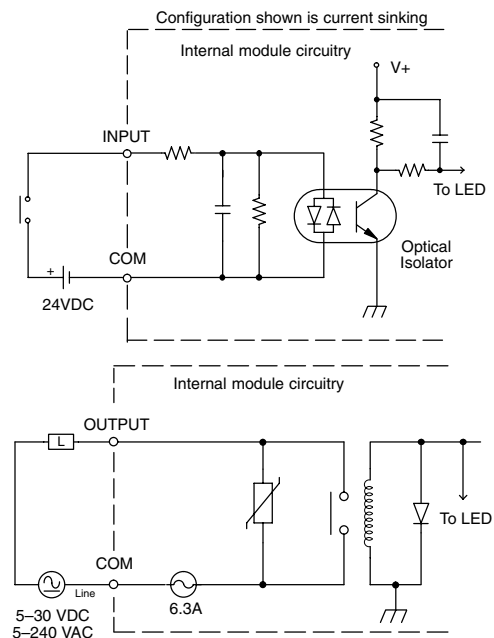
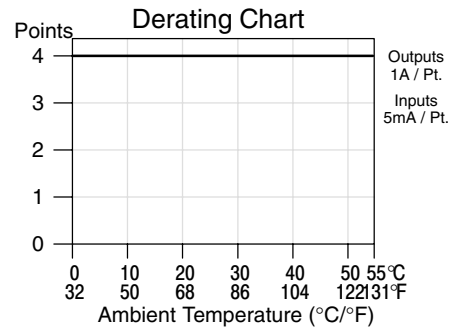
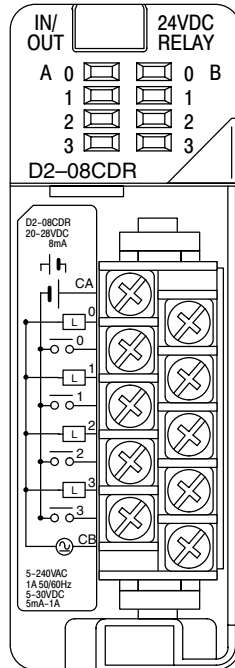
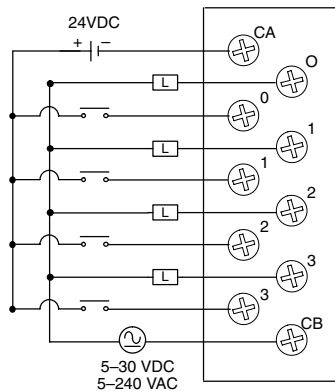
D2-08CDR 4 pt. DC Input / 4pt. Relay Output

Input Specifications	
Inputs per module	4 (sink/source)
Input Points Consumed	8 (only 1st 4pts. are used)
Input Commons per module	1
Input voltage range	20 – 28 VDC
Peak voltage	30 VDC
AC frequency	n/a
ON voltage level	19 VDC minimum
OFF voltage level	7 VDC maximum
Input impedance	4.7 K
Input current	5 mA @ 24 VDC
Maximum Current	8 mA @ 30 VDC
Minimum ON current	4.5 mA
Maximum OFF current	1.5 mA
OFF to ON response	1 to 10 ms
ON to OFF response	1 to 10 ms
Fuse (input circuits)	None
General Specifications	
Base power required	200 mA max
Terminal type	Removable
Status Indicators	Logic side
Weight	3.5 oz. (100 g)

Output Specifications	
Outputs per module	4
Output Points Consumed	8 (only 1st 4pts. are used)
Output Commons per module	1
Operating voltage	5–30VDC / 5–240VAC
Output type	Relay, form A (SPST)
Peak voltage	30VDC, 264VAC
AC frequency	47–63 Hz
Max load current (resistive)	1A / point 4A / module (resistive)
Max leakage current	0.1mA @ 264VAC
Max inrush current	3A for <100 ms 10A for < 10 ms (common)
Minimum load	5 mA @ 5 VDC
OFF to ON response	12 ms
ON to OFF response	10 ms
Fuse (output circuits)	1 (6.3A slow blow, replaceable) Order D2-FUSE-3 (5 per pack)

Installation, Wiring, and Specifications

Typical Relay Life (Operations)			
Voltage / Load		Current	Closures
24VDC Resistive	1A	500K	
24VDC Solenoid	1A	100K	
110VAC Resistive	1A	500K	
110VAC Solenoid	1A	200K	
220VAC Resistive	1A	350K	
220VAC Solenoid	1A	100K	



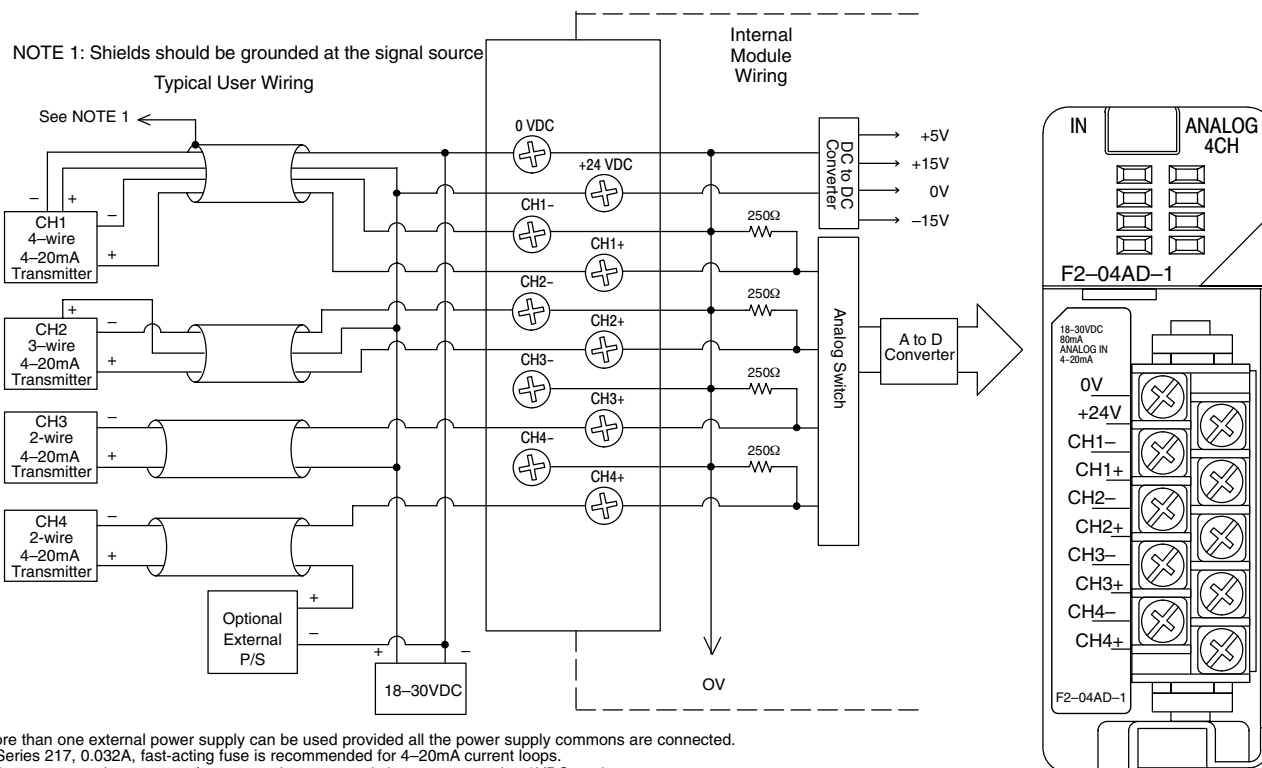
F2-04AD-1 4 Channel 4-20mA Analog Input

This module requires a 24VDC user power supply for operation. See the F2-04AD-1L if you want to use a 12VDC supply.

Number of Channels	4, single ended (one common)
Input Ranges	4 to 20 mA current
Resolution	12 bit (1 in 4096)
Active Low-pass Filtering	-3 dB at 20Hz, 2 poles (-12 dB per octave)
Input Impedance	250Ω ± 0.1%, ½W current input
Absolute Maximum Ratings	-40 mA to +40 mA, current input
Converter type	Successive approximation
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 4 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (End to End)	± 1 count (0.025% of full scale) maximum
Input Stability	± 1 count
Full Scale Calibration Error (offset error not included)	± 12 counts max., @ 20mA current input
Offset Calibration Error	± 7 counts max., @ 4mA current input

Maximum inaccuracy	± .5% @ 77°F (25°C) ± .65% 32 to 140°F (0 to 60°C)
Accuracy vs. Temperature	± 50 ppm/°C maximum full scale (including max. offset change)
Recommended Fuse	0.032 A, Series 217 fast-acting, current inputs
Digital Inputs	16 (X) input points
Input points required	12 binary data bits, 2 channel ID bits
Power Budget Requirement	50 mA maximum, 5 VDC (supplied by base)
External Power Supply	80 mA maximum, +18 to +30 VDC
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 4096).



