6

Discrete Input Modules

In This Chapter. . . .

D3-08ND2 and D3-08NA-2 Discontinued 06/2023. Please consider BRX, Productivity, or CLICK as a replacement.

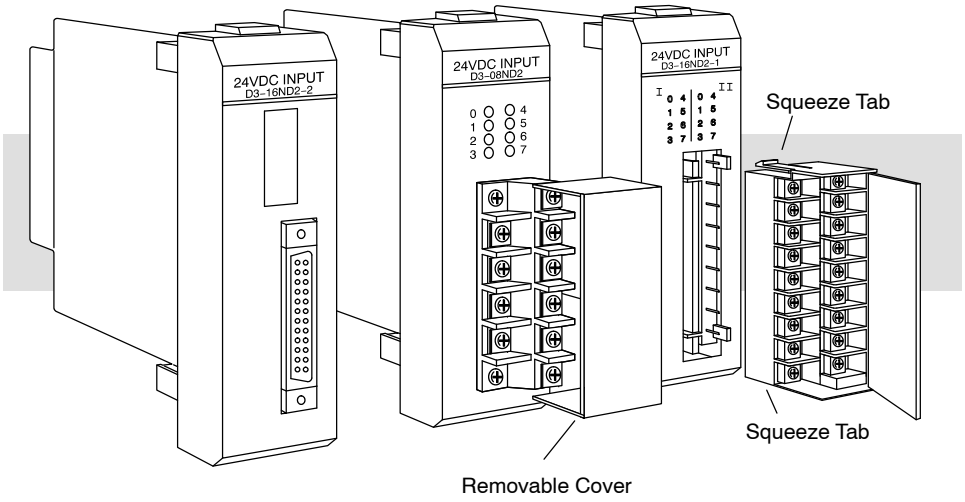
D3-16NA module has been retired as of 10/20/2021. Please consider BRX, Productivity, or CLICK as a replacement.

D3-08NA-1 also has been retired as of 04/08/2022. Please consider BRX, Productivity, or CLICK as a replacement.

Discrete Input Module Identification and Terminology

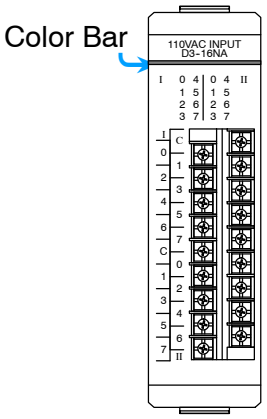
This chapter contains I/O specification sheets for the discrete input modules. The diagram below shows the status indicator location for some of the most common discrete input modules.

Discrete Input Module Status Indicators



Color Coding of I/O Modules

The DL305 family of I/O modules has a color coding scheme to help you identify whether the module is an input module, an output module or a special module. This is done through a color bar indicator located on the front of each module below the part number. The following color scheme is used.



Module Type	Color Code
Discrete/Analog Output	Red
Discrete/Analog Input	Blue
Other	White

Input Module Selection

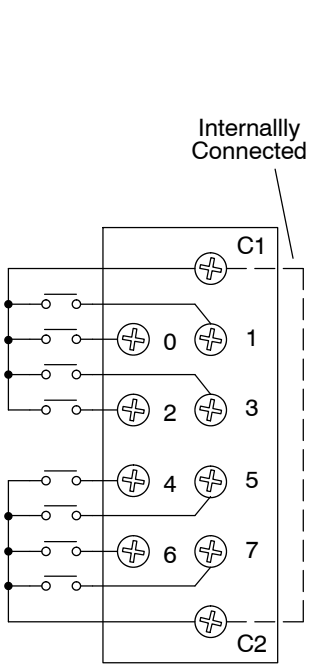
Your input module selection depends on the field devices used and system performance requirements. The input module specifications in this chapter list the information needed for choosing the correct module for a field device and to assure it meets the system requirements. The following list defines the specifications listed in this chapter.

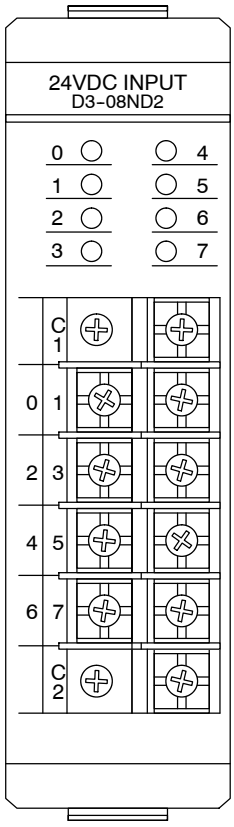
Inputs Per Module	Indicates number of input points per module and designates current sinking, current sourcing, or either.
Commons Per Module	Number of commons per module and their electrical characteristics.
Input Voltage Range	The operating voltage range of the input circuit. DL305 input modules require either an internal or external power supply for the operating voltage. The base power supply will provide the internal voltage.
Peak Voltage	Maximum voltage allowed for the input circuit.
AC Frequency	AC modules are designed to operate within a specific frequency range. 60 Hz is the standard AC frequency in the U.S., 50 Hz is common in other countries.
ON Voltage Level	The voltage level at which the input point will turn ON.
OFF Voltage Level	The voltage level at which the input point will turn OFF.
Input Current	Typical operating current for an active (ON) input.
Input Impedance	Input impedance can be used to calculate input current for a particular operating voltage.
Minimum ON Current	The minimum current for the input circuit to operate reliably in the ON state.
Maximum OFF Current	The maximum current for the input circuit to operate reliably in the OFF state.
Base Power Required	Power from the base power supply is used by the DL305 input modules and varies between different modules. The guidelines for using module power is explained in the power budget configuration section in chapter 4.
OFF to ON Response	The time the module requires to process an OFF to ON state transition.
ON to OFF Response	The time the module requires to process an ON to OFF state transition.
Terminal Type	Indicates whether the terminal type is a removable or non-removable connector or terminal.
Status Indicators	LEDs indicate the ON/OFF status of an input point. These LEDs are electrically located on either the logic side or the field device side of the input circuit.
Weight	Indicates the weight of the module. (See Appendix D for a complete listing of DL305 component weights.)

