

SPECIFICATIONS: DISCRETE I/O MODULES



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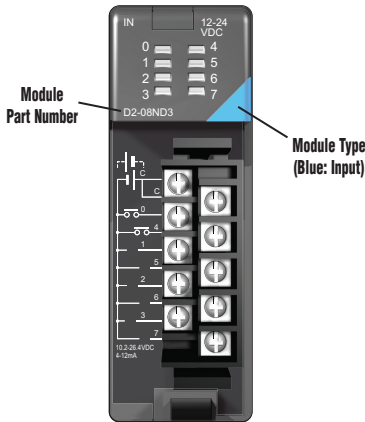
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Discrete I/O Modules Overview

There are 25 discrete I/O modules available for use in local and remote I/O bases. The specifications and wiring diagrams for these modules are found in this chapter. Each discrete I/O module is identified as an “Input”, “Output” or “Input/Output” module using the color coding scheme shown below. A blue bar on the front panel signifies an Input I/O module, a red bar signifies an Output I/O module and a White bar signifies a combination Input/Output module.

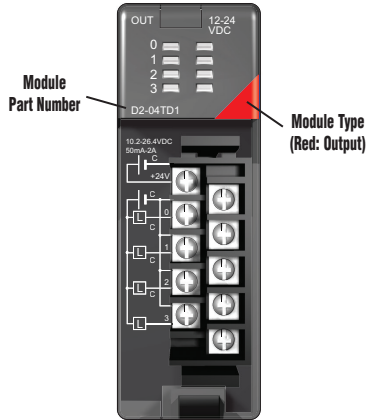
Discrete Input Modules



Discrete Input Modules			
Part Number	Number of Inputs	Description	See Page
D2-08ND3	8	Sinking/Sourcing DC Input	5-4
D2-16ND3-2	16	Isolated Sinking/Sourcing DC Input	5-5
D2-32ND3	32	Isolated Sinking/Sourcing DC Input	5-6
D2-32ND3-2	32	Isolated Sinking/Sourcing DC Input	5-7
D2-08NA-1	8	AC Input	5-8
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D2-16NA	16	Isolated AC Input	5-10

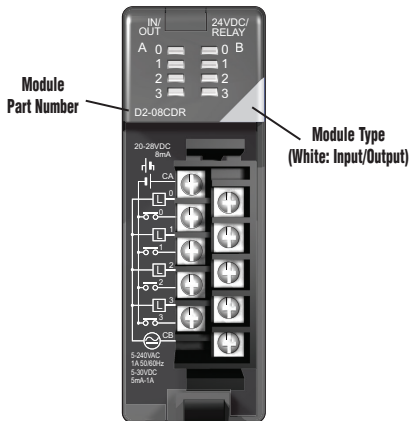
Discrete I/O Modules Overview, continued

Discrete Output Modules



Discrete Output Modules			
Part Number	Number of Outputs	Description	See Page
<i>D2-04TD1</i>	4	Sinking Output	5-11
<i>D2-08TD1</i>	8	Sinking Output	5-12
<i>D2-08TD2</i>	8	Sourcing Output	5-13
<i>D2-16TD1-2</i>	16	Sinking Output	5-14
<i>D2-16TD2-2</i>	16	Sourcing Output	5-15
<i>F2-16TD1P</i>	16	Protected Sinking Output	5-16
<i>F2-16TD2P</i>	16	Protected Sourcing Output	5-18
<i>D2-32TD1</i>	32	Sinking Output	5-20
<i>D2-32TD2</i>	32	Sourcing Output	5-21
<i>F2-08TA</i>	8	AC Output	5-22
<i>D2-08TA</i>	8	AC Output	5-23
<i>D2-12TA</i>	12	AC Output	5-24
<i>D2-04TRS</i>	4	Isolated Relay Output	5-25
<i>D2-08TR</i>	8	Relay Output	5-26
<i>F2-08TR</i>	8	Relay Output	5-27
<i>F2-08TRS</i>	8	Isolated Relay Output	5-28
<i>D2-12TR</i>	12	Relay Output	5-29

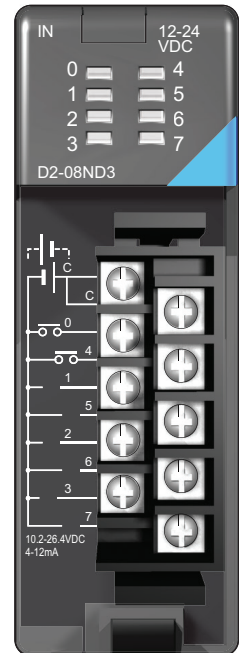
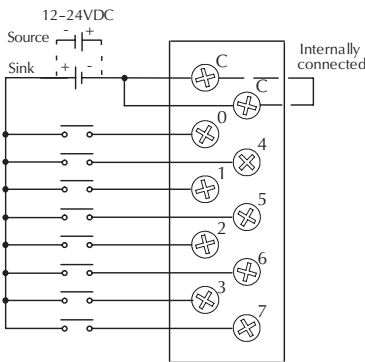
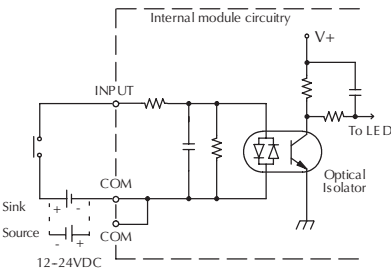
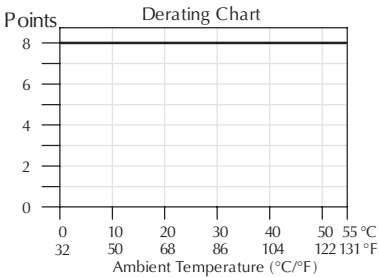
Discrete Input/Output Module



Discrete Input/Output Modules				
Part Number	Number of Inputs	Number of Outputs	Description	See Page
<i>D2-08CDR</i>	4	4	Sinking/Sourcing DC Input with Relay Output	5-30

D2-08ND3, DC Input

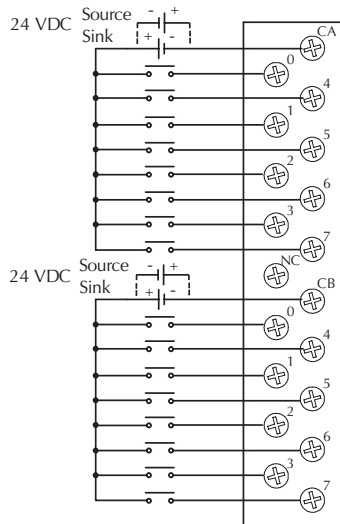
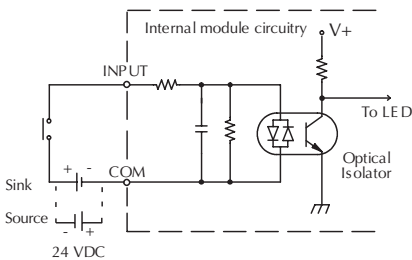
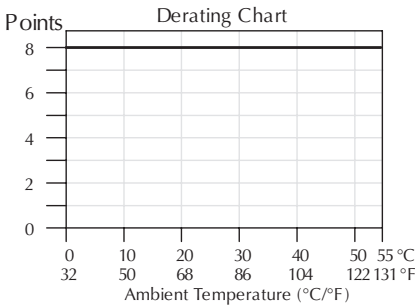
D2-08ND3 DC Input	
Inputs per Module	8 (sink/source)
Commons per Module	1 (2 I/O terminal points)
Input Voltage Range	10.2-26.4 VDC
Peak Voltage	26.4 VDC
ON Voltage Level	9.5 VDC minimum
OFF Voltage Level	3.5 VDC maximum
AC Frequency	N/A
Input Impedance	2.7 kΩ
Input Current	4.0 mA @ 12VDC 8.5 mA @ 24VDC
Minimum ON Current	3.5 mA
Maximum OFF Current	1.5 mA
Base Power Required 5VDC	50mA
OFF to ON Response	1 to 8 ms
ON to OFF Response	1 to 8 ms
Terminal Type (included)	Removable, D2-8IOCON
Status Indicator	Logic side
Weight	2.3 oz. (65g)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5m)
	ZL-D2-CBL10-1 (1.0m)
	ZL-D2-CBL10-2 (2.0m)



D2-16ND3-2, DC Input

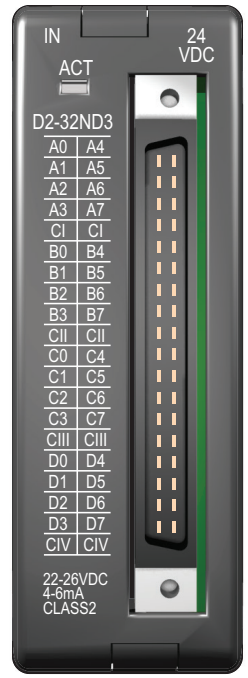
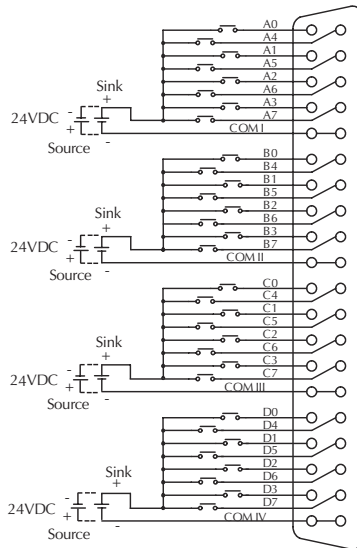
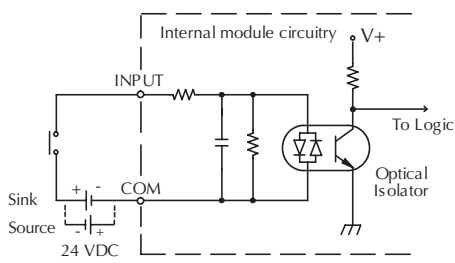
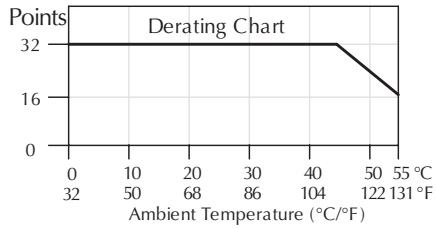
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D2-16ND3-2 DC Input	
Inputs per Module	16 (sink/source)
Commons per Module	2 isolated (8 I/O terminal points/com)
Input Voltage Range	20–28 VDC
Peak Voltage	30VDC (10mA)
ON Voltage Level	19VDC minimum
OFF Voltage Level	7VDC maximum
AC Frequency	N/A
Input Impedance	3.9 kΩ
Input Current	6mA @ 24VDC
Minimum ON Current	3.5 mA
Maximum OFF Current	1.5 mA
Base Power Required 5VDC	100mA
OFF to ON Response	3 to 9 ms
ON to OFF Response	3 to 9 ms
Terminal Type (included)	Removable, D2-16IOCON
Status Indicator	Logic side
Weight	2.3 oz. (65g)
ZIPLink Module	ZL-RTB20 (Feedthrough) ZL-LTB16-24 (Sensor Input)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)