More than one external power supply can be used provided all the power supply commons are connected. A Series 217, 0.032A, fast-acting fuse is recommended for 4-20mA current loops. If the power supply common of an external power supply is not connected to 0VDC on the module, then the output of the external transmitter must be isolated. To avoid "ground loop" errors, recommended 4-20mA transmitter types are:

- 2 or 3 wire: Isolation between input signal and power supply.
- 4 wire: Isolation between input signal, power supply, and 4-20mA output

Installation, Wiring and Specifications

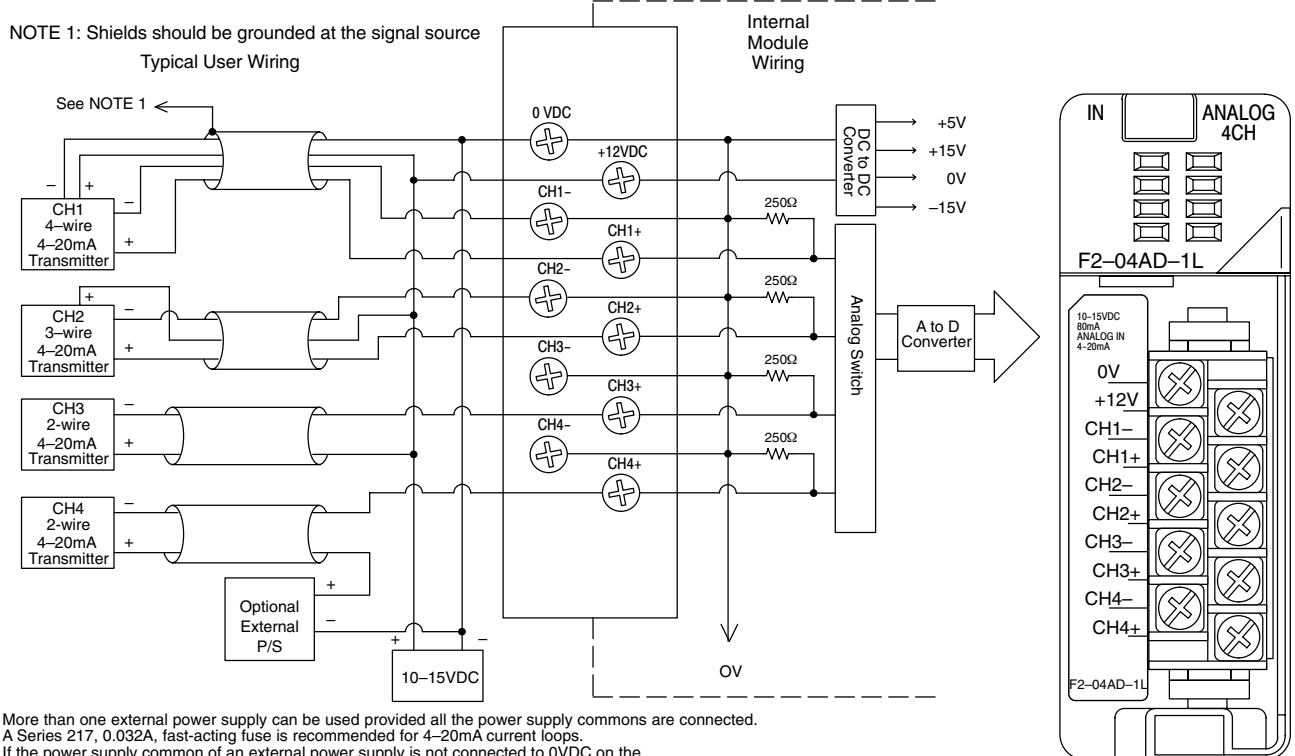
F2-04AD-1L 4 Channel 4-20mA Analog Input

This module requires a 12VDC user power supply for operation. See the F2-04AD-1 if you want to use a 24VDC supply.

Number of Channels	4, single ended (one common)
Input Ranges	4 to 20 mA current
Resolution	12 bit (1 in 4096)
Active Low-pass Filtering	-3 dB at 20Hz, 2 poles (-12 dB per octave)
Input Impedance	250Ω ± 0.1%, ½W current input
Absolute Maximum Ratings	-40 mA to +40 mA, current input
Converter type	Successive approximation
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 4 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (End to End)	± 1 count (0.025% of full scale) maximum
Input Stability	± 1 count
Full Scale Calibration Error (offset error not included)	± 12 counts max., @ 20mA current input
Offset Calibration Error	± 7 counts max., @ 4mA current input

Maximum inaccuracy	± .5% @ 77°F (25°C) ± .65% 32 to 140°F (0 to 60°C)
Accuracy vs. Temperature	± 50 ppm/°C maximum full scale (including max. offset change)
Recommended Fuse	0.032 A, Series 217 fast-acting, current inputs
Digital Inputs	16 (X) input points
Input points required	12 binary data bits, 2 channel ID bits
Power Budget Requirement	60 mA maximum, 5 VDC (supplied by base)
External Power Supply	90 mA maximum, +10 to +15 VDC
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 4096).



More than one external power supply can be used provided all the power supply commons are connected.
A Series 217, 0.032A, fast-acting fuse is recommended for 4-20mA current loops.
If the power supply common of an external power supply is not connected to 0VDC on the module, then the output of the external transmitter must be isolated. To avoid "ground loop" errors, recommended 4-20mA transmitter types are:

- 2 or 3 wire: Isolation between input signal and power supply.
- 4 wire: Isolation between input signal, power supply, and 4-20mA output

Installation, Wiring, and Specifications

F2-04AD-2 4 Channel Voltage Analog Input

This module requires a 24VDC user power supply for operation. See the F2-04AD-2L if you want to use a 12VDC supply.

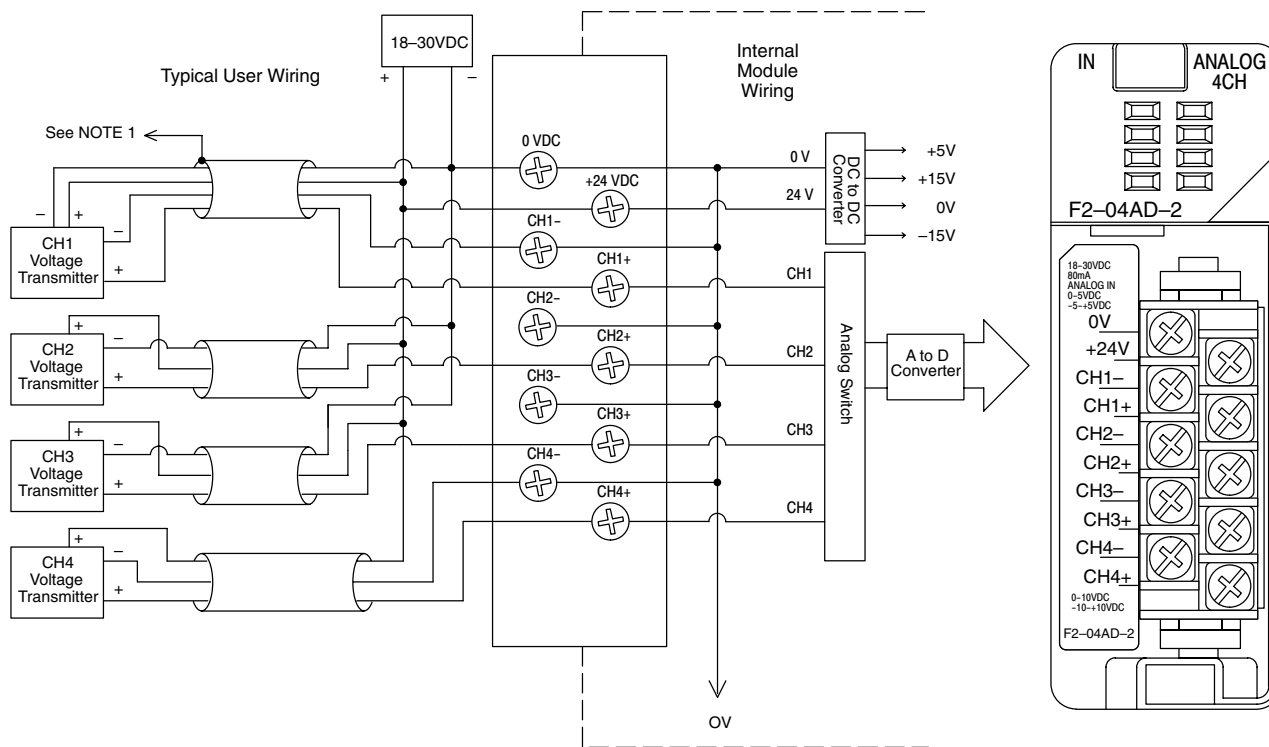
Number of Channels	4, single ended (one common)
Input Ranges	0 to 5V, 0 to 10V, $\pm 5V$, $\pm 10V$
Resolution	12 bit (1 in 4096)
Active Low-pass Filtering	-3 dB at 20Hz, 2 poles (-12 dB per octave)
Input Impedance	> 20 M Ω
Absolute Maximum Ratings	-75 to +75 VDC
Converter type	Successive approximation
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 4 channels per scan minimum (D2-240 and D2-250)
Linearity Error (End to End)	± 1 count (0.025% of full scale) maximum
Input Stability	± 1 count
Full Scale Calibration Error (offset error not included)	± 7 counts maximum
Offset Calibration Error	± 1 count maximum (0V input)

Maximum inaccuracy	$\pm .3\%$ @ 77°F (25°C) $\pm .45\%$ 32 to 140°F (0 to 60°C)
Accuracy vs. Temperature	± 50 ppm / °C full scale calibration change (including maximum offset change)
Digital Inputs Input points required	16 (X) input points 12 binary data bits, 2 channel ID bits
Power Budget Requirement	60 mA maximum, 5 VDC (supplied by base)
External Power Supply	90 mA maximum, +18 to +30 VDC
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

Installation, Wiring and Specifications

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096).