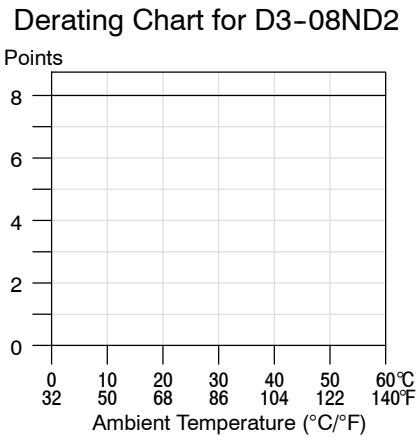
D3-08ND2, 24 VDC Input Module

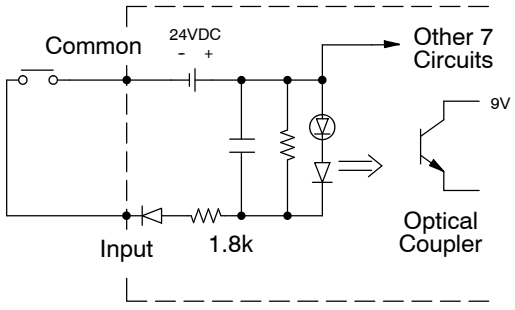
D3-08ND2 Discontinued 06/2023

Inputs per module	8 (current sourcing)		Base power required	9V 10 mA Max 24V 14mA/ON pt. (112 mA Max)
Commons per module	2 (internally connected)			
Input voltage range	18–36VDC			
Input voltage	Internally supplied		OFF to ON response	4–15 ms
Peak voltage	40 VDC		ON to OFF response	4–15 ms
AC frequency	N/A		Terminal type	Non-removable
ON voltage level	< 3 V		Status indicators	Field side
OFF voltage level	>18 V		Weight	4.2 oz. (120 g)
Input impedance	1.8 K ohm			
Input current	12 mA Max			
Minimum ON current	7 mA			
Maximum OFF current	3 mA			





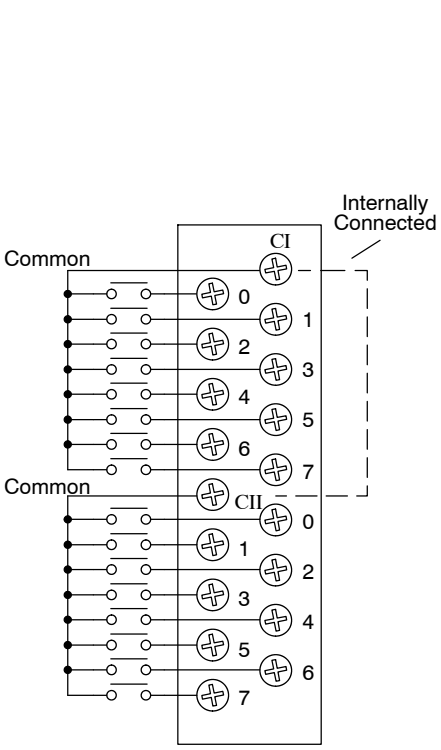


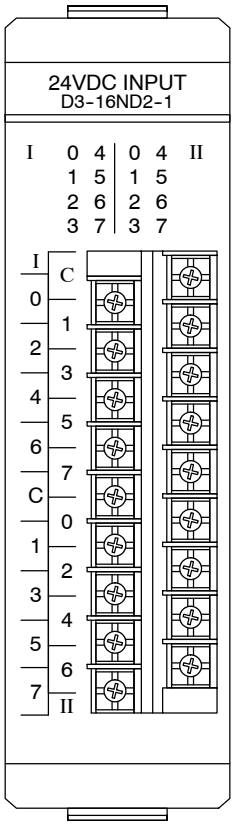


D3-16ND2-1, 24 VDC Input Module

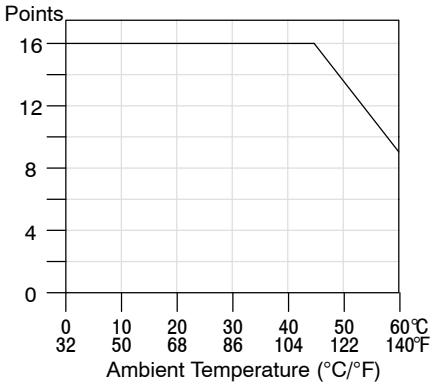
D3-16ND2-1
Discontinued 07/2021

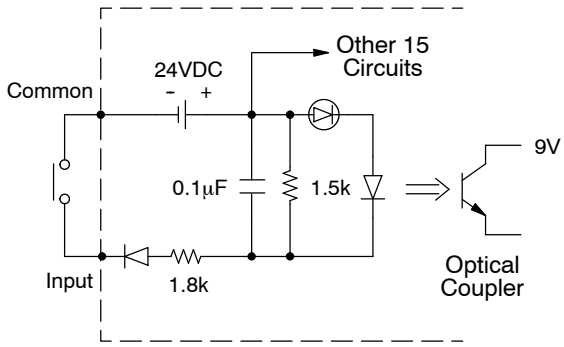
Inputs per module	16 (current sourcing)		Base power required	9V 25 mA Max 24V 14mA/ON pt. (224 mA Max)
Commons per module	2 (internally connected)			
Input voltage range	18–36VDC			
Input voltage	Internally supplied		OFF to ON response	3–15 ms
Peak voltage	36VDC		ON to OFF response	4–15 ms
AC frequency	N/A		Terminal type	Removable
ON voltage level	< 3V		Status indicators	Field side
OFF voltage level	>19 V		Weight	6.3 oz. (180 g)
Input impedance	1.8 K ohm			
Input current	20 mA Max			
Minimum ON current	5 mA			
Maximum OFF current	1 mA			