D2-32ND3, DC Input

D2-32ND3 DC Input	
Inputs per Module	32 (sink/source)
Commons per Module	4 isolated (8 I/O terminal points / com)
Input Voltage Range	20–28 VDC
Peak Voltage	30VDC
ON Voltage Level	19VDC minimum
OFF Voltage Level	7VDC maximum
AC Frequency	N/A
Input Impedance	4.8 kΩ
Input Current	8.0 mA @ 24VDC
Minimum ON Current	3.5 mA
Maximum OFF Current	1.5 mA
Base Power Required 5VDC	25mA
OFF to ON Response	3 to 9 ms
ON to OFF Response	3 to 9 ms
Terminal Type (not included)	Removable 40-pin Connector ¹
Status Indicator	Module Activity LED
Weight	2.1 oz. (60g)
ZIPLink Module	ZL-RTB40 (Feedthrough) ZL-LTB32-24 (Sensor Input)
ZIPLink Cable	ZL-D24-CBL40 (0.5 m) ZL-D24-CBL40-1 (1.0 m) ZL-D24-CBL40-2 (2.0 m) ZL-D24-CBL40-1P (1.0 m Pigtail) ZL-D24-CBL40-2P (2.0 m Pigtail)
<i>ZIPLink connector is recommended or purchase custom connector separately.</i>	

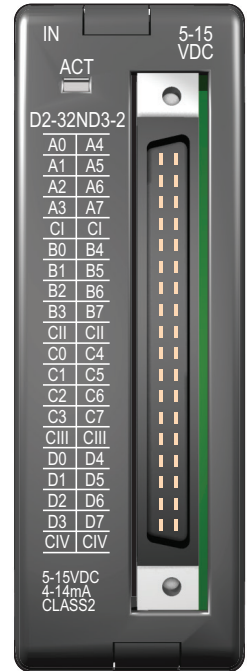
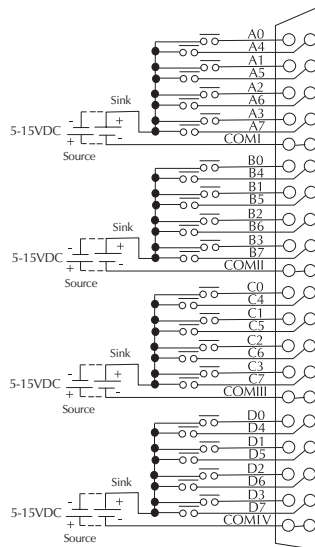
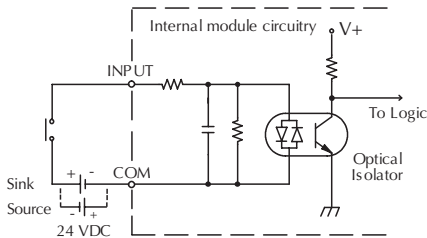
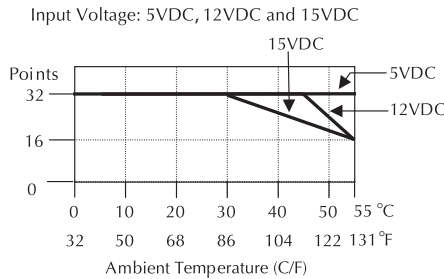


D2-32ND3-2, DC Input

D2-32ND3-2 DC Input	
Inputs per Module	32 (Sink/Source)
Commons per Module	4 isolated (8 I/O terminal points / com)
Input Voltage Range	4.50 to 15.6 VDC min. to max.
Peak Voltage	16VDC
ON Voltage Level	4VDC minimum
OFF Voltage Level	2VDC maximum
AC Frequency	N/A
Input Impedance	1.0 kΩ @ 5-15 VDC
Input Current	4mA @ 5VDC 11mA @ 12VDC 14mA @ 15VDC
Maximum Input Current	16mA @ 15.6 VDC
Minimum ON Current	3mA
Maximum OFF Current	0.5 mA
Base Power Required 5VDC	25mA
OFF to ON Response	3 to 9 ms
ON to OFF Response	3 to 9 ms
Terminal Type (not included)	Removable 40-pin connector ¹
Status Indicator	Module activity LED
Weight	2.1 oz (60g)
ZIPLink Module	ZL-RTB40 (Feedthrough) ZL-LTB32-24 (Sensor Input)
ZIPLink Cable	ZL-D24-CBL40 (0.5 m) ZL-D24-CBL40-1 (1.0 m) ZL-D24-CBL40-2 (2.0 m) ZL-D24-CBL40-1P (1.0 m Pigtail) ZL-D24-CBL40-2P (2.0 m Pigtail)
ZIPLink connector is recommended or purchase custom connector separately.	

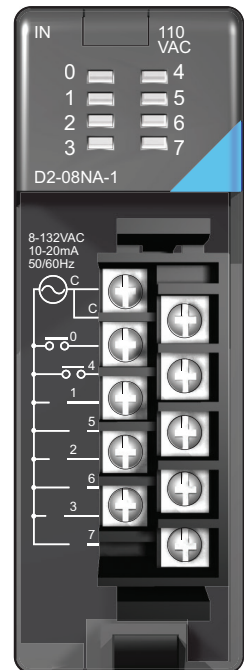
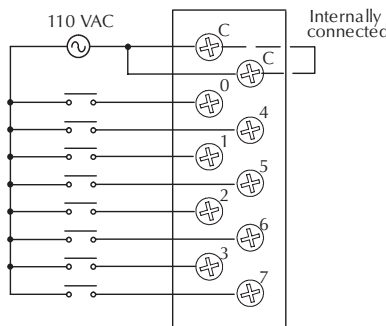
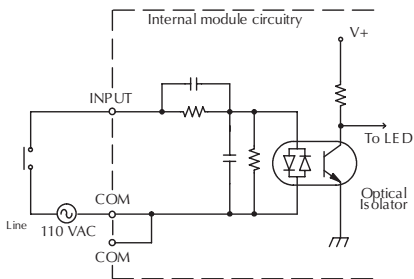
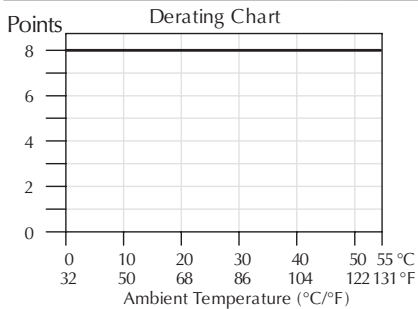
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Derating Chart



D2-08NA-1, AC Input

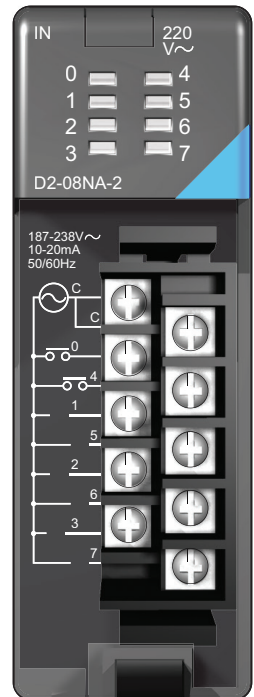
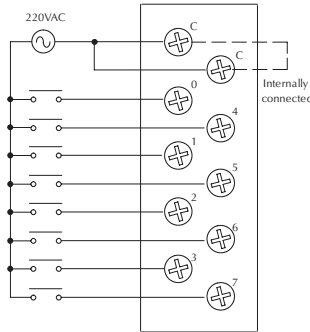
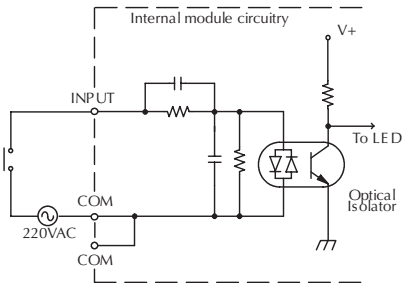
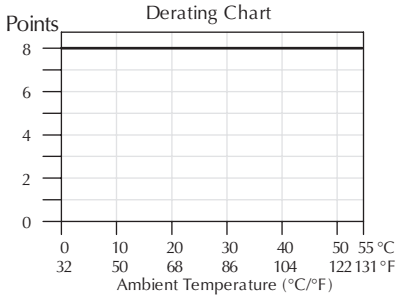
D2-08NA-1 AC Input	
Inputs per Module	8
Commons per Module	1 (2 I/O terminal points)
Input Voltage Range	80–132 VAC
Peak Voltage	132VAC
ON Voltage Level	75VAC minimum
OFF Voltage Level	20VAC maximum
AC Frequency	47–63 Hz
Input Impedance	12kΩ @ 60Hz
Input Current	13mA @ 100VAC, 60Hz 11mA @ 100VAC, 50Hz
Minimum ON Current	5mA
Maximum OFF Current	2mA
Base Power Required 5VDC	50mA
OFF to ON Response	5 to 30 ms
ON to OFF Response	10 to 50 ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.5 oz. (70g)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)



