



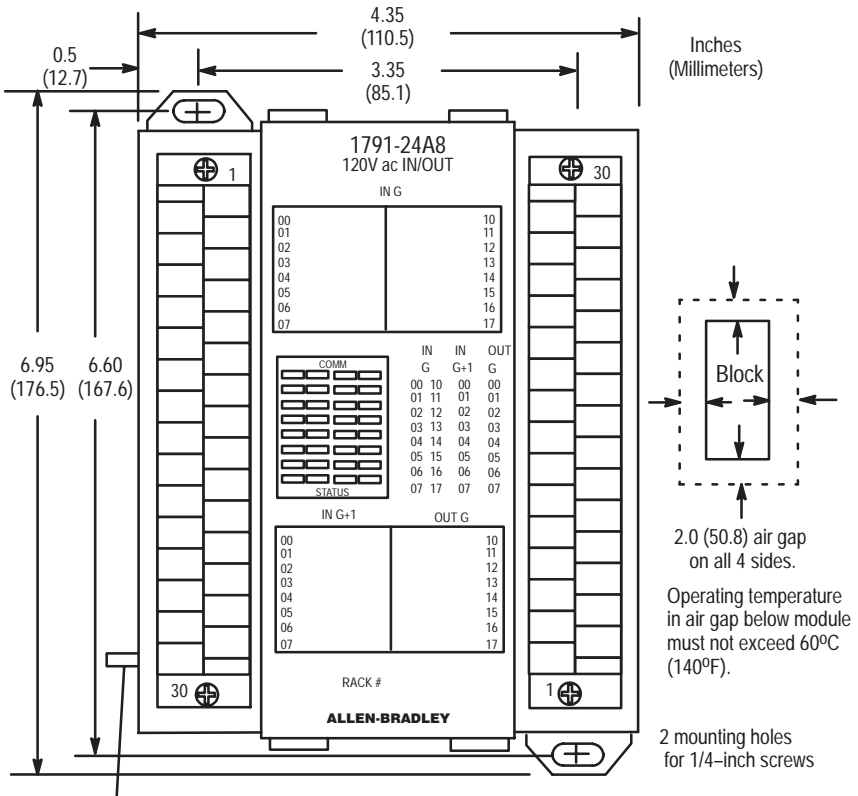
# 24 Input/8 Output AC Block I/O Module

Cat. No. 1791-24A8 Series B

## Installation

Mount the block I/O module in a vertical (recommended) or horizontal position. Allow sufficient room around the block for cooling air to flow through the block module. Refer to Figure 1.

Figure 1  
Mounting Dimensions for the Block I/O Module  
Cat. No. 1791-24A8 (PLC version shown)