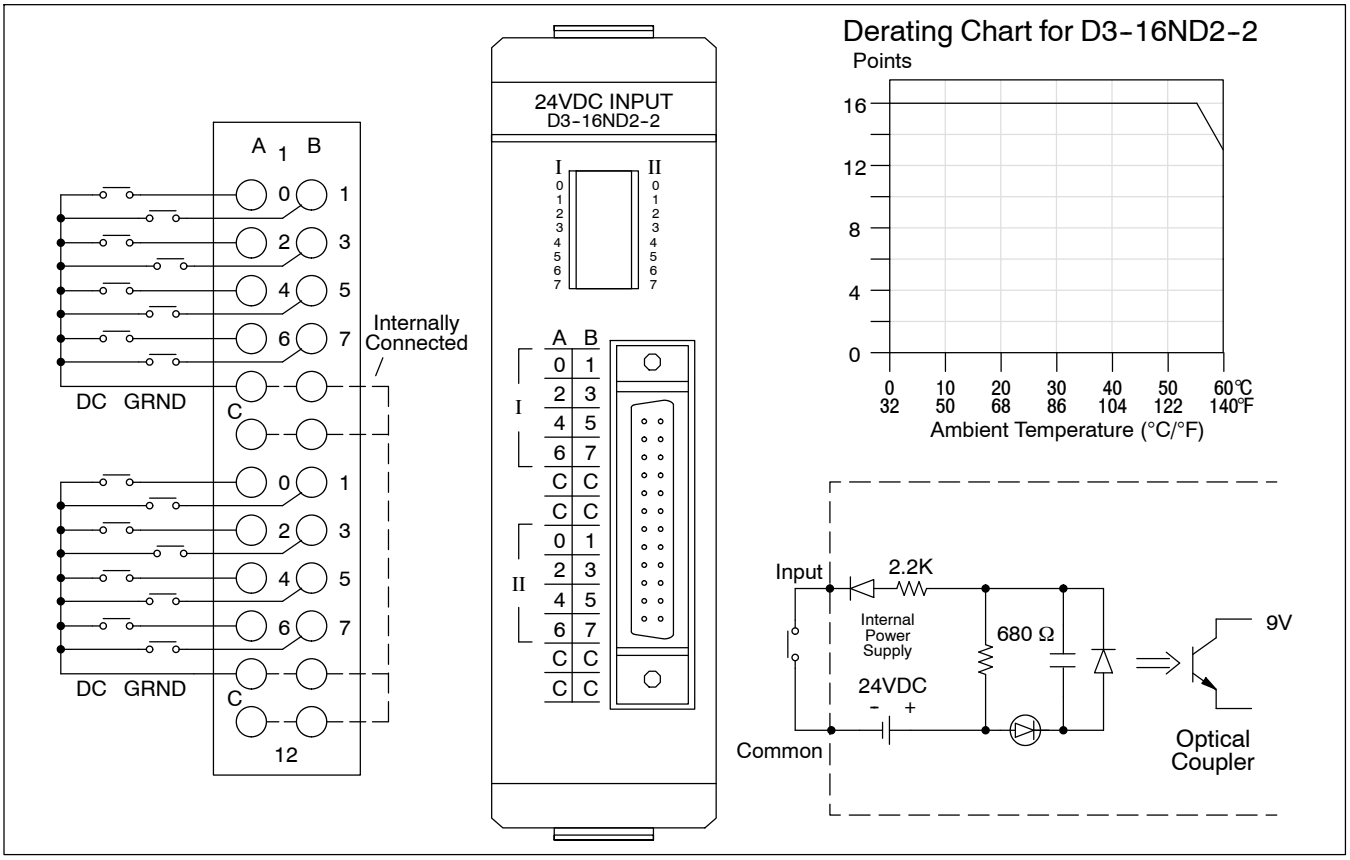
Derating Chart for D3-16ND2-1





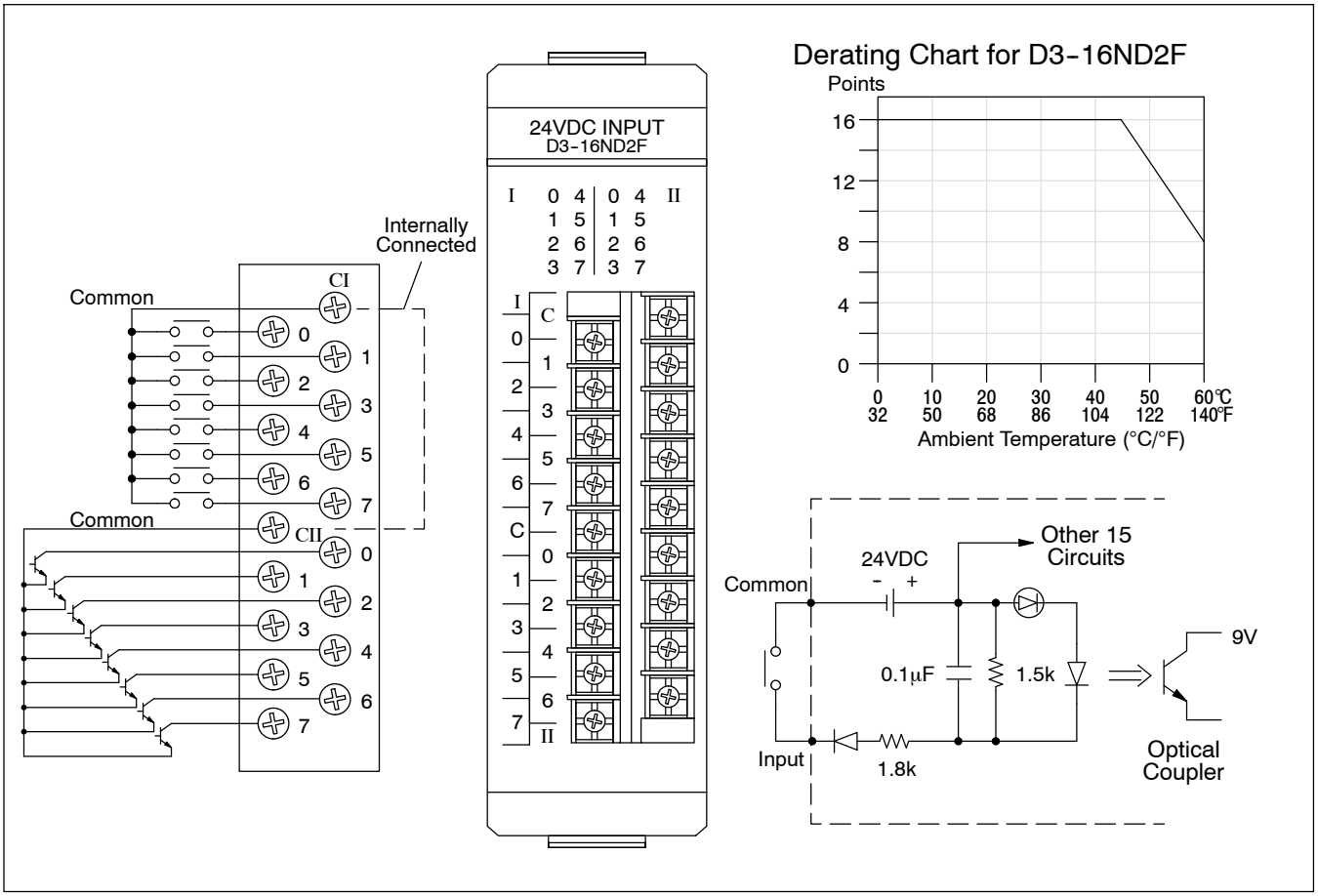
D3-16ND2-2, 24 VDC Input Module Module

Inputs per module	16 (current sourcing)		Base power required	9V 3mA+1.3mA/ON pt (24 mA Max) 24V 1mA+13mA/ON pt (209 mA Max)
Commons per module	8 internally connected			
Input voltage range	18–36 VDC			
Input voltage	Internally supplied			
Peak voltage	36 VDC		OFF to ON response	4–15 ms
AC frequency	N/A		ON to OFF response	4–15 ms
ON voltage level	< 3 V		Terminal type	24 Pin Removable connector
OFF voltage level	> 19 V			
Input impedance	2.2 K ohm		Status indicators	Field side
Input current	20 mA Max		Weight	5.3 oz. (150 g)
Minimum ON current	5 mA			
Maximum OFF current	2 mA			



D3-16ND2F, 24 VDC Fast Response Input Module

Inputs per module	16 (current sourcing)		Base power required	9V 25 mA Max 24V 14 mA/ON pt. (224 mA Max)
Commons per module	2 (internally connected)			
Input voltage range	18–36VDC			
Input voltage	Internally supplied		OFF to ON response	0.8 ms
Peak voltage	36VDC		ON to OFF response	0.8 ms
AC frequency	N/A		Terminal type	Removable