D2-08NA-2, AC Input

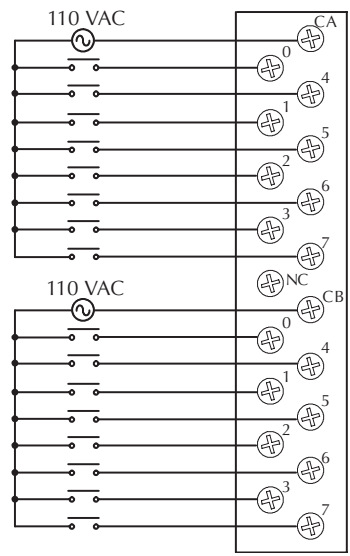
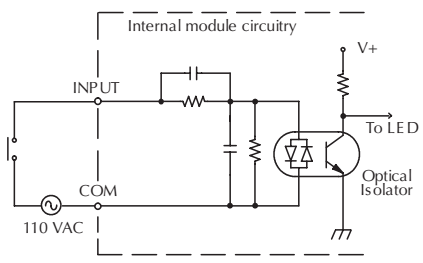
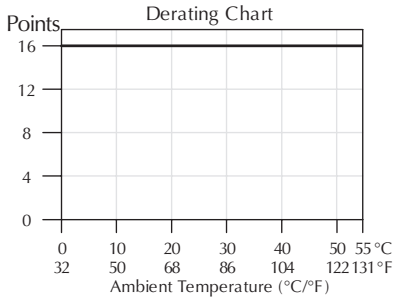
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D2-08NA-2 AC Input	
Inputs per Module	8
Commons per Module	1 (2 I/O terminal points)
Input Voltage Range	170–265 VAC
Peak Voltage	265VAC
ON Voltage Level	150VAC minimum
OFF Voltage Level	40VAC maximum
AC Frequency	47–63 Hz
Input Impedance	18kΩ @ 60 Hz
Input Current	9mA @ 220VAC, 50Hz 11mA @ 265VAC, 50Hz 10mA @ 220VAC, 60Hz 12mA @ 265VAC, 60Hz
Minimum ON Current	10mA
Maximum OFF Current	2mA
Base Power Required 5VDC	100mA
OFF to ON Response	5 to 30 ms
ON to OFF Response	10 to 50 ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.5 oz. (70g)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)



D2-16NA, AC Input

D2-16NA AC Input	
Inputs per Module	16
Commons per Module	2 (isolated)
Input Voltage Range	80–132 VAC
Peak Voltage	132VAC
ON Voltage Level	70VAC minimum
OFF Voltage Level	20VAC maximum
AC Frequency	47–63 Hz
Input Impedance	12kΩ @ 60Hz
Input Current	11mA @ 100VAC, 50Hz 13mA @ 100VAC, 60Hz 15mA @ 132VAC, 60Hz
Minimum ON Current	5mA
Maximum OFF Current	2mA
Base Power Required 5VDC	100mA
OFF to ON Response	5 to 30 ms
ON to OFF Response	10 to 50 ms
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	2.4 oz. (68g)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)



D2-04TD1, DC Output

D2-04TD1 DC Output	
Outputs per Module	4 (current sinking)
Output Points Consumed	8 points (only first 4 pts. used)
Commons per Module	1 (4 I/O terminal points)
Output Type	NMOS FET (open drain)
Operating Voltage	10.2–26.4 VDC
Peak Voltage	40VDC
ON Voltage Drop	0.72 VDC maximum
AC Frequency	N/A
Max Load Current (resistive)	4A/point 8A/common
Max Leakage Current	0.1 mA @ 40VDC
Max Inrush Current	6A for 100ms, 15A for 10ms
Minimum Load Current	50mA
External DC Required	24VDC @ 20mA max.
Base Power Required 5VDC	60mA
OFF to ON Response	1ms
ON to OFF Response	1ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.8 oz. (80g)
Fuses	4 (1 per point) (6.3 A slow blow, non-replaceable)
ZIPLink Module*	ZL-RTB20 (Feedthrough)
ZIPLink Cable*	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)
*D2-04TD1 outputs are derated not to exceed 2 Amps per point and 2 Amps per common when using the ZIPLink wiring system.	

Inductive Load
Maximum Number of Switching Cycles per Minute

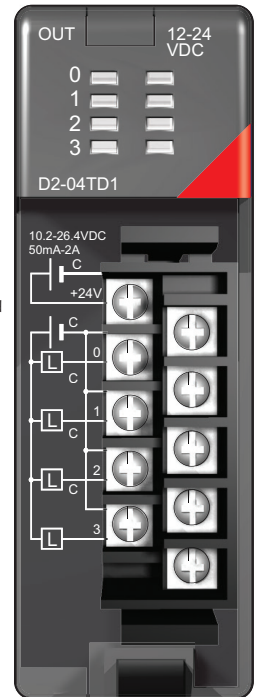
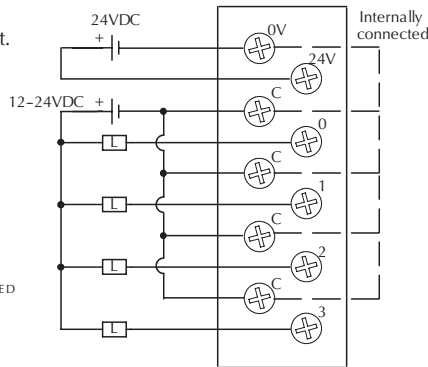
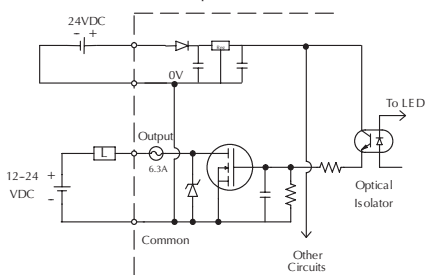
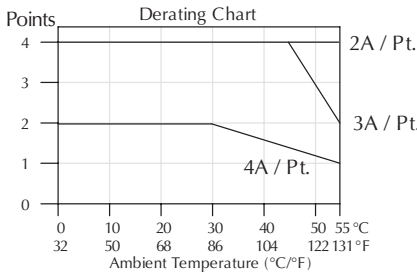
Load Current	Duration of output in ON state		
	7ms	40ms	100ms
0.1 A	8000	1400	600
0.5 A	1600	300	120
1.0 A	800	140	60
1.5 A	540	90	35
2.0 A	400	70	-
3.0 A	270	-	-
4.0 A	200	-	-

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

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

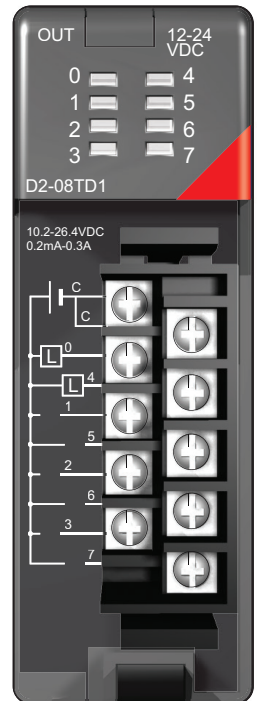
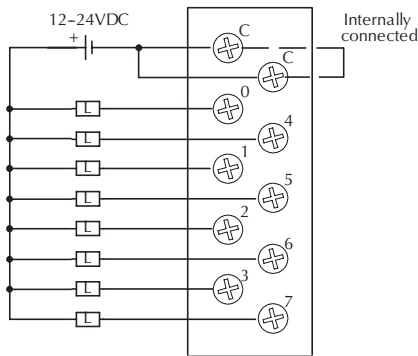
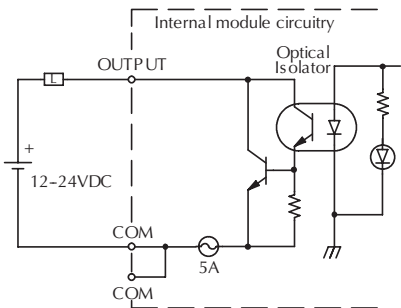
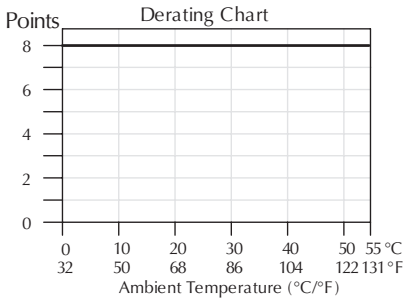
Find the load current you expect to use and the duration that the output is ON. The number at the intersection of the row and column represents the switching cycles per minute. For example, a 1A inductive load that is on for 100 ms can be switched on and off a maximum of 60 times per minute. To convert this to duty cycle percentage use: (duration x cycles)/60. In this example, (60 x 0.1)/60 = 0.1, or 10% duty cycle.

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D2-08TD1, DC Output

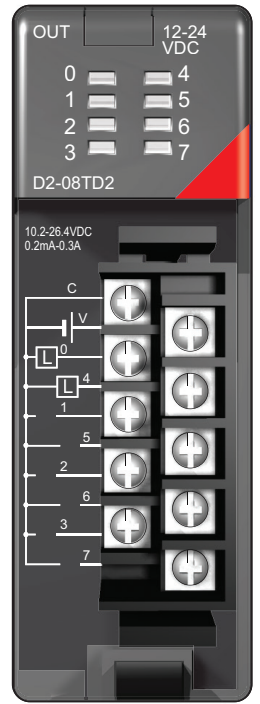
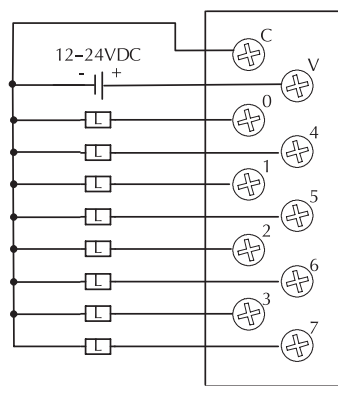
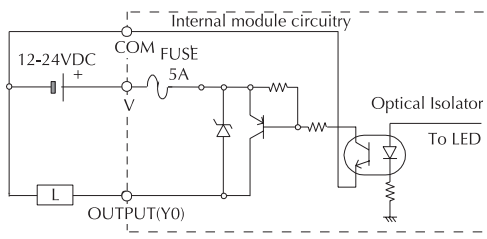
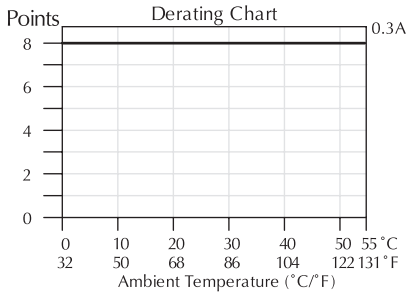
D2-08TD1 DC Output	
Outputs per Module	8 (current sinking)
Commons per Module	1 (2 I/O terminal points)
Output Type	NPN open collector
Operating Voltage	10.2–26.4 VDC
Peak Voltage	40VDC
ON Voltage Drop	1.5 VDC maximum
AC Frequency	N/A
Minimum Load Current	0.5 mA
Max Load Current	0.3 A/point; 2.4 A/common
Max Leakage Current	0.1 mA @ 40VDC
Max Inrush Current	1A for 10ms
Base Power Required 5VDC	100mA
OFF to ON Response	1ms
ON to OFF Response	1ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.3 oz. (65g)
Fuses	1 per common 5A fast blow, non-replaceable
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)