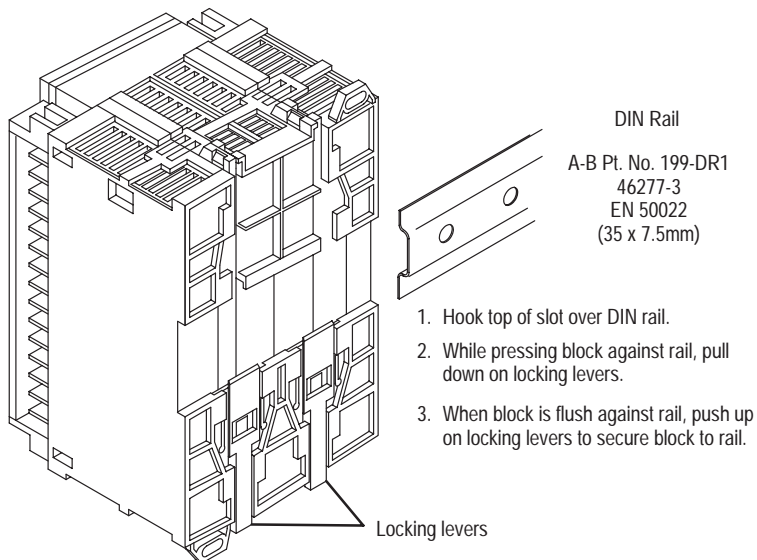


Equipment Grounding Stud

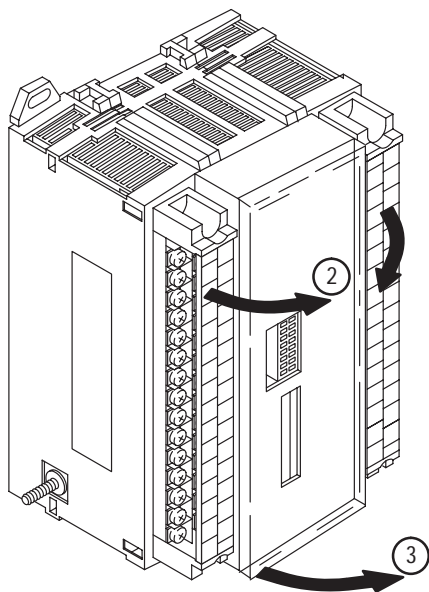
Dimensions  
6.95H x 4.35W x 3.85D  
(176.5H x 110.5W x 98D)

**CAUTION:** When tightening grounding stud nut, do not exceed 15 in.-lbs.

**Figure 2**  
Mounting on a DIN Rail



**Figure 3**  
Inserting Labels

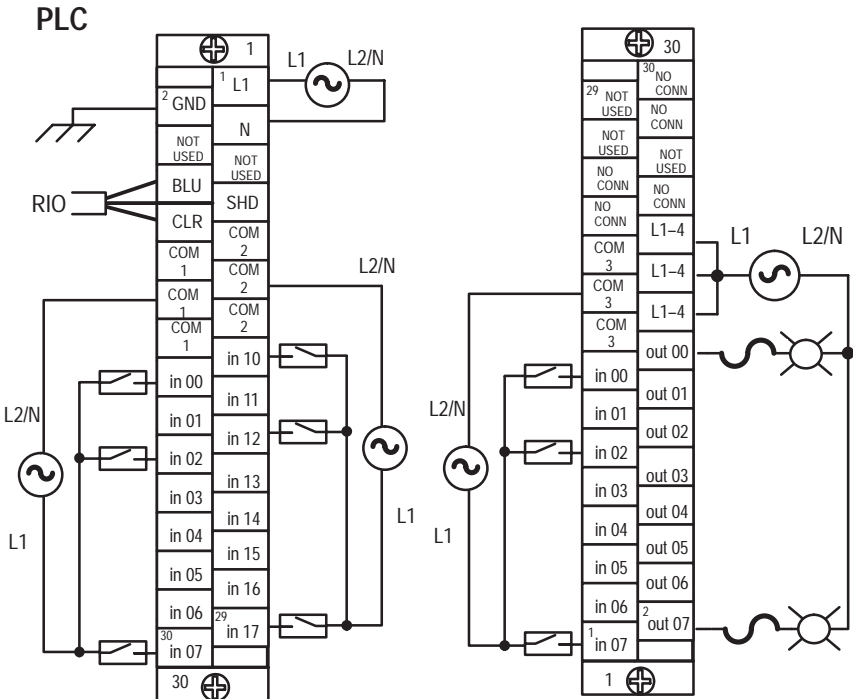


**Table A**  
**Acceptable Wiring Cables for Block I/O Connection**

Use	Cable Type
Remote I/O link	Belden 9463
Input and output wiring	Up to 14AWG (2mm <sup>2</sup> ) stranded with 3/64 inch insulation