ON voltage level	< 13V		Status indicators	Field side
OFF voltage level	>19 V		Weight	6.3 oz. (180 g)
Input impedance	1.8 K ohm			
Input current	20 mA Max			
Minimum ON current	5 mA			
Maximum OFF current	1 mA			

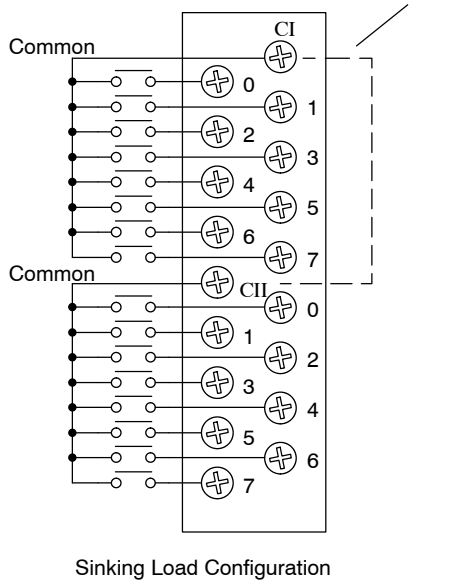


F3-16ND3F, TTL/24 VDC Fast Response Input Module

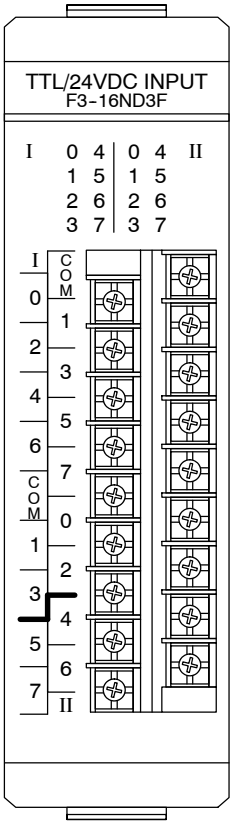
Inputs per module	16 sink/source (jumper selectable sink/source)*		Base power required	9V 148 mA Max 24V 68 mA Max
			Input current	1 mA @ 5VDC 3 mA @ 12-24 DC
Commons per module	2 (non-isolated)		Input impedance	4.7K
Input voltage range	5 VDC TTL & CMOS, 12-24 VDC (jumper selectable)*		OFF to ON response	1 ms
			ON to OFF response	1 ms
Input voltage supplied	Internal (used with sinking loads) External (used with sourcing loads)		Maximum input rate	500 Hz
			Minimum ON current	0.4 mA @ 5VDC 0.9 mA @ 12-24VDC
Peak voltage	100 VDC (35 VDC Continuous)		Maximum OFF current	0.8 mA @ 5VDC 2.2 mA @ 12-24VDC
AC frequency	N/A		Terminal type	Removable
ON voltage level	0-1.5VDC @ 5VDC 0-4VDC @ 12-24VDC		Status indicators	Logic side
OFF voltage level	3.5-5VDC @ 5VDC 10-24VDC @12-24VDC		Weight	5.4 oz. (153 g)