D2-08TD2, DC Output

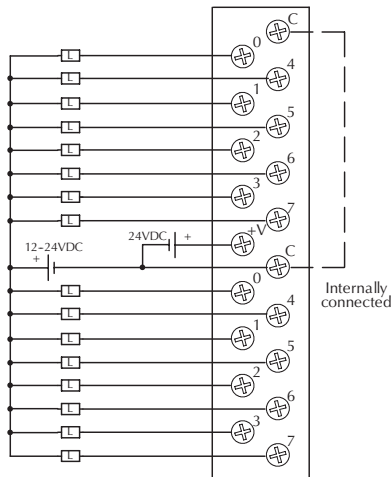
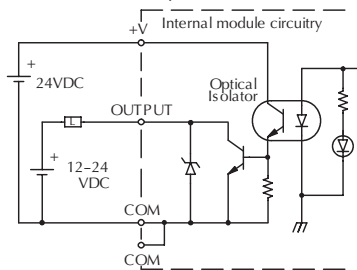
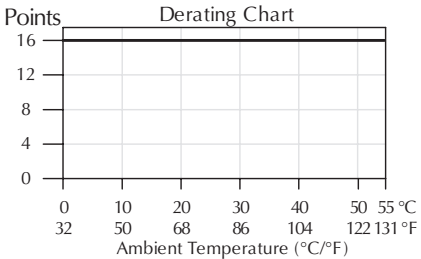
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D2-08TD2 DC Output	
Outputs per Module	8 (current sourcing)
Commons per Module	1
Output Type	PNP open collector
Operating Voltage	12 to 24 VDC
Output Voltage	10.8 to 26.4 VDC
Peak Voltage	40VDC
ON Voltage Drop	1.5 VDC
AC Frequency	N/A
Minimum Load Current	N/A
Max Load Current	0.3 A per point; 2.4 A per common
Max Leakage Current	1.0 mA @ 40VDC
Max Inrush Current	1A for 10ms
Base Power Required 5VDC	100mA
OFF to ON Response	1ms
ON to OFF Response	1ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.1 oz. (60g)
Fuses	1 per common 5A fast blow, non-replaceable
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)



D2-16TD1-2, DC Output

D2-16TD1-2 DC Output	
Outputs per Module	16 (current sinking)
Commons per Module	1 (2 I/O terminal points)
Output Type	NPN open collector
External DC required	24VDC ±4V @ 80mA max
Operating Voltage	10.2–26.4 VDC
Peak Voltage	30VDC
ON Voltage Drop	0.5 VDC maximum
AC Frequency	N/A
Minimum Load Current	0.2 mA
Max Load Current	0.1 A/point 1.6 A/common
Max Leakage Current	0.1 mA @ 30VDC
Max Inrush Current	150mA for 10ms
Base Power Required 5VDC	200mA
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	2.3 oz. (65g)
Fuses	None
ZIPLink Module	ZL-RTB20 (Feedthrough) ZL-RFU20 (Fuse) ZL-RRL16-24 (Relay)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)

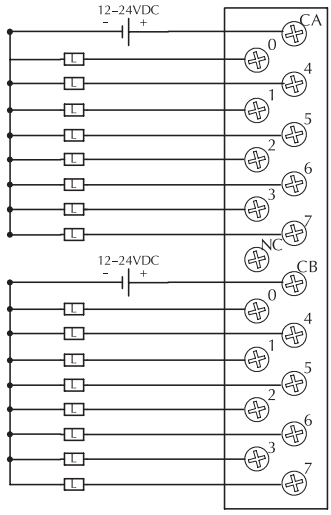
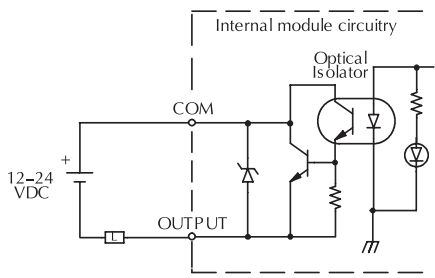
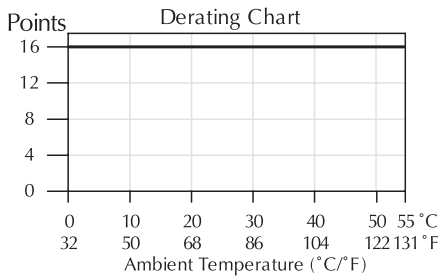


* Can also be used with 5VDC supply

D2-16TD2-2, DC Output

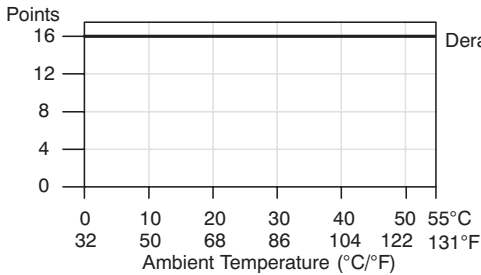
D2-16TD2-2 DC Output	
Outputs per Module	16 (current sourcing)
Commons per Module	2
Output Type	NPN open collector
Operating Voltage	10.2–26.4 VDC
Peak Voltage	30VDC
ON Voltage Drop	1.0 VDC maximum
AC Frequency	N/A
Minimum Load Current	0.2 mA
Max Load Current	0.1 A/point 1.6 A/module
Max Leakage Current	0.1 mA @ 30VDC
Max Inrush Current	150mA for 10ms
Base Power Required 5VDC	200mA
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	2.8 oz. (80g)
Fuses	None
ZIPLink Module	ZL-RTB20 (Feedthrough) ZL-RFU20 (Fuse)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)

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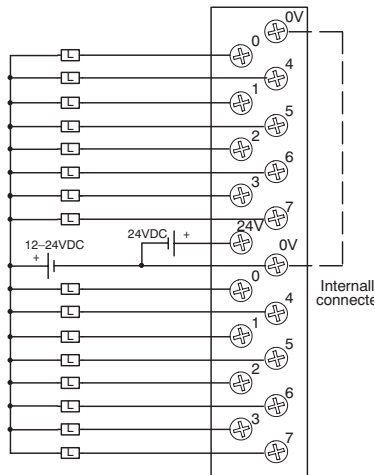
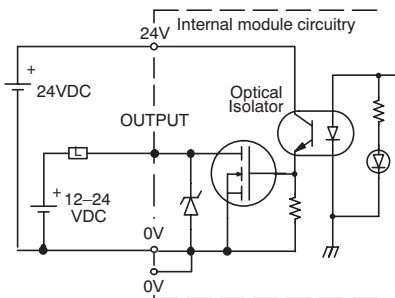


F2-16TD1P, DC Output With Fault Protection

F2-16TD1P DC Output with Fault Protection	
Inputs per module	16 (status indication)
Outputs per module	16 (current sinking)
Commons per module	1 (2 I/O terminal points)
Output type	NMOS FET (open drain)
Operating voltage	10.2–26.4 VDC, external
Peak voltage	40VDC
AC frequency	N/A
ON voltage drop	0.7 V (output current 0.5 A)
Overcurrent trip	0.6 A min., 1.2A max.
Maximum load current	0.25 A continuous, 0.5 A peak
Maximum OFF current	Jumper J6 installed: 200µA; J6 removed: 30µA
Base power required 5V	70mA
OFF to ON response	0.5 ms
ON to OFF response	0.5 ms
Terminal type	Removable (D2-16IOCON)
Status indicators	Logic Side
Weight	2.0 oz. (25g)
Fuses	None
External DC required	24VDC +/-10% @ 50mA
External DC overvoltage shutdown	27V, outputs are restored when voltage is within limits



Derating Chart



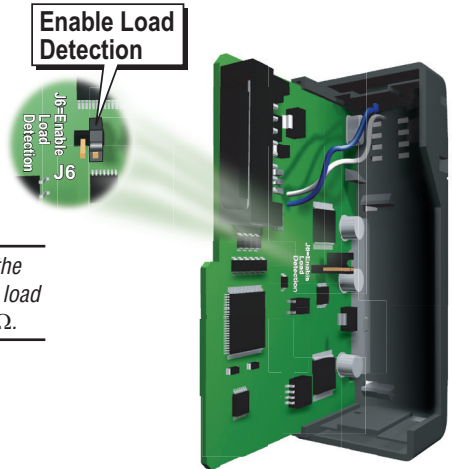
When the A/B switch is in the A position, the LEDs display the output status of the module's first 8 output points. Position B displays the output status of the module's second group of 8 output points.

F2-16TD1P, DC Output With Fault Protection, continued

This module detects the following fault statuses and turns the related X bit(s) on.

1. Missing external 24VDC for the module
2. Open load
3. Over temperature (the output is shut down)
4. Over load current (the output is shut down)

Fault Status	X bit Fault Status Indication
Missing external 24VDC	All 16 X bits are on.
Open load	Only the X bit assigned to the faulted output is on
Over temperature	
Over load current	



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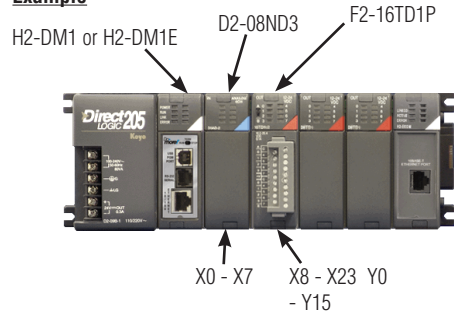
NOTE: Open load detection can be disabled by removing the jumper switch J6 on the module PC board. Disable if the load might be energized by 200µA, or load resistance is > 56kΩ.