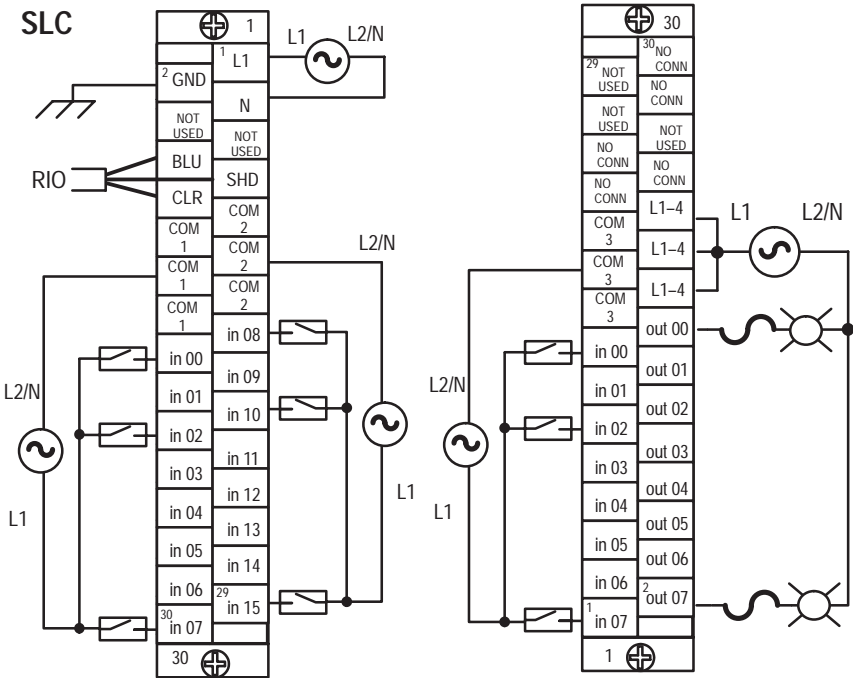
Connect wiring as shown in Figure 4 or Figure 5.

**Figure 4**  
**Wiring Connections with PLC Family Programmable Controllers (refer to Table B)**



**NOTE:** COM 1 connections are internally connected together.  
 COM 2 connections are internally connected together.  
 COM 3 connections are internally connected together.  
 L1-4 connections must be externally connected together to accommodate total amperage.  
 Output fusing is recommended. Refer to Table C.

**Figure 5**  
**Wiring Connections with SLC Family Processors (refer to Table B)**



**NOTE:** COM 1 connections are internally connected together.  
 COM 2 connections are internally connected together.  
 COM 3 connections are internally connected together.  
 L1-4 connections must be externally connected together to accommodate total amperage.  
 Output fusing is recommended. Refer to Table C.

The block I/O module has an equipment grounding stud on the lower left side of the module. Connect this grounding stud to your equipment ground. Torque the nut to 15 in-lbs maximum when connecting to your equipment ground.



**ATTENTION:** Do not overtighten the nut on the grounding stud when connecting the wire. Damage to the module could result.

Refer to “Programmable Controller Wiring and Grounding Guidelines” (1770-4.1) for further information.

**Table B**  
**Wiring Block Designations**

Connections	1791-24A8 Series B		Connector/Terminal	
	Designation	Description	Left Conn.	Right Conn.
Power Connections	L1	ac hot	1	
	N	ac neutral	3	
	GND	Chassis ground	2 <sup>1</sup>	
Remote I/O Connections	BLU	Blue wire – RIO	6	
	CLR	Clear wire – RIO	8	
	SHD	Shield – RIO	7	
I/O Connections				
Input (G) <sup>6</sup>	in 00 thru in 07	Input 00 thru 07	16, 18, 20, 22, 24, 26, 28, 30	
	COM 1	L2/N Input Common	10, 12, 14 <sup>2</sup>	
	COM 2	L2/N Input Common	9, 11, 13 <sup>3</sup>	
	PLC: in 10 thru in 17 SLC: in 08 thru in 15	PLC: Input 10 thru 17 SLC: Input 08 thru 15	15, 17, 19, 21, 23, 25, 27, 29	
Input (G + 1) <sup>7</sup>	in 00 thru in 07	Input 00 thru 07		15, 13, 11, 9, 7, 5, 3, 1
	COM 3	L2/N Input Common		21, 19, 17 <sup>4</sup>
Output (G) <sup>8</sup>	L1-4	Output Supply		22, 20, 18 <sup>5</sup>
	PLC: out 00 thru out 07 SLC: out 00 thru out 07	PLC: Output 00 thru 07 SLC: Output 00 thru 07		16, 14, 12, 10, 8, 6, 4, 2
	Not used	For internal test only; not for customer use.	4, 5	29, 27, 26
	No Conn	No internal connection; customer can use.		30, 28, 25, 24, 23