* 12 Inputs are jumper selectable for 5VDC/12-24VDC and Sink Load/Source Load

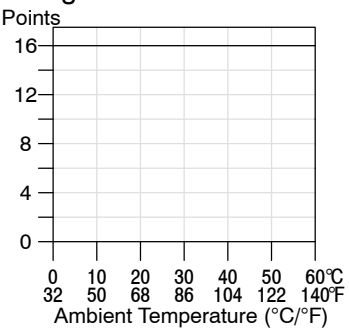
4 Inputs are jumper selectable for 5VDC/12-24VDC and Sink Load/Source Load

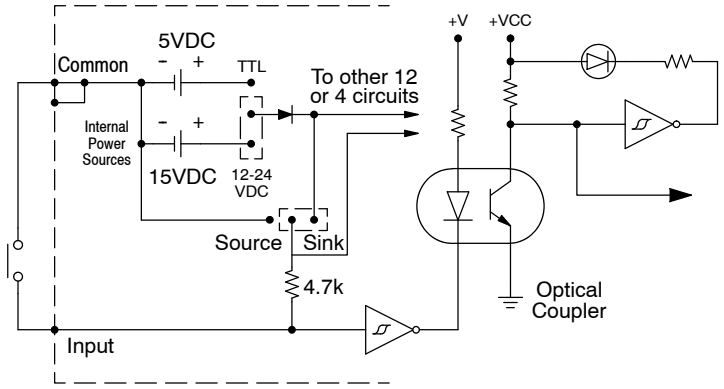


Sinking Load Configuration

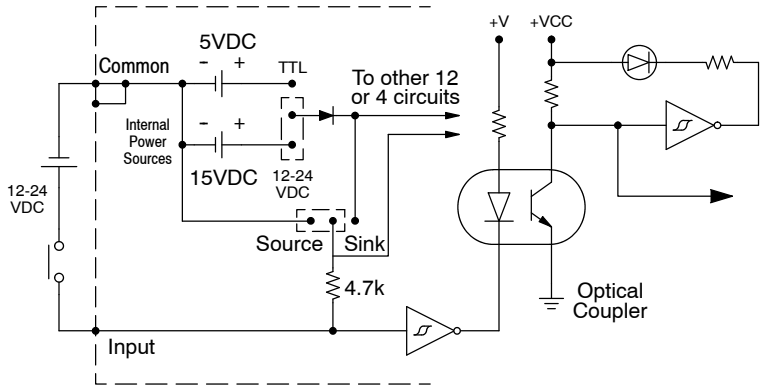


Derating Chart for F3-16ND3F





Jumper selected for 12-24VDC, sinking load configuration



Jumper selected for sourcing load configuration. An external power supply must be used in this configuration.

The DC power to sense the state of the inputs when jumpers are installed for sinking type signals is provided by the rack power supply. Sinking type inputs are turned ON by switching the input circuit to common. Source type input signals assume the ON state until the input device provides the voltage to turn the input OFF.

Selection of Operating Mode:

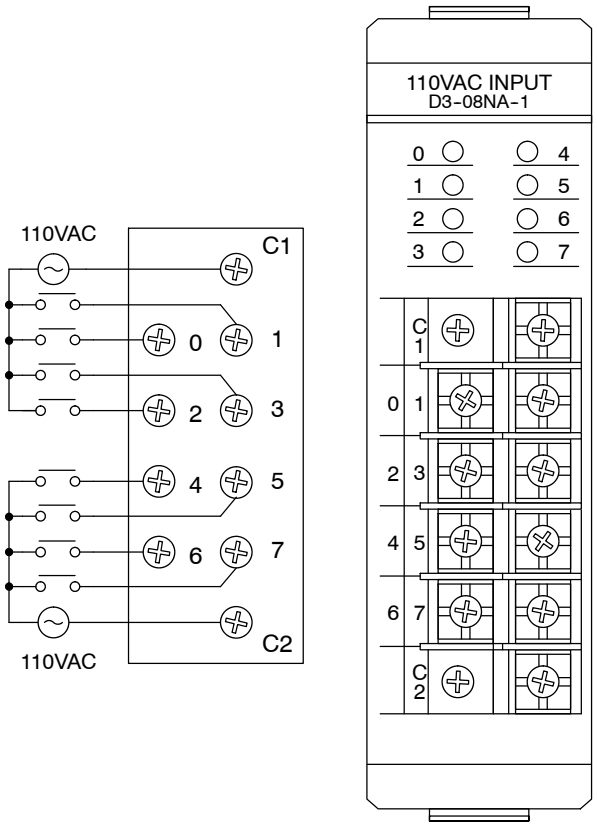
The mode of operation, either 5VDC or 12-24VDC sink or source, for each group of circuits is determined by the position of jumper plugs on pins located on the edge of the circuit board. There are four sets of pins (3 pins in each set), with two sets for each group of inputs. The first two sets of pins are used to configure the first 12 inputs (eg. 0 to 7 and 100 to 103) and are labeled 12 CIRCUITS. Above the first set of pins are the labels 12/24V and 5V. Above the second set of pins are the labels SINK and SRC (source). To select an operating mode for the first 12 circuits, place a jumper on the two pins nearest the appropriate labels. For example, to select 24VDC Sink input operation for the first 12 inputs, place a jumper on the two pins labeled 12/24V and on the two pins labeled SINK. The last two sets of pins are used to configure the last 4 inputs (eg. 104 to 107) and are labeled 4 CIRCUITS. The operating mode selected for the last group of 4 inputs can be different than the mode chosen for the first group of 12 inputs. Correct module operation requires each set of three pins have a jumper installed (four jumpers total).

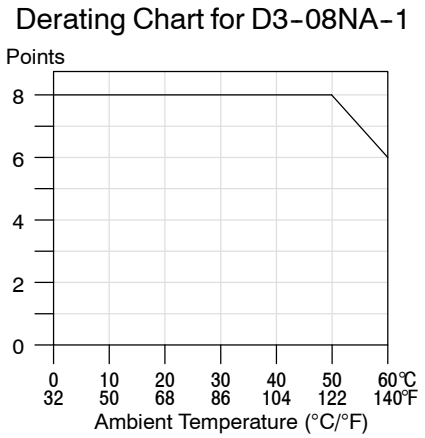
NOTE: When a group of inputs are used with TTL logic, select the SINK operating mode for that group. “Standard” TTL can sink several milliamps but can source less than 1 mA.