When this module is installed, 16 X bits are automatically assigned as fault status indicators. Each X bit indicates the fault status of a particular output.

In this example, X8-X23 are assigned as fault status indicators.

- X8: Fault status indicator for Y0
- X9: Fault status indicator for Y1
- ↓
- X22: Fault status indicator for Y14
- X23: Fault status indicator for Y15

Example

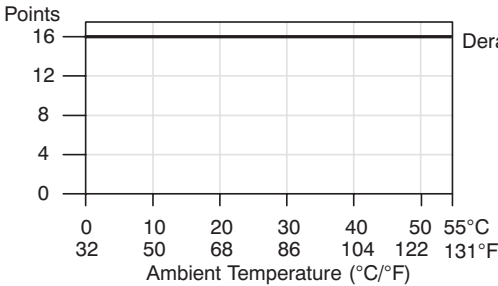


The fault status indicators (X bits) will automatically reset once the fault condition is corrected. Over temperature and over load can be reset by turning the assigned output off or power cycling the PLC.

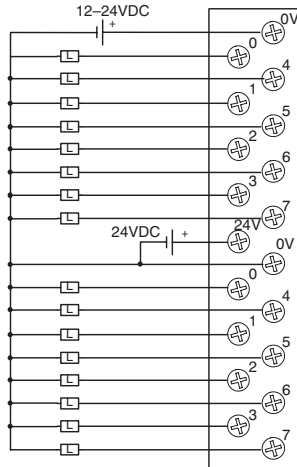
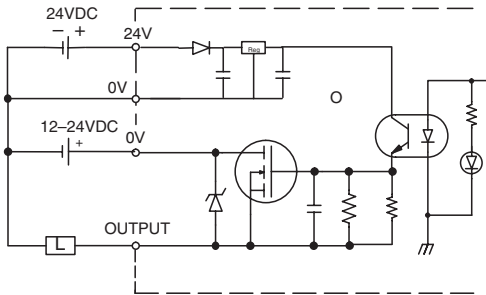
Fault Status	Operation
Missing external 24VDC	Apply external 24VDC
Open load	Connect the load.
Over temperature	Turn the output (Y bit) off or power cycle the PLC
Over load current	

F2-16TD2P, DC Output with Fault Protection

F2-16TD2P DC Output with Fault Protection	
Inputs per module	16 (status indication)
Outputs per module	16 (current sourcing)
Commons per module	1
Output type	NMOS FET (open source)
Operating voltage	10.2–26.4 VDC, external
Peak voltage	40VDC
AC frequency	N/A
ON voltage drop	0.7 V (output current 0.5 A)
Overcurrent trip	0.6 A min., 1.2 A max.
Maximum load current	0.25 A continuous, 0.5 A peak
Maximum OFF current	Jumper J6 installed: 200µA; J6 removed: 30µA
Base power required 5V	70mA
OFF to ON response	0.5 ms
ON to OFF response	0.5 ms
Terminal type	Removable (D2-16IOCON)
Status indicators	Logic Side
Weight	2.0 oz. (25g)
Fuses	None
External DC required	24VDC ±10% @ 50mA
External DC overvoltage shutdown	27V, outputs are restored when voltage is within limits



Derating Chart



When the A/B switch is in the A position, the LEDs display the output status of the module's first 8 output points. Position B displays the output status of the module's second group of 8 output points.

F2-16TD2P, DC Output With Fault Protection, continued

This module detects the following fault statuses and turns the related X bit(s) on.

1. Missing external 24VDC for the module
2. Open load
3. Over temperature (the output is shut down)
4. Over load current (the output is shut down)

Fault Status	X bit Fault Status Indication
Missing external 24VDC	All 16 X bits are on.
Open load	Only the X bit assigned to the faulted output is on
Over temperature	
Over load current	

NOTE: Open load detection can be disabled by removing the jumper switch J6 on the module PC board. Disable if the load might be energized by 200µA, or load resistance is > 56kΩ.

When this module is installed, 16 X bits are automatically assigned as fault status indicators. Each X bit indicates the fault status of a particular output.

In this example, X8-X23 are assigned as fault status indicators.

X8: Fault status indicator for Y0

X9: Fault status indicator for Y1

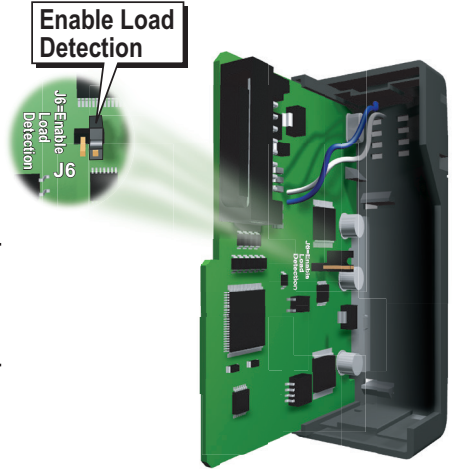


X22: Fault status indicator for Y14

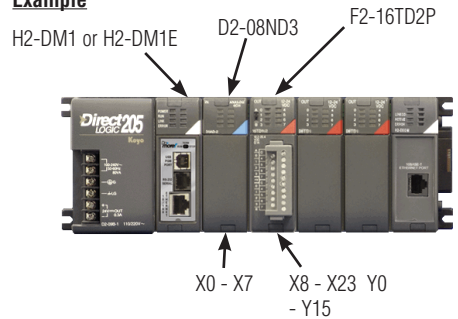
X23: Fault status indicator for Y15

The fault status indicators (X bits) will automatically reset once the fault condition is corrected. Over temperature and over load can be reset by turning the assigned output off or power cycling the PLC.

Fault Status	Operation
Missing external 24VDC	Apply external 24VDC
Open load	Connect the load.
Over temperature	Turn the output (Y bit) off or power cycle the PLC
Over load current	

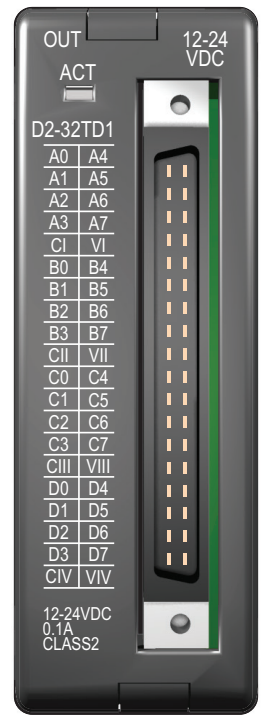
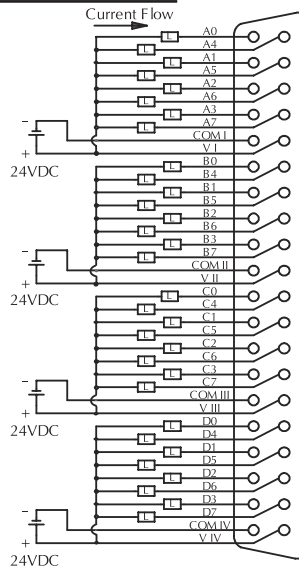
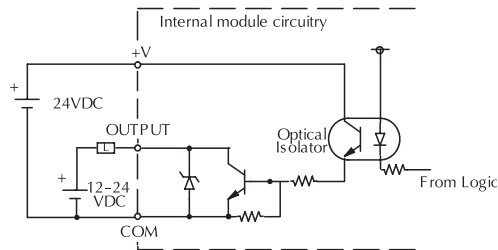
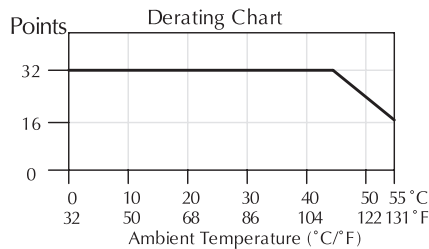


Example



D2-32TD1, DC Output

D2-32TD1 DC Output	
Outputs per Module	32 (current sinking)
Commons per Module	4 (8 I/O terminal points)
Output Type	NPN open collector
Operating Voltage	12–24 VDC
Peak Voltage	30VDC
ON Voltage Drop	0.5 VDC maximum
Minimum Load Current	0.2 mA
Max Load Current	0.1 A/point; 3.2 A per module
Max Leakage Current	0.1 mA @ 30VDC
Max Inrush Current	150mA for 10ms
Base Power Required 5VDC	350mA
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Terminal Type (not included)	Removable 40-pin connector†
Status Indicator	Module activity (no I/O status indicators)
Weight	2.1 oz. (60g)
Fuses	None
External DC Power Required	20–28 VDC max. 120mA (all points on)
ZIPLink Module	ZL-RTB40 (Feedthrough) ZL-RFU40 (Fuse)
ZIPLink Cable	ZL-D24-CBL40 (0.5 m) ZL-D24-CBL40-1 (1.0 m) ZL-D24-CBL40-2 (2.0 m) ZL-D24-CBL40-1P (1.0 m Pigtail) ZL-D24-CBL40-2P (2.0 m Pigtail)
<i>ZIPLink connector is recommended or purchase custom connector separately.</i>	