<sup>1</sup> Connect chassis ground to equipment grounding stud. These are not internally connected.

<sup>2</sup> Left connector terminals 10, 12 and 14 are internally connected together.

<sup>3</sup> Left connector terminals 9, 11 and 13 are internally connected together.

<sup>4</sup> Right connector terminals 21, 19 and 17 are internally connected together.

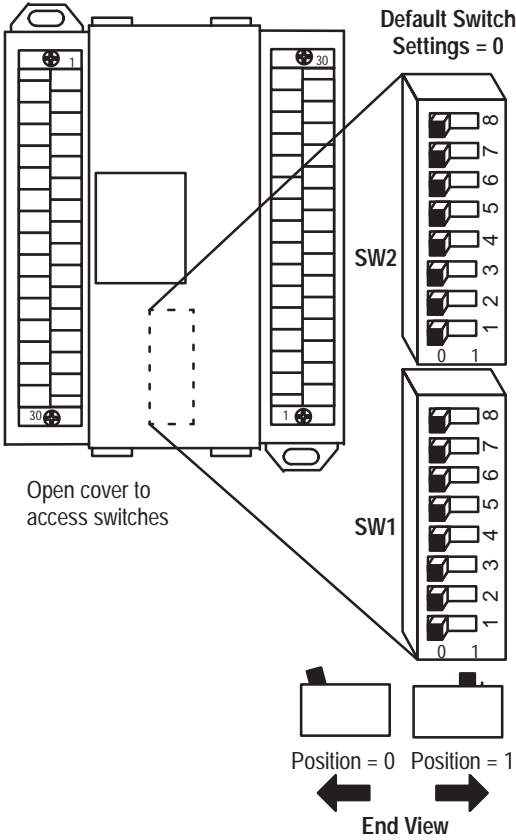
<sup>5</sup> Right connector terminals 22, 20 and 18 must be externally connected to accommodate total amperage.

<sup>6</sup> (IN G) = input module group (1 word).

<sup>7</sup> IN (G+1) = input module group plus 1 word.

<sup>8</sup> OUT (G) = output module group (1 word).

**Figure 6**  
**Switch Settings**



**ATTENTION:** Cycle power to the module after setting the switches.

<b>SW2-8</b>
Not used

<b>SW2-7</b>
Not Used

<b>SW2-6</b>	<b>Last I/O Group (PLC-2 only)</b>
0	Not last rack
1	Last rack

<b>SW2-5</b>	<b>Processor Restart/Lockout (PRL)</b>
0	Processor Restart
1	Processor Lockout

<b>SW2-4</b>	<b>Hold Last State</b>
0	Reset Outputs
1	Hold Last State

<b>SW2-3</b>
Set to 0

Communication Rate		
<b>SW2-2</b>	<b>SW2-1</b>	<b>Bits/s</b>
0	0	57.6 K
0	1	115.2 K
1	0	230.4 K
1	1	230.4 K

Starting Quarter		
<b>SW1-2</b>	<b>SW1-1</b>	<b>Module Group</b>
0	0	0 (1st)
0	1	2 (2nd)
1	0	4 (3rd)
1	1	6 (4th)