NOTE 1: Shields should be grounded at the signal source



F2-04AD-2L 4 Channel Voltage Analog Input

This module requires a 12VDC user power supply for operation. See the F2-04AD-2 if you want to use a 24VDC supply.

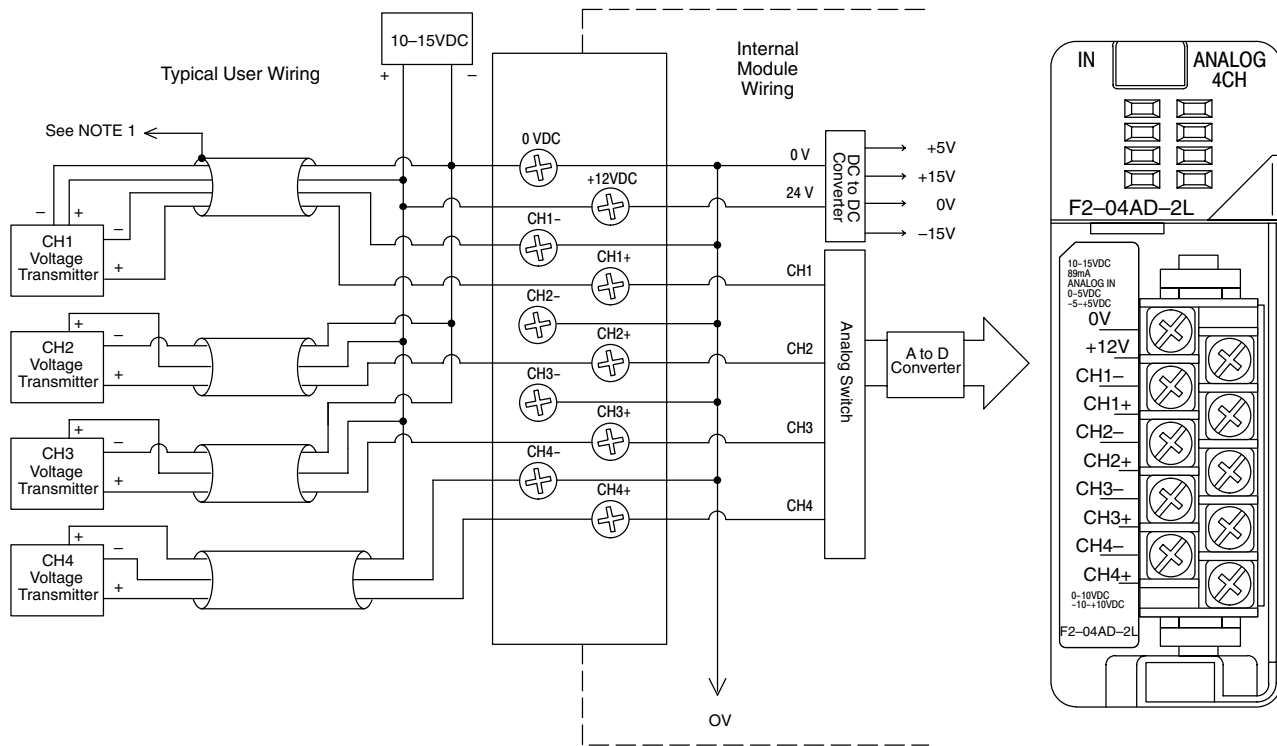
Number of Channels	4, single ended (one common)
Input Ranges	0 to 5V, 0 to 10V, $\pm 5V$, $\pm 10V$
Resolution	12 bit (1 in 4096)
Active Low-pass Filtering	-3 dB at 20Hz, 2 poles (-12 dB per octave)
Input Impedance	> 20 M Ω
Absolute Maximum Ratings	-75 to +75 VDC
Converter type	Successive approximation
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 4 channels per scan minimum (D2-240 and D2-250 CPU)
Linearity Error (End to End)	± 1 count (0.025% of full scale) maximum
Input Stability	± 1 count
Full Scale Calibration Error (offset error not included)	± 7 counts maximum
Offset Calibration Error	± 1 count maximum (0V input)

Maximum inaccuracy	$\pm .3\%$ @ 77°F (25°C) $\pm .45\%$ 32 to 140°F (0 to 60°C)
Accuracy vs. Temperature	± 50 ppm / °C full scale calibration change (including maximum offset change of 2 counts)
Digital Inputs Input points required	16 (X) input points 12 binary data bits, 2 channel ID bits
Power Budget Requirement	60 mA maximum, 5 VDC (supplied by base)
External Power Supply	90 mA maximum, +10 to +15 VDC
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

Installation, Wiring, and Specifications

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096).

NOTE 1: Shields should be grounded at the signal source



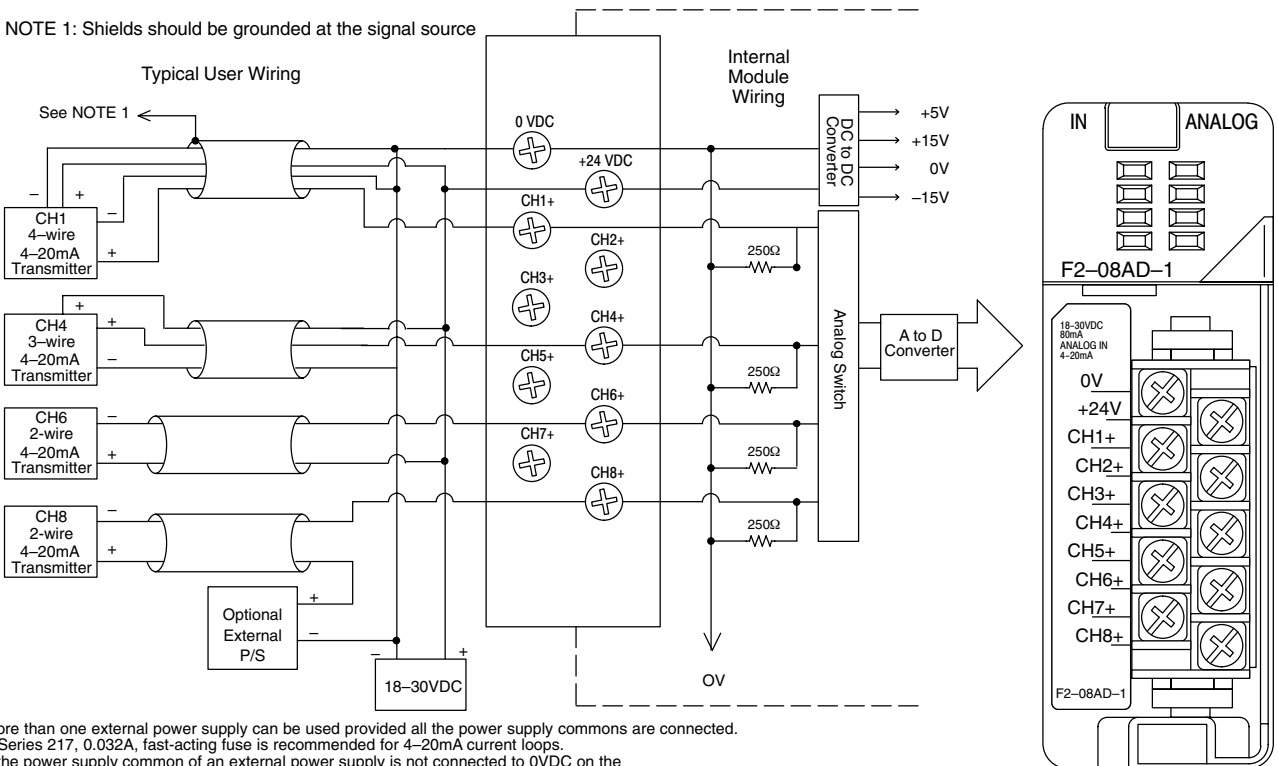
F2-08AD-1 8 Channel 4-20mA Analog Input

Number of Channels	8, single ended (one common)
Input Ranges	4 to 20 mA current
Resolution	12 bit (1 in 4096)
Active Low-pass Filtering	-3 dB at 50Hz (-6 dB per octave)
Input Impedance	250Ω ± 0.1%, ½W current input
Absolute Maximum Ratings	-40 mA to +40 mA, current input
Converter type	Successive approximation
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 8 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (End to End)	± 1 count (0.025% of full scale) maximum
Input Stability	± 1 count
Full Scale Calibration Error (offset error not included)	± 4 counts max., @ 20mA current input
Offset Calibration Error	± 1 counts max., @ 4mA current input

Maximum inaccuracy	± .5% @ 77°F (25°C) ± .65% 32 to 140°F (0 to 60°C)
Accuracy vs. Temperature	± 50 ppm/°C maximum full scale (including max. offset change of 2 counts)
Recommended Fuse	0.032 A, Series 217 fast-acting, current inputs
Digital Inputs	16 (X) input points
Input points required	12 binary data bits, 2 channel ID bits
Power Budget Requirement	50 mA maximum, 5 VDC (supplied by base)
External Power Supply	80 mA maximum, +18 to +26.4 VDC
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 4096).