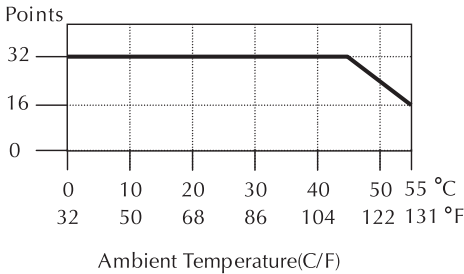


D2-32TD2, DC Output

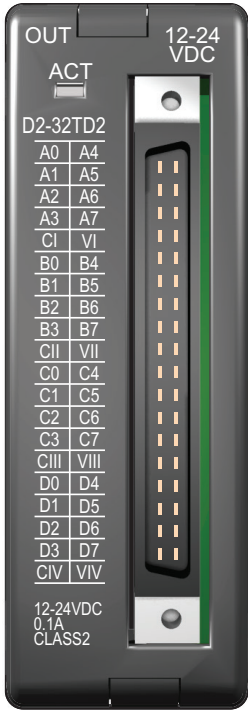
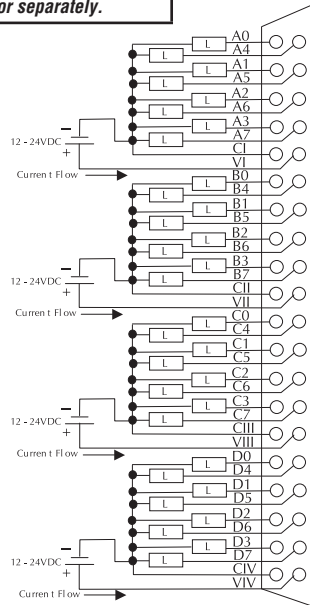
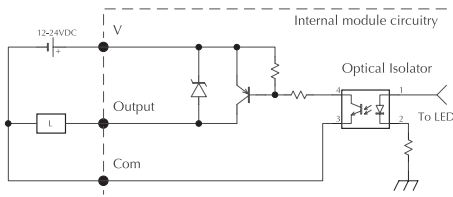
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D2-32TD2 DC Output	
Outputs per Module	32 (current sourcing)
Commons per Module	4 (8 I/O terminal points)
Output Type	Transistor
Operating Voltage	12 to 24 VDC
Peak Voltage	30VDC
ON Voltage Drop	0.5 VDC @ 0.1 A
Minimum Load Current	0.2 mA
Max Load Current	0.1 A/point; 0.8 A/common
Max Leakage Current	0.1 mA @ 30VDC
Max Inrush Current	150mA @ 10ms
Base Power Required 5VDC	350mA
OFF to ON Response	0.5 ms
ON to OFF Response	0.5 ms
Terminal Type (not included)	Removable 40-pin connector ¹
Status Indicator	Module activity (no I/O status indicators)
Weight	2.1 oz (60g)
Fuses	None
ZIPLink Module	ZL-RTB40 (Feedthrough) ZL-RFU40 (Fuse)
ZIPLink Cable	ZL-D24-CBL40 (0.5 m) ZL-D24-CBL40-1 (1.0 m) ZL-D24-CBL40-2 (2.0 m) ZL-D24-CBL40-1P (1.0 m Pigtail) ZL-D24-CBL40-2P (2.0 m Pigtail)
<i>ZIPLink connector is recommended or purchase custom connector separately.</i>	

Derating Chart

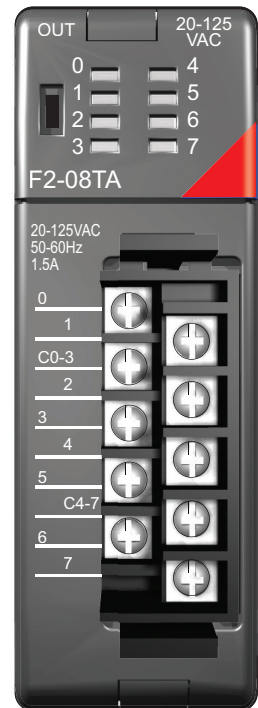
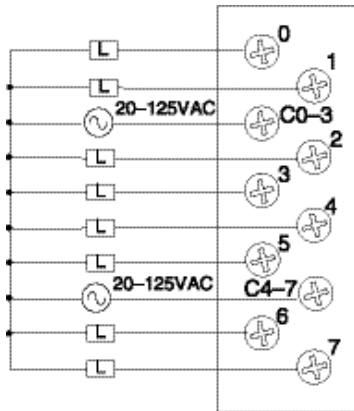
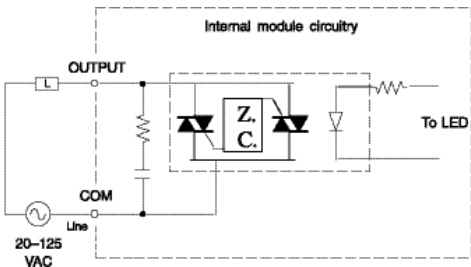
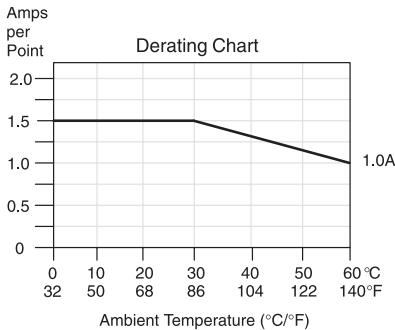


Equivalent Input Circuit



F2-08TA, AC Output

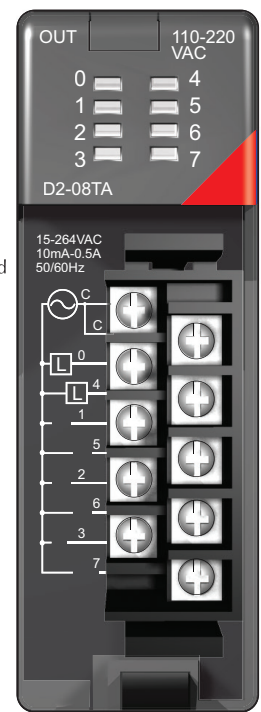
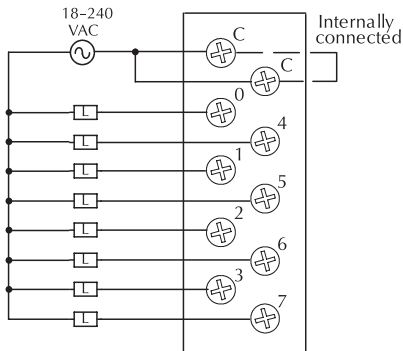
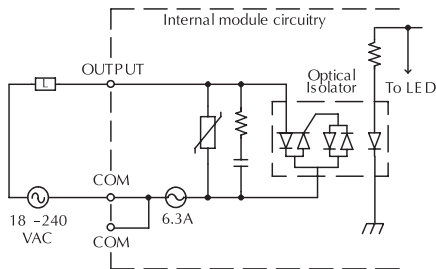
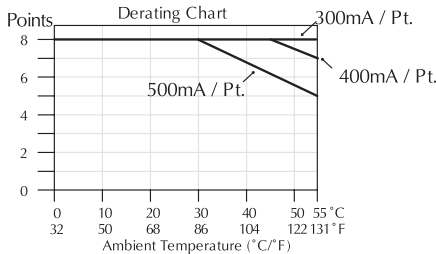
F2-08TA AC Output	
Outputs per Module	8
Commons per Module	2 (Isolated)
Output Type	SSR (Triac with zero crossover)
Operating Voltage	24-140 VAC
Peak Voltage	140VAC
ON Voltage Drop	1.6 V(rms) @ 1.5 A
AC Frequency	47 to 63 Hz
Minimum Load Current	50mA
Max Load Current	1.5 A / pt @ 30°C 1.0 A / pt @ 60°C 4.0 A / common; 8.0 A / module @ 60°C
Max Leakage Current	0.7 mA(rms)
Peak One Cycle Surge Current	15A
Base Power Required 5VDC	250mA
OFF to ON Response	0.5 ms - 1/2 cycle
ON to OFF Response	0.5 ms - 1/2 cycle
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	3.5 oz.
Fuses	None
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)



D2-08TA, AC Output

D2-08TA AC Output	
Outputs per Module	8
Commons per Module	1 (2 I/O terminal points)
Output Type	SSR (Triac)
Operating Voltage	15-264 VAC
Peak Voltage	264VAC
ON Voltage Drop	< 1.5 VAC (>0.1 A) < 3.0 VAC (<0.1 A)
AC Frequency	47 to 63 Hz
Minimum Load Current	10mA
Max Load Current	0.5 A/point; 4A/common
Max Leakage Current	4mA (264VAC, 60Hz) 1.2 mA (100VAC, 60Hz) 0.9 mA (100VAC, 50Hz)
Max Inrush Current	10A for 10ms
Base Power Required 5VDC	250mA
OFF to ON Response	1ms
ON to OFF Response	1ms + 1/2 cycle
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.8 oz. (80g)
Fuses	1 per common, 6.3 A slow blow, non-replaceable
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)

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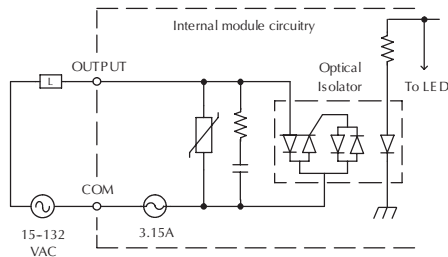
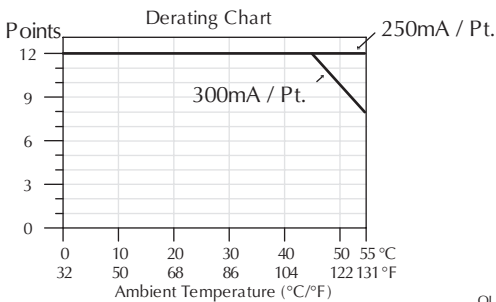
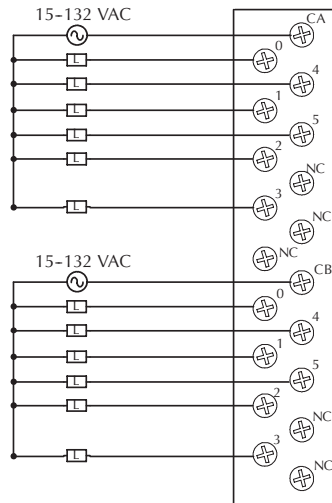


D2-12TA, AC Output

D2-12TA AC Output	
Outputs per Module	12
Outputs Points Consumed	16 (four unused, see chart right)
Commons per Module	2 (isolated)
Output Type	SSR (Triac)
Operating Voltage	15-132 VAC
Peak Voltage	132VAC
ON Voltage Drop	< 1.5 VAC (>50mA) < 4.0 VAC (<50mA)
AC Frequency	47 to 63 Hz
Minimum Load Current	10mA
Max Load Current	0.3 A /point; 1.8 A/common
Max Leakage Current	2mA (132VAC, 60Hz)
Max Inrush Current	10A for 10ms
Base Power Required 5VDC	350mA
OFF to ON Response	1ms
ON to OFF Response	1ms + 1/2 cycle
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	2.8 oz. (80g)
Fuses	(2) 1 per common 3.15 A slow blow, replaceable Order D2-FUSE-1 (5 per pack)
ZIPLink Module	ZL-RTB20 (Feedthrough) ZL-RFU20 (Fuse)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)