**Installation Instructions**  
**Block I/O**  
**Cat. No. 1791-24A8 Series B**

1747-SN Rack Number	1771-SN Rack Number	PLC-2 Rack Number	PLC-5 Rack Number	PLC-5/250 Rack Number	PLC-3 Rack Number	SW1 Switch Position					
						8	7	6	5	4	3
Rack 0	Rack 1	Rack 1	Not Valid	Rack 0	Rack 0	0	0	0	0	0	0
Rack 1	Rack 2	Rack 2	Rack 1	Rack 1	Rack 1	0	0	0	0	0	1
Rack 2	Rack 3	Rack 3	Rack 2	Rack 2	Rack 2	0	0	0	0	1	0
Rack 3	Rack 4	Rack 4	Rack 3	Rack 3	Rack 3	0	0	0	0	1	1
	Rack 5	Rack 5	Rack 4	Rack 4	Rack 4	0	0	0	1	0	0
	Rack 6	Rack 6	Rack 5	Rack 5	Rack 5	0	0	0	1	0	1
	Rack 7	Rack 7	Rack 6	Rack 6	Rack 6	0	0	0	1	1	0
			Rack 7	Rack 7	Rack 7	0	0	0	1	1	1
			Rack 10	Rack 10	Rack 10	0	0	1	0	0	0
			Rack 11	Rack 11	Rack 11	0	0	1	0	0	1
			Rack 12	Rack 12	Rack 12	0	0	1	0	1	0
			Rack 13	Rack 13	Rack 13	0	0	1	0	1	1
			Rack 14	Rack 14	Rack 14	0	0	1	1	0	0
			Rack 15	Rack 15	Rack 15	0	0	1	1	0	1
			Rack 16	Rack 16	Rack 16	0	0	1	1	1	0
			Rack 17	Rack 17	Rack 17	0	0	1	1	1	1
			Rack 20	Rack 20	Rack 20	0	1	0	0	0	0
			Rack 21	Rack 21	Rack 21	0	1	0	0	0	1
			Rack 22	Rack 22	Rack 22	0	1	0	0	1	0
			Rack 23	Rack 23	Rack 23	0	1	0	0	1	1
			Rack 24	Rack 24	Rack 24	0	1	0	1	0	0
			Rack 25	Rack 25	Rack 25	0	1	0	1	0	1
			Rack 26	Rack 26	Rack 26	0	1	0	1	1	0
			Rack 27	Rack 27	Rack 27	0	1	0	1	1	1
			Rack 30	Rack 30	Rack 30	0	1	1	0	0	0
			Rack 31	Rack 31	Rack 31	0	1	1	0	0	1
			Rack 32	Rack 32	Rack 32	0	1	1	0	1	0
			Rack 33	Rack 33	Rack 33	0	1	1	0	1	1
			Rack 34	Rack 34	Rack 34	0	1	1	1	0	0
			Rack 35	Rack 35	Rack 35	0	1	1	1	0	1
			Rack 36	Rack 36	Rack 36	0	1	1	1	1	0
			Rack 37	Rack 37	Rack 37	0	1	1	1	1	1
			Rack 40	Rack 40	Rack 40	1	0	0	0	0	0
			Rack 41	Rack 41	Rack 41	1	0	0	0	0	1
			Rack 42	Rack 42	Rack 42	1	0	0	0	1	0
			Rack 43	Rack 43	Rack 43	1	0	0	0	1	1
			Rack 44	Rack 44	Rack 44	1	0	0	1	0	0
			Rack 45	Rack 45	Rack 45	1	0	0	1	0	1
			Rack 46	Rack 46	Rack 46	1	0	0	1	1	0
			Rack 47	Rack 47	Rack 47	1	0	0	1	1	1
			Rack 50	Rack 50	Rack 50	1	0	1	0	0	0