Includes circuitry to automatically detect broken or open transmitters.



More than one external power supply can be used provided all the power supply commons are connected. A Series 217, 0.032A, fast-acting fuse is recommended for 4-20mA current loops. If the power supply common of an external power supply is not connected to 0VDC on the module, then the output of the external transmitter must be isolated. To avoid "ground loop" errors, recommended 4-20mA transmitter types are:

- 2 or 3 wire: Isolation between input signal and power supply.
- 4 wire: Isolation between input signal, power supply, and 4-20mA output

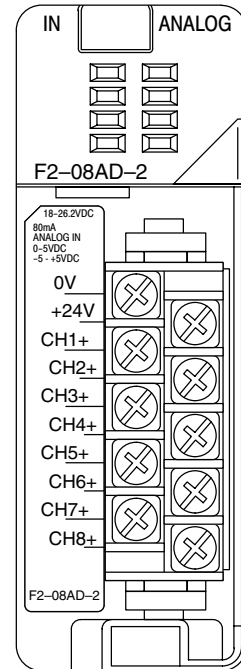
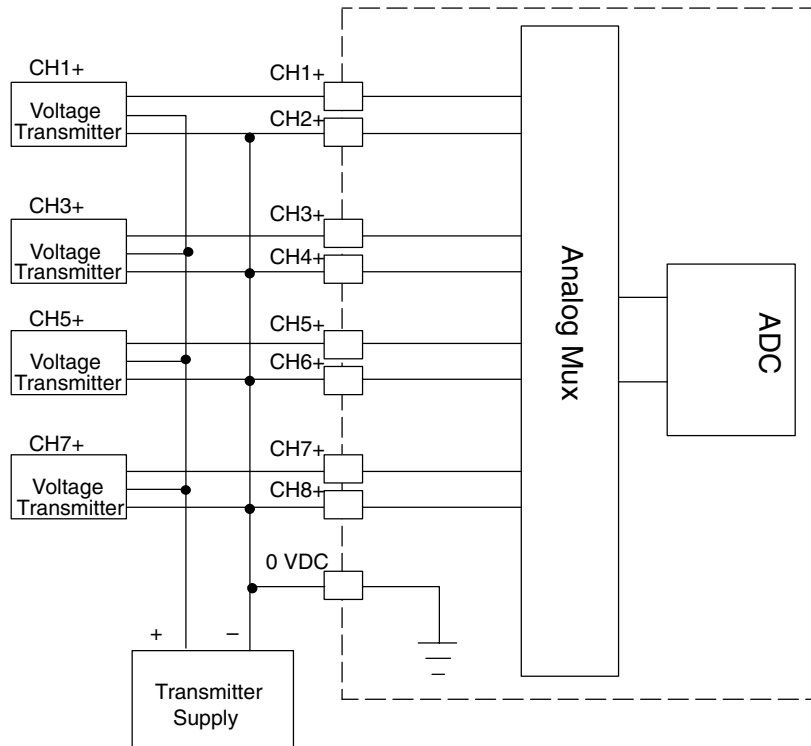
Installation, Wiring and Specifications

F2-08AD-2 8 Channel Voltage Analog Input

Number of Channels	8, single ended (one common)	Maximum inaccuracy	± .1% @ 77°F (25°C) ± .3% 32° to 140°F (0 to 60°C)
Input Ranges	0 to 5, 0 to 10, ±5, ± 10 VDC	Accuracy vs. Temperature	± 50 ppm/°C maximum full scale (including max. offset change of 2 counts)
Resolution	12 bit (0 to 4095) uni-polar	Digital Inputs Input points required	16 (X) input points 12 binary data bits, 3 channel ID bits
Active Low-pass Filtering	-3 dB at 200Hz (-6 dB per octave)	Power Budget Requirement	60 mA maximum, 5 VDC (supplied by base)
Input Impedance	> 20 MΩ	External Power Supply	80 mA maximum, +18 to +26.4 VDC
Absolute Max Ratings	-75 to +75 VDC	Operating Temperature	32 to 140° F (0 to 60° C)
Converter type	Successive approximation	Storage Temperature	-4 to 158° F (-20 to 70° C)
Conversion Time (PLC update rate)	1 channel per scan minimum (D2-230 CPU) 8 channels per scan maximum (D2-240 or D2-250 CPU)	Relative Humidity	5 to 95% (non-condensing)
Linearity Error	± 1 count (± 0.025% of full scale) max	Environmental air	No corrosive gases permitted
Input Stability	± 1 count	Vibration	MIL STD 810C 514.2
Full Scale Calibration Error (offset error not included)	± 3 counts maximum	Shock	MIL STD 810C 516.2
Offset Calibration Error	± 1 count maximum (0V input)	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 4096).

Includes circuitry to automatically detect broken or open transmitters.



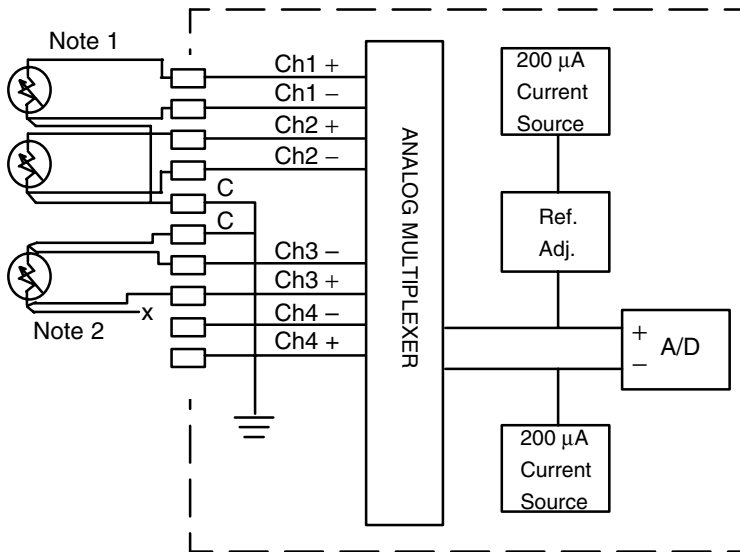
Note 1: Connect unused channels (CH2+, CH4+, CH6+, CH8+, COM)

Installation, Wiring, and Specifications

F2-04RTD Input

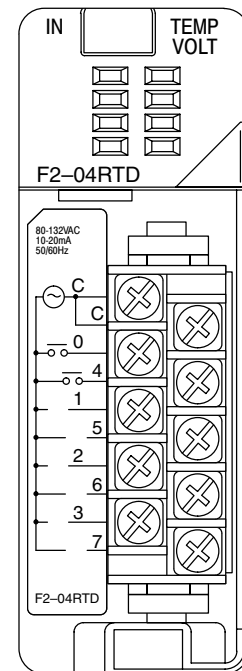
Number of Channels	4	Converter Type	Charge Balancing
Input Ranges	Type Pt100: -200.0/850.0 °C, -328/1562 °F	Linearity Error	±.05°C maximum, ±.01°C typical
	Type Pt1000: -200.0/595.0 °C, -328/1103 °F	Full Scale Calibration Error	±1° C
	Type jPt100: -38.0/450.0 °C, -36/842 °F	PLC Update Rate	4 Channel/scan max., 240/250 CPU 1 ch. per scan min., 230 CPU
	Type CU-10/25Ω: -200.0/260.0 °C, -328/500 °F	Digital Input Points Required	32 inputs, 16 binary data 2 inputs, channel identification 4 inputs, open/shorted fault
Resolution	16 bit (1 in 65535)	Base Power Required 5V	90 mA @ 5VDC
Display Resolution	±0.1°C, ±0.1°F (± 3276.7)	External Power Supply	24 VDC ± 10%, 50 mA current
RTD Excitation Current	200 µA	Operating Temperature	32° to 140° F (0° to 60° C)
Input Type	Differential	Storage Temperature	-4° to 158° F (-20° to 70° C)
Notch Filter	> 100 db notches at 50/60 Hz -3db=13.1 Hz	Temperature Drift	None (self-calibrating)
Maximum Settling Time	100 msec (full-scale step input)	Relative Humidity	5 to 95% (non-condensing)
Common Mode Range	0-5 Vdc	Environmental air	No corrosive gases permitted
Absolute Maximum Ratings	Fault protected inputs to ± 50Vdc	Vibration	MIL STD 810C 514.2
Sampling Rate	160 msec per channel	Shock	MIL STD 810C 516.2
		Noise Immunity	NEMA ICS3-304

Installation, Wiring and Specifications



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 a RTD sensor has 4 wires, the plus sense wire should be left unconnected as shown.