Addresses Used			
Points	Used?	Points	Used?
Yn+0	Yes	Yn+8	Yes
Yn+1	Yes	Yn+9	Yes
Yn+2	Yes	Yn+10	Yes
Yn+3	Yes	Yn+11	Yes
Yn+4	Yes	Yn+12	Yes
Yn+5	Yes	Yn+13	Yes
Yn+6	No	Yn+14	No
Yn+7	No	Yn+15	No

Yn is the starting address



D2-04TRS, Relay Output

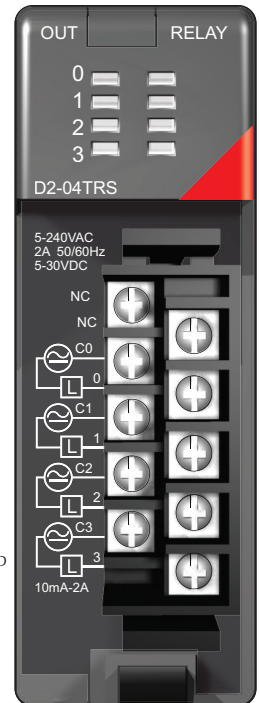
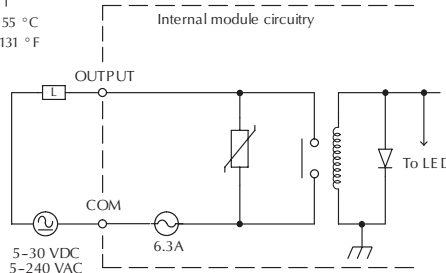
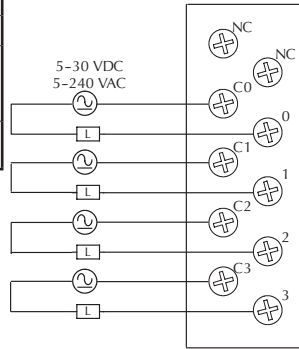
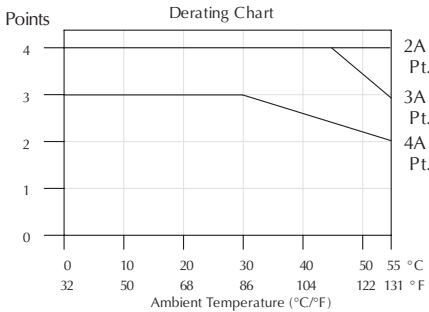
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D2-04TRS Relay Output	
Outputs per Module	4
Outputs Points Consumed	8 (only 1st 4pts are used)
Commons per Module	4 (isolated)
Output Type	Relay, form A (SPST)
Operating Voltage	5–30 VDC / 5–240 VAC
Peak Voltage	30 VDC, 264 VAC
ON Voltage Drop	0.72 VDC maximum
AC Frequency	47 to 63 Hz
Minimum Load Current	10mA
Max Load Current (resistive)	4A/point; 8A/module (resistive)
Max Leakage Current	0.1 mA @ 264VAC
Max Inrush Current	5A for < 10ms
Base Power Required 5VDC	250 mA
OFF to ON Response	10ms
ON to OFF Response	10ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	2.8 oz. (80g)
Fuses	1 per point 6.3 A slow blow, replaceable Order D2-FUSE-3 (5 per pack)
ZIPLink Module*	ZL-RTB20 (Feedthrough)
ZIPLink Cable*	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)

***D2-04TRS outputs are derated not to exceed 2 Amps per point and 2 Amps per common when using the ZIPLink wiring system.**

Typical Relay Life (Operations)				
Voltage & Load Current				
Type of Load	1A	2A	3A	4A
24VDC Resistive	500k	200k	100k	50k
24VDC Solenoid ¹	100k	40k	–	–
110VAC Resistive	500k	250k	150k	100k
110VAC Solenoid ²	200k	100k	50k	–
220VAC Resistive	350k	150k	100k	50k
220VAC Solenoid ³	100k	50k	–	–

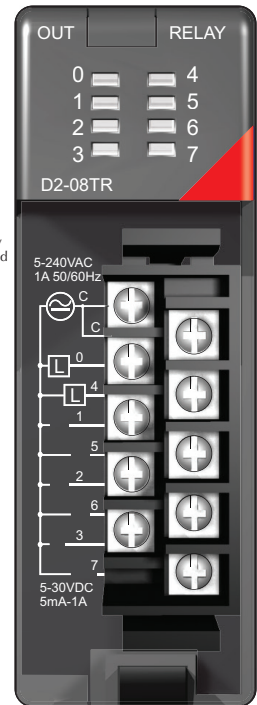
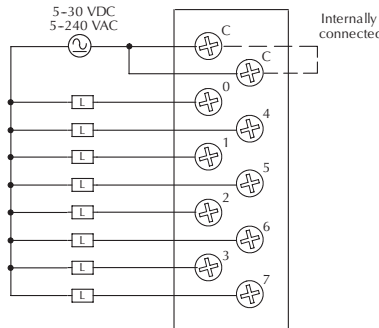
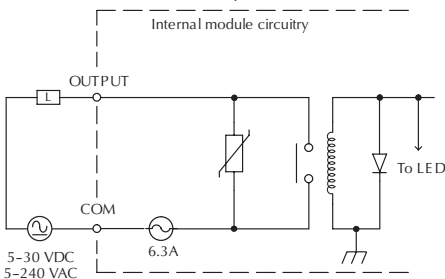
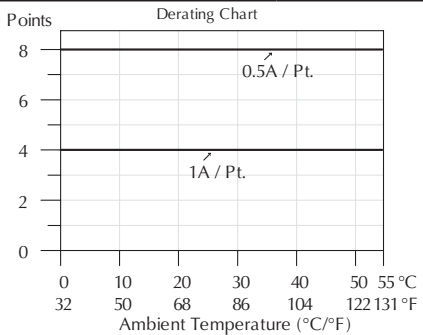
1. At 24VDC solenoid (inductive) loads over 2A cannot be used.
2. At 100VAC solenoid (inductive) loads over 3A cannot be used.
3. At 220VAC solenoid (inductive) loads over 2A cannot be used.



D2-08TR, Relay Output

D2-08TR Relay Output	
Outputs per Module	8
Outputs Points Consumed	8
Commons per Module	1 (2 I/O terminals)
Output Type	Relay, form A (SPST)
Operating Voltage	5-30 VDC; 5-240 VAC
Peak Voltage	30VDC, 264VAC
ON Voltage Drop	N/A
AC Frequency	47 to 60 Hz
Minimum Load Current	5mA @ 5VDC
Max Load Current (resistive)	1A/point; 4A/common
Max Leakage Current	0.1 mA @265VAC
Max Inrush Current	Output: 3A for 10ms Common: 10A for 10ms
Base Power Required 5VDC	250mA
OFF to ON Response	12ms
ON to OFF Response	10ms
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	3.9 oz. (110g)
Fuses	One 6.3 A slow blow, replaceable Order D2-FUSE-3 (5 per pack)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)

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



F2-08TR, Relay Output

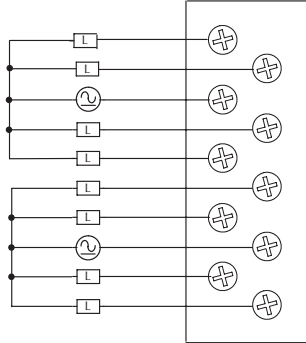
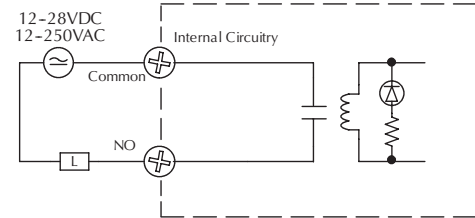
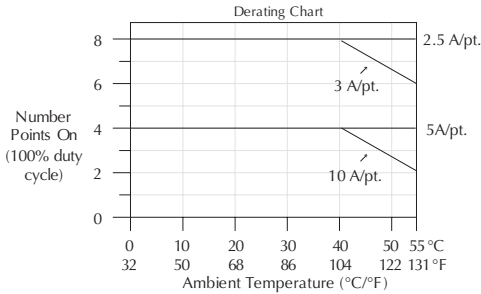
F2-08TR Relay Output	
Outputs per Module	8
Outputs Points Consumed	8
Commons per Module	2 (isolated), 4-pt. per common
Output Type	8, Form A (SPST normally open)
Operating Voltage	7A @ 12–28 VDC, 12–250 VAC; 0.5 A @ 120VDC
Peak Voltage	150VDC, 265VAC
ON Voltage Drop	N/A
AC Frequency	47 to 63 Hz
Minimum Load Current	10mA @ 12VDC
Max Load Current (resistive)	10A/point ³ (Subject to derating) Max of 10A/common
Max Leakage Current	N/A
Max Inrush Current	12A
Base Power Required 5VDC	670mA
OFF to ON Response	15ms (typical)
ON to OFF Response	5ms (typical)
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	5.5 oz. (156g)
Fuses	None
ZIPLink Module*	ZL-RTB20 (Feedthrough)
ZIPLink Cable*	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)

***F2-08TR outputs are derated not to exceed 2 Amps per point and 4 Amps per common when using the ZIPLink wiring system.**

Typical Relay Life ¹ (Operations) at Room Temperature			
Voltage & Type of Load ²	Load Current		
	50mA	5A	7A
24VDC Resistive	10M	600k	300k
24VDC Solenoid	–	150k	75k
110VDC Resistive	–	600k	300k
110VDC Solenoid	–	500k	200k
220VAC Resistive	–	300k	150k
220VAC Solenoid	–	250k	100k

- Contact life may be extended beyond those values shown with the use of arc suppression techniques described in the DL205 User Manual. Since these modules have no leakage current, they do not have built-in snubber. For example, if you place a diode across a 24VDC inductive load, you can significantly increase the life of the relay.
- At 120VDC 0.5 A resistive load, contact life cycle is 200k cycles.
- Normally closed contacts have 1/2 the current handling capability of the normally open contacts.