PLCs

**Installation Instructions**  
**Block I/O**  
**Cat. No. 1791-24A8 Series B**

1747-SN Rack Number	1771-SN Rack Number	PLC-2 Rack Number	PLC-5 Rack Number	PLC-5/250 Rack Number	PLC-3 Rack Number	SW1 Switch Position					
						8	7	6	5	4	3
					Rack 51	1	0	1	0	0	1
					Rack 52	1	0	1	0	1	0
					Rack 53	1	0	1	0	1	1
					Rack 54	1	0	1	1	0	0
					Rack 55	1	0	1	1	0	1
					Rack 56	1	0	1	1	1	0
					Rack 57	1	0	1	1	1	1
					Rack 60	1	1	0	0	0	0
					Rack 61	1	1	0	0	0	1
					Rack 62	1	1	0	0	1	0
					Rack 63	1	1	0	0	1	1
					Rack 64	1	1	0	1	0	0
					Rack 65	1	1	0	1	0	1
					Rack 66	1	1	0	1	1	0
					Rack 67	1	1	0	1	1	1
					Rack 70	1	1	1	0	0	0
					Rack 71	1	1	1	0	0	1
					Rack 72	1	1	1	0	1	0
					Rack 73	1	1	1	0	1	1
					Rack 74	1	1	1	1	0	0
					Rack 75	1	1	1	1	0	1
					Rack 76	1	1	1	1	1	0
					Not Valid	1	1	1	1	1	1

Rack address 77 is an illegal configuration.  
 PLC-5/11 processors can scan rack 03.  
 PLC-5/15 and PLC-5/20 processors can scan racks 01–03.  
 PLC-5/25 and PLC-5/30 processors can scan racks 01–07.  
 PLC-5/40 and PLC-5/40L processors can scan racks 01–17.  
 PLC-5/60 and PLC-5/60L processors can scan racks 01–27.  
 PLC-5/250 processors can scan racks 00–37.

The SLC 500 controllers communicate with the block I/O using an I/O Scanner module (cat. no. 1747-SN series A). Refer to the user manual for the 1747-SN/A Scanner module for more information.

**Important:** This block I/O module is **not** compatible with the **1747-DSN** Distributed I/O Scanner module.



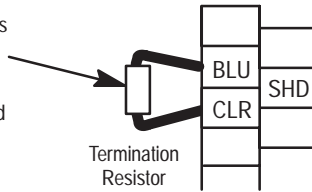
## Termination Resistor

A termination resistor must be installed on the last block in a series. Connect the resistor as shown in Figure 7.

**Figure 7**  
**Installing the Termination Resistor**

Connect termination resistor across terminals 6 (BLU) and 8 (CLR).

150 ohm – 57.6K and 115.2K baud  
 82 ohm – 230.4K baud



10835-I



**ATTENTION:** Devices that are operating at 230.4K baud must have 82 ohm terminators in place for proper operation.

## Indicators

### PLC

COMM			
	IN G	IN G+1	OUT G
<input type="checkbox"/>	00	10	00
<input type="checkbox"/>	01	11	01
<input type="checkbox"/>	02	12	02
<input type="checkbox"/>	03	13	03
<input type="checkbox"/>	04	14	04
<input type="checkbox"/>	05	15	05
<input type="checkbox"/>	06	16	06
<input type="checkbox"/>	07	17	07
STATUS			

### SLC

COMM			
	IN G	IN G+1	OUT G
<input type="checkbox"/>	00	08	00
<input type="checkbox"/>	01	09	01
<input type="checkbox"/>	02	10	02
<input type="checkbox"/>	03	11	03
<input type="checkbox"/>	04	12	04
<input type="checkbox"/>	05	13	05
<input type="checkbox"/>	06	14	06
<input type="checkbox"/>	07	15	07
STATUS			

Indicator	Description
COMM OFF ON Flashing	Communication not established Communication established Processor in Program mode
STATUS OFF ON Flashing	Normal Error (hardware or software), block power low COMM FAIL – communication cable disconnected, 100ms between valid frames, no more than 255 valid frames between valid frames addressed to block, 20ms idle time exceeded.