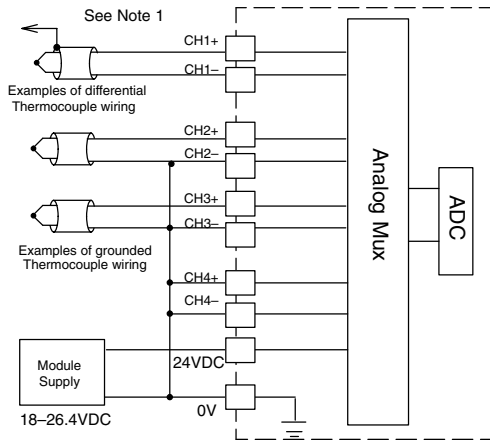


F2-04THM 4 Channel Thermocouple Input

Number of Channels	4	PLC Update Rate	4 Channel/scan max., 240/250 CPU 1 ch. per scan min., 230 CPU
Resolution	16 bit (1 in 65535)	Digital Input Points Required	16 inputs, binary data 2 inputs, channel identification 4 inputs, open/shorted fault
Display Resolution	±0.1°C, ±0.1°F	Base Power Required 5V	110mA mA @ 5VDC
RTD Excitation Current	200 µA	External Power Required	60mA max., 18-26.4VDC
Input Type	Differential	Power Supply Rejection	85 db typical
Input Impedence	20 MΩ	Operating Temperature	32° to 140° F (0° to 60° C)
Notch Filter	> 100 db notches at 50/60 Hz -3db=13.1 Hz	Storage Temperature	-4° to 158° F (-20° to 70° C)
Maximum Settling Time	100 msec (full-scale step input)	Accuracy vs. Temperature*	57 ppm / °C maximum full scale
Common Mode Range	±5 Vdc	Temperature Drift	5ppm maximum
Common Mode Rejection	90 db minimum at DC 150 db minimum at 50 Hz and 60 Hz	Relative Humidity	5 to 95% (non-condensing)
Absolute Maximum Ratings	Fault protected inputs to ±50Vdc	Environmental air	No corrosive gases permitted
Sampling Rate	160 msec per channel	Vibration	MIL STD 810C 514.2
Converter Type	Charge Balancing	Shock	MIL STD 810C 516.2
Linearity Error	±.05°C maximum, ±.01°C typical	Noise Immunity	NEMA ICS3-304
Full Scale Calibration Error	±1° C		

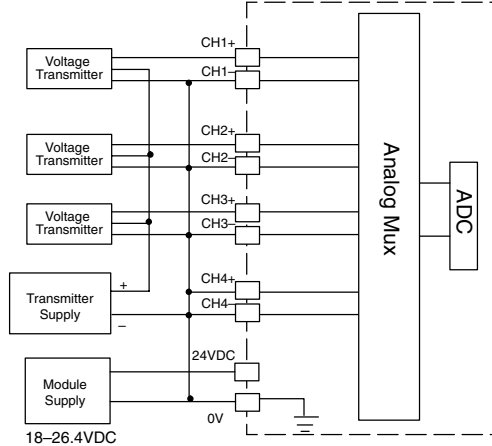
Installation, Wiring, and Specifications

Temperature Wiring Diagram

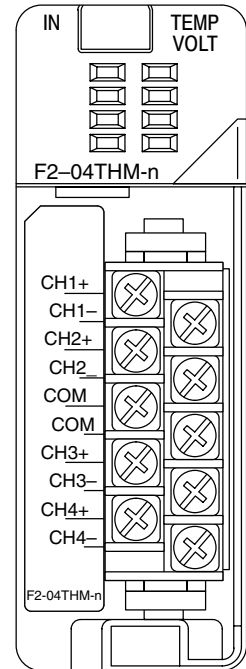


Note 1: Terminate shields at the respective signal source
 Note 2: Connect unused channels (CH4+,CH4-, Com)

Voltage Wiring Diagram



Note 1: Connect unused channels (CH4+,CH4-, Com)



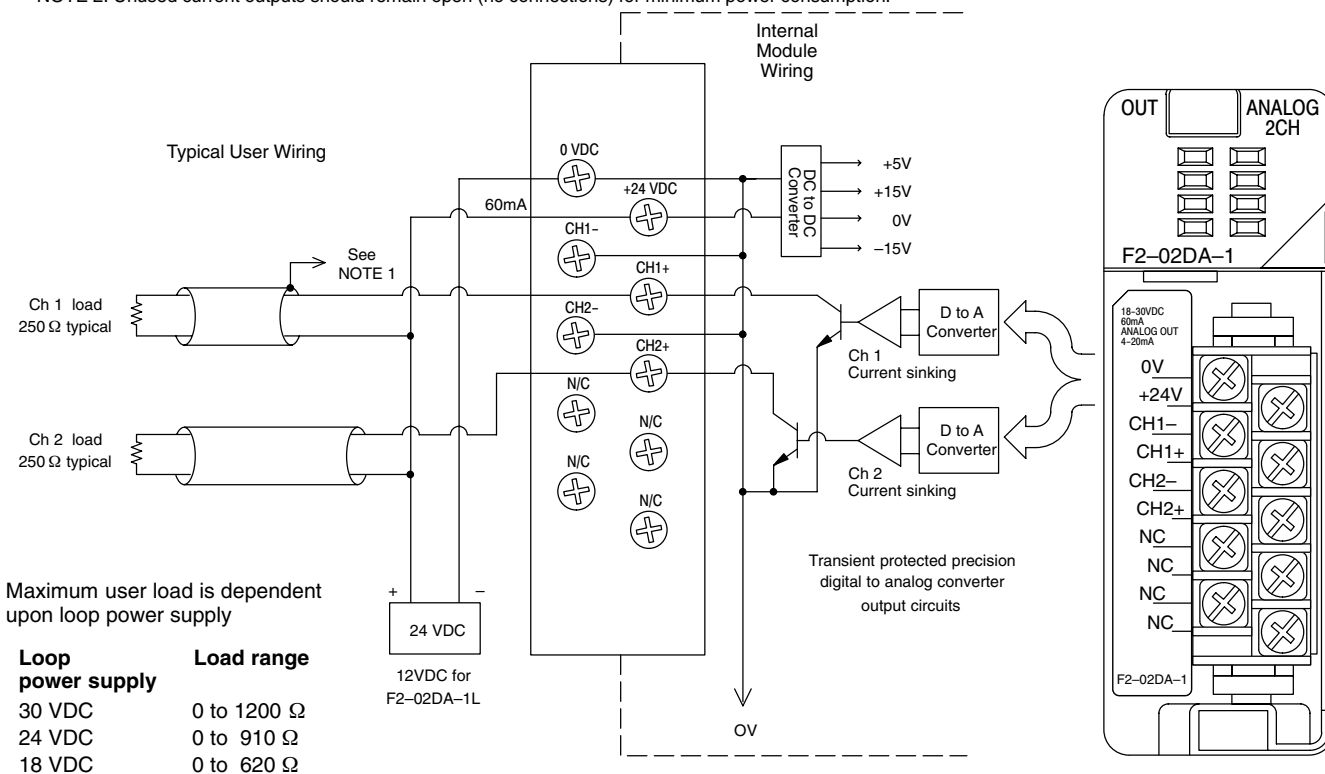
F2-02DA-1(L) 2 Channel 4-20mA Analog Output

Number of Channels	2
Output Ranges	4 to 20 mA
Resolution	12 bit (1 in 4096)
Output Type	Single ended, 1 common
Maximum loop supply	30VDC
Peak output voltage	40VDC (clamped by transient voltage suppressor)
Load Impedance	0Ω minimum
Maximum Load / Power Supply	620Ω /18V, 910Ω /24V, 1200Ω /30V
PLC update rate	1 channel per scan minimum (D2-230 CPU) 2 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (end to end)	± 1 count (± 0.025% of full scale) maximum
Conversion Settling time	100μs maximum (full scale change)
Full scale calibration error (offset error included)	± 5 counts max., 20mA @ 77°F (25°C)
Offset Calibration Error	± 3 counts max., 4mA @ 77°F (25°C)

Accuracy vs. Temperature	± 50 ppm/°C full scale calibration change (including maximum offset change of 2 counts)
Maximum Inaccuracy	0.1% @ 77°F (25°C) 0.3% @ 32 to 140°F (0 to 60°C)
Digital outputs Output points required	16 (Y) output points 12 binary data bits, 2 channel ID bits
Power Budget Requirement	40 mA @ 5 VDC (supplied by base)
External Power Supply	F2-02DA-1: 18 to 30 VDC, 60mA F2-02DA-1L: 12-15VDC, 70mA (add 20 mA for each current loop used)
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 4096).

NOTE 1: Shields should be connected to the 0V of the module or the 0v of the P/S.
NOTE 2: Unused current outputs should remain open (no connections) for minimum power consumption.