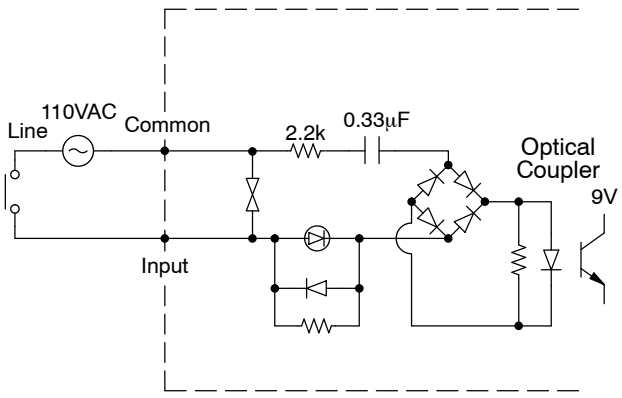
D3-08NA-1, 110 VAC Input Module

D3-08NA-1 has been retired as of 04/08/2022.

Inputs per module	8		Minimum ON current	8 mA
Commons per module	2 (isolated)		Maximum OFF current	2 mA
Input voltage range	85-132VAC		Base power required	9V 10 mA Max 24V N/A
Input voltage supply	External		OFF to ON response	10-30 ms
Peak voltage	132VAC		ON to OFF response	10-60 ms
AC frequency	47-63 Hz		Terminal type	Non-removable
ON voltage level	>80 VAC		Status indicators	Field side
OFF voltage level	<20 VAC		Weight	5 oz. (140 g)
Input impedance	10 K ohm			
Input current	15 mA @ 50 Hz 18 mA @ 60 Hz			



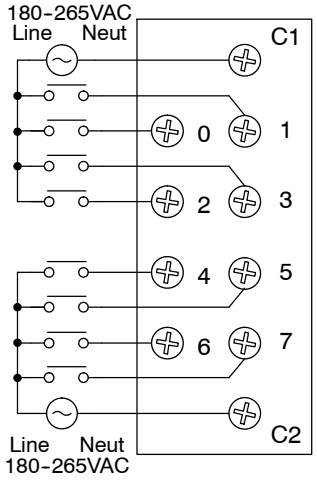


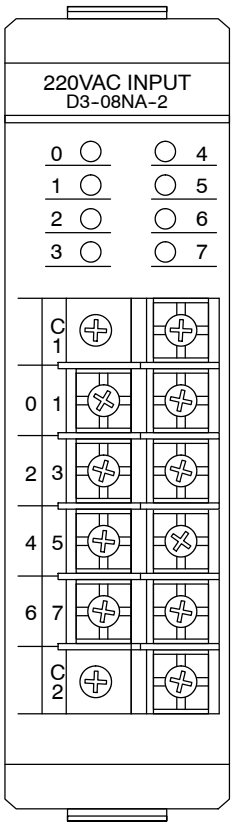


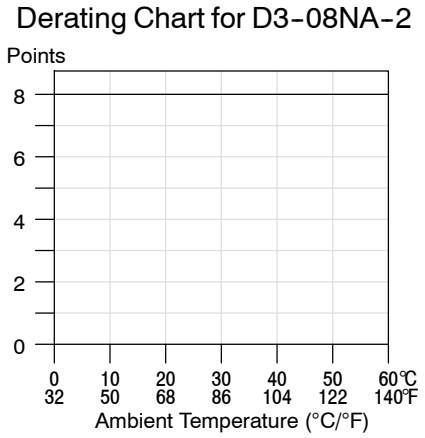
D3-08NA-2, 220 VAC Input Module

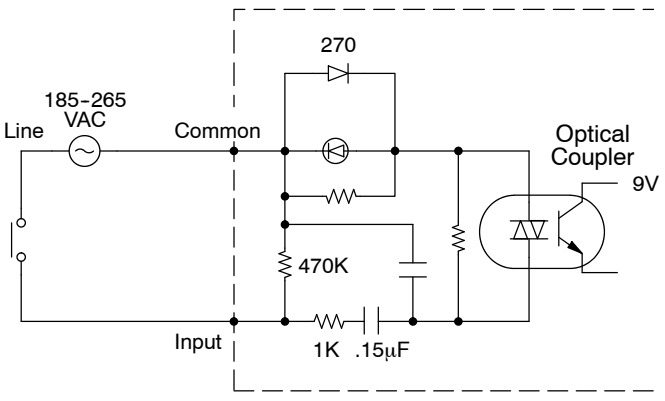
D3-08NA-2 Discontinued 06/2023

Inputs per module	8		Minimum ON current	10 mA
Commons per module	2 (isolated)		Maximum OFF current	2 mA
Input voltage range	180-265VAC		Base power required	9V 10 mA max 24V N/A
Input voltage supply	External			
Peak voltage	265 VAC		OFF to ON response	5-50 ms
AC frequency	50-60Hz		ON to OFF response	5-60 ms
ON voltage level	>180 VAC		Terminal type	Non-removable
OFF voltage level	< 40 VAC		Status indicators	Field side
Input impedance	18 K ohm		Weight	5 oz. (140 g)
Input current	13 mA @ 50 Hz 18 mA @ 60 Hz			