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F2-08TRS, Relay Output

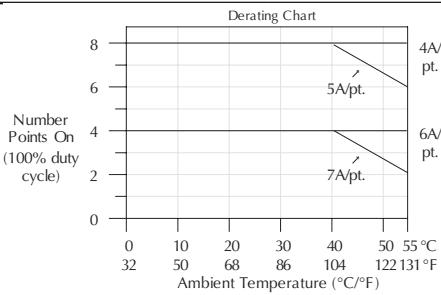
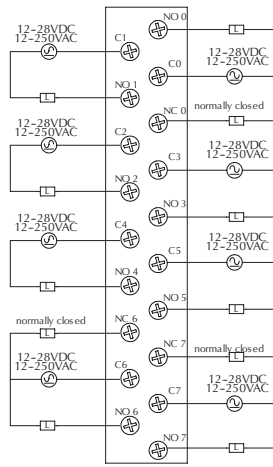
F2-08TRS Relay Output	
Outputs per Module	8
Outputs Points Consumed	8
Commons per Module	8 (isolated)
Output Type	3, Form C (SPDT) 5, Form A (SPST normally open)
Operating Voltage	7A @ 12-28 VDC, 12-250 VAC 0.5 A @ 120VDC
Peak Voltage	150VDC, 265VAC
ON Voltage Drop	N/A
AC Frequency	47 to 63Hz
Minimum Load Current	10mA @ 12VDC
Max Load Current (resistive)	7A/point ³ (subject to derating)
Max Leakage Current	N/A
Max Inrush Current	12A
Base Power Required 5VDC	670mA
OFF to ON Response	15ms (typical)
ON to OFF Response	5ms (typical)
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	5.5 oz. (156g)
Fuses	None
ZIPLink Module*	ZL-RTB20 (Feedthrough)
ZIPLink Cable*	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)

*F2-08TRS outputs are derated not to exceed 2 Amps per point and 2 Amps per common when using the ZIPLink wiring system.

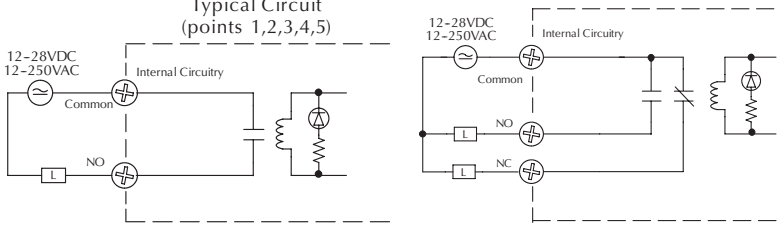
Typical Relay Life ¹ (Operations) at Room Temperature			
Voltage & Type of Load ²	Load Current		
	50mA	5A	7A
24VDC Resistive	10M	600k	300k
24VDC Solenoid	—	150k	75k
110VDC Resistive	—	600k	300k
110VDC Solenoid	—	500k	200k
220VAC Resistive	—	300k	150k
220VAC Solenoid	—	250k	100k

- Contact life may be extended beyond these values shown with the use of arc suppression techniques described in the DL205 User Manual. Since these modules have no leakage current, they do not have built-in snubber. For example, if you place a diode across a 24VDC inductive load, you can significantly increase the life of the relay.
- At 120VDC 0.5 A resistive load, contact life cycle is 200k cycles.
- Normally closed contacts have 1/2 the current handling capability of the normally open contacts.

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



D2-12TR, Relay Output

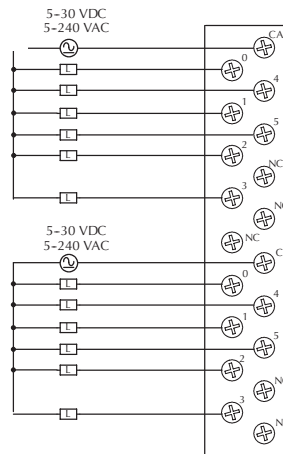
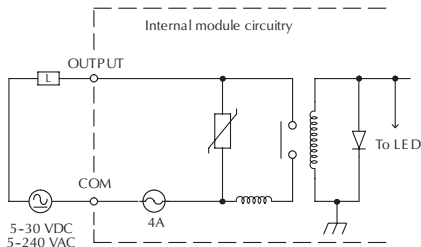
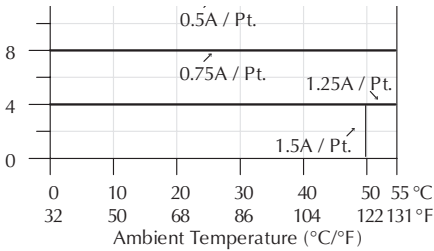
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D2-12TR Relay Output	
Outputs per Module	12
Outputs Points Consumed	16 (four unused, see chart below)
Commons per Module	2 (6-pts. per common)
Output Type	Relay, form A (SPST)
Operating Voltage	5-30 VDC; 5-240 VAC
Peak Voltage	30VDC; 264VAC
ON Voltage Drop	N/A
AC Frequency	47 to 60 Hz
Minimum Load Current	5mA @ 5VDC
Max Load Current (resistive)	1.5 A/point; Max of 3A/common
Max Leakage Current	0.1 mA @ 265VAC
Max Inrush Current	Output: 3A for 10ms Common: 10A for 10ms
Base Power Required 5VDC	450mA
OFF to ON Response	10ms
ON to OFF Response	10ms
Terminal Type (included)	Removable; D2-16IOCON
Status Indicator	Logic side
Weight	4.6 oz. (130g)
Fuses	(2) 4A slow blow, replaceable Order D2-FUSE-4 (5 per pack)
ZIPLink Module	ZL-RTB20 (Feedthrough) ZL-RFU20 (Fuse)
ZIPLink Cable	ZL-D2-CBL19 (0.5 m) ZL-D2-CBL19-1 (1.0 m) ZL-D2-CBL19-2 (2.0 m) ZL-D2-CBL19-1P (1.0 m Pigtail) ZL-D2-CBL19-2P (2.0 m Pigtail)

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

Addresses Used			
Points	Used?	Points	Used?
Yn+0	Yes	Yn+8	Yes
Yn+1	Yes	Yn+9	Yes
Yn+2	Yes	Yn+10	Yes
Yn+3	Yes	Yn+11	Yes
Yn+4	Yes	Yn+12	Yes
Yn+5	Yes	Yn+13	Yes
Yn+6	No	Yn+14	No
Yn+7	No	Yn+15	No

Yn is the starting address

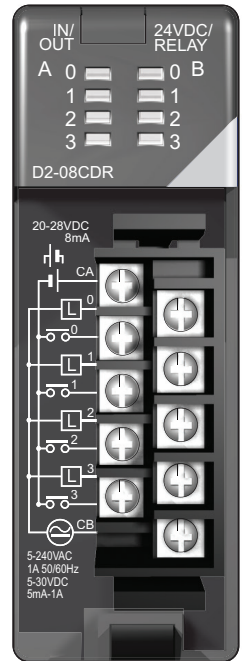
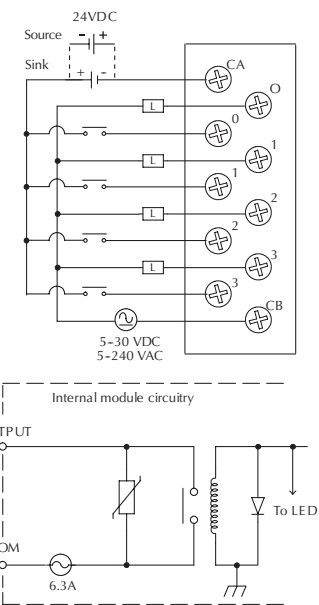
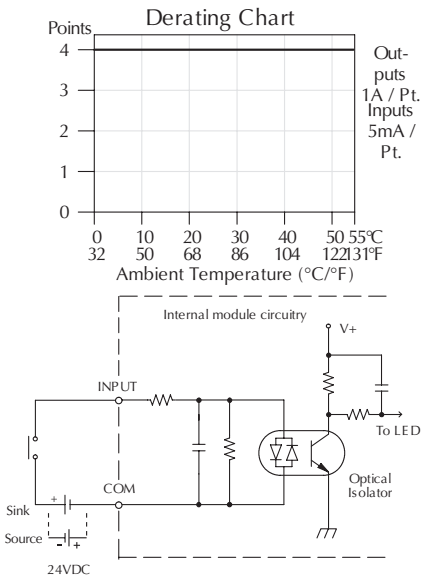


D2-08CDR, 4 pt. DC Input / 4pt. Relay Output

D2-08CDR 4-pt. DC In / 4pt. Relay Out	
General Specifications	
Base Power Required 5VDC	200mA
Terminal Type (included)	Removable; D2-8IOCON
Status Indicator	Logic side
Weight	3.5 oz. (100g)
Input Specifications	
Inputs per Module	4 (sink/source)
Input Points Consumed	8 (only first 4-pts are used)
Commons per Module	1
Input Voltage Range	20-28 VDC
Peak Voltage	30VDC
ON Voltage Level	19VDC minimum
OFF Voltage Level	7VDC maximum
AC Frequency	N/A
Input Impedance	4.7 kΩ
Input Current	5mA @ 24VDC
Maximum Current	8mA @ 30VDC
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
Fuses (input circuits)	None
Output Specifications	
Outputs per Module	4
Output Points Consumed	8 (only first 4-pts are used)
Commons per Module	1

Output Type	Relay, form A (SPST)
Operating Voltage	5-30 VDC; 5-240 VAC
Peak Voltage	30VDC; 264VAC
ON Voltage Drop	N/A
AC Frequency	47 to 63 Hz
Minimum Load Current	5mA @ 5VDC
Max Load Current (resistive)	1A/point ; 4A/module
Max Leakage Current	0.1 mA @ 264VAC
Max Inrush Current	3A for < 100 ms, 10A for < 10ms (common)
OFF to ON Response	12ms
ON to OFF Response	10ms
Fuses (output circuits)	1 (6.3 A slow blow, replaceable); Order D2-FUSE-3 (5 per pack)
ZIPLink Module	ZL-RTB20 (Feedthrough)
ZIPLink Cable	ZL-D2-CBL10 (0.5 m) ZL-D2-CBL10-1 (1.0 m) ZL-D2-CBL10-2 (2.0 m)

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



Notes:

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