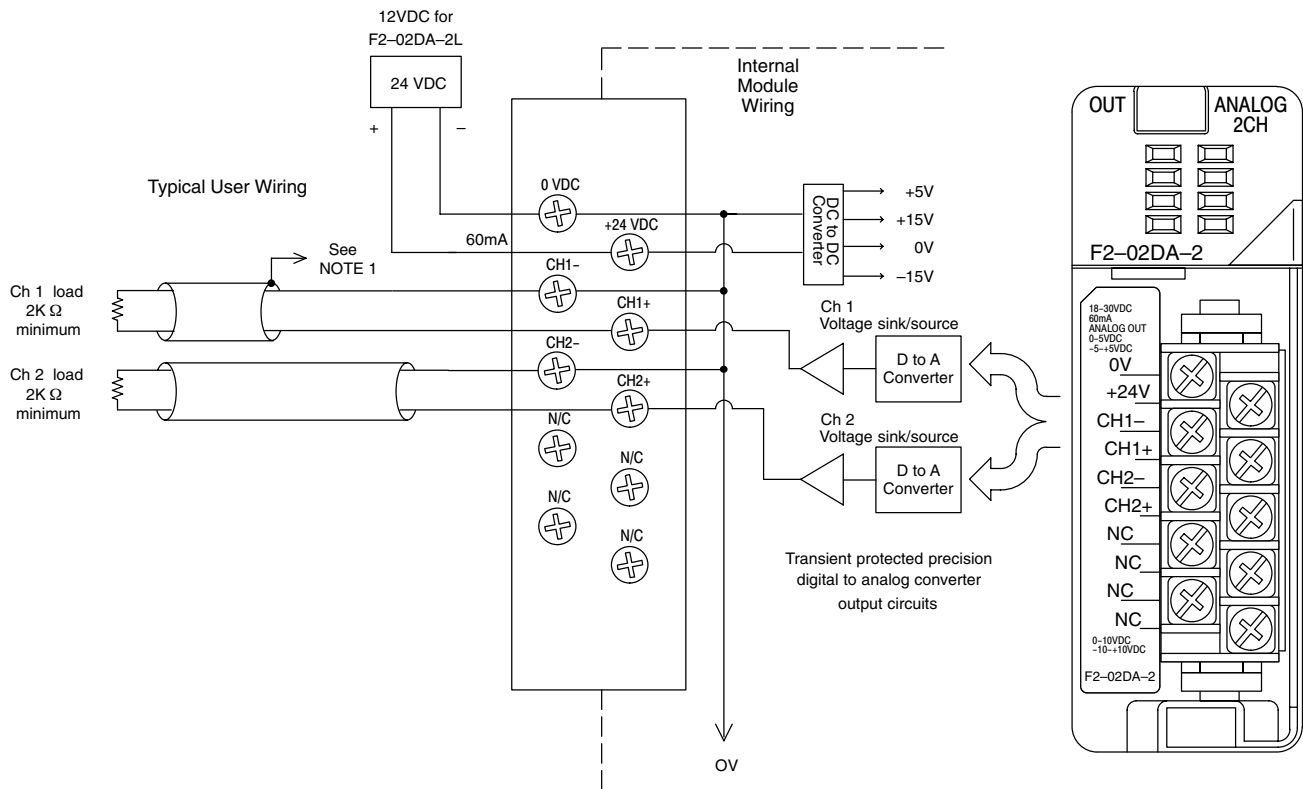
F2-02DA-2(L) 2 Channel Voltage Analog Output

Number of Channels	2
Output Ranges	0 to 5V, 0 to 10V, $\pm 5V$, $\pm 10V$
Resolution	12 bit (1 in 4096)
Output Type	Single ended, 1 common
Peak output voltage	15VDC (clamped by transient voltage suppressor)
Load Impedance	2000 Ω minimum
Load capacitance	.01 μ F maximum
PLC update rate	1 channel per scan minimum (D2-230 CPU) 2 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (end to end)	± 1 count ($\pm 0.025\%$ of full scale) maximum
Conversion Settling time	5 μ s maximum (full scale change)
Full scale calibration error (offset error included)	± 12 counts max. unipolar @ 77°F (25°C) ± 16 counts max. bipolar @ 77°F (25°C)
Offset Calibration Error	± 3 counts max. unipolar @ 77°F (25°C) ± 8 counts max. bipolar @ 77°F (25°C)

Accuracy vs. Temperature	± 50 ppm/ $^{\circ}$ C full scale calibration change (including maximum offset change of 2 counts)
Maximum Inaccuracy	$\pm 0.3\%$ unipolar ranges @ 77°F (25°C) $\pm 0.45\%$ unipolar ranges > 77°F (25°C) $\pm 0.4\%$ bipolar ranges @ 77°F (25°C) $\pm 0.55\%$ bipolar ranges > 77°F (25°C)
Digital outputs Output points required	16 (Y) output points (12 binary data bits, 2 channel ID bits)
Power Budget Requirement	40 mA @ 5 VDC (supplied by base)
External Power Supply	F2-02DA-2: 18 to 30 VDC, 60 mA F2-02DA-2L: 10-15VDC, 70mA (outputs fully loaded)
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 4096).

NOTE 1: Shields should be connected to the 0V of the module or the 0v of the P/S.
NOTE 2: Unused voltage outputs should remain open (no connections) for minimum power consumption.



Installation, Wiring, and Specifications

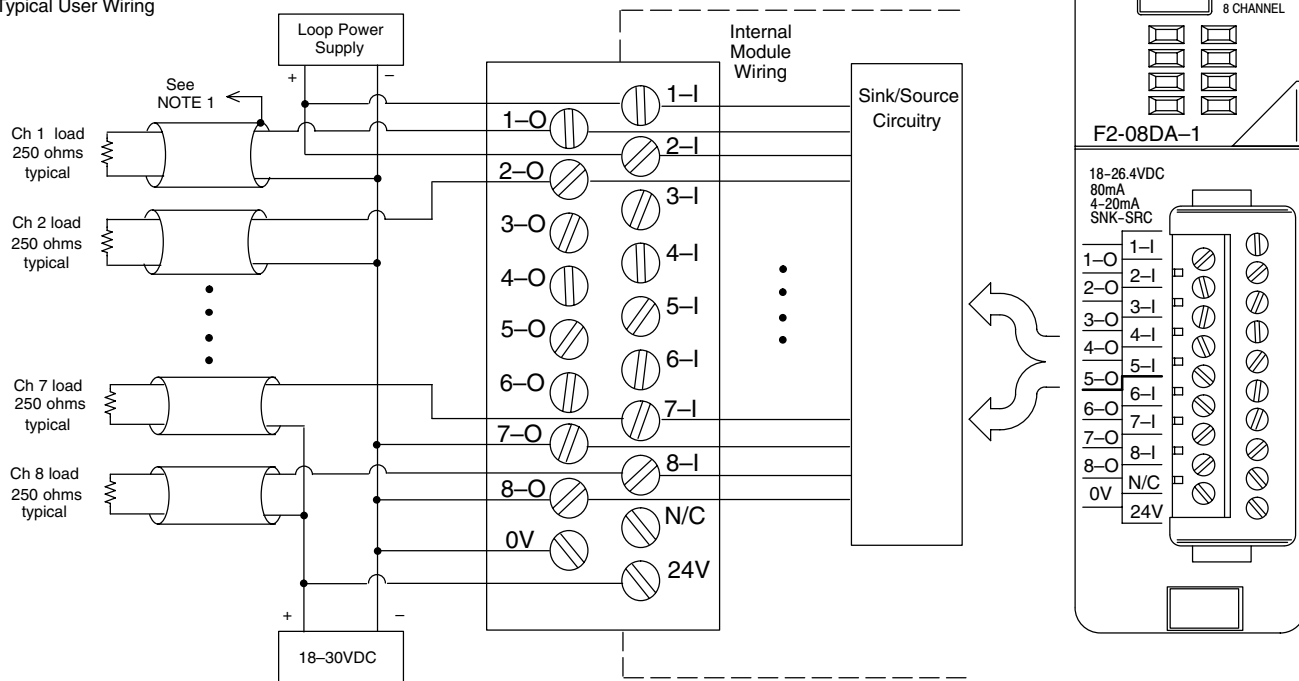
F2-08DA-1 8-Channel Current Analog Output

Number of Channels	8, Single ended	Maximum Full Scale Inaccuracy @ 60°C	0.5% sinking (any load) & sourcing (125Ω load) 0.64% sourcing (250Ω load) 0.83% sourcing (400Ω load)
Output Range	4 – 20mA	Maximum Full Scale Inaccuracy @ 25°C (includes all errors & temperature drift)	0.3% sinking (any load) & sourcing (125Ω load) 0.44% sourcing (250Ω load) 0.63% sourcing (400Ω load)
Resolution	12 bit (1 in 4096)	Digital outputs Output points required	12 binary data bits, 3 channel ID bits, 1 output enable bit/16 (Y) output points required
Output Type	Current sinking and sourcing	Power Budget Requirement	30mA @ 5 VDC (supplied by base)
Maximum Loop Voltage	30VDC	External Power Supply	18–30VDC, 50mA plus 20mA/output loop, class 2
Source Load	0 – 400kΩ (for loop power 18 – 30V)	Operating Temperature	32 to 140° F (0 to 60° C)
Sink Load	0–600Ω/24V, 0–900Ω/24V, 0–1200Ω/30V	Storage Temperature	–4 to 158° F (–20 to 70° C)
Total Load (sink plus source)	600Ω/24V, 900Ω/24V, 1200Ω/30V	Relative Humidity	5 to 95% (non-condensing)
Linearity Error (end to end)	± 2 count (± 0.050% of full scale) maximum	Environmental air	No corrosive gases permitted
Conversion Settling time	400 μs maximum (full scale change)	Vibration	MIL STD 810C 514.2
Full scale calibration error	± 12 counts max. sinking (any load) ± 12 counts max. sourcing (125Ω load) ± 18 counts max. sourcing (250Ω load) ± 26 counts max. sourcing (400Ω load)	Shock	MIL STD 810C 516.2
Offset Calibration Error	± 9 counts max. sinking (any load) ± 9 counts max. sourcing (125Ω load) ± 11 counts max. sourcing (250Ω load) ± 13 counts max. sourcing (400Ω load)	Noise Immunity	NEMA ICS3–304

Installation, Wiring and Specifications

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096).

Typical User Wiring



NOTE 1: Shields should be connected to the 0V terminal of the module.