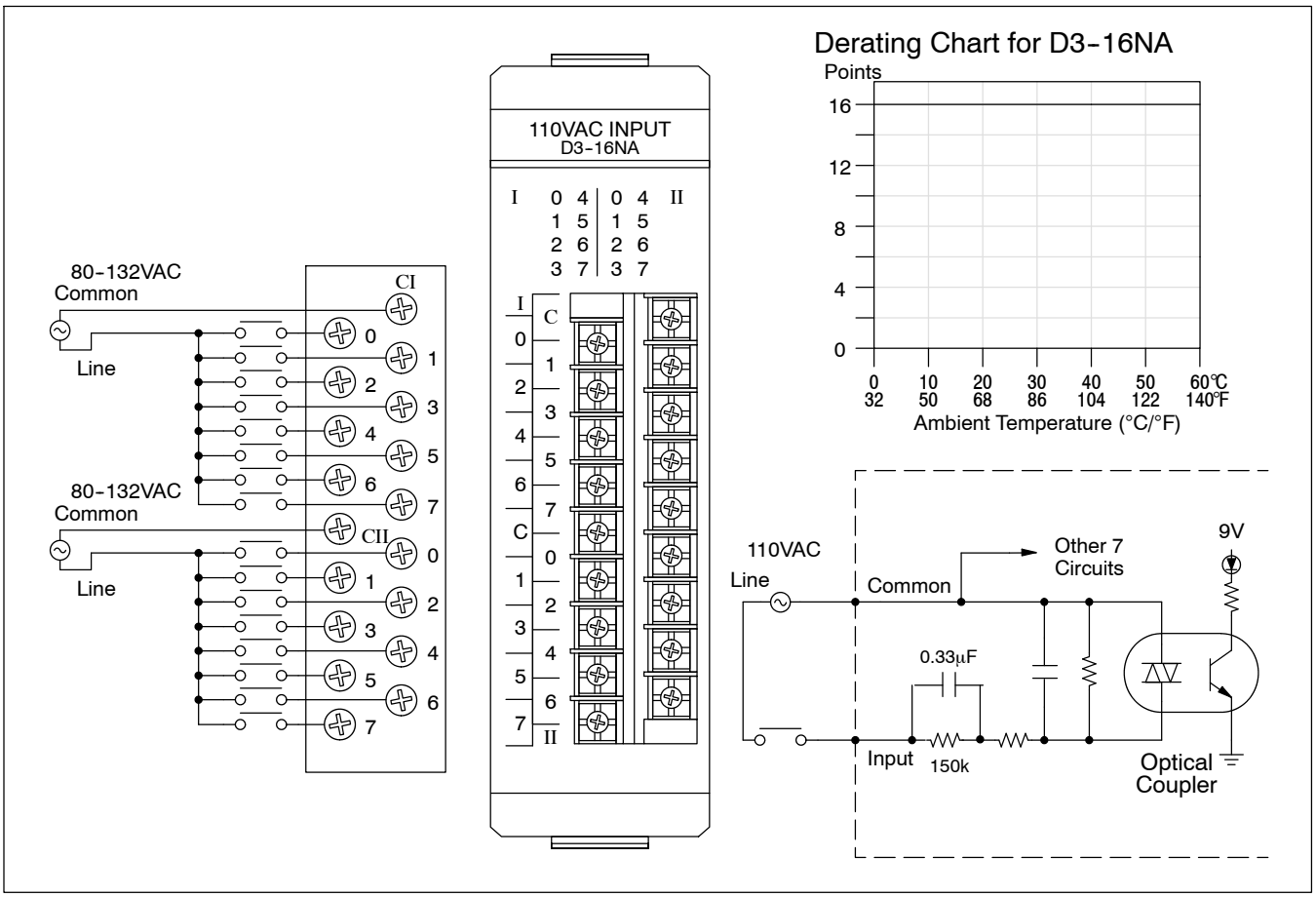




D3-16NA, 110 VAC Input Module

Inputs per module	16		Minimum ON current	8 mA
Commons per module	2 (isolated)		Maximum OFF current	1.5 mA
Input voltage range	80-132VAC		Base power required*	9V 6.25 mA Max/ON pt. 100mA max
Input voltage supply	External		OFF to ON response	5-50 ms
Peak voltage	132VAC		ON to OFF response	5-60 ms
AC frequency	50-60 Hz		Terminal type	Removable
ON voltage level	>80 VAC		Status indicators	Logic side
OFF voltage level	<15 VAC		Weight	6.4 oz. (180 g)
Input impedance	8 K ohm			
Input current	16 mA @ 50 Hz 25 mA @ 60 Hz			

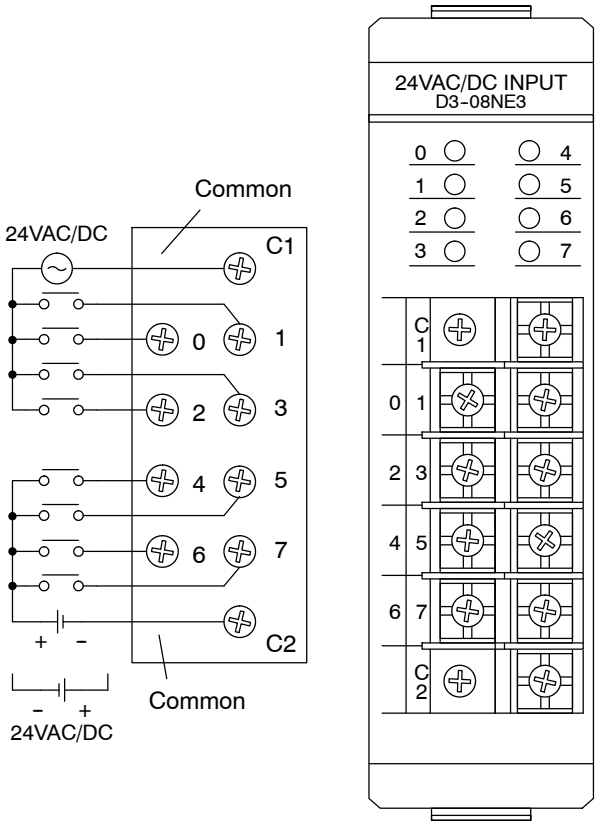
* 9V typical values are 4 mA/ON pt., 64 mA total



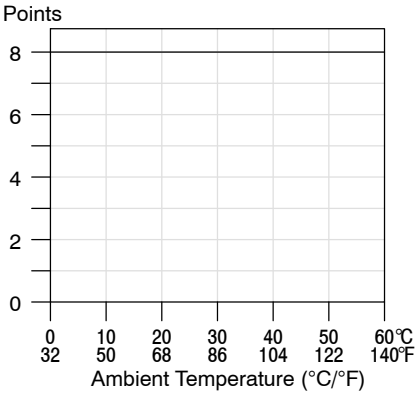
D3-16NA module has been retired as of 10/20/2021. Please consider BRX, Productivity, or CLICK as a replacement.