COMM and STATUS will alternately flash when processor restart lockout is selected, a fault has occurred and the processor is communicating with the block.

## Fusing

The block I/O module is internally fused to protect the module. No external power fusing is required.

The outputs of the block I/O modules are not fused. Fusing of outputs is recommended. If desired to fuse an output, you must provide external fusing.

**Table C**  
**Recommended Fuses**

Type of Circuit	Part Number <sup>1</sup>	Size	Rating in Amps	Maximum Surge Current <sup>2</sup> (repeatable every 2s)
ac	SAN-O SS2-1.0	0.25 in. x 1.25 in.	1.0A	3.0A for 50ms
	SAN-O MQ2-1.0	5mm x 20mm	1.0A	2.5A for 50ms

<sup>1</sup> Note: Do not substitute another fuse for those listed.

<sup>2</sup> The recommended fuses will withstand surges of the above listed currents for the time specified.

Block I/O modules are derated linearly above 30°C up to and including 60°C.

**Table D**  
**Output Ratings and Non-fused Surge Currents**

Catalog Number	Voltage	Mounting	Max. Output Rating:		Maximum Surge Current <sup>1</sup> (repeatable every 2s)
			@ 30°C	@ 60°C	
1791-24A8/B	120V ac	Vertical	600mA	300mA	10A for 50ms
	120V ac	Horizontal	300mA	150mA	

<sup>1</sup> These surge ratings are for non-fused outputs only.

## 1791-24A8 Specifications

### Input Specifications

Inputs per Block		24 (3 groups of 8)
Nominal Input Current		11mA
Nominal Input Voltage		120V ac
On-state Voltage Range		79–132V ac, 47–63Hz
Off-state Voltage	Maximum	35V
On-state Current	Minimum Maximum	5mA @ 79V, 60Hz 12.3mA @ 132V, 60Hz
Off-state Current	Minimum	2.3mA (60Hz)
Input Impedance	Maximum	15K ohms @ 60Hz
Input Signal Delay	Off to on On to off	1.0ms 26ms (maximum) (allows for 1/2 cycle drop-out)

### Output Specifications

Outputs per Block		8 (1 group of 8)
Output Voltage Range		20–132V ac
Output Current Rating	Vertical Mtg. Horizontal Mtg.	300mA @ 60°C, 600mA @ 30°C 150mA @ 60°C, 300mA @ 30°C
Surge Current		10A for 50ms each, repeatable every 2 sec.
Minimum On-state Current		50mA per output
Maximum On-state Voltage Drop		1.5V peak @ 300mA
Off-state Leakage Current (maximum)		3mA
Output Signal Delay	Off to on On to off	1.0ms @ 60Hz; 1.0ms @ 50Hz 8.3ms @ 60Hz; 10.0ms @ 50Hz

**Specifications continued on next page**

**Installation Instructions**  
**Block I/O**  
**Cat. No. 1791-24A8 Series B**

**General Specifications**

External Power (internally protected - no external fuse required)		
	Voltage	85-132V ac, 47-63Hz
	Current	150mA
Dimensions		
	Inches	6.95H X 4.35W X 3.85D
	Millimeters	176.5H X 110.5W X 98D
Isolation		
	Power supply to RIO	500V ac
	I/O Group-to-Group	1250V ac
	I/O Group-to-Logic	1250V ac
Power Dissipation	Maximum	18.76 Watts
Thermal Dissipation	Maximum	63.97 BTU/hr
Environmental Conditions		
	Operational Temperature	0 to 60°C (32 to 140°F)
	Storage Temperature	-40 to 85°C (-40 to 185°F)
	Relative Humidity	5 to 95% noncondensing
Conductors		
	Wire Size	14 gauge stranded maximum 3/64 inch insulation maximum
	Category	1 <sup>1</sup>

<sup>1</sup> You use this conductor category information for planning conductor routing as described in the system level installation manual.



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