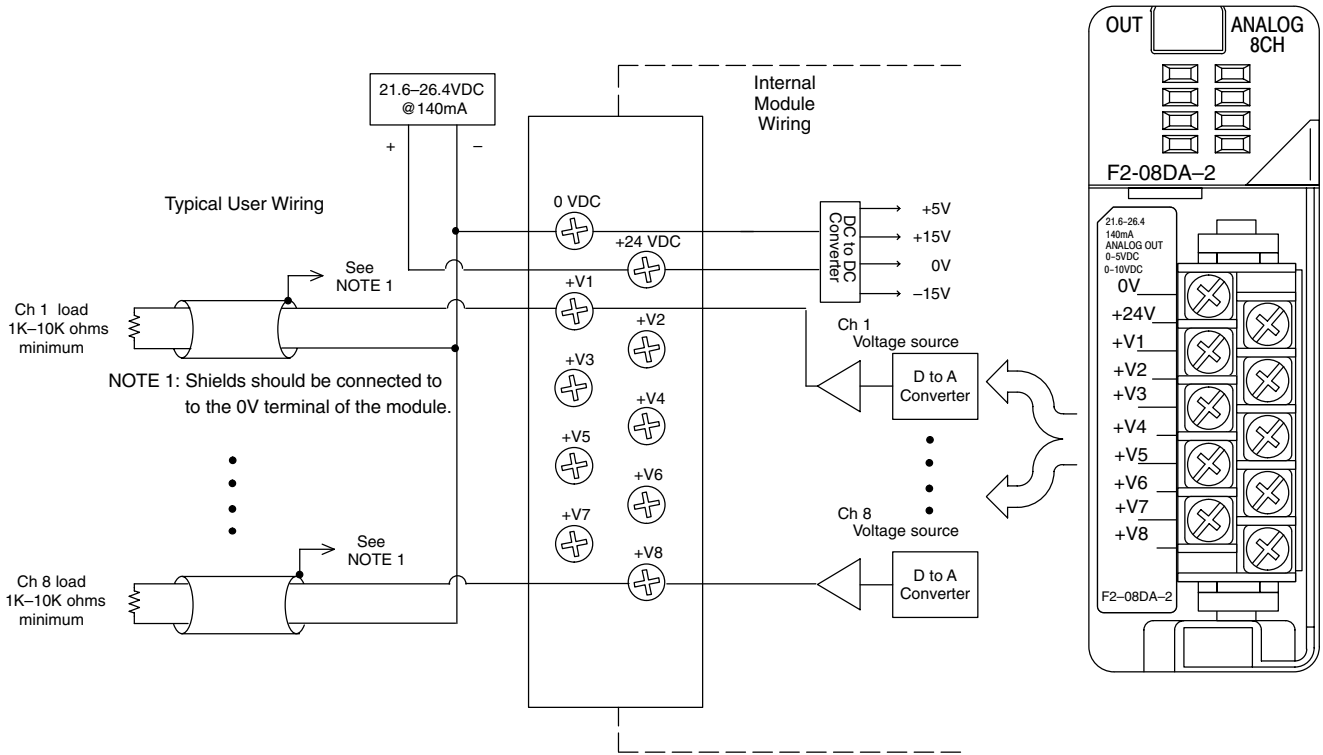
F2-08DA-2 8-Channel Voltage Analog Output

Number of Channels	8, Single ended
Output Ranges	0 to 5V, 0 to 10
Resolution	12 bit (1 in 4096)
Output Type	voltage sourcing
Peak output voltage	15VDC (clamped by transient voltage suppressor)
Load Impedance	1K ohm to 10K ohm
Load capacitance	.01µF maximum
PLC update rate	1 channel per scan minimum (D2-230 CPU) 8 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (end to end)	± 1 count (± 0.025% of full scale) maximum
Conversion Settling time	400 µs maximum (full scale change) 4.5ms to 9ms for digital out to analog out
Full scale calibration error (offset error included)	± 12 counts max. @ 77°F (25°C)
Offset Calibration Error	± 3 counts max. @ 77°F (25°C)

Accuracy vs. Temperature	± 57 ppm/°C full scale calibration change (including maximum offset change of 2 counts)
Maximum Inaccuracy	± 0.3% @ 77°F (25°C) ± 0.45% @ 0-60°C (32-140°F)
Digital outputs Output points required	16 (Y) output points, (12 binary data bits, 3 channel ID bits, 1 output enable bit)
Power Budget Requirement	60 mA @ 5 VDC (supplied by base)
External Power Supply	21.6-26.4 VDC, 140 mA (outputs fully loaded)
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 4096).

Installation, Wiring, and Specifications



F2-02DAS-1 Isolated 2 Channel 4-20mA Analog Output

Number of Channels	2, isolated (2 commons)
Output Ranges	4 to 20 mA
Resolution	16 bit (1 in 65536)
Output Type	current sourcing
Loop supply	12-32VDC
Isolation voltage	± 750V continuous, channel to channel, channel to logic
Load Impedance	0-525 ohms
PLC update rate	1 channel per scan minimum (D2-230 CPU) 2 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (end to end)	± 10 counts (± 0.015% of full scale) maximum
Conversion Settling time	3ms to 0.1% of full scale
Gain Calibration Error	± 32 counts (± 0.05%)
Offset Calibration Error	± 13 counts (± 0.02%)

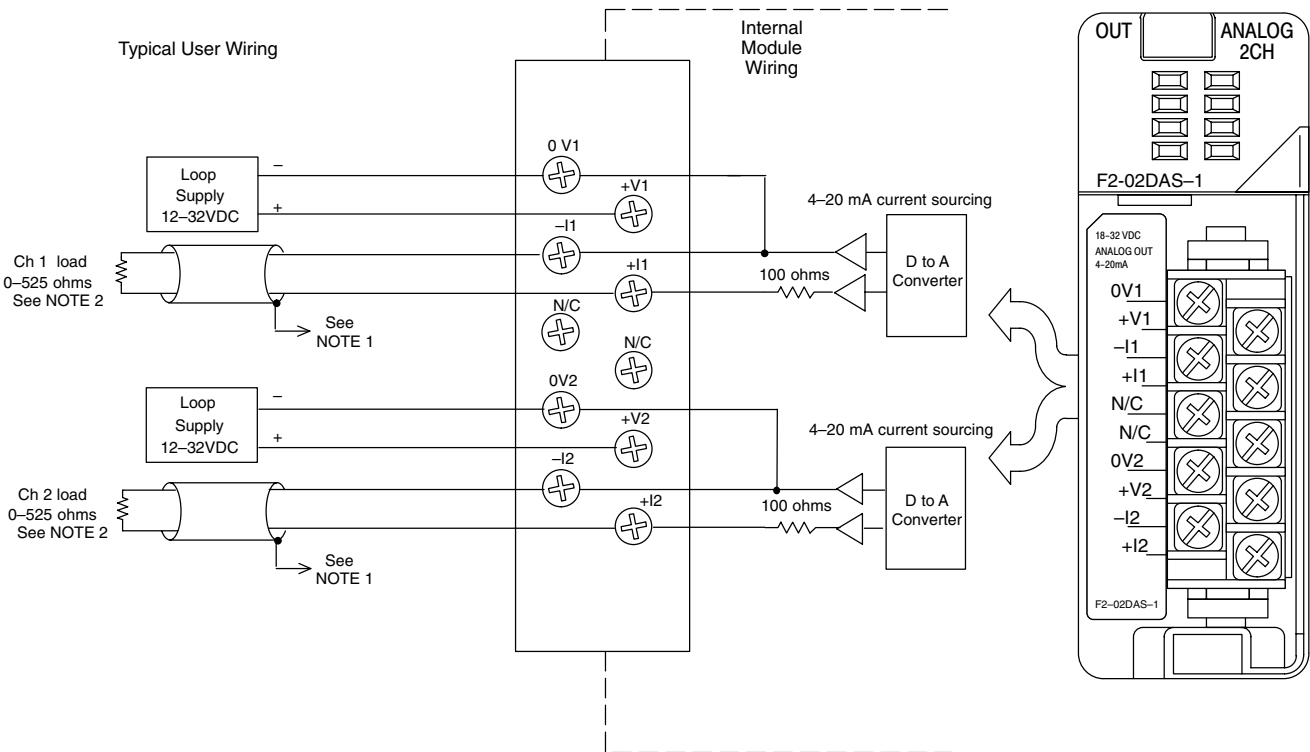
Output Drift	50 ppm/°C
Maximum Inaccuracy	± 0.07% @ 77°F (25°C) ± 0.18% @ 32 to 140°F (0 to 60°C)
Digital outputs Output points required	32 (Y) output points 16 binary data bits, 2 channel ID bits
Power Budget Requirement	100 mA @ 5 VDC (supplied by base)
External Power Supply	12 to 32 VDC, 50 mA / channel
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 65536).

NOTE 1: Shields should be connected to the 0V terminal of the module.

NOTE 2: Loads must be within the compliance voltage.

NOTE 3: For non-isolated outputs, connect all 0V's together (0V1.....0V2) and connect all +V's together (+V1.....+V2).



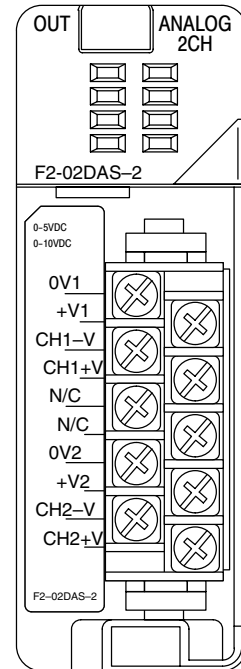
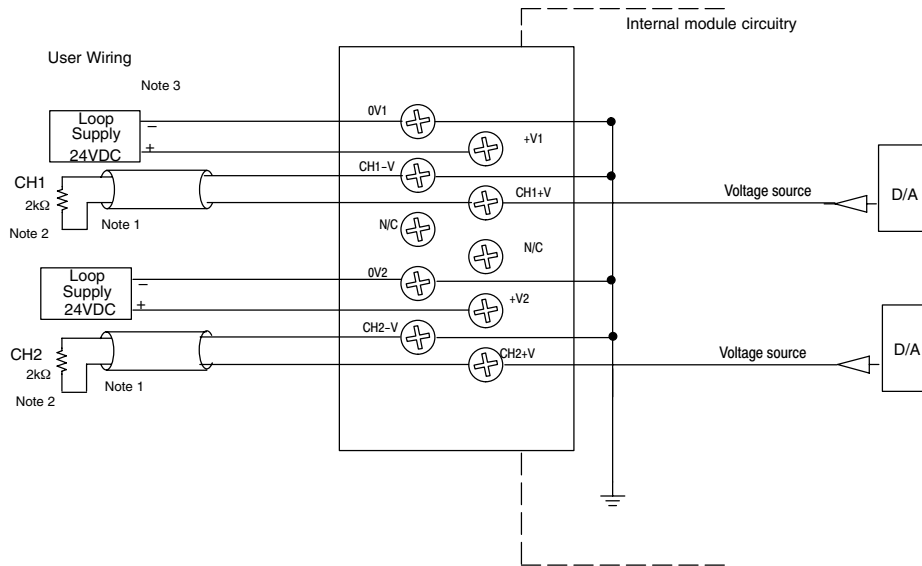
F2-02DAS-2 Isolated 2 Channel Voltage Analog Output

Number of Channels	2, isolated (2 commons)
Output Ranges	0-5VDC, 0-10VDC
Resolution	16 bit (1 in 65536)
Isolation voltage	± 750V continuous, channel to channel, channel to logic
Load Impedance	2K ohms min.
PLC update rate	1 channel per scan minimum (D2-230 CPU) 2 channels per scan minimum (D2-240 or D2-250 CPU)
Linearity Error (end to end)	± 10 counts (± 0.015% of full scale) maximum
Conversion Settling time	3ms to 0.1% of full scale
Gain Calibration Error	± 32 counts (± 0.05%)
Offset Calibration Error	± 13 counts (± 0.02%)

Maximum Inaccuracy	± 0.07% @ 77°F (25°C) ± 0.18% @ 32 to 140°F (0 to 60°C)
Digital outputs Output points required	32 (Y) output points 16 binary data bits, 2 channel ID bits
Power Budget Requirement	100 mA @ 5 VDC (supplied by base)
External Power Supply	21.6-26.4 VDC, 60 mA / channel
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 65536).

- NOTE 1: Shields should be connected to the 0V.
- NOTE 2: Load must be within compliance voltage.
- NOTE 3: For non-isolated outputs, connect 0V1 to 0V2.



Installation, Wiring, and Specifications

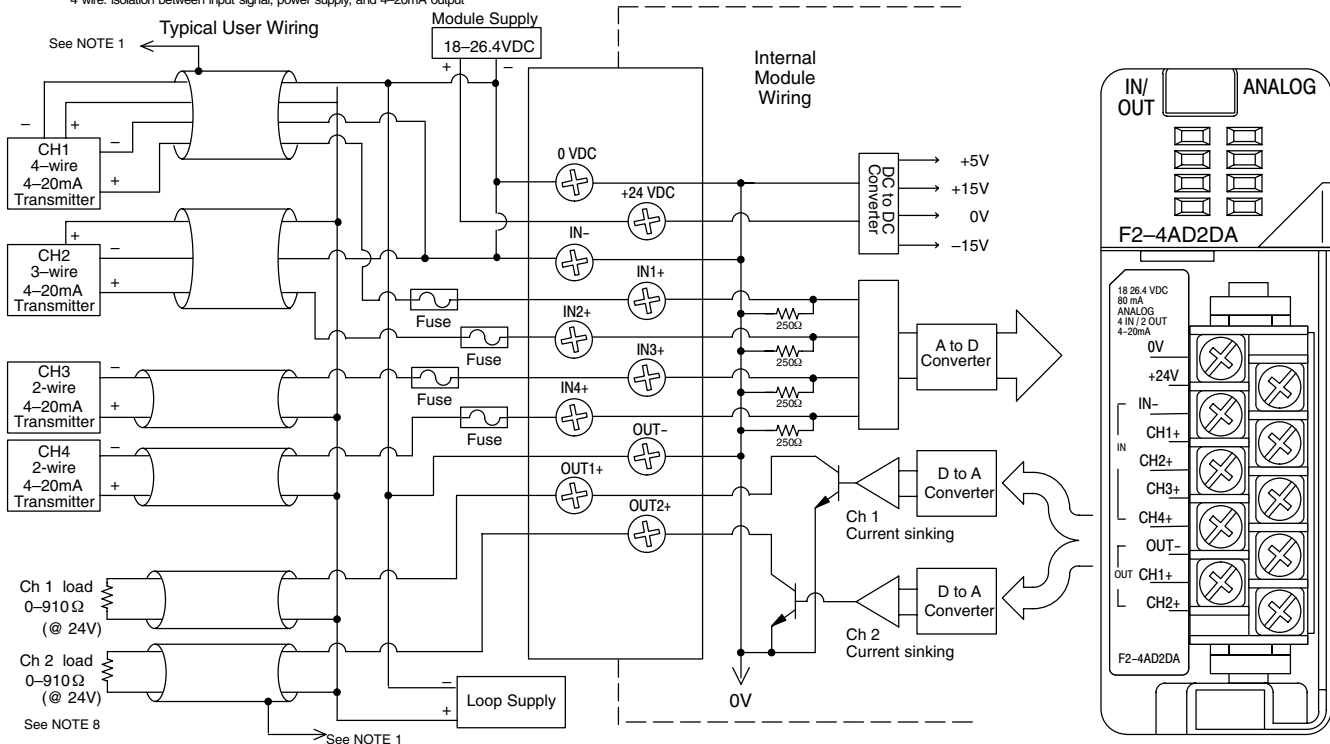
F2-4AD2DA 4-Channel Analog Input / 2-Channel Analog Output

Input Channels	4, single ended (one common)	Maximum Inaccuracy	± 0.1% @ 77°F (25°C) ± 0.3% @ 32 to 140°F (0 to 60°C)
Output Channels	2, single ended (one common)	Digital input and output points required	16 point (X) inputs 16 point (Y) outputs
Ranges	4 to 20 mA current	PLC update rate	4 input channels per scan minimum (D2-240 or D2-250 CPU) 2 output channels per scan minimum (D2-240 or D2-250 CPU) 1 input and 1 output channel per scan minimum (D2-230 CPU)
Resolution	12 bit (1 in 4096)	Power Budget Req. R	60 mA @ 5 VDC (supplied by base)
Peak withstanding volts	75 VDC, current outputs	External Power Sup.	22 to 26 VDC, 100 mA maximum
Maximum cont. overload	-40 to +40 mA, each current input	Operating Temperature	32 to 140° F (0 to 60° C)
Input Impedance	250Ω, ± 0.1%, ½W, 25ppm/°C current input resistance	Storage Temperature	-4 to 158° F (-20 to 70° C)
External load resistance	0Ω minimum, current outputs	Relative Humidity	5 to 95% (non-condensing)
Maximum loop supply	26VDC, current outputs	Environmental air	No corrosive gases permitted
Recommended fuse	0.032A, series 217 fast-acting, current inputs	Vibration	MIL STD 810C 514.2
Maximum load / Power supply	910Ω /24V, current outputs	Shock	MIL STD 810C 516.2
Active low-pass filter	-3 dB at 20Hz, 2 poles (-12 dB per octave)	Noise Immunity	NEMA ICS3-304
Linearity Error (end to end)	± 1 count (± 0.025% of full scale) maximum		
Output Settling time	100 μs maximum (full scale change)		
Accuracy vs. Temperature	± 50 ppm/°C full scale calibration change (including maximum offset change)		

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096).

- Note 1: Shields should be connected at their respective signal source.
- Note 2: Unused channels should remain open for minimum power consumption.
- Note 3: More than one external power supply can be used provided the power supply commons are connected.
- Note 4: A Series 217, 0.032A fast acting fuse is recommended for 4-20mA current input loops.
- Note 5: If the power supply common of an external power supply is not connected to 0VDC on the module, then the output of the external transmitter must be isolated. To avoid 'ground loop' errors, recommended 4-20mA transmitter types are:
2 or 3 wire: isolation between input signal and power supply
4 wire: isolation between input signal, power supply, and 4-20mA output

- Note 6: If an analog channel is connected backwards, then erroneous data values will be returned for that channel.
- Note 7: To avoid small errors due to terminal block losses, connect 0VDC, IN-, and OUT- on the terminal block as shown. The module's internal connection alone of these nodes is not sufficient to permit module performance up to the accuracy specifications.
- Note 8: Choose an output transducer resistance according to the maximum load/power supply listed in the Output Specifications.



Installation, Wiring and Specifications