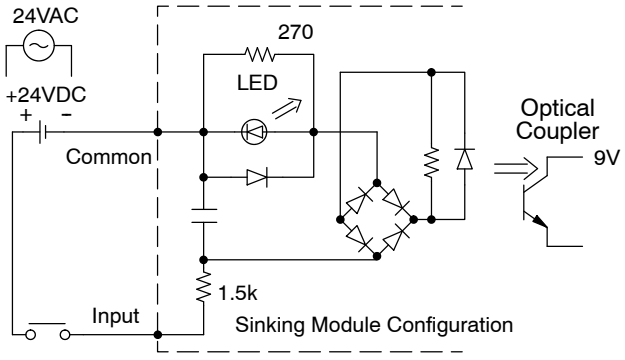
D3-08NE3, 24 VAC/DC Input Module

Inputs per module	8 (sink/source)		Base power required	9V 10 mA max 24V N/A
Commons per module	2 (isolated)			
Input voltage range	20-28 VAC/VDC		OFF to ON response	AC: 5-50 ms DC: 6-30 ms
Input voltage	External			
Peak voltage	28 VAC/VDC		ON to OFF response	AC/DC: 5-60 ms
AC frequency	47-63 Hz		Terminal type	Non-removable
ON voltage level	>20 V		Status indicators	Field side
OFF voltage level	<6V		Weight	4.2 oz. (120 g)
Input impedance	1.5 K ohm			
Input current	19 mA Max			
Minimum ON current	10 mA			
Maximum OFF current	2 mA			



Derating Chart for D3-08NE3

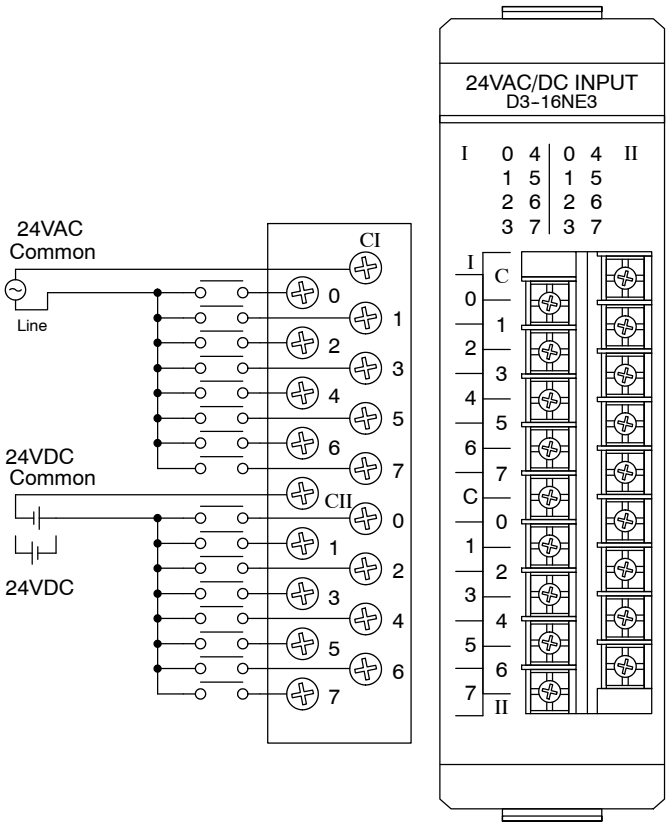


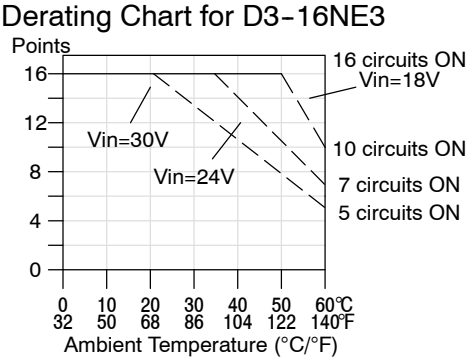


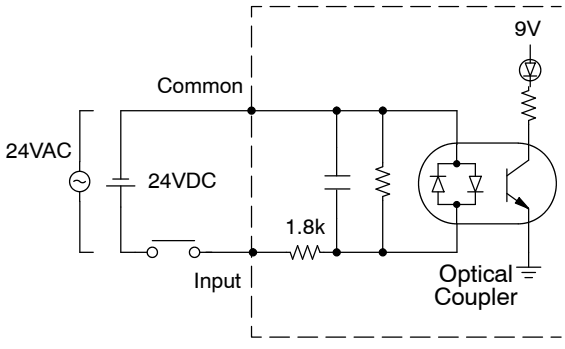
NOTE: This module can be wired in a sourcing configuration and it will be operational except there will be no module LED indication for each input.

D3-16NE3, 24 VAC/DC Input Module

Inputs per module	16 (sink/source)		Base power required	9V 2.5 mA.+4.5mA/ ON pt.(130 mA max) 24V N/A
Commons per module	2 (isolated)			
Input voltage range	14-30VAC/VDC			
Input voltage supplied	External		OFF to ON response	AC 5-30 ms DC 5-25 ms
Peak voltage	30 VAC/VDC			
AC frequency	47-63 Hz		ON to OFF response	AC 5-30 ms DC 5-25 ms
ON voltage level	>14 V			
OFF voltage level	<3 V		Terminal type	Removable
Input impedance	1.8 K ohm		Status indicators	Logic side
Input current	16 mA Max		Weight	6 oz. (170 g)
Minimum ON current	7 mA			
Maximum OFF current	2 mA			







Sinking Module Configuration

D3-08SIM, Input Simulator

Inputs per module	8			
Base Power required	10mA @ 9VDC 112mA max @ 24VDC			
OFF to ON response	4-15 ms			
ON to OFF response	4-15 ms			
Terminal type	None			
Status indicators	Switch side			
Weight	3.0 oz. (85